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GENERAL CATALOGUE 2006/2007

Automation systems







realizing

Advanced Industrial Automation

OMRON

GENERAL CATALOGUE 2006/2007

Automation systems

www.omron-industrial.com

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Automation systems

Just create…

This catalog includes a complete line of Industrial Automation Systems that can be used individually or combined with other products from Omron's Smart Platform concept.
The products offered are designed to deliver high performance and total reliability with just one goal: to ensure YOUR production never stops.

Please be aware that the attached CD-ROM contains information on some additional product families, not included in the printed version of this catalog. In addition you can find the latest product information on www.omron-industrial.com.



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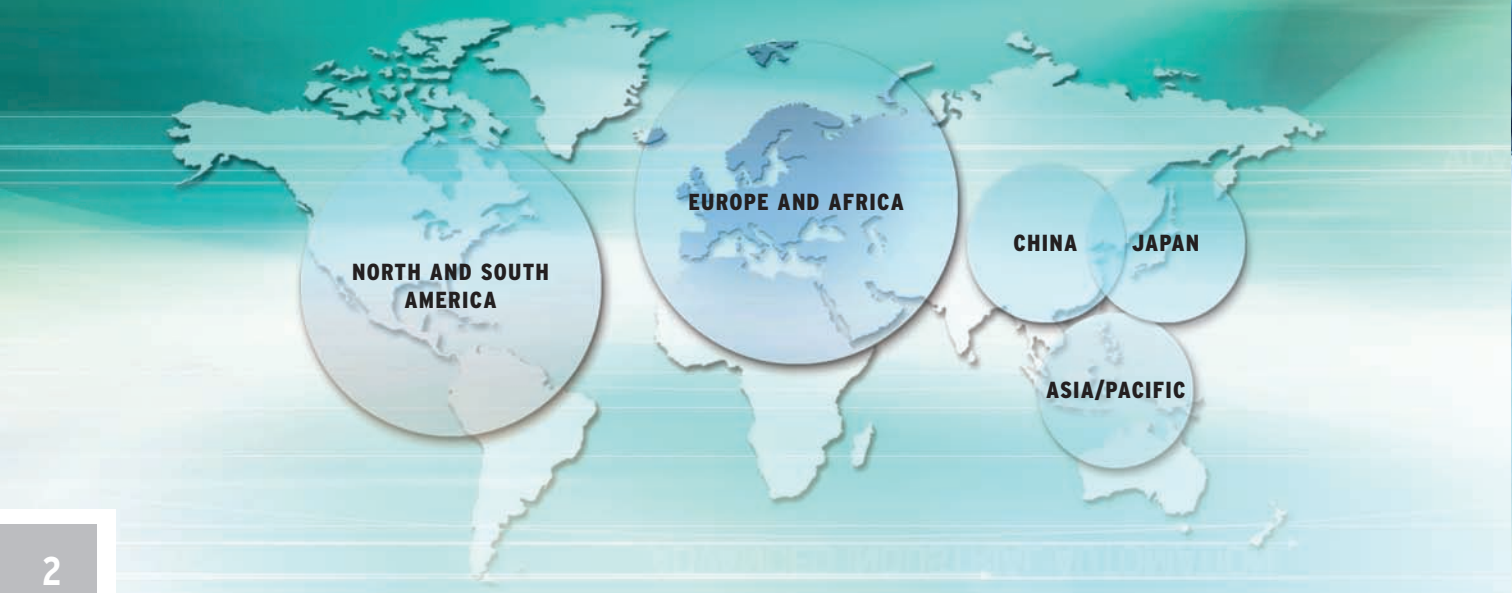
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Omron – a global corporation

...right on your doorstep



Omron Corporation

Omron Industrial Automation is a leading manufacturer of technologically advanced industrial automation products and worldwide supplier of application expertise. It is part of the global Omron Corporation. Pioneering technology Omron has developed into a $5 billion global manufacturing company in sensing and control.

Omron continues to make significant contributions in a wide variety of fields such as industrial automation, electronic and automotive components, and healthcare. Omron Industrial Automation technologies can be found in factories and machines all over the world. Our solutions continue to be flexible and innovative, but our standards remain rigid: never stop, never fail, just create!

Omron Industrial Automation Europe

In Europe we have maintained a leading position in machine and industrial automation for over 30 years. Our infrastructure is designed to think globally while acting locally. From sales, application knowledge and support to R&D and customised production, we can support your needs wherever you are located, and through every step of your manufacturing process.
You'll find Omron's expertise in control systems, motion & drives, sensing, safety and control components.

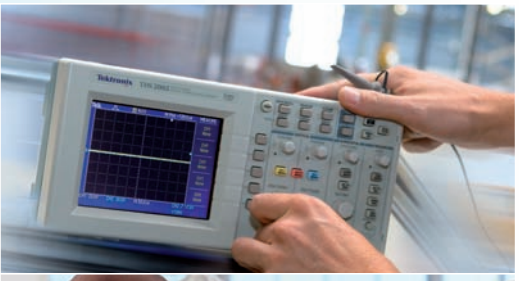
- 50 years in industrial automation
- Over 24,000 employees
- Support in every European country
- Over 1,800 employees in 18 European countries
- 8% of turnover invested in R&D
- More than 200,000 products
- More than 6,950 patents registered to date

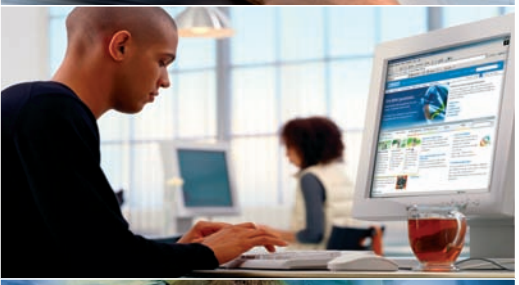
Application support

As an Omron customer you have unprecedented support from our application engineers, who can advise you on-site anywhere in Europe. We can carry out tests on your design on-site or demonstrate a new product without disturbing or halting your production process.



"From the moment you contact Omron you get direct access to our application expertise, wherever and whenever you need it..."







- **European manufacturing**

  Omron has manufacturing sites in s'Hertogenbosch, the Netherlands and Nufringen, Germany where, in addition to our standard product offering, we can provide fast and flexible customised solutions using on-site R&D facilities and expertise. Both factories meet very strict quality assurance standards, and are the forefront of meeting global environmental standards. Omron actively welcomes people to come and visit these facilities.

- **Online support**

  Omron's web-site is designed to provide fast, no-nonsense support, enabling you to quickly find the latest information on manuals, data sheets and brochures, read about our latest product releases, and check out the most frequently asked questions. You can also download our latest software versions or patch upgrades along with 2-D and 3-D CAD drawings. All the support you need is available on www.omron-industrial.com.

- **European Repair Centre**

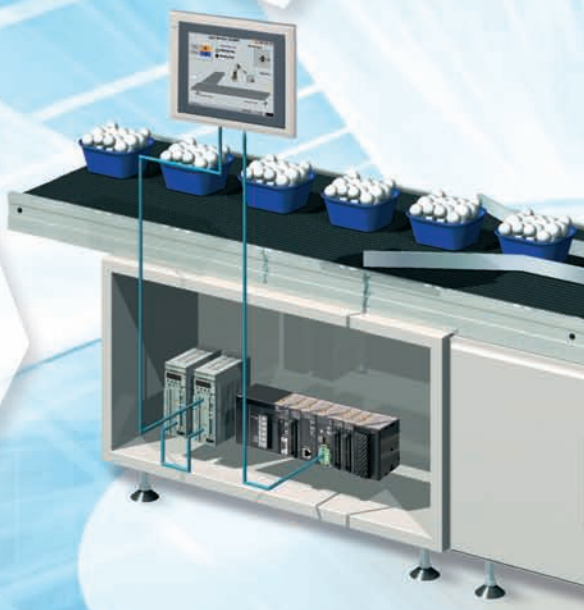
  Omron has set up a special repair service with DHL that enables your product to be picked up, repaired and returned within 5 days. This repair service is totally free for products under Omron's warranty conditions, and includes a direct pick up and delivery at your site.
  You can get more information on this service at www.repair.europe.omron.com.

Omron's support – every step along the way

MARKET PRESSURE

Modular concepts for the implementation of tailor-made machine solutions at moderate costs. Short change-over times to reduce stand-still of the production-line. Remote diagnostics to both reduce travelling costs & improve response time. Omron offers you the possibility to handle each of these requirements better then today.

Improve at no risk



SUPPORT

Being one of the biggest players in industrial automation globally, Omron has a wide spread network of own sales & support offices all around the world. Within the European Union we offer a five days repair service. Thanks to the One Connection principle of Omron's Smart Platform you can call in on any point of the system, and troubleshoot any device on it remotely.

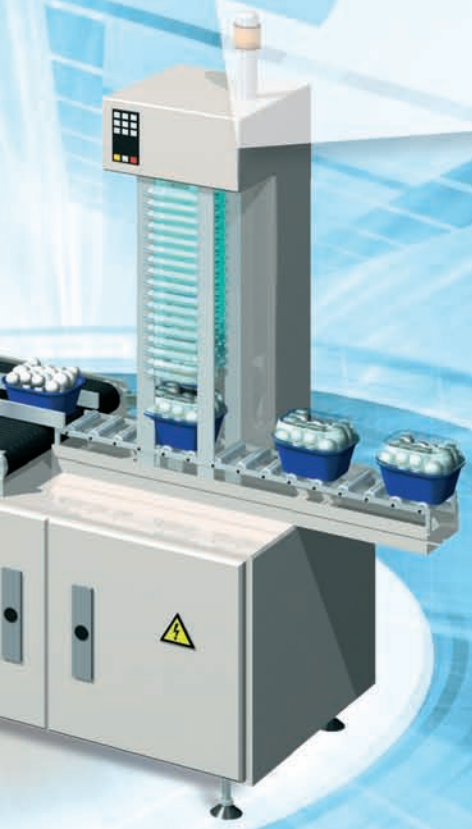
At your (customers) doorstep

YOUR MACHINE

MAINTENANCE

Effective maintenance reduces the overall operation costs. Omron supports this a.o. with software modules as it's pre-made Smart Active Parts. These provide diagnostic information on a device or PLC module in the network. For instance the power consumption of a drive is monitored, or the switching of a relay is counted. The tag sharing as Omron offers within CX-One makes it very easy to understand for maintenance engineers what of such info is where in the system.

One software



DESIGN

With it's wide portfolio Omron can offer you the right (product) solution for almost any application, and if there is still something special missing Omron offers connectivity to almost any Open Network in the market. CX-Simulator – standard part of our CX-One engineering tool – enables (pre)testing your project without the need of the hardware being present. And last but not least, during your design over 600 application and sales engineers in Europe provide local advise on how to utilize the Omron products in your application.

One minute

COMMISSIONING

CX-One's network overview provides an easy view of the machine. Pre-made software modules do not only inform you about the network status but also allow a quick overview of alarms per device. The One Connection in Omron's Smart Platform concept enables you to access any device on any network, from any point in the machine without the need to first duplicate the information in the PLC memory.

One connection

OPERATION

Omron's products meet very strict quality assurance standards which day after day is demonstrated by their high availability. The excellent performance of our products is proven by products as the CJ1 PLC. Not a single Control System on the market offers so many functions, to be performed at such a high speed, in such a small housing. But also Omron products as the CompoNet fieldbus that achieves a cycle time of 0.6 (!) msec.

Never stop, never fail

Smart Platform concept

One software – One connection – One minute



Total machine integration with the robustness offered by PLCs and the flexibility of the IPC. What was a dream in the eighties, a vision in the nineties is now materialising into reality.

Enabling complete machine and plant automation from one single platform without having to worry about fieldbuses, integration of various software and above all without being locked with one dominant supplier. FDT/DTM, messaging across networks and Internet are the main contributors.

Our aim is to minimize the time and effort you spend in automation and focus your resources in creativity. Hence our motto JUST CREATE!

The Smart Platform concept is built around three major advantages for the user:

- One software
- One connection
- One minute



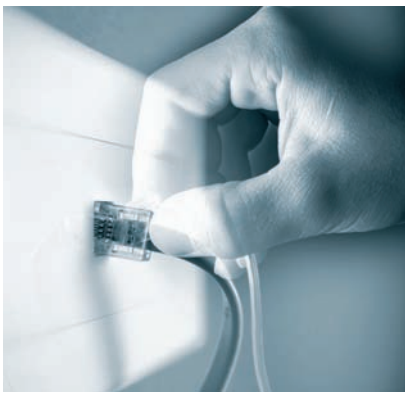
Easy programming and configuration with Omron's CX-One software.

For a demonstration and to order your 30 days' trial version for free please visit **www.smartplatform.info**



One software

CX-One allows you to control, visualise, position, detect and regulate from one automation suite.



One connection

No matter what device, what fieldbus and what task you are performing, one connection is all you need to give you full access to your machine.



One minute

Drag & drop, plug and work in minutes to control, visualise and maintain your machine.

... just create

Why Smart Platform?

Smart Platform can help you increase the flexibility and efficiency of your machines or production lines. It provides:

- A single software environment for your machine covering sensing, regulation, control, motion, and visualisation.
- Easy drag & drop object-based programming and configuration of the complete system.
- Communications and architecture that is network independent.
- Distributed intelligent devices that are self-reporting and self-maintaining to reduce downtime and identify the source of production problems.

Smart Platform

Software news

CX-One

Main features and benefits

- One software to support programming PLCs & HMIs, networks, Motion & Drive, Regulation & Switching and Sensors
- One installation and license number for all software
- Common look-&-feel for configuration of all devices
- Web registration offers free upgrade, free libraries, FAQ and help



One software for your complete machine

1. One software

Omron introduces CX-One, a single programming and configuration environment that enables the user to build, configure and program networks, PLCs, HMIs, motion control systems, drives, temperature controllers and sensors. The result of a single software is to reduce complexity of the configuration and allow automation systems to be programmed or configured with minimal training.

2. One connection

From a single connection point either locally, through networks or from a modem connection the Omron 'Smart Platform' devices on your machine can be programmed or parameterised. This allows remote access or servicing of your complete machine to become a reality. The same transparent communications architecture also allows Omron devices to easily communicate together, passing and sharing information and enabling more effective modular machine design.

3. One minute

'Plug & Work' functionality is achievable through Omron's function block library, device profiles and SMART Active Parts, which can be simply 'drag & drop'-configured in contrast to conventional programming. The SMART Active Parts are pre-defined electronic objects of field devices (e.g. 'read actual speed' of an inverter, view a scene from a vision sensor, represent a temperature controller etc.) that can be dragged and dropped into the HMI screen.

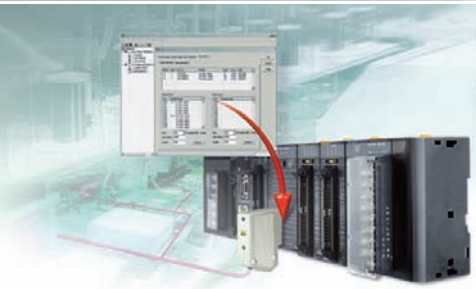
CX-Designer



New but familiar

- Tag sharing between PLC and HMI: Drag & drop or copy/paste from excel.
- Very easy re-use of projects and screens.
- Windows look and feel: Easy selection, Docking of windows etc.
- Same interface as rest of CX-ONE: The same icons/dialogs for downloading etc.
- Beautiful and comprehensive project view: Customisable workspace with toolbars and property window.
- Completely new, but backwards compatible: New property window but also the “old-fashioned-double-click” property dialog from NS-Designer.

CX-PROFIBUS



Open access to device intelligence

- Advanced configuration tool for PROFIBUS networks that uses FDT/DTM(*) technology.
- Improved support for more advanced devices, either Omron or third party.
- Integrated file saving within CX-One.
- Supports Omron messaging, hence allows full integration of PROFIBUS in Omron’s Smart Platform.
- The PROFIBUS-DP network topology and system characteristics are stored in the Omron PROFIBUS master unit.
- Configuration can be done remotely, via other networks as Ethernet or ControllerLink.

* FDT/DTM stands for Field Device Tool / Device Type Manager

CX-Programmer



Easy programming with powerful results

- Integrated into CX-One, Omron‘s universal software suite.
- Any automation device can now be accessed for configuration, programming, monitoring and maintenance.
- All through a single connection, on any network layer.
- Auto-connect through USB or serial links.
- Enhanced security: protect your proprietary know-how.
- Easy setup screens for all PLC units.
- PLC simulation tools included: test before you even download!

CX-Drive



One tool for inverters and servos

- Covers the complete range of Omron Yaskawa inverters and servos.
- Full access to all parameters.
- 3 different operator levels available.
- Easy overview of parameters includes filters to show values.
- Graphical overviews are available to further assist with configuration of some more detailed parameters.
- CX-Drive shares the common CX-Server communications middleware functionality from CX-One.
- But is also available as stand-alone tool.

PLC news

CJ1 screwless I/O



Main features and benefits

- Drastically reduces wiring time
- Accepts a wide range of wiring gauges
- Easy to attach and detach; no tools required
- Easy to test signals, even while wiring is connected
- Construction prevents over-stressing of clamping spring
- Interchangeable with existing CJ1 screw terminals
- Safe – no metal parts can be touched by fingers

Screwless – the reliable connection!

Versatile and reliable

Omron's screwless I/O terminals accept a wide range of wires, solid or stranded, with or without ferrules, from 0.08 to 1.5 mm^2. The common power supply terminals even accept two wires each, for easier power distribution. Because the spring-loaded clamps secure the wires in their sockets, the wiring will not come loose through shock or vibration. This eliminates the routine task of re-tightening screws during regular inspection. During testing and commissioning, the spring clamps can be contacted to verify the signal levels. Yet the terminal is always safe to touch, whether wires are inserted or not.

Easy to use

Individual wires are easy to attach and detach from the terminalblock, simply by inserting a screwdriver in the release hole. Traditional screw terminals must be tightened at the correct torque; with Omron's screwless I/O, the contact pressure is always right. A special insert in our clamping spring protects it from being overstressed, making sure the spring always stays in shape. The new screwless I/O terminal is interchangeable with existing connectors, and can be used on any existing CJ1 unit that uses the classic 18-point screw terminal block. And they are just as convenient to attach or detach; no tools required!



CJ1-built-in-Ethernet

Ethernet for all

Omron's smallest modular PLC offers an economical way to connect to 100 Mbit/s Ethernet networks for seamless and smart distributed control.
Communication over Industrial Ethernet networks has so far been restricted to high-end PLC models. Omron lowers the threshold for truly distributed control using 100 Mbit/s Ethernet with the introduction of 3 new CPU models in the CJ1M-range. The 100BASE-TX Ethernet interface integrated in the new CJ1M CPUs adds a high-speed, reliable network connection to the existing 2 serial ports. You can connect the PLC to Ethernet networks, whilst retaining the possibility to make serial data links to existing peripheral devices.

Main features and benefits

- **Speed and Transparency**
  Up to 255 nodes can be linked using secure connection-based TCP/IP data communication with Omron's proven industrial FINS protocol on Ethernet
- **Easy Access and Setup**
  The FTP server functions provide simple access to data stored on a standard CompactFlash Card hich can be used in any CJ1 CPU

CJ1-CTL



Get the right position

A compact and powerful new counter unit provides easy connection of four incremental encoders to any CJ1 series PLC.

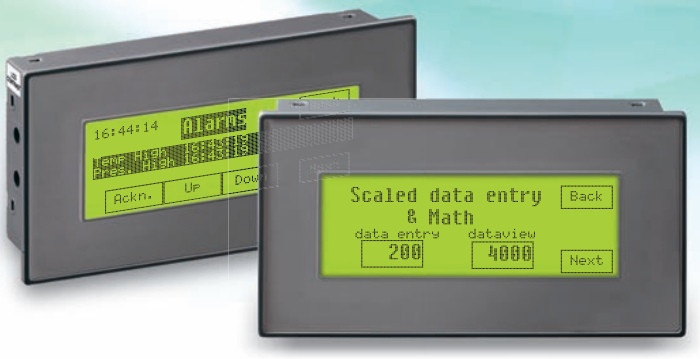
Now you can boost the functionality and performance of your CJ1 PLC with the CJ1W-CTL41-E four-channel counter unit. Able to process pulse signals up to 100kHz, the CTL41-E allows count frequencies up to 400,000 counts per second on all four channels simultaneously.
And by internally monitoring the counter values against 32 comparison values, the CTL41-E can also issue interrupts to the CPU for sub-millisecond response in critical applications. With a single CJ1 able to control up to 24 units, the CTL41-E can turn one of the world's most compact PLCs into one of the world's most powerful and flexible machine control systems.

Main features and benefits

- **4 encoder inputs**
- **100 kHz pulse frequency**
- **32-bit counter values**
- **Linear & circular mode**
- **32 comparison values**
- **Interrupts to PLC CPU**
- **On-the-fly reconfiguration**
- **Easy wiring**

HMI news

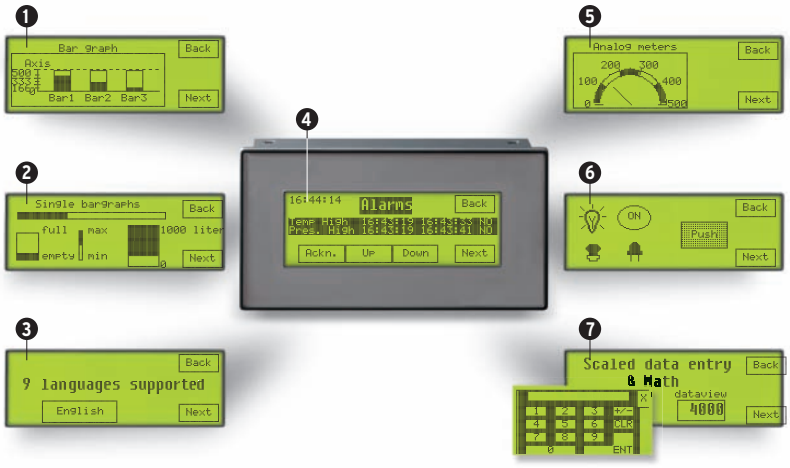
NT3S



Small, Powerful, Flexible, Economic...NT3S

The Omron NT3S terminal is designed to replace mechanical pushbuttons and lamps or text based function key terminals by offering extra functionality, without increasing overall costs.

The NT3S-series offers powerful, free programmable functionality on a small touch screen based user interface. You can create your own "function keys" wherever you want them on your screen and at the same time make use of text in multiple languages. You can also use comprehensive graphics to monitor your application. This product is a step up from our NT2S/NT11S function key series and a step up to our more intelligent NS-series.



Main features and benefits

- 4.1" monochrome STN LCD with LED backlight
- Maximum of two universal (RS232/485/422) serial ports to connect multiple devices with different protocols at the same time
- Drivers for most PLCs, Inverters and Servo Controllers
- Support for floating point data
- Real-time and historical alarms (historical alarms in RTC version only)
- Trend graph for defined tags (RTC models only)
- Saves recipes data in non-volatile memory
- Windows® based programming software NT-XS for free!
- IP65 design

❶❷ On the NT3S you can show different kind of bar graphs. Single bar graphs can be filled in different directions and multiple bar graphs with legend can easily be created with a simple wizard.

❸ Up to nine languages can be used in the NT3S. This means you can for instance make the text buttons variable. This way you can design one project with different languages, so you can use it in different countries.

❹ You can monitor up to 256 alarms in 16 different groups with the NT3S. Alarms can be shown with text, time, date and status. Acknowledgement can be prohibited by password.

❺ Analogue meters can also monitor values of connected devices. You can set the range, angle, and "colours" to your wish.

❻ You can create your own buttons and lamps by making use of bitmaps or by choosing one from the library. You can set the "colour", filling and label.

❼ Showing and entering data is easy with the NT3S. Data can be shown in the desired format (HEX, BCD etc.). Entering data is performed with a pop-up keypad.

NS5M / NS5



Main features and benefits

- 5.7" screen
- 320 x 240 pixels resolution
- The highest amount of memory in the market
- Easy integration with Omron PLCs and Field Devices by our Smart Active Parts

NS5-Monochrome – Less colour, same performance

With NS5-Monochrome, Omron is addressing customer demands for more performance without increasing costs for machines. It offers the same high quality and the same features as the rest of the NS-series, ranging from 5.7" to 12.1". We offer you the highest amount of memory (20 MB in all 5.7" screens) in the market, so you can create beautiful applications with many bitmaps and you can re-use applications throughout the complete range.

Other features of the NS5 Monochrome are:

- USB connection for downloading
- Optional Ethernet connection
- Compact Flash slot
- Powerful data log/trending function

NS5 TFT

The NS5 TFT is adding even more clarity and visibility to our 5.7 range of screens. With a field of view of 70 degrees left and right an operator on a machine can read it even when looking at the screen from an angle. With the 30,768 colours you can make the most beautiful applications to make your machine stand out from the rest.

Other features of the NS5 are:

- Long-life backlight of minimal 75,000 hours (less maintenance costs)
- The highest amount of memory in the market (applications are compatible throughout the NS range)

A true machine management tool



Working with SMART Active Parts is easy. SAPs are pre-programmed visualisation software modules with embedded communication code. They allow a complete machine to be configured, commissioned, operated and maintained via the HMI. Just Drag & Drop a SAP into your project from the library in CX-Designer and enter the address of the device it should be linked to. SAPs allow, for instance, a user to monitor all slaves of a network master on one single screen, read and write parameters of connected inverters without using the inverter console, or view PLC alarms in simple text, all without having to program a single line of communication code. This saves a lot of development time, and at the same time allows more advanced features to be included that, for instance, reduce down-time or simplify machine set-up. That's why we call the NS a true machine management tool.

Remote I/O news

DeviceNet safety



Main features and benefits

- Open communication standard.
- Fast and easy installation
- Predefined and certified function blocks
- Detachable cage clamp terminals
- I/O-Modules support standard and safety mode on one module
- Predicitive maintenance and self diagnosis
- Certified for applications up to safety category 4 (EN 954-1) and SIL 3 (IEC 61508)

DeviceNet safety offers more than a safe network

As a founding member of the DeviceNet organisation, and specialist for machine safety, Omron is one of the few companies with expertise to combine innovative bus technology and safety to a seamless solution up to safety category 4 (EN 954-1) and SIL 3 (IEC 61508).

Unique features of the DeviceNet Safety products are:

- Test pulse outputs to ensure crosstalk and short circuit detection.
- Mixed mode operation of the DeviceNet Safety Terminals. All in- and outputs can flexibly be assigned to the safety or standard part of the control system. If they are used for safety, the Safety Network Controller ensures system integrity. Smart slave functions like operation counters and monitoring of ON-time or operation time are fully supported.

WT30



Main features and benefits

- One master modem – multiple slave modems
- Relay functionality – communication distance up to 240 meters
- All-in-one unit available with a wireless modem and 16 points digital terminal
- Roaming: The master modem automatically selects the radio frequency and automatically changes the communication route for moving objects.

The ultimate flexibility

Within Industrial Automation there are still many cabling issues to be solved, like communication with moving equipment, retrofitting networking on running devices and leaping over an obstacle in a walkway, roadway or waterway. Now Omron provides a simple and reliable solution to solve these issues, the WT30, a serie of wireless I/O products.

Smart Slice



Main features and benefits

- Modular remote I/O with up to 64 I/O units per station
- DeviceNet and PROFIBUS-DP interfaces
- Intelligent functions in all units reduce PLC programming
- 3-piece construction for easy installation and maintenance
- Toolless push-in connection technology

Smart functions you can rely on

SmartSlice: Intelligence at I/O level

In automated production, high availability is absolutely critical to stay efficient. Smart control systems that can help your process stay up are always a worthwhile investment. The latest innovation from Omron is SmartSlice. This modular, remote I/O system is full of patented, smart features – making it the most intelligent and easy-to-use remote I/O system currently available. SmartSlice will allow you to minimise engineering, troubleshooting and maintenance in your machine, line or plant, resulting in significantly reduced downtime.

Maintenance data logging minimises downtime

All SmartSlice I/O units autonomously collect and store the information that will help you plan machine maintenance. Timely detection of reduced performance will minimise unplanned downtime and keep machine performance fast and reliable.

Each unit remembers its last maintenance date: maintenance personnel can check per unit if there have been any replacements or repairs. A descriptive comment can be entered per node, per unit, even per I/O point.

This can help you troubleshoot a machine without having to know PLC-internal tag names or programs.

Early-warning system prevents breakdowns

Every SmartSlice unit has its own built-in early-warning functions, enabling you to schedule maintenance and prevent breakdowns. Warnings include:

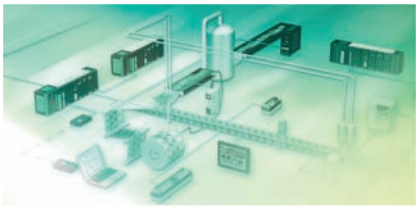
- Supply voltage out of safe range – e.g. due to damaged cable or poor connection.
- Preset maintenance interval exceeded – which can be a time interval or a target number of operations, to indicate that an inspection of (electro-)mechanical parts is required.
- Maximum allowed delay between two I/O signals is exceeded – to indicate that wear or lack of lubrication is causing a machine to work slower than intended.

An integral component of Smart Platform

The SmartSlice remote I/O series was developed as a part of Omron's Smart Platform. Designed to make machine automation easy, Smart Platform provides seamless, drag-and-drop integration of all automation components in your machine. From sensor to controller, from HMI to drive, all devices are accessible through one connection using a single software suite, CX-One. Moreover, built-in distributed intelligence in Omron devices means that you spend less time programming and troubleshooting.

Case studies





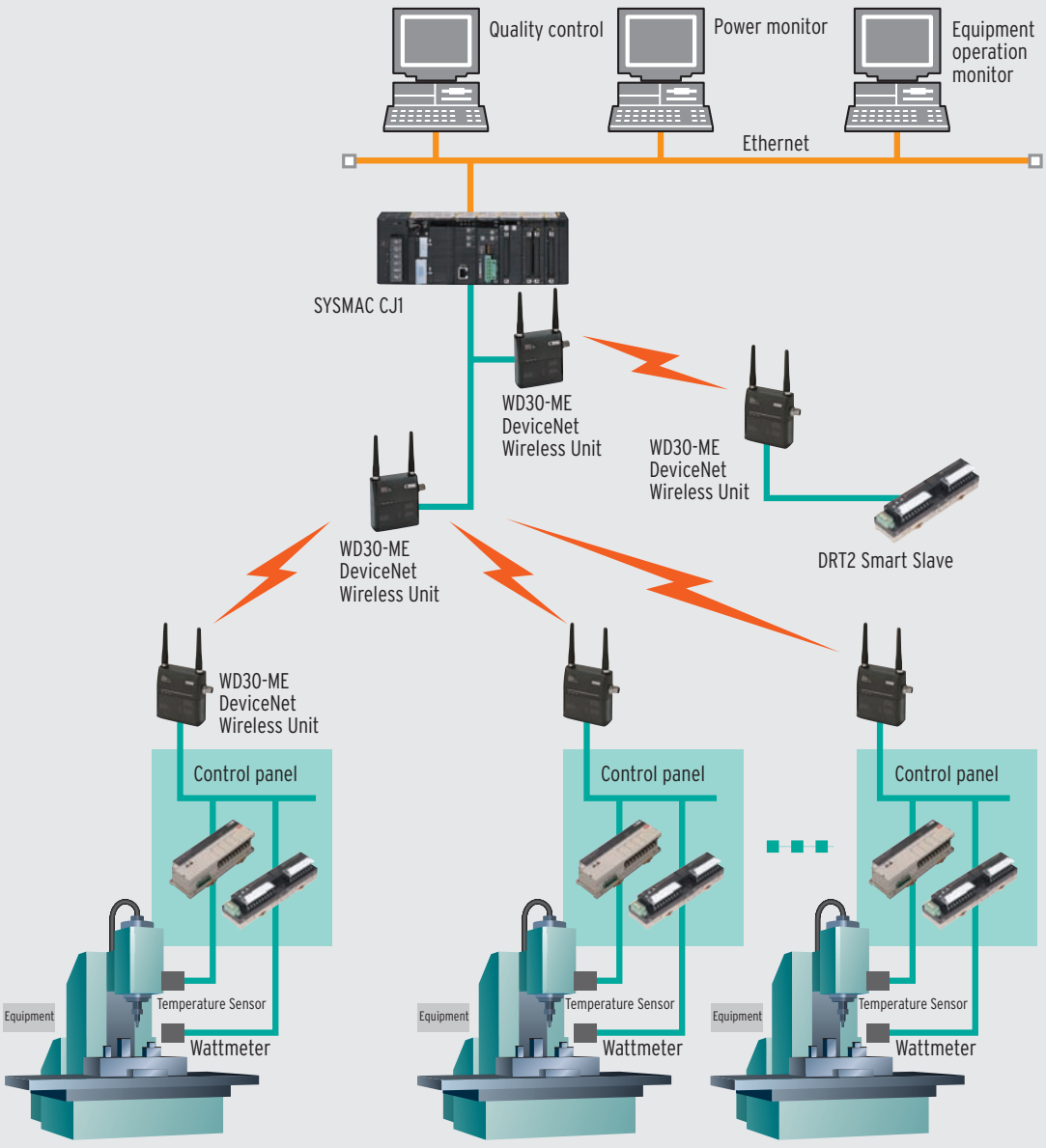


Smart factory at work

The future is wireless

Wireless communication allows lower maintenance, quick production line set-up and space saving.

In contrast with a regular wireless system that can be used for only one purpose, such as collecting production information, the Device-Net Wireless System can be used for multiple purposes.

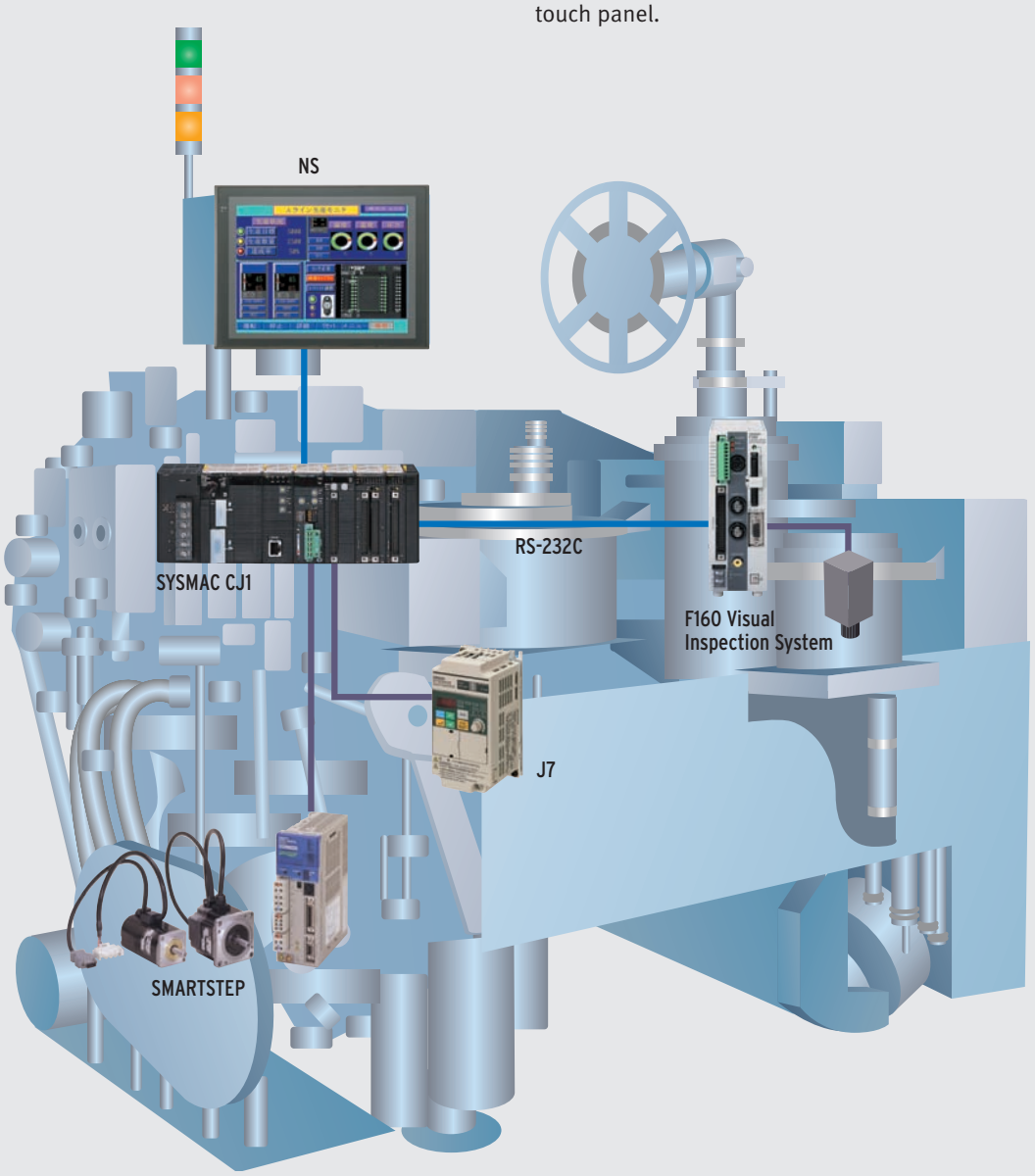


Application examples

Vision meets motion in a flexible assembly line

Space, size and development time is cut by 30% by integrating vision and motion.

By using a HMI equipped with a Video Board, the HMI can also be used to set-up and monitor for the Visual Inspection System. This solution simultaneously helps reduce equipment costs and saves space.
In addition, the motion controller parameters can be set, edited, and stored very easily from the HMI's touch panel.

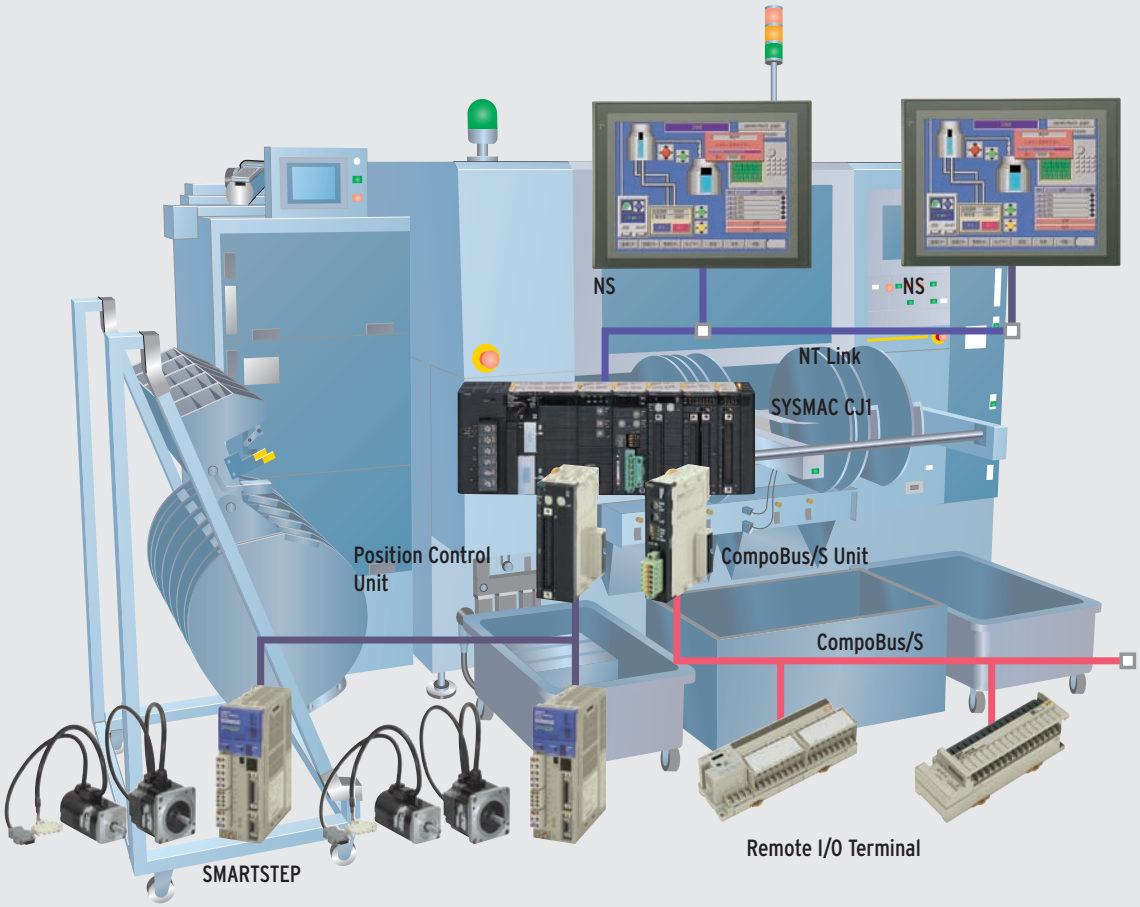


The manufacturing speed is increased significantly by using a PLC, Position Control Unit, and Visual Inspection System from Omron.

Moulding machine

When fast and precise operation is key, a total solution from Omron offers full satisfaction. Fast operation, accurate positioning, easy connectivity and complete machine management through the NS HMI family.

For equipment that requires an extremely fast cycle time Omron offers PLC that achieve cycle times as fast as 1 ms.
If Omrons NS-series Programmable Terminals are used, there is no delay in operation due the the high performance communications.



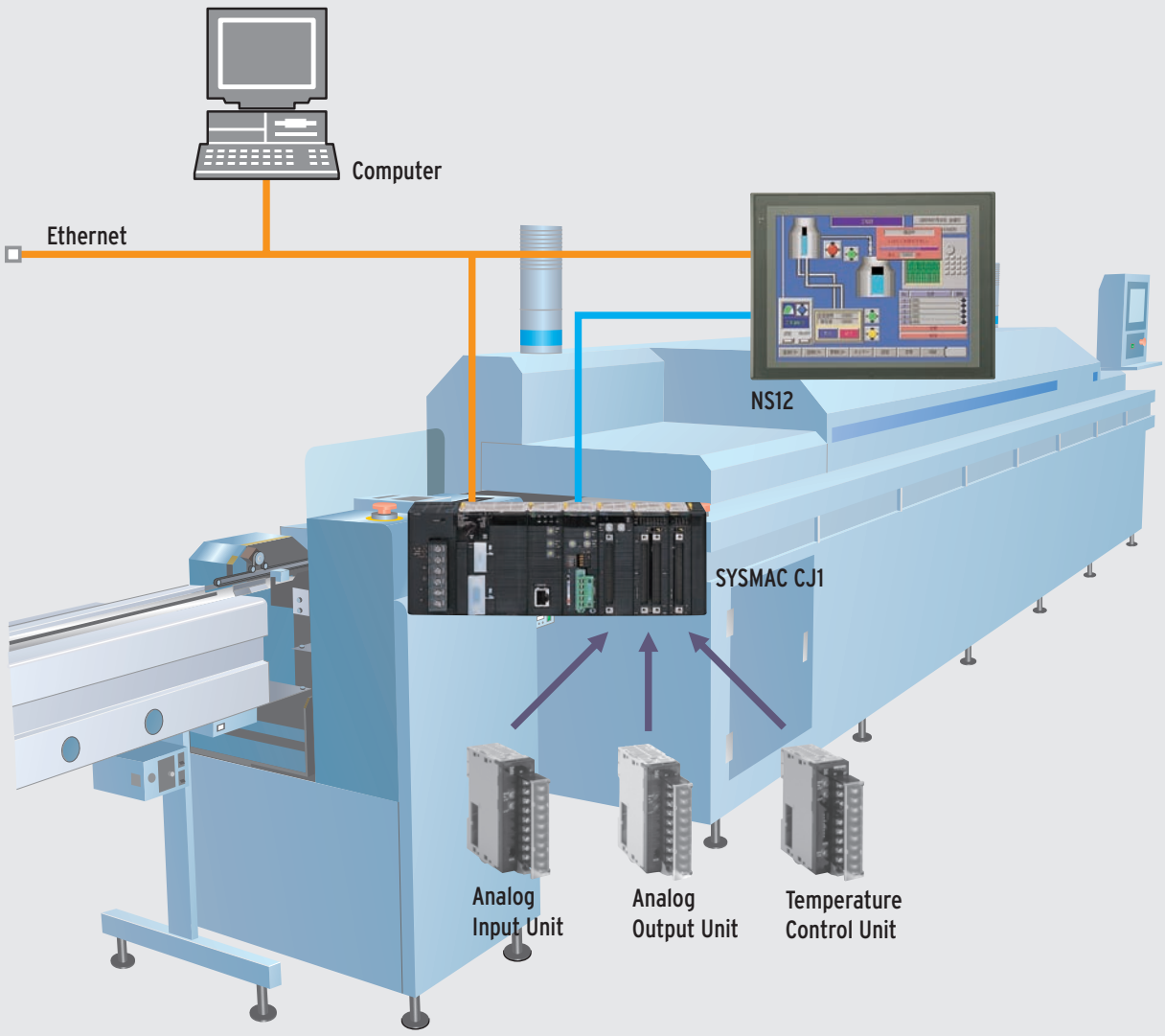
The high-speed I/O bus Compobus/S has a communication cycle of an astonishingly fast 0.5ms. As a result the same respons times can be achieved as if the I/O units were mounted directly on the PLC. Achieveing true remote I/O.

Application examples

Total management of solder reflow machine by NS terminals

NS handles recipes via its memory card and communication via Ethernet port.

Store recipe data in the PT's memory card. The memory card data can be accessed through Ethernet.

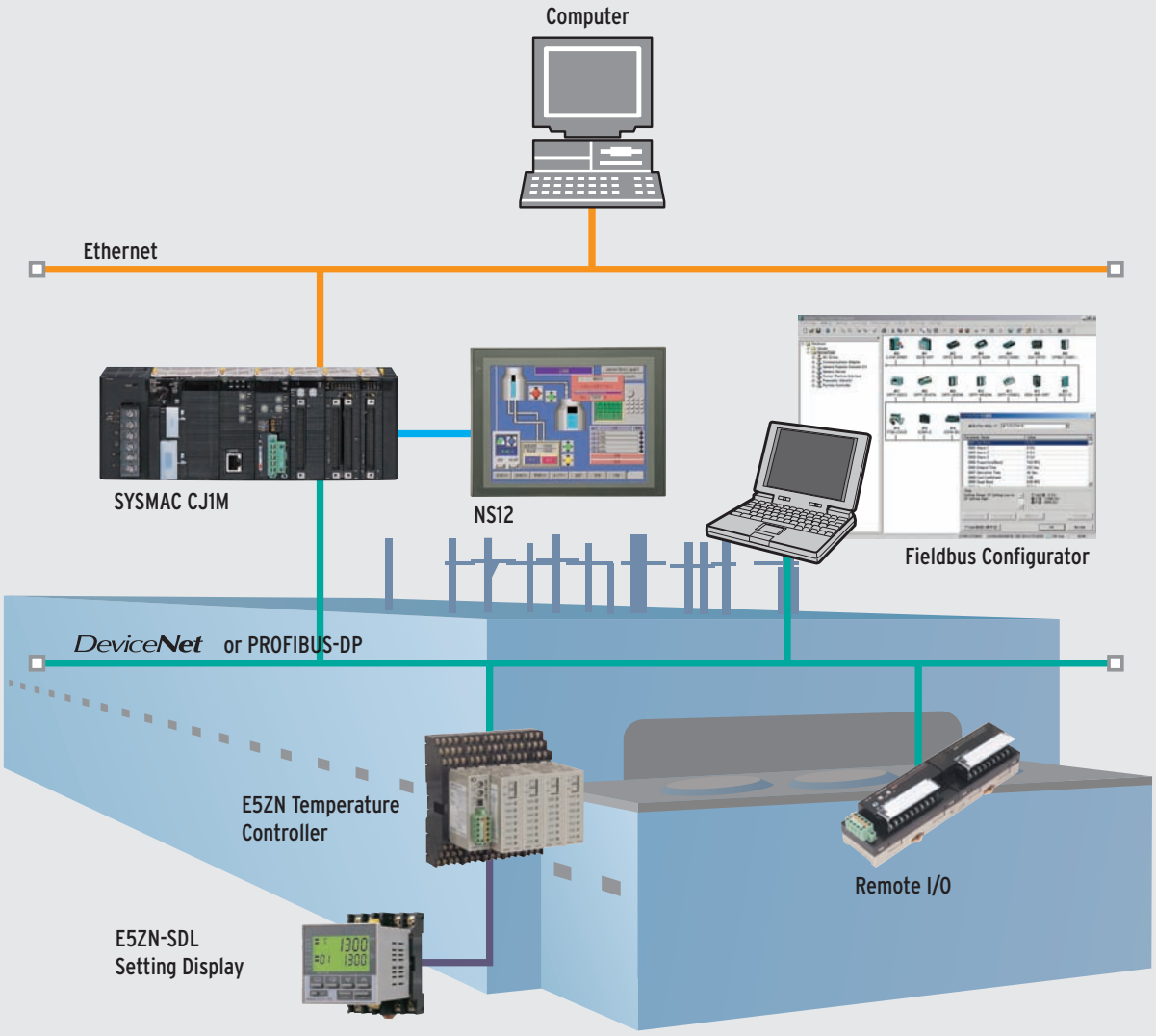


▲ With 4 channels/Unit, the CJ1-series Temperature Control Unit can support multi-point control and save space.

Cut cabling costs in industrial furnaces

Start-up costs for large-scale temperature control can be substantially reduced with networked temperature controllers

Decentralised temperature controllers (E5ZN) on DeviceNet (or PROFIBUS DP) help minimising machine wiring and reduce programming effort in the PLC.
Of course complete machine management is ensured through the NS terminals.



▲ By installing a networked Temperature Control Unit close to the measurement point (such as a thermocouple), a compensating conductor is unnecessary.

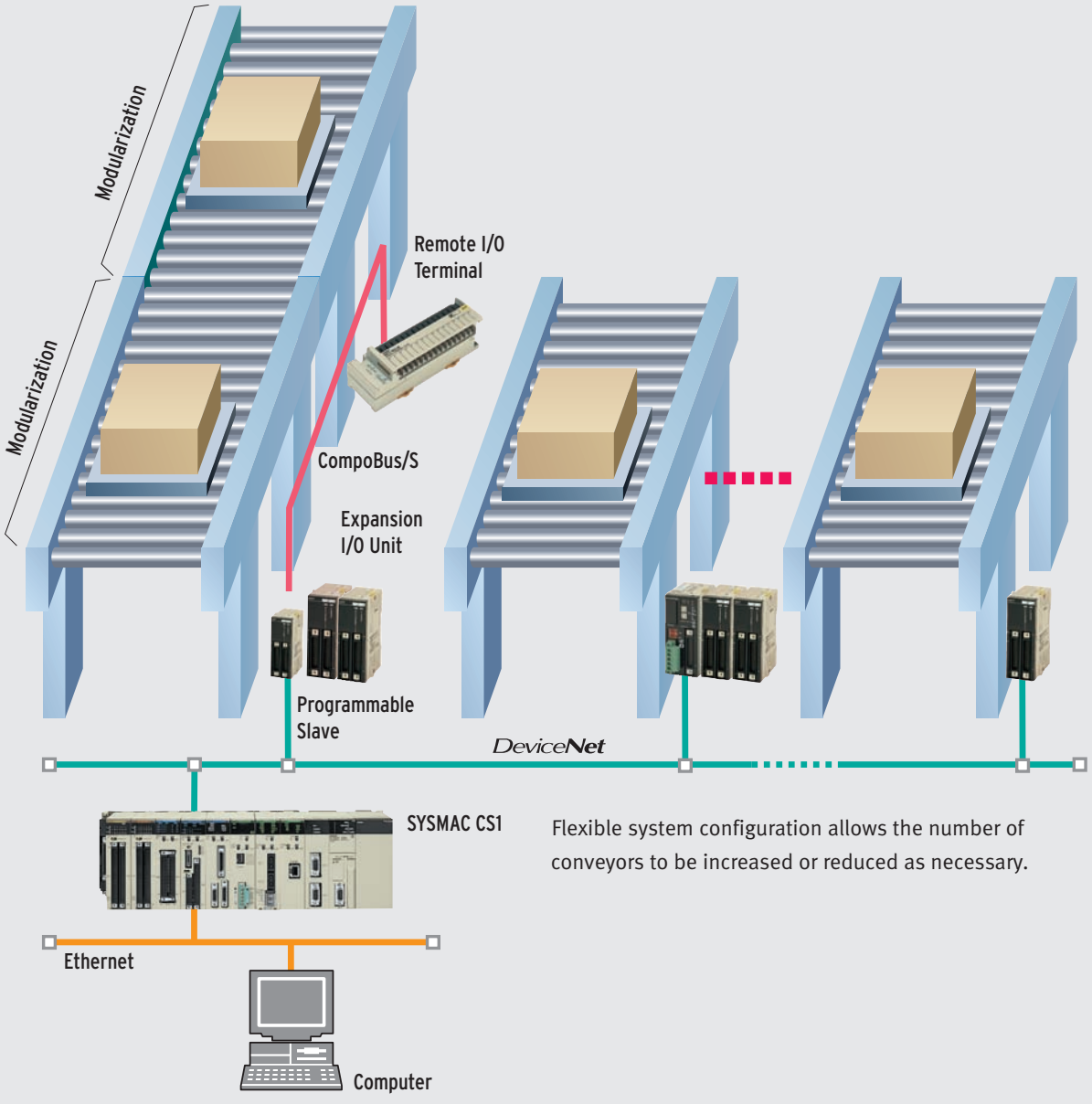
▲ Verifying the printed article information in a high-speed packaging line.

Application examples

Modular PLC helps slicing bulky conveyor systems

A compact shape, integrated communication functions and a wide range of functional modules help you create smart modular machines.

A distributed control architecture. The small PLCs can be used to slice the conveyor system in modules that can be reused.



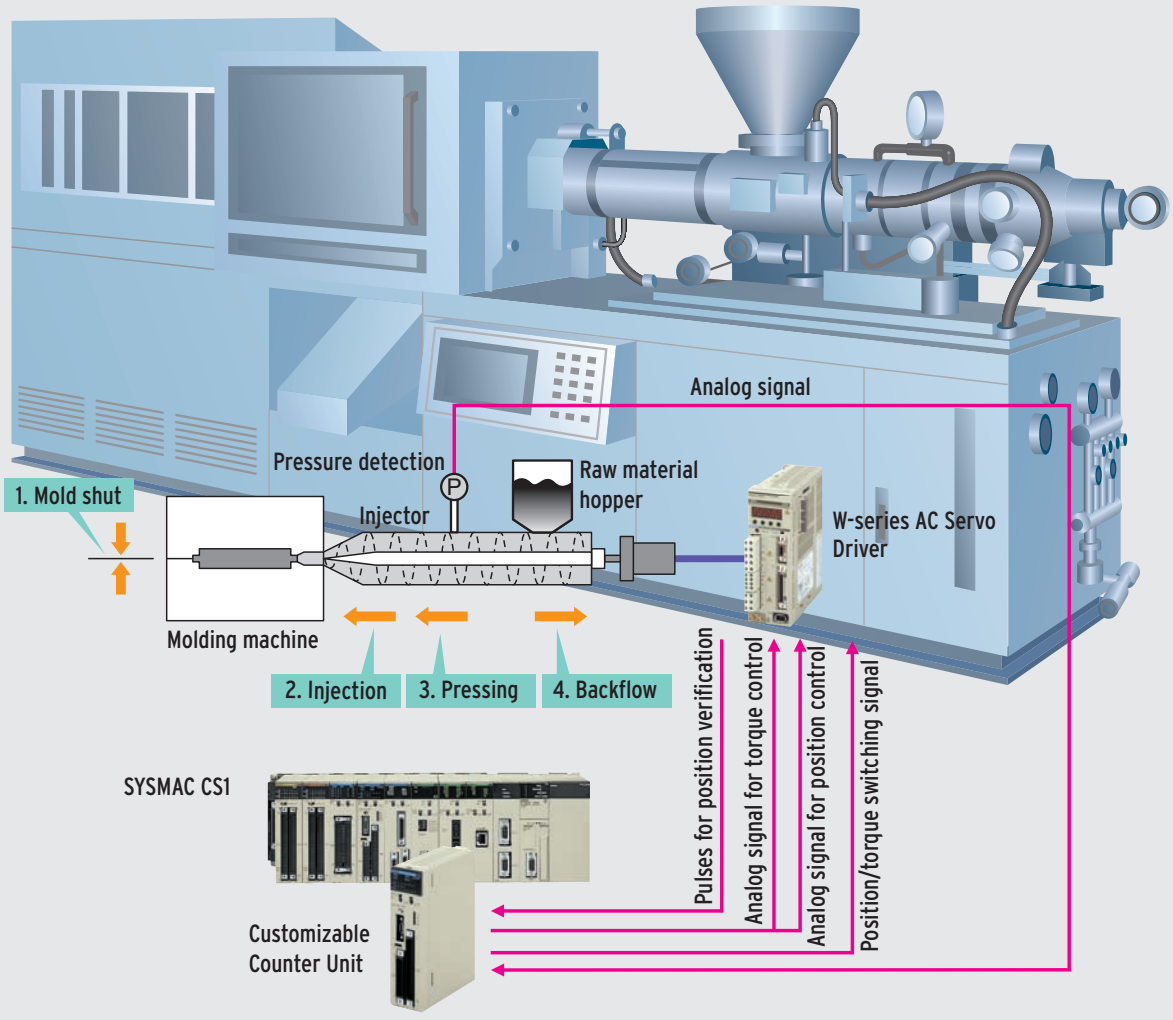
Flexible system configuration allows the number of conveyors to be increased or reduced as necessary.

Customised motion solution slash costs in molding machines

Customisable counter with compact Sigma servo's meet the exact customer needs.

The Customisable Counter unit controls the resin volume injected into the moulding machine (position control) and injection pressure (torque control). This configuration combines all required functions into a single unit.

When controlling the molding machine's injection pressure, it is necessary to convert injected volume to rotations (position control) and injection force to pressure (torque control) during operation. A single Customizable Counter Unit can control both functions, so precise molding is possible at low cost.

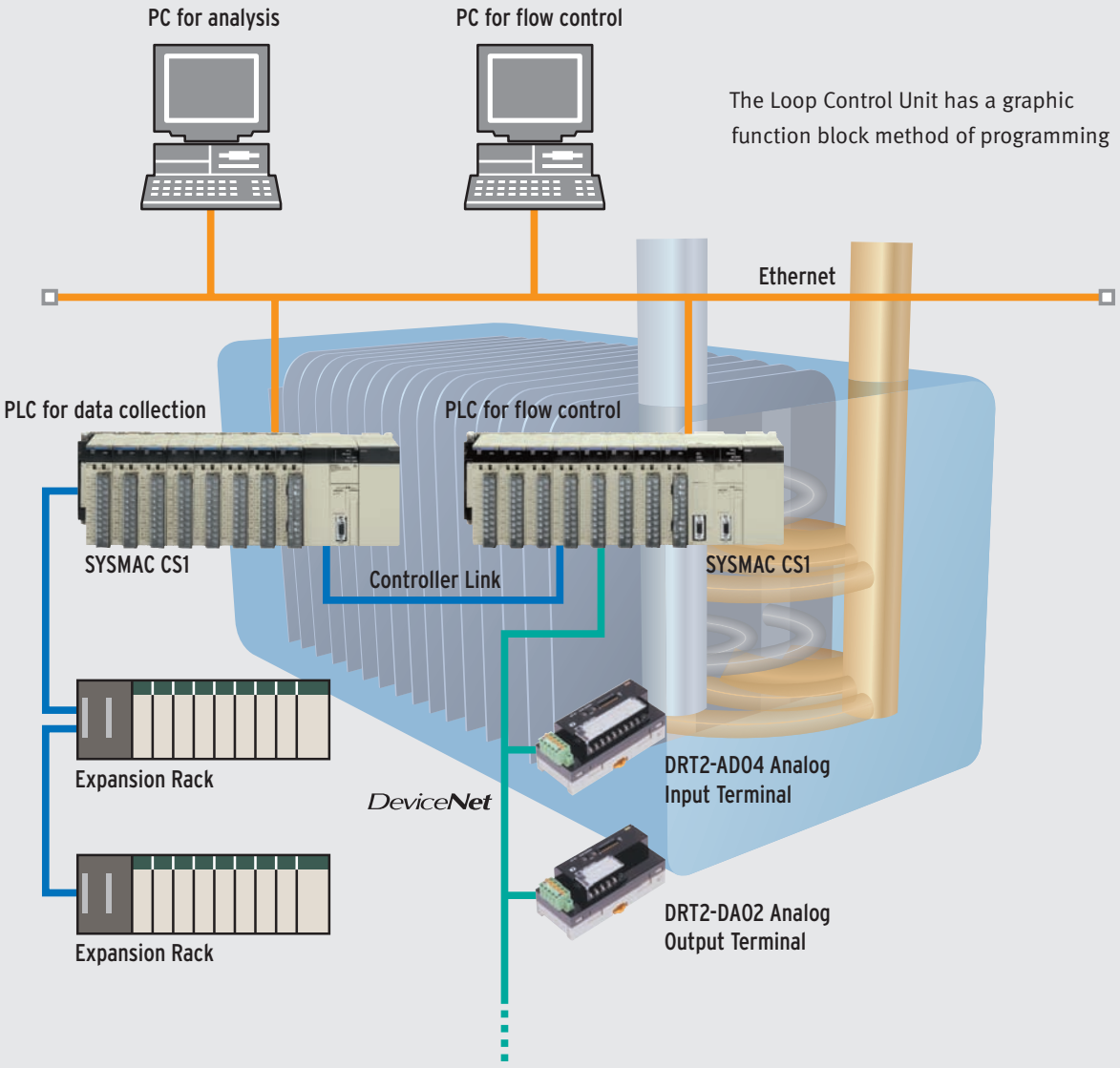


Application examples

Fuel cell evaluation via LCU (loop control unit)

Loop Control Board to provide easy dedicated control of variables such as flow, pressure and temperature.

The PLC and Loop Control Board achieve compact and efficient multi-loop analog control of the variables (such as flow volume, pressure, and temperature) to evaluate fuel cells. It also does not require a communications program to exchange data with the PLC. Furthermore, PID control can be performed as fast as 10 ms, so variables such as gas flow and pressure can be controlled precisely.

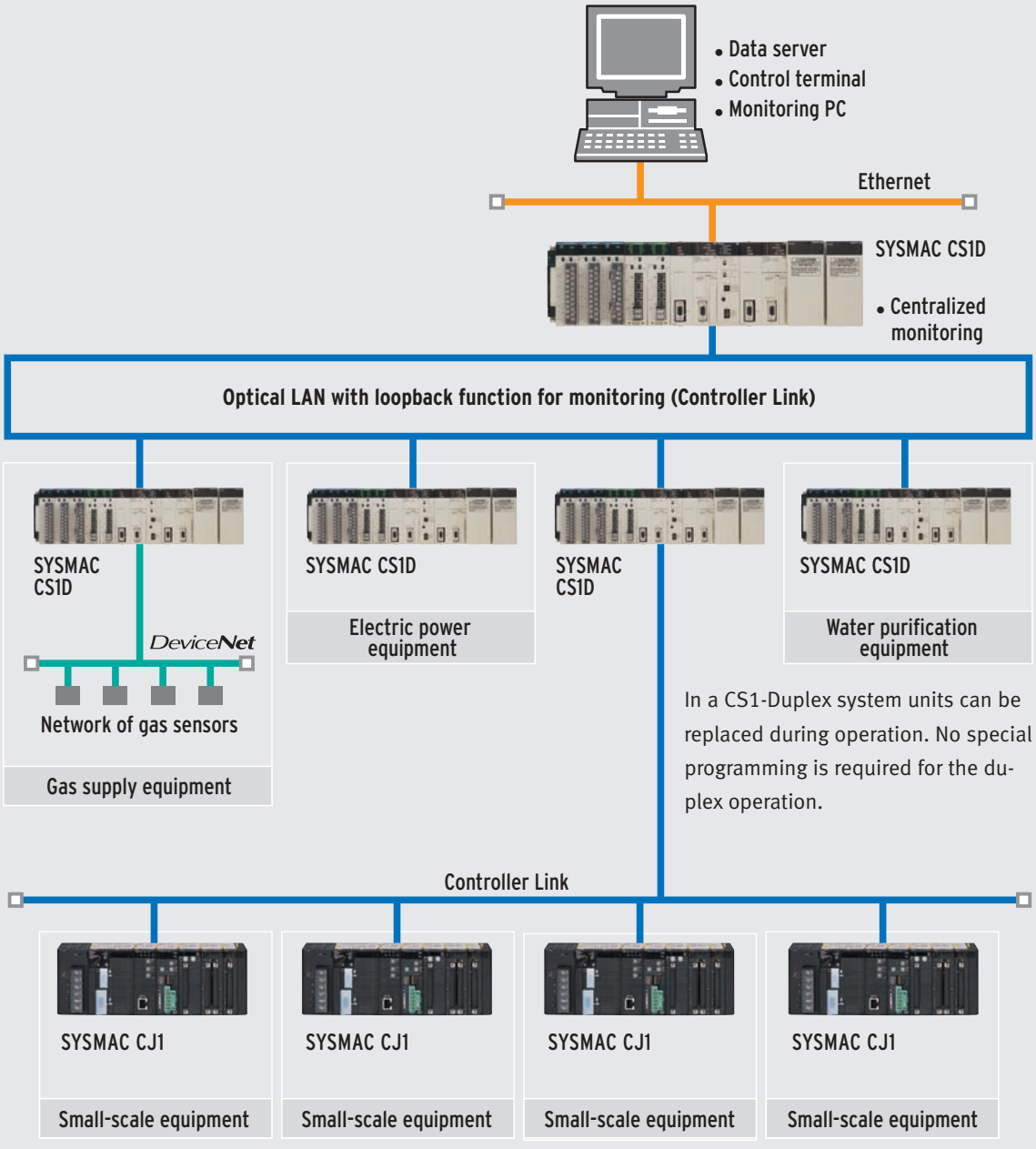


The Loop Control Unit has a graphic function block method of programming

ZERO downtime in utility management

A Duplex PLC system provides highly reliable system redundancy.

The duplex system provides stable operation in plants that require continuously operation. If an optical fibre breaks, communications are backed up with the loop-back function. If one CPU unit breaks down, the other CPU unit acts as a backup and the system continues to operate.



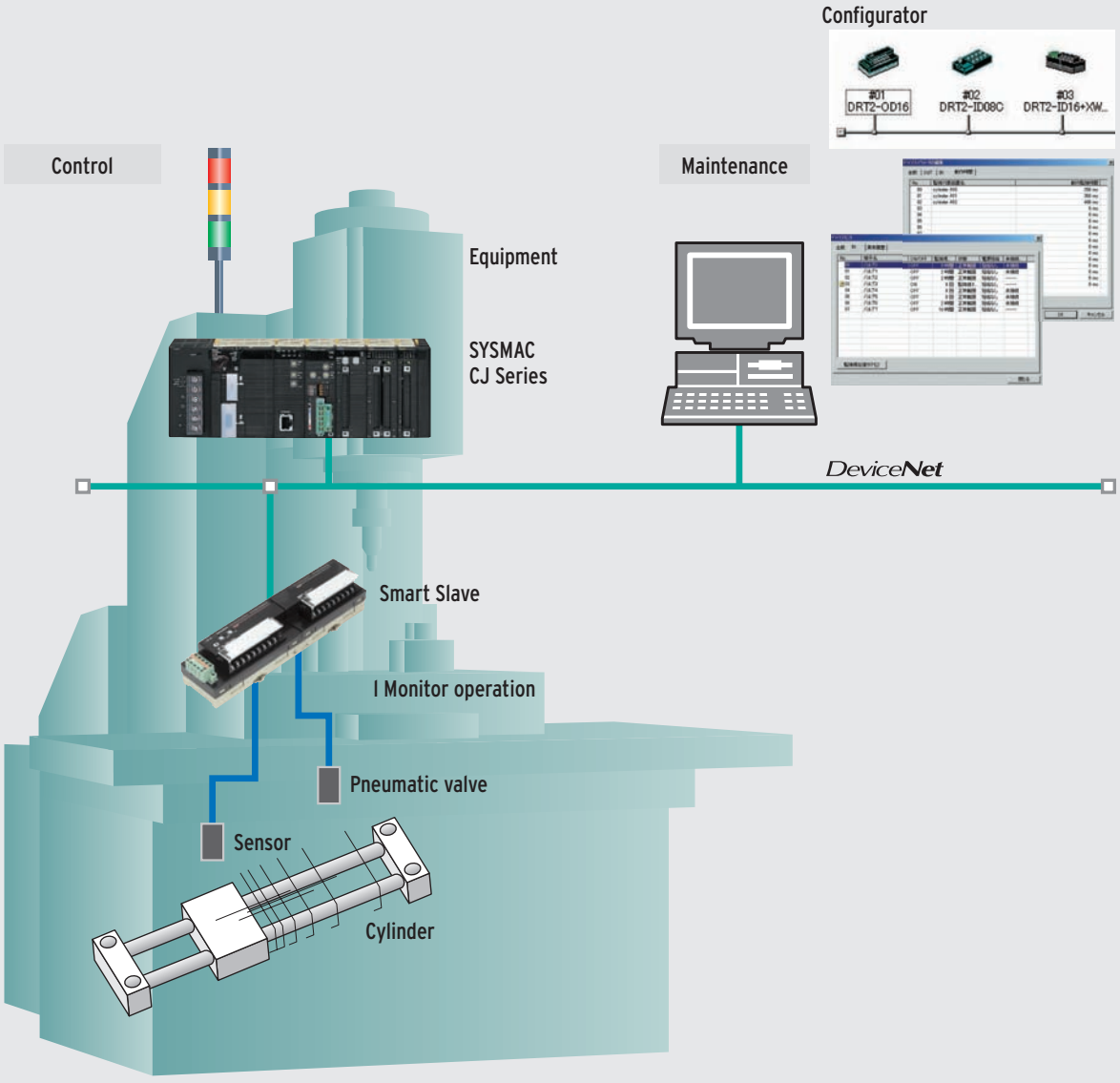
In a CS1-Duplex system units can be replaced during operation. No special programming is required for the duplex operation.

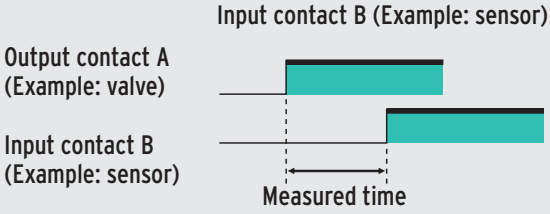
Application examples

Practical Applications using Smart Slaves

Smart Slaves monitor the status of connected devices and help establish an effective preventive maintenance system.

Monitor the operating status of connected devices, not just the ON/OFF status of control bits. The Smart Slaves' advanced monitoring functions indicate when connected devices require maintenance or replacement.

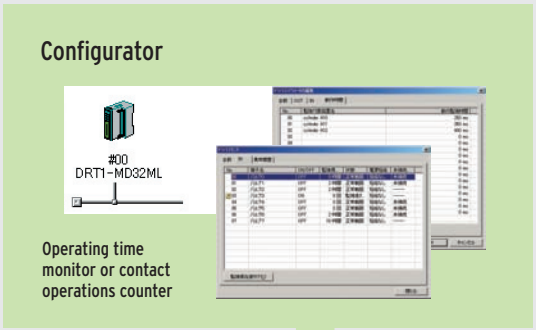


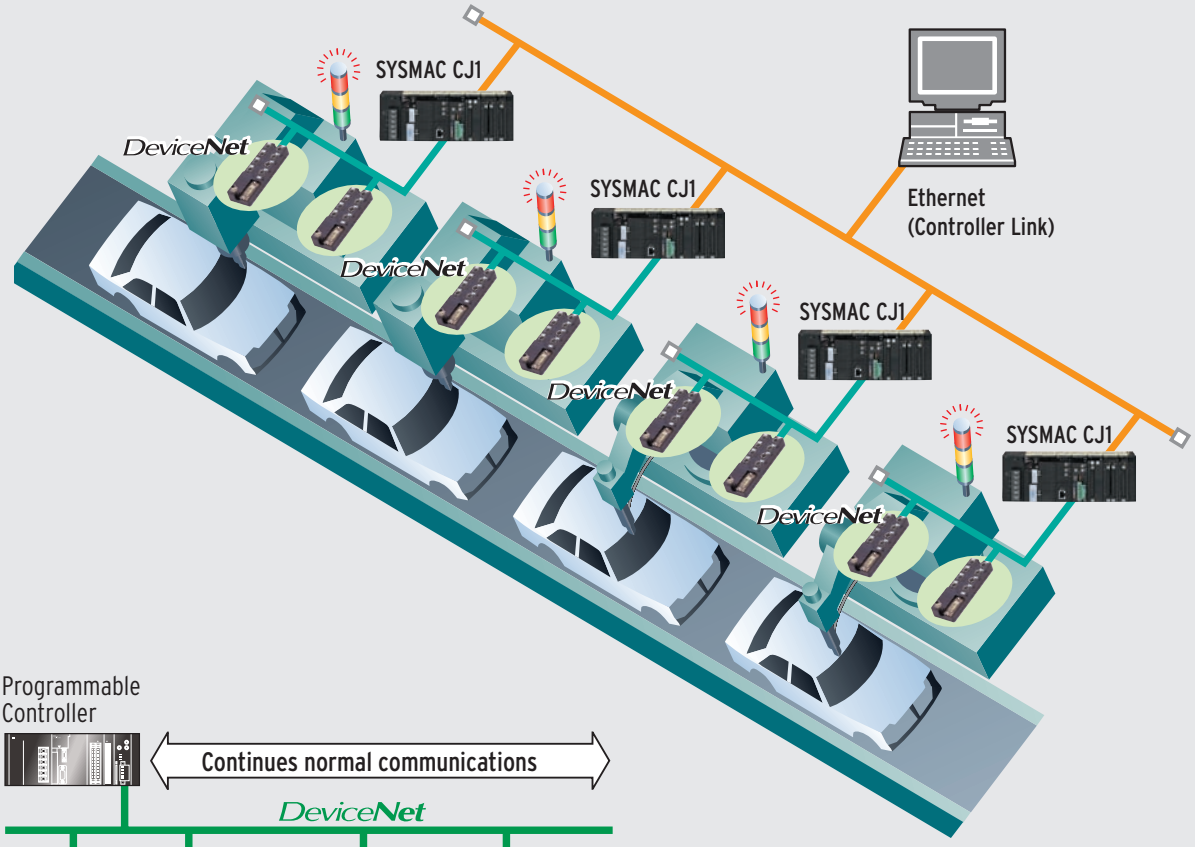


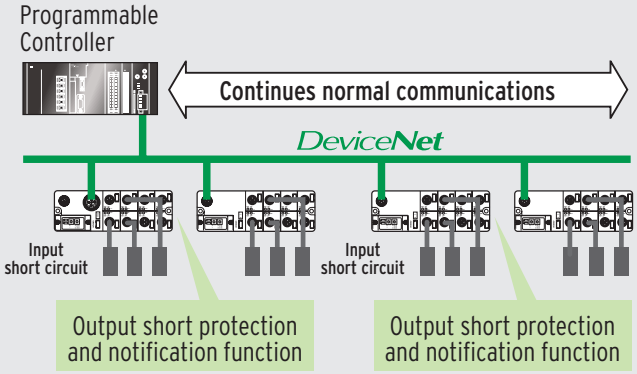
By measuring the cylinder's operating time, it is possible to identify problems such as air leakage or oil loss very early. Since the operating time is monitored, any deviation can be identified and then eliminated by making adjustments with a speed controller or other device.

Short-circuits can be isolated quickly to significantly reduce production line downtime.

The location of a short circuit can be isolated with the Smart Slave indicators, helping to improve plant efficiency. Short circuits in input devices, such as Sensors, are detected to provide protection at the connector level. This function is very effective and valuable in large-scale systems, such as automobile production lines, where a single short circuit can result in large losses. The specific location of a short circuit can be identified quickly to help minimize the production line's downtime.







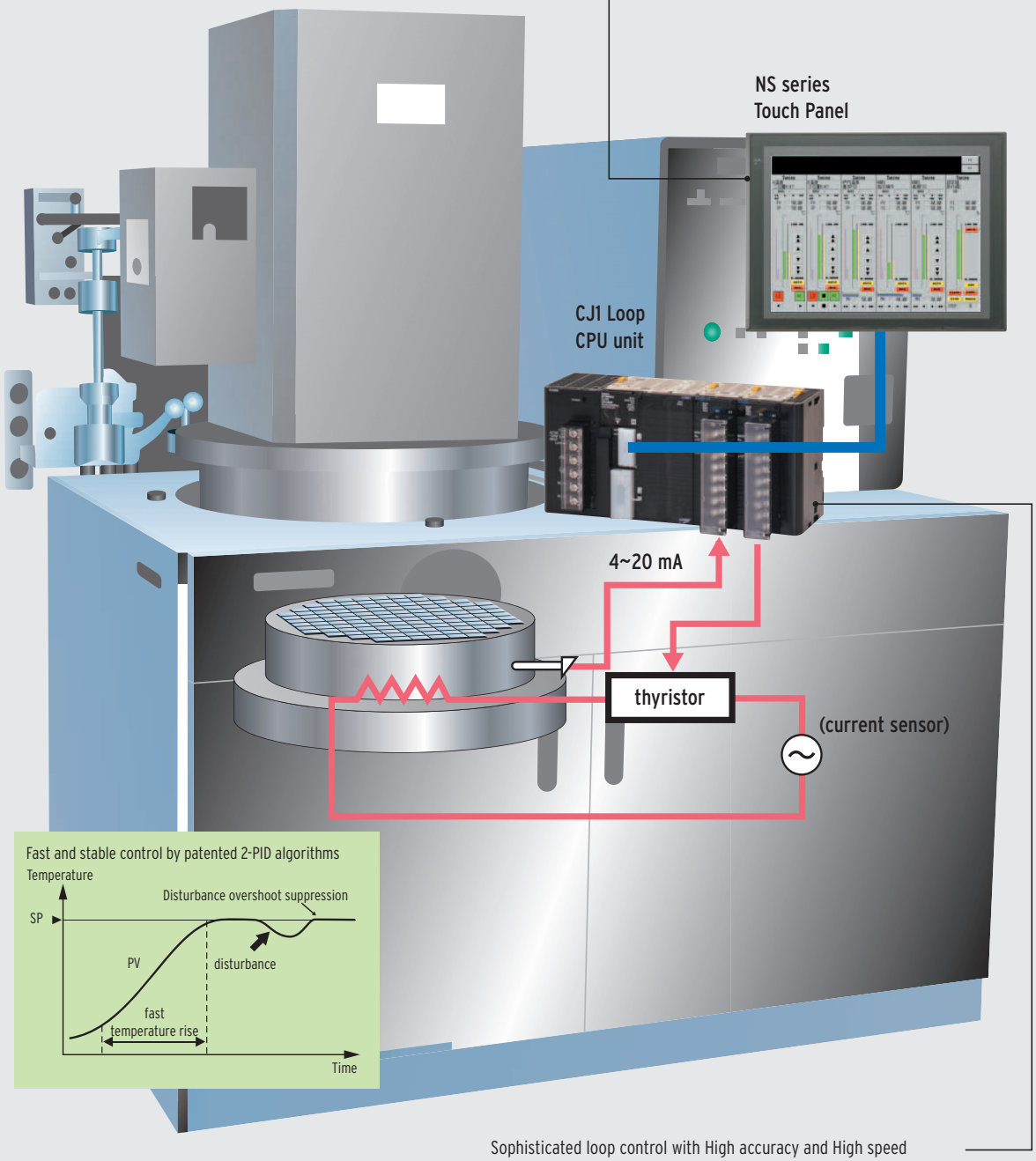
Application examples

Solve your machine control issues efficiently

Semiconductor Equipment

Integration of Loop control and Sequence control can achieve High speed and High accuracy control within a single control system.

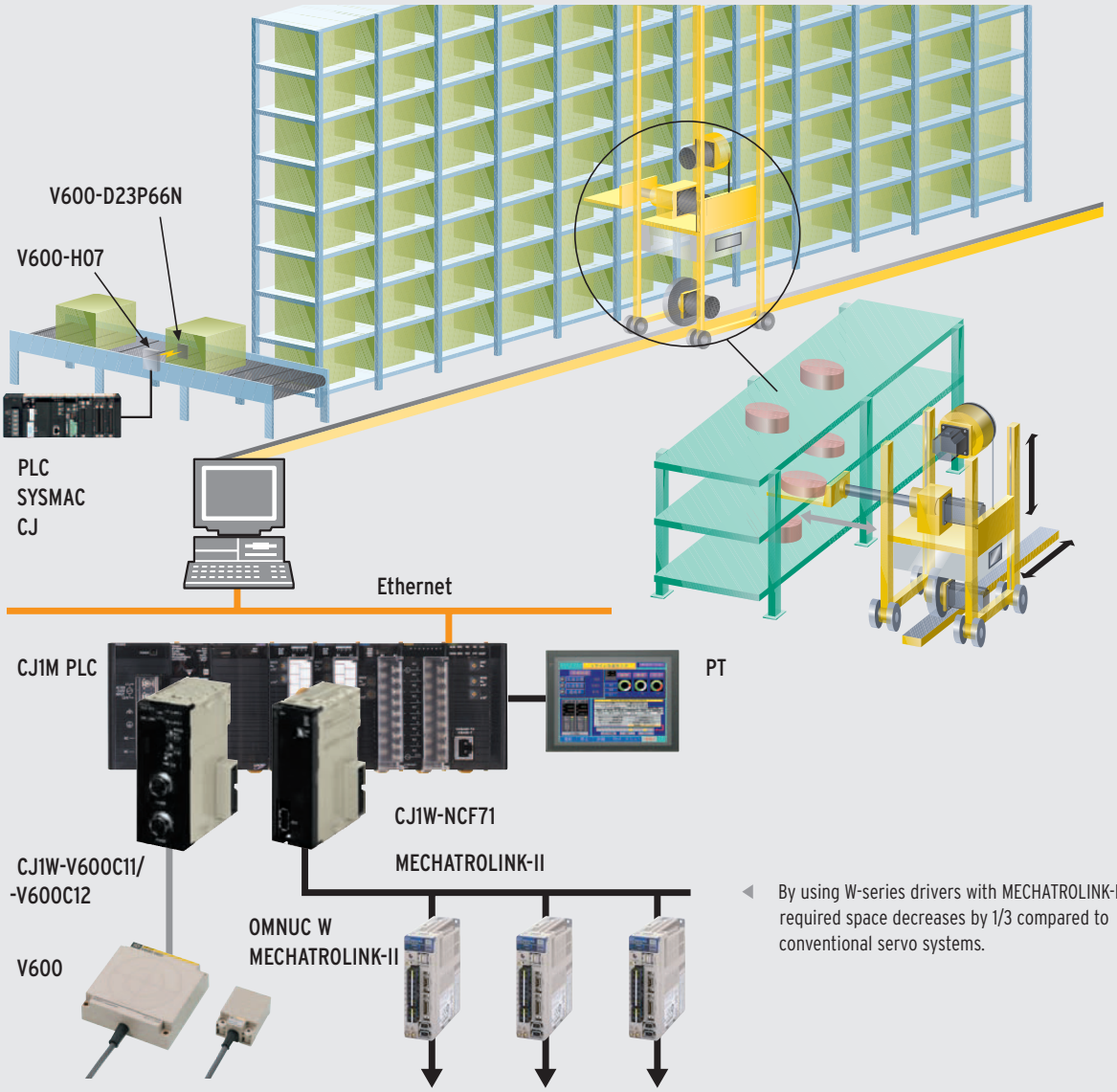
Create a group view on a touch panel automatically from the loop control program. No programming required!



Sophisticated loop control with High accuracy and High speed (10ms cycle time). Monitor views, tuning panels and setting panels are created automatically. Design and debugging work are minimised.

Automatic Warehouse

Keep track of your machine's condition by monitoring motor response, feedback position, speed and torque. Warehouse stock data is easily controlled with integrated RF-ID modules.



▲ Due to reliable data matching between pallet and content, product tracking in the control system is greatly simplified. Picking and sorting errors are reduced.

▲ By using with motor with absolute encoder, it allows skip the zero point search after power down and contributes to increase a rate of operation of equipment.

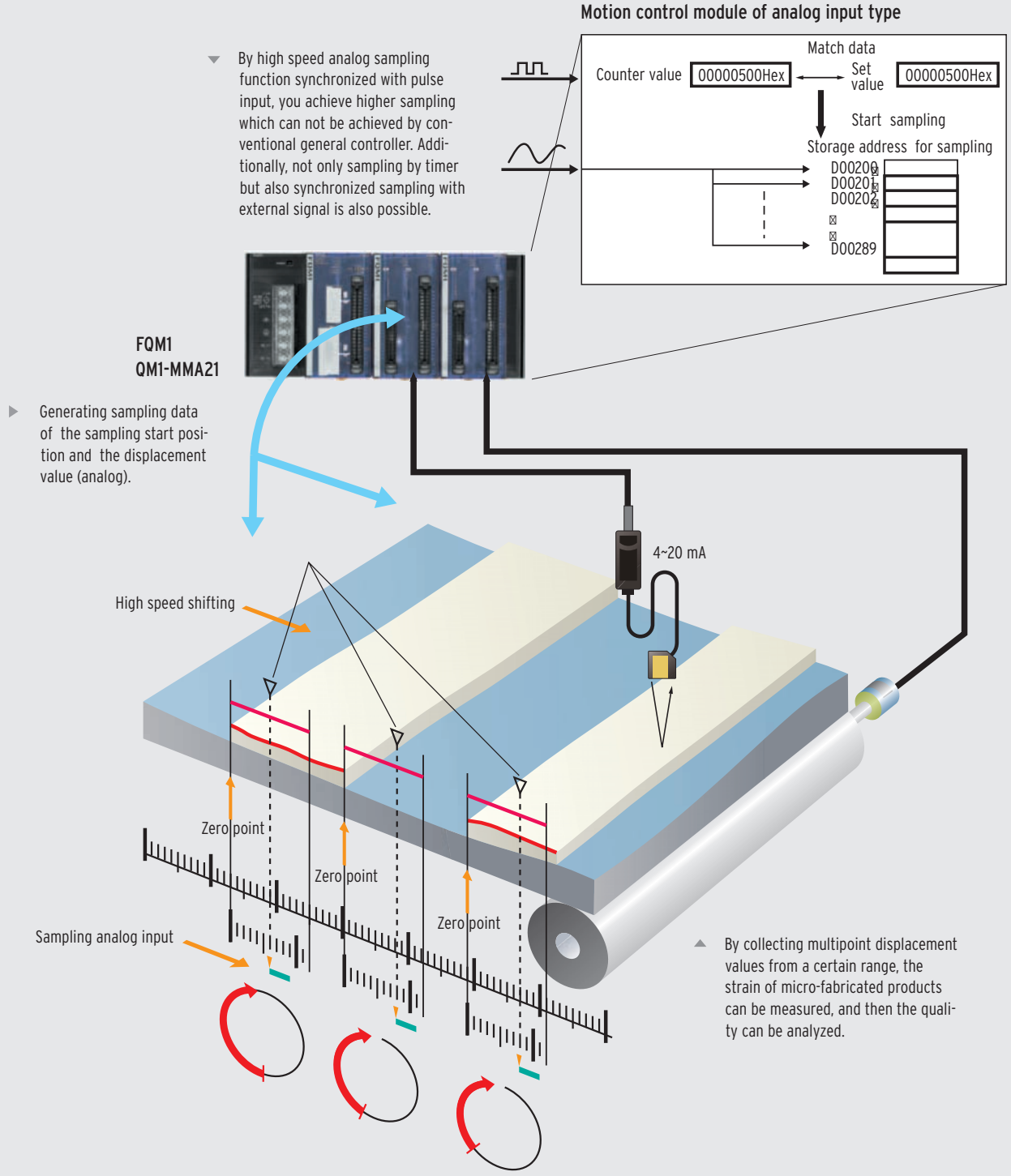
◀ By using W-series drivers with MECHATROLINK-II, required space decreases by 1/3 compared to conventional servo systems.

Application examples

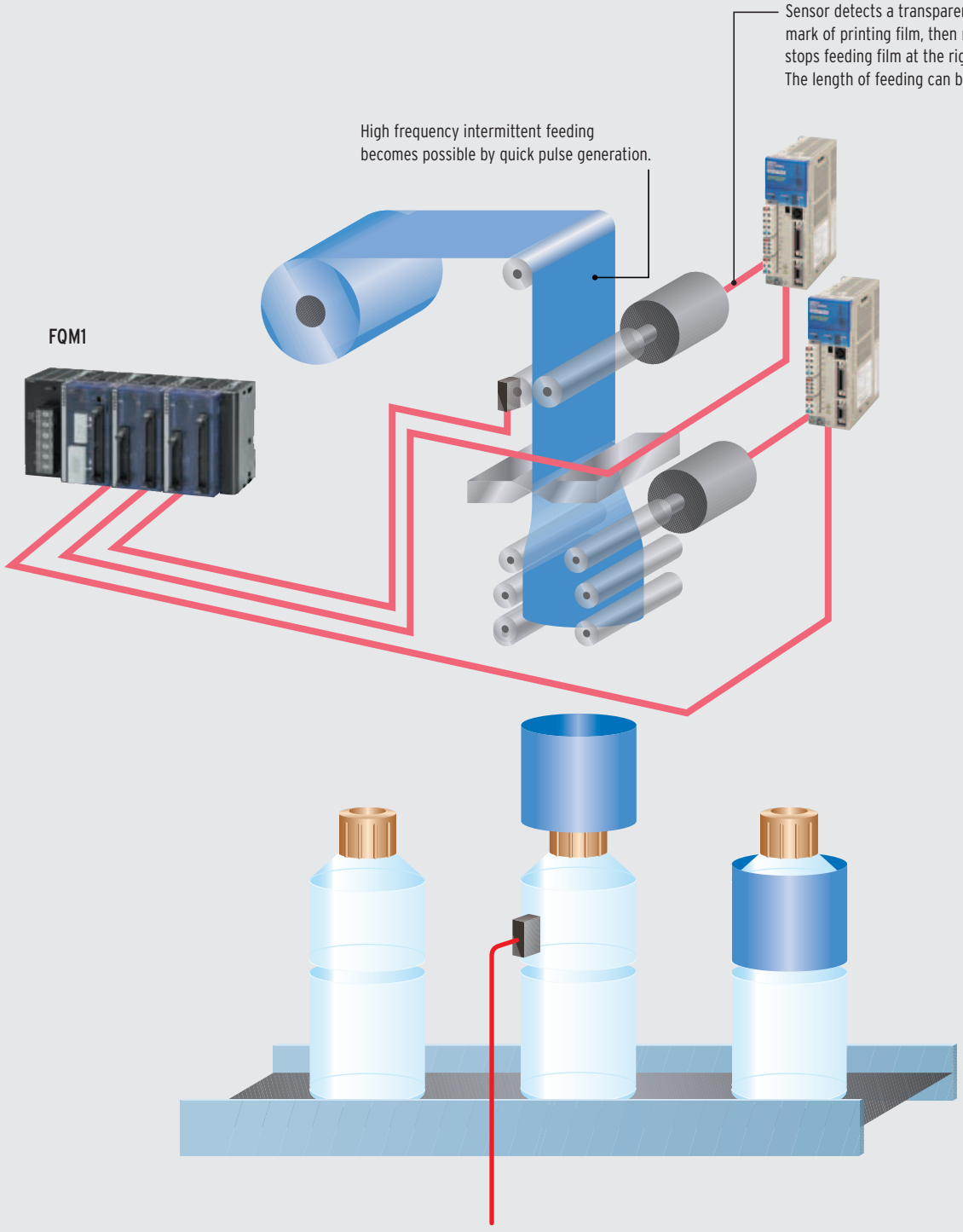
Solve your machine control issues efficiently

LCD panel inspection machine

Easy to collect inspection data along with the proper position.



Shrink labeling machine









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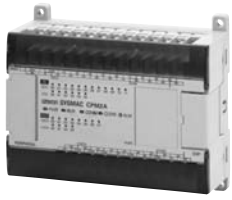
OMRON

PLC Selection Table

Flexible, Fast & Efficient Solutions

Flexibility, efficiency and speed are vital factors for staying competitive in the machine building industry. Omron's Control Systems give you this competitive edge. Omron's reputation for product quality, reliability and advanced technology is inherent in all of its control systems, from the smart remote I/O and the compact CPM to the high-performance modular CJ1 and the backplane-based CS1 series.

These control systems are designed for processing speed and transparency. They provide seamless data exchange inside machines, between machines, between machines and hosts, and between machines and remote locations.

		Compact PLC series			
					
		CPM1A	**CPM2A**	**CPM2B**	**CPM2C**
Page		40	65	82	86
Built-in	**Digital I/O**	10 - 40	20 - 60	32 - 40	10 - 32
	Interrupt inputs	2 - 4	2 - 4	4	2 - 4
	Counter Inputs	1 (5 kHz)	1 (20 kHz) + 2 to 4 (2 kHz)		
	Pulse Outputs	1 (2 kHz)	2 (10 kHz)		
CPU features / option boards		Built-in AC or DC power supply 2 analog settings	Built-in AC or DC power supply 2 analog settings Removable terminal blocks Standard 2nd serial port	Optional RS-232C port / clock / battery. 12/24 V DC versions. Customised versions on demand.	DC power supply 2nd serial port via converter unit
Max. digital I/O points		10 - 100	80 - 120	168	106 - 192
Execution time (bit instruction)		0.72 - 1.72 µs	0.26 - 0.64 µs		
Program memory		2 kWords	4 kWords		
Data memory		1 kWords	2 kWords		
CompactFlash memory		n.a.			
Analog I/O		Up to 6 inputs and 3 outputs 8-bit, 12-bit resolution U, I, TC, Pt100		Up to 8 inputs and 4 outputs. 13-bit resolution U, I	Up to 4 x (2 in + 1 out) 12-bit resolution U, I, TC, Pt100
Special function units		n.a.			
Industrial networks		Serial Communications			
Fieldbus master		n.a.		CompoBus/S	
Fieldbus I/O link		DeviceNet CompoBusS PROFIBUS-DP		DeviceNet	DeviceNet CompoBus/S

Compact PLC series	Modular PLC series		Rack PLC series	
				
CP1H	**CJ1M**	**CJ1G/H**	**CS1G/H**	**CS1D**
	154	154	274	261
40	16		n.a.	
8	4		n.a.	
4 (100 kHz)	2 (100 kHz)		n.a.	
2 (100kHz) + 2 (30kHz)	2 (100 kHz)		n.a.	
Built-in AC or DC power supply 4 analog in / 2 analog out (XA model) 2 serial communication board plug-ins 1 simple analog input 1 analog setting Removable terminal blocks USB programming port	Choice of models with and without built-in I/O Ethernet CPU (3 models)	Loop control CPU (4 models)	2 Serial Ports Loop Control Board	Loop Control Board Duplex CPU, Power Supply and Communications
320	160 - 640	960 - 2560	960 - 5120	5120
0.1 µs	0.1 µs	0.04/0.02 µs	0.04/0.02 µs	0.02 µs
20 kSteps	5 - 20 kSteps	10 - 250 kSteps	10 - 250 kSteps	60 - 250 kSteps
32 kWords	32 kWords	64 - 448 kWords	64 - 448 kWords	128 - 448 kWords
n.a.	Up to 64 MB		Up to 64 MB	
Up to approx. 30 inputs/outputs (8, 13, 14-bit resolution U, I, TC, PT100)	Up to 20 x 8 points 12 bit resolution U, I 15 bit resolution TC, Pt100, Pt1000 inputs	Up to 36 x 8 points 13-bit resolution U, I, 15-bit resolution TC, Pt100, PT1000 inputs	Up to 80 x 8 points, 13 bit resolution or 80 x 4 points, 16 bit resolution U, I, TC, Pt100, process I/O	Up to 75 x 8 points, 13 bit resolution or 75 x 4 points, 16 bit resolution U, I, TC, Pt100, process I/O
Temperature Control Protocol Macro RFID Sensor Unit	Temperature Control High-speed counters (500 kHz) SSI encoder input Position Control Protocol Macro RFID sensor Unit		Temperature Control SSI encoder input High-speed counters (500 kHz) Position Control Motion Control Process Control Protocol Macro	
Ethernet (100 BASE-Tx) Controller Link Serial Communications	Ethernet (100 BASE-Tx) Controller Link Serial communications		Ethernet (100 BASE-Tx) Controller Link Serial communications	
DeviceNet CAN PROFIBUS-DP CompoBus/S	DeviceNet CAN PROFIBUS-DP CompoBus/S		DeviceNet PROFIBUS-DP CAN / CANopen CompoBus/S	
DeviceNet PROFIBUS-DP CAN	DeviceNet PROFIBUS-DP CAN		DeviceNet PROFIBUS-DP CAN / CANopen	

Compact PLCs

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Compact PLC series

CPM1A

Ultracompact and Economical ... For a Wide Range of Uses
AC or DC power, relay or transistor outputs, sourcing or sinking, etc.

SYSMAC CPM1A

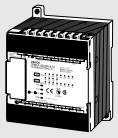


Setting a standard for micro PLCs, the CPM1A packs all basic functions into a compact size. Four CPU sizes are available, each with a choice of AC or DC power, relay or transistor outputs. Select any combination of power supply, output, and the number of I/O points to meet your needs.

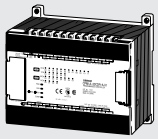
AC Power Source CPU Units Depth: 70 mm



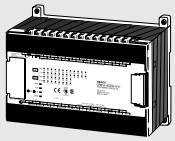
■Relay Output CPU Unit
CPM1A-10CDR-A-V1
■Transistor Output CPU Units
CPM1A-10CDT-A-V1 (Sink)
CPM1A-10CDT1-A-V1 (Source)
●Input points: 6, DC input
●Output points: 4



■Relay Output CPU Unit
CPM1A-20CDR-A-V1
■Transistor Output CPU Units
CPM1A-20CDT-A-V1 (Sink)
CPM1A-20CDT1-A-V1 (Source)
●Input points: 12, DC input
●Output points: 8



■Relay Output CPU Unit
CPM1A-30CDR-A-V1
● Transistor Output CPU Units
CPM1A-30CDT-A-V1 (Sink)
CPM1A-30CDT1-A-V1 (Source)
●Input points: 18, DC input
●Output points: 12

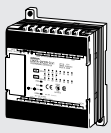


■Relay Output CPU Unit
CPM1A-40CDR-A-V1
■Transistor Output CPU Units
CPM1A-40CDT-A-V1 (Sink)
CPM1A-40CDT1-A-V1 (Source)
●Input points: 24, DC input
●Output points: 16

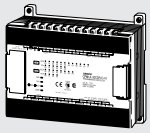
DC Power Source CPU Units Depth: 50 mm



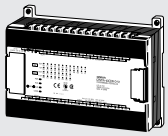
■Relay Output CPU Unit
CPM1A-10CDR-D-V1
■Transistor Output CPU Units
CPM1A-10CDT-D-V1 (Sink)
CPM1A-10CDT1-D-V1 (Source)
●Input points: 6, DC input
●Output points: 4



■Relay Output CPU Unit
CPM1A-20CDR-D-V1
■Transistor Output CPU Units
CPM1A-20CDT-D-V1 (Sink)
CPM1A-20CDT1-D-V1 (Source)
●Input points: 12, DC input
●Output points: 8

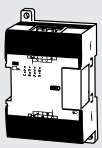


■Relay Output CPU Unit
CPM1A-30CDR-D-V1
■Transistor Output CPU Units
CPM1A-30CDT-D-V1 (Sink)
CPM1A-30CDT1-D-V1 (Source)
●Input points: 18, DC input
●Output points: 12

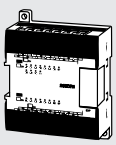


■Relay Output CPU Unit
CPM1A-40CDR-D-V1
■Transistor Output CPU Units
CPM1A-40CDT-D-V1 (Sink)
CPM1A-40CDT1-D-V1 (Source)
●Input points: 24, DC input
●Output points: 16

Expansion I/O Units

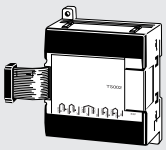


CPM1A-8ED
●Input points: 8, DC input
CPM1A-8ER
●Output points: 8, RY output
CPM1A-8ET
●Output points: 8, TR output (Sink)
CPM1A-8ET1
●Output points: 8, TR output (Source)



CPM1A-20EDR1
●Input points: 12, DC input
●Output points: 8, RY output
CPM1A-20EDT
●Input points: 12, DC input
●Output points: 8, TR output (Sink)
CPM1A-20EDT1
●Input points: 12, DC input
●Output points: 8, TR output (Source)

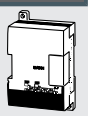
Temperature Sensor Units



CPM1A-TS001
●Thermocouple inputs: 2
CPM1A-TS002
●Thermocouple inputs: 4
CPM1A-TS101
●Pt100 inputs: 2
CPM1A-TS-101-DA
●Pt100 inputs: 2,
Analog outputs: 1
CPM1A-TS102
●Pt100 inputs: 4

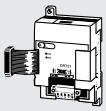
Analog I/O Units

CPM1A-MAD01
(Resolution: 256)
CPM1A-MAD11
(Resolution: 6,000)
2 inputs + 1 output
CPM1A-AD041 (4 inputs)
CPM1A-DA041 (4 outputs)



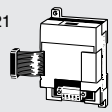
DeviceNet

CPM1A-DRT21
●I/O Link
inputs: 32
●I/O Link
outputs: 32



PROFIBUS-DP

PROFIBUS-DP
I/O Link Unit
CPM1A-PRT21
●I/O Link
inputs: 16
●I/O Link
outputs: 16



CompoBus/S

CompoBus/S
I/O Unit
CPM1A-SRT21
●I/O Link inputs: 8
●I/O Link outputs: 8



Space-saving Integration for Compact machines and Small-scale Control cabinets



- Ultracompact Size

  Ten-I/O-point AC models measure only 90 mm x 66 mm x 70 mm (H x W x D), and contain all basic PLC functions.
- A Wide Variety of Models Handling from 10 to 100 I/O Points

  By combining CPU Units having from 10 to 40 I/O points with 20-I/O-point Expansion I/O Units, CPM1A PLCs can be configured for 10 to 100 I/O points.
- Programming by Programmable Terminal

  Use of the optional Communications Adapter (RS-232C or RS-422 conversion) enables fast Host Link or NT Link communications with an OMRON Programmable Terminal. This makes it possible to program the CPM1A on the PT screen, greatly simplifying maintenance tasks.
- High-speed Processing

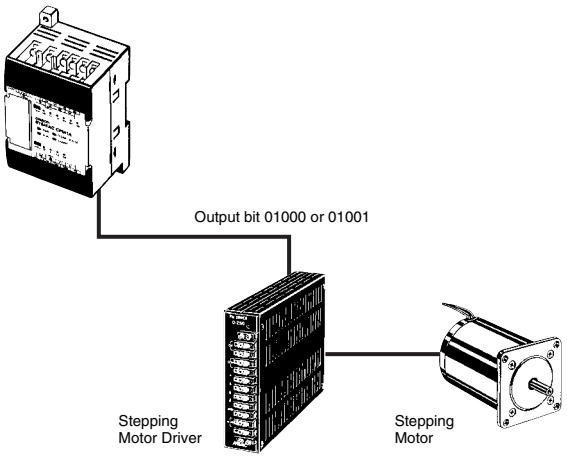
  Processing is fast, e.g., 0.7-µs AND LD / OR LD and 16.3-µs MOV instructions, allowing high-speed execution of even lengthy programs. Integrated interrupt and pulse catch inputs also handle high-speed pulses that occur within one program cycle.
- Versatile Functions in a Compact Body

  A large program capacity and instruction list handle even complicated control tasks with ease.
  - User memory: 2,048 words
  - Data memory: 1,024 words
  - Timer/counter: 128 points
  - Basic instructions: 14 types
  - Application instructions: 79 types
  - Analog setting dials: 2 points (built-in)
- Pulse Output

  CPM1A CPU models with transistor outputs can output pulses with a maximum frequency of 2 kHz. Combining these models with a Stepping Motor Driver or Servo Driver enables easy positioning operation.

Application Example

Changing the speed of a stepping motor.

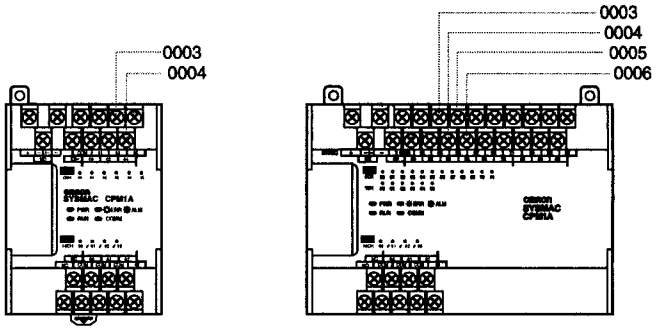


Functions

Input Interrupts

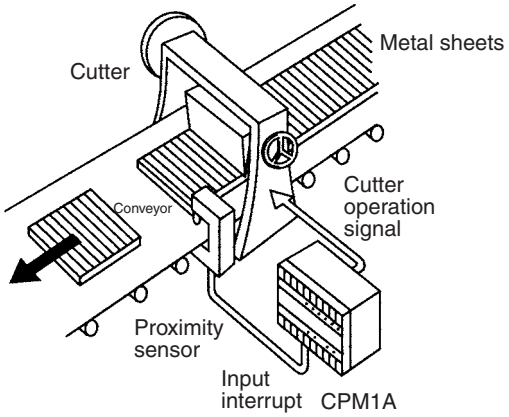
There are two input interrupts in the CPM1A 10-point I/O CPU and four in the 20-, 30-, and 40-point I/O CPUs.
Input interrupts are available in two modes.

10-point I/O CPU **20-, 30- and 40-point I/O CPU**



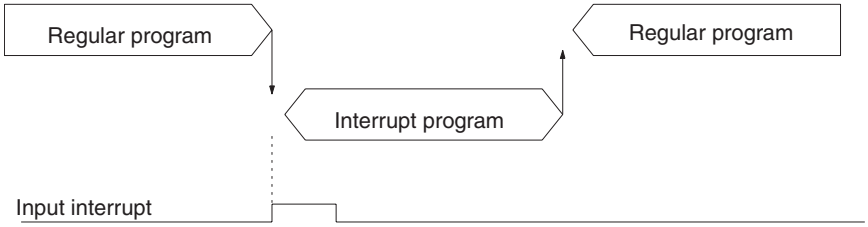
Application Example:

Cutting Metal Sheets to Specified Lengths
The proximity sensor detects the edge of a metal plate to operate the cutter. Metal sheets can be cut continuously to the specified lengths at a high speed.



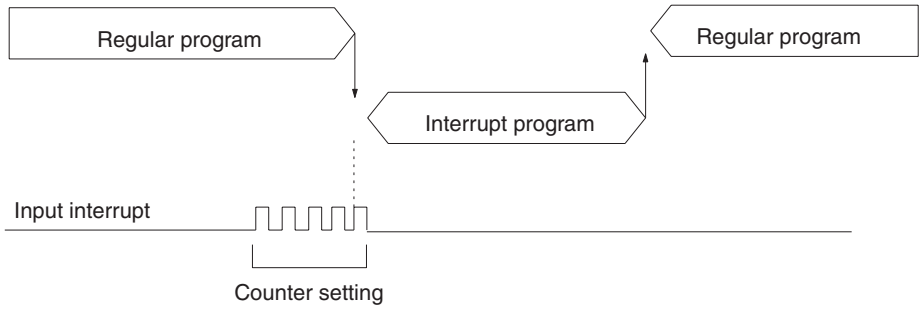
Input Interrupt Mode

If an input interrupt occurs, the regular program shuts down irrelevant of the cycle time, and the interrupt processing program is executed immediately.



Counter Mode

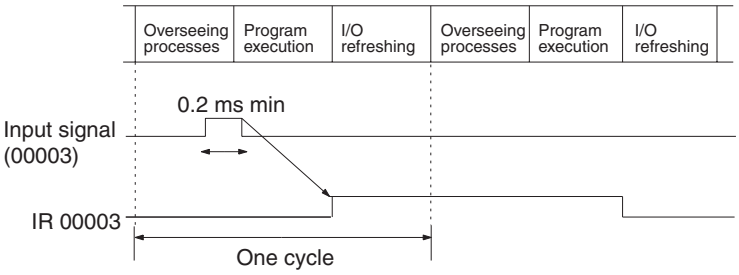
When the number of external signals counted at high speed reaches a specified number of counts, the regular program shuts down, and the interrupt processing program is executed at fixed counts. The count can be set between 0 and 65535.



Quick-response Inputs

There are two quick-response inputs for the CPM1A 10-point I/O CPU and four for the 20-, 30-, and 40-point I/O CPU (shared with the interrupt inputs). Since an internal buffer is provided, the quick-response input function can even detect signals modified within one cycle.

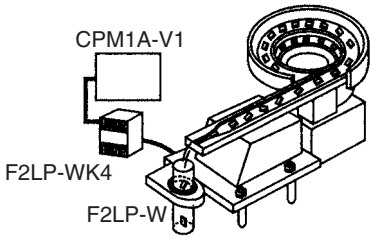
CPU	Input no.	Minimum input pulse width
10-point I/O CPU	00003 to 00004	0.2 ms
20-point, 30-point, 40-point I/O CPU	00003 to 00006	



Application Example:

Calculating the Number of Chips

The metal sensor counts the number of parts that have passed. Steady counting can be achieved even when the input-ON time is short.

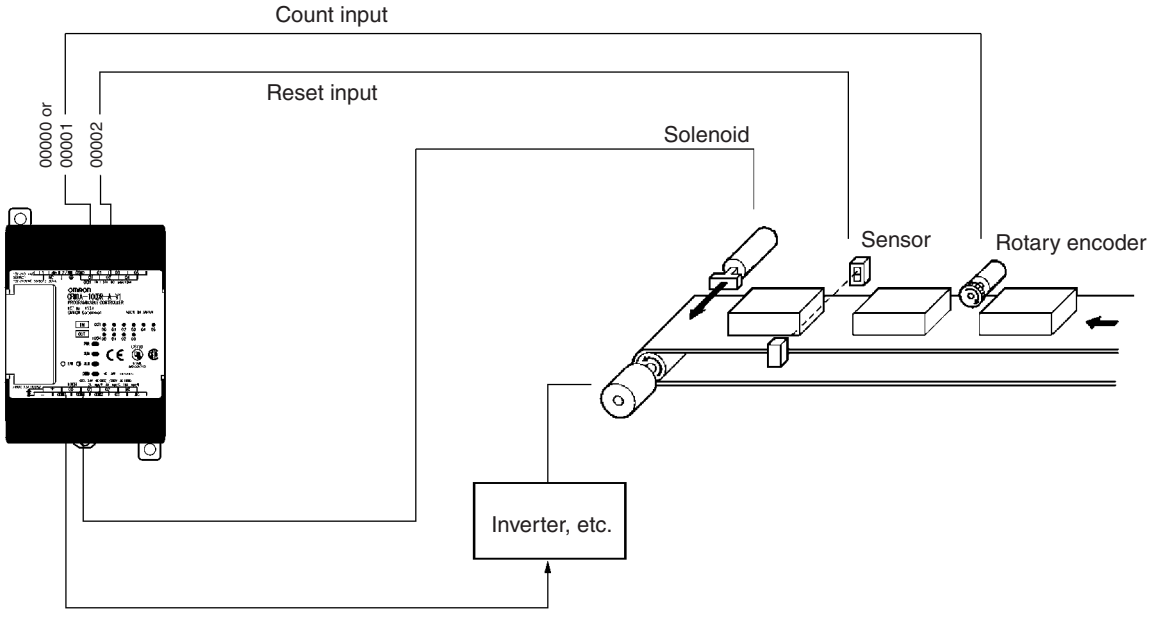


High-speed Counter

The CPM1A has a high-speed counter function that can be used in the incrementing and up/down mode. Using this function together with the input interrupts enables zone comparison control or target value control irrelevant of the cycle time.

Item		Incrementing mode	Up/Down mode
Input no.	00000	Count input	A-phase input
	00001	---	B-phase input
	00002	Reset input	Z-phase input
Input method		Single-phase input	Phase-difference, 4 x inputs
Count frequency		5.0 kHz	2.5 kHz
Count range		0 to 65535	-32767 t0 32767

Note: When using in the incrementing mode, the input 00001 can be used as an input contact.

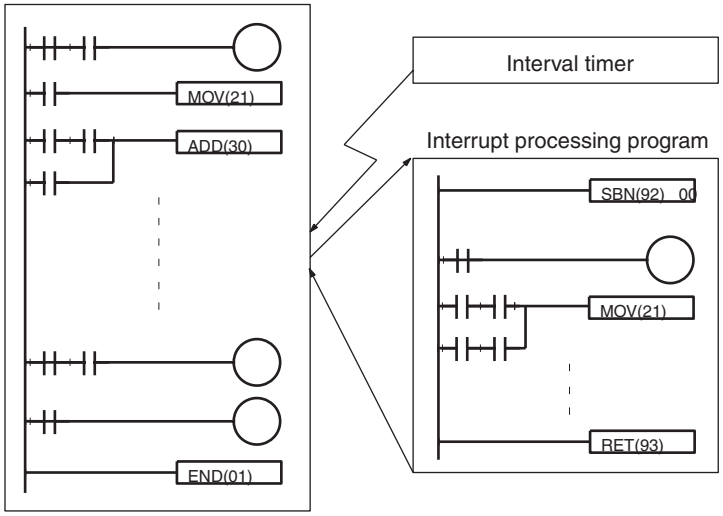


Interval Timer Interrupts

The CPM1A has one interval timer. The interval timer shuts down the regular program irrelevant of the point in the cycle once the time is up, and immediately executes an interrupt processing program. Interval timers are used in the following two modes.

Item	One-shot mode	Scheduled interrupt mode
Operation	An interrupt is executed only once when the time is up.	Interrupts are executed repeatedly at fixed periods.
Setting time	0.5 ms to 319,968 ms (0.1-ms units)	

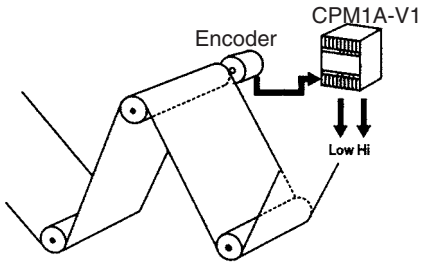
Normal program



Application example

Computing the Sheet Speed

The number of pulse inputs is computed in the interrupt mode at a fixed time to calculate the speed.

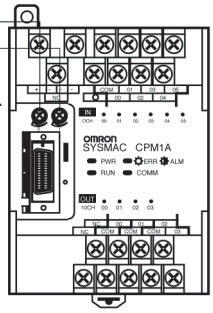


Analog Setting

The CPM1A contains two analog setting controls that can be used for a broad range of analog timer and counter settings. Turning the setting control stores values of 0 to 200 (BCD data) in the SR area.

Analog setting	Storage area	Setting value (BCD)
Analog setting 0	SR 250	0000 to 0200
Analog setting 1	SR 251	

Analog setting 0
Analog setting 1
*Phillips screwdriver is required.

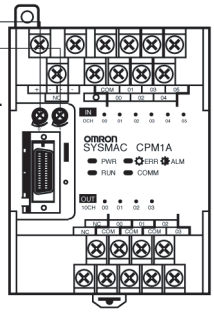


Application Example:

Tact Operation Control of Conveyor Lines

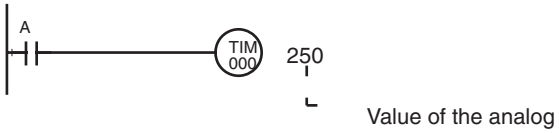
A conveyor can be stopped temporarily as required for assembly processes. When the timer function and limit switches are used in a combination, conveyors can be stopped for a fixed time or can be run at a constant speed for a fixed distance. Fine adjustment of the stopping time can be easily done by using the analog setting controls.

Analog setting 0
Analog setting 1
*Phillips screwdriver is required.



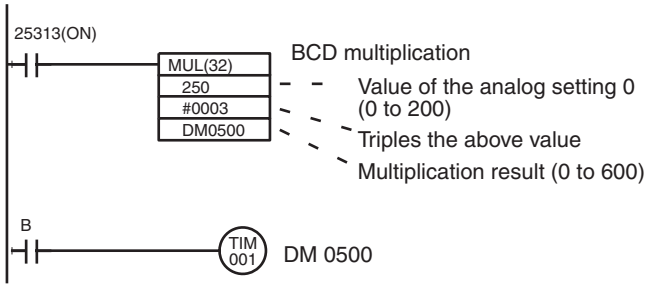
Program Example

1. Analog timer for 0.0 to 20.0 seconds



Value of the analog setting 0 (0 to 200)

2. Analog timer for 0.0 to 60.0 seconds



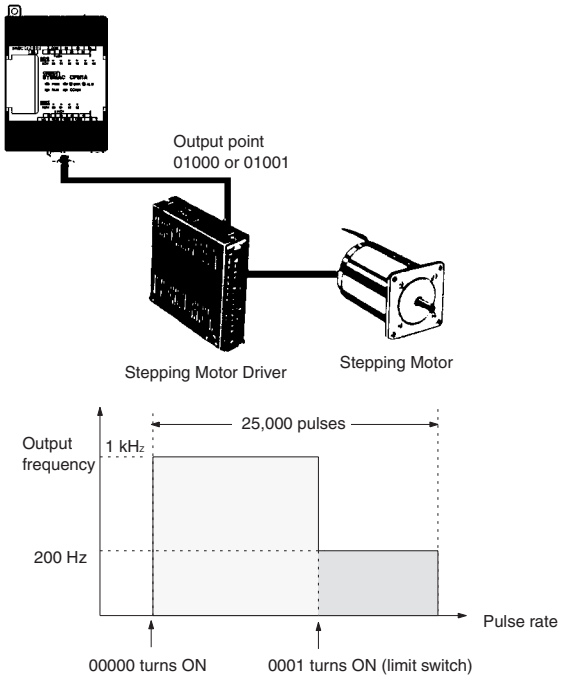
Pulse Output Function

The CPM1A with transistor output has a function that is capable of outputting a pulse of up to 2 kHz.

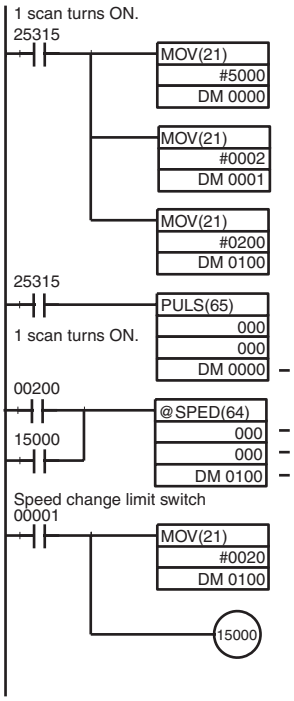
When used in combination with a Stepping Driver or Servodriver, positioning can be easily performed.

Application Example

Changing the speed of the Stepping Motor.



Program Example



Sets the number of output pulses as 25,000 (times) in the data memory area.

DM 0001				DM 0000			
0	0	0	2	5	0	0	0

Sets the initial frequency to 2,000 pulses/second.

Pulse rate setting

Pulse rate (BCD 8 digits)

Frequency conversion:
Output port (output point 01000)
Output mode (single)
Frequency data (x 10 Hz)

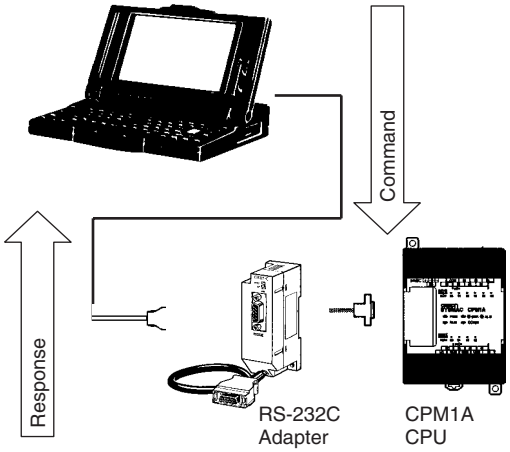
Changes to 200 Hz when the limit switch is turned ON.

Communications

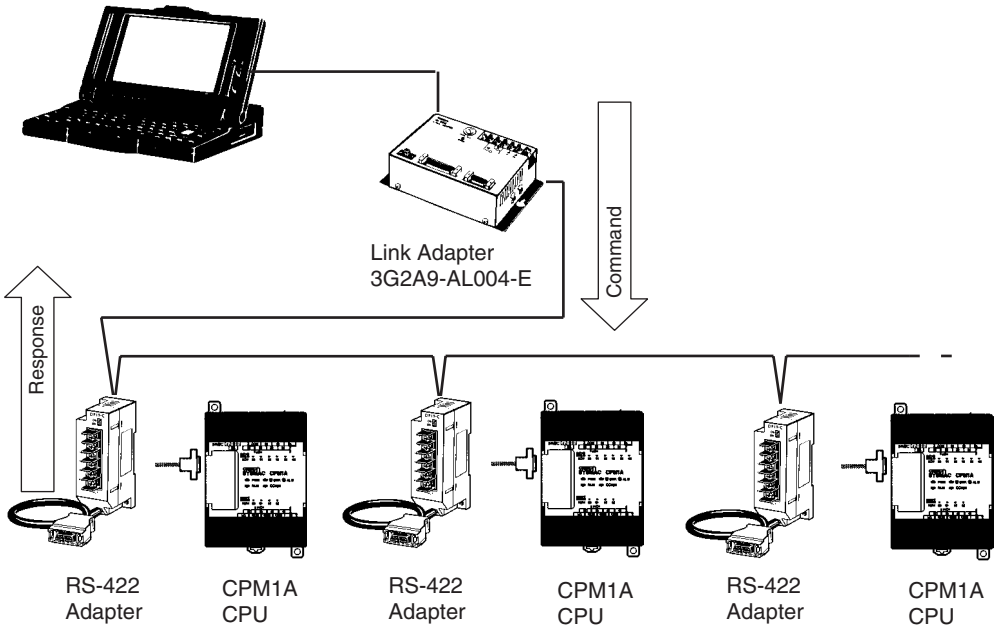
Host Link Communications

CPM1A host link communications consist of interactive procedures whereby the CPM1A returns a response to a command sent from the IBM PC/AT or compatible computer. These communications allow the IBM PC/AT or compatible computer to read and write in the CPM1A's I/O Areas and Data Memory Areas as well as in areas containing the status of various settings.

1:1 Host Link Communications



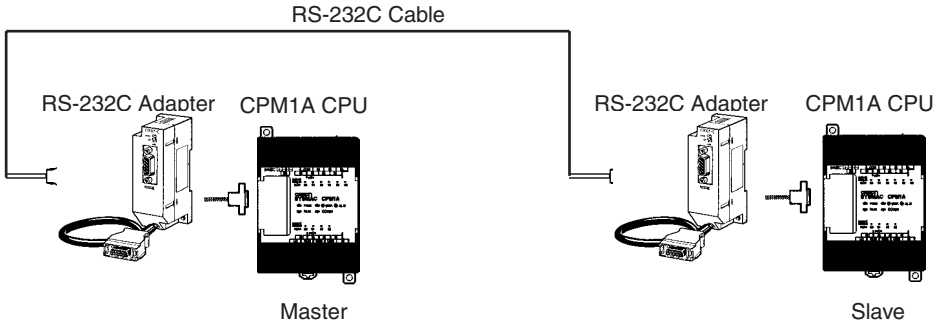
1:n Host Link Communications

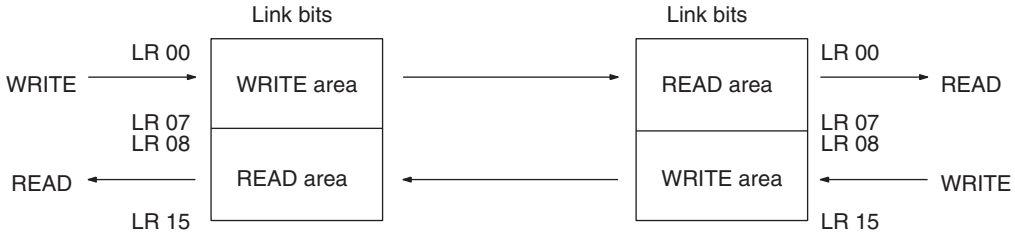


1:1 Links

With a 1:1 link, two CPM1As or a CPM1A and CQM1 or C200H□ are connected 1:1 with one side as the Master and the other as the Slave to provide an I/O link of a maximum of 256 points (LR 0000 to LR 1515).

Example of a 1:1 Link between CPM1As



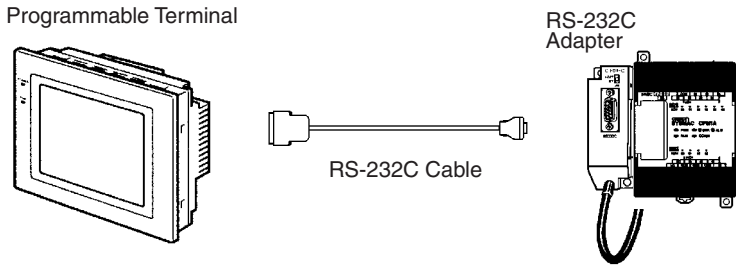


Limitations of the CPM1A 1:1 Link

CPM1A I/O links are limited to 16 words (LR 00 to LR 15). Therefore, use these 16 words (LR 00 to LR 15) on the CQM1 or C200H□ side when forming 1:1 links with a CQM1 or C200H□.

NT Links

High-speed communications can be achieved by providing a direct access through the use of the NT Link between the CPM1A and Programmable Terminal.



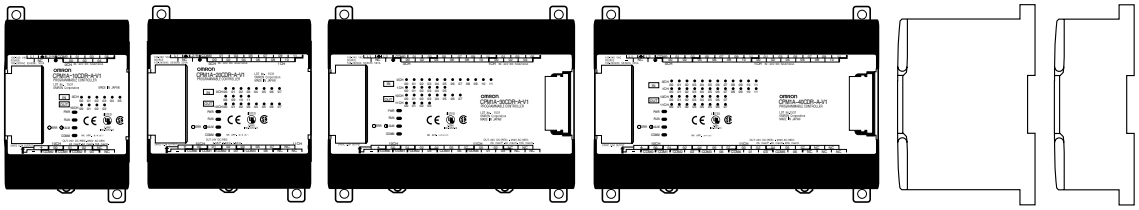
System Configuration

CPM1A Line-up

CPU with AC Power Supply • DC input • RY output / TR output
CPU with DC Power Supply • DC input • RY output / TR output

AC Power Supply Type

DC Power Supply Type



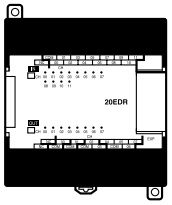
10 I/O points (Expansion not possible)

20 I/O points (Expansion not possible)

30 I/O points

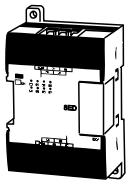
40 I/O points

Expansion I/O Unit
• DC input
• RY output/TR output



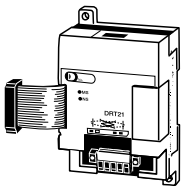
20 I/O points

Expansion I/O Unit
• DC input
• RY output/TR output

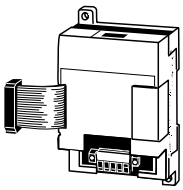


8 I/O points

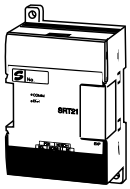
DeviceNet I/O Link Unit
CPM1A-DRT21



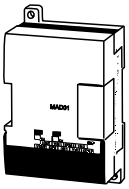
PROFIBUS-DP I/O Link Unit
CPM1A-PRT21



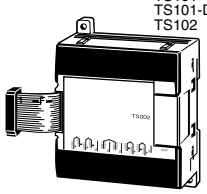
CompoBus/S I/O Link Unit
CPM1A-SRT21



Analog I/O Unit
CPM1A-MAD01
-MAD11
-AD041
-DA041



Temperature Sensor Units
CPM1A- TS001
TS002
TS101
TS101-DA
TS102



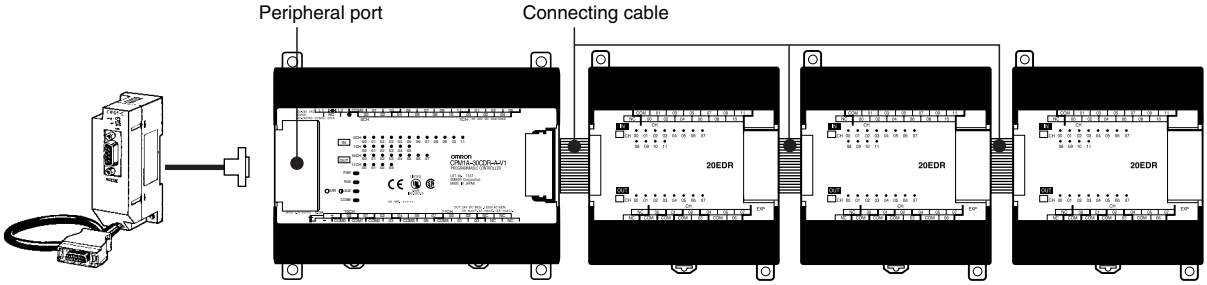


RS-232C Adapter
CPM1-CIF01



RS-422 Adapter
CPM1-CIF11

CPM1A System Configuration



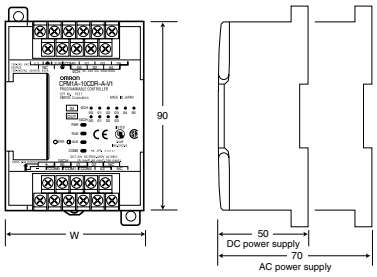
Both AC and DC power supplies.
30-point CPU and 40-point CPU only.
May be expanded up to a maximum of 3 Units.

Expansion I/O Unit

Expansion I/O Unit

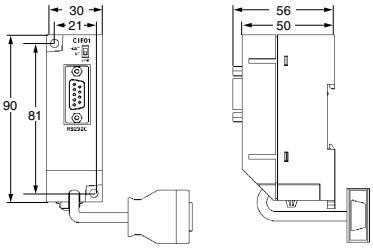
Expansion I/O Unit

External Dimensions

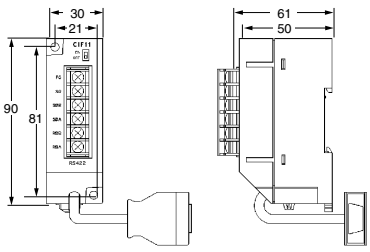


Model	W (mm)
CPM1A-10CD□-A-V1	66
CPM1A-10CD□-D-V1	
CPM1A-20CD□-A-V1	86
CPM1A-20CD□-D-V1	
CPM1A-30CD□-A-V1	130
CPM1A-30CD□-D-V1	
CPM1A-40CD□-A-V1	150
CPM1A-40CD□-D-V1	
CPM1A-20ED□	86 (depth: 50 mm)
CPM1A-8E□/SRT21	66 (depth: 50 mm)
CPM1A-MAD01/TS101-DA	66 (depth: 50 mm)
CPM1A-TS□□□/MAD11	86 (depth: 50 mm)
CPM1A-DRT21/PRT21	66 (depth: 50 mm)
CPM1A-AD041/DA041	86 (depth: 50 mm)

CPM1-CIF01

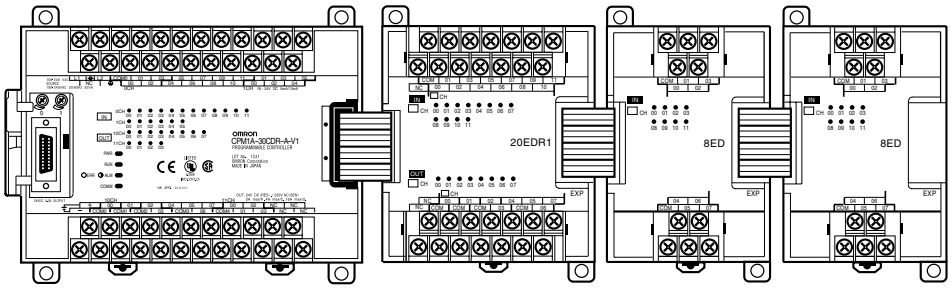


CPM1-CIF11



CPM1A System Configuration Example

A maximum of three Expansion I/O Units can be connected to the CPU Unit. Note that each 4-Channel Analog I/O Unit is counted as two Expansion Units (Group 2 Units, see Table 2).



CPU Unit | Expansion I/O Unit | Expansion I/O Unit | Expansion I/O Unit

Connection Groups for Expansion Units

Group 1 (G1)	Group 2 (G2)
Expansion I/O Units, Analog I/O Unit, CompoBus/S I/O LInk Unit PROFIBUS-DP I/O Link Unit DeviceNet I/O Link Unit CPM1A-TS001/101(-DA)	CPM1A-TS002/102 CPM1A-AD041/DA041

In addition to the CPU Unit, Expansion Units from the groups indicated in the above table can be combined as shown below.

Possible Expansion Unit Combinations

Expansion Unit 1	Expansion Unit 2	Expansion Unit 3
G1	G1	G1
G2	G1	---

Note: 1. Expansion Units 1, 2, and 3 can be mounted in any order.

2. Only one Expansion Unit can be mounted if an NT-AL001 is connected to the RS-232C port.

DC Power Supply-type CPM1A Power Consumption

Use the list below for calculating CPM1A power capacity. The CPM2C-PA201 AC Power Supply Unit provides 15 watts of power, so the remainder of the PLC power can be used as service power for sensors or other components.

CPM1A CPU Unit	Power Consumption (W)	Expandability
CPM1A-10CDR-D-V1	3.5	Not possible
CPM1A-20CDR-D-V1	4.5	Not possible
CPM1A-30CDR-D-V1	5.5	
CPM1A-40CDR-D-V1	6.5	
CPM1A-10CDT/T1-D-V1	3	Not possible
CPM1A-20CDT/T1-D-V1	3.5	Not possible
CPM1A-30CDT/T1-D-V1	4	
CPM1A-40CDT/T1-D-V1	4.5	

Add the following power consumption when using Expansion Units.

CPM1A CPU Unit	Power Consumption (W)
CPM1A-20EDR1	2.5
CPM1A-20EDT/T1	1.5
CPM1A-8ED	1
CPM1A-8ER	2
CPM1A-8ET/T1	1
CPM1A-SRT21/DRT21/PRT21	1
CPM1A-MAD01/MAD11	3.5
CPM1A-TS001/TS101(-DA)	3
CPM1A-TS002/TS102	3
CPM1A-AD041	3
CPM1A-DA041	3.3

The power consumption for the CPU Unit includes that of the Programming Console, RS-232C Adaptor, etc.

Specifications

General Specifications

Item		10-point I/O	20-point I/O	30-point I/O	40-point I/O
Power supply vol tage/frequency	AC power supply	100 to 240 V AC, 50/60 Hz			
	DC power supply	24 V DC			
Operating voltage range	AC power supply	85 to 264 V AC			
	DC power supply	20.4 to 26.4 V DC			
Power consumption	AC power supply	30 V AC max.		60 V AC max.	
	DC power supply	(See below.)			
Inrush current		30 A max.		60 A max.	
External power supply (AC only)	Power supply voltage	24 V DC			
	Power supply output capacity	200 mA		300 mA	
Insulation resistance		20 MΩ min. at 500 V DC between the AC terminals and the protective earth terminal.			
Dielectric strength		2,300 V AC at 50/60 Hz for one minute with a leakage current of 10 mA max. between all the external AC terminals and the protective earth terminal.			
Noise resistance		Conforms to IEC61000-4-4, 2 kV (power lines)			
Vibration resistance		10 to 57 Hz with an amplitude of 0.075 mm, and 57 to 150 Hz with an acceleration of 9.8 m/s^2 in the X, Y, and Z directions for 80 minutes each (i.e. swept for 8 minutes, 10 times).			
Shock resistance		147 m/s^2 in the X, Y and Z directions 3 times each.			
Ambient temperature (operating)		0° to 55°C			
Ambient humidity (operating)		10% to 90% (no condensation)			
Ambient environment (operating)		With no corrosive gas			
Ambient temperature (storage)		–20° to 75°C			
Terminal screw size		M3			
Power supply holding time		10 ms min. for AC models, and 2 ms min. for DC models			
Weight		AC model: 400 g max. DC model: 300 g max.	AC model: 500 g max. DC model: 400 g max.	AC model: 600 g max. DC model: 500 g max.	AC model: 700 g max. DC model: 600 g max.

Note: The specifications of the Expansion I/O Unit are the same as for the CPU except that the power is supplied from the CPU and the weight is 300 g.

Performance Specifications

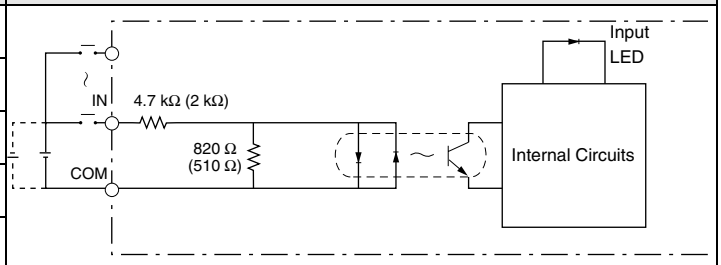
Item		10-point I/O	20-point I/O	30-point I/O	40-point I/O
Control method		Stored program method			
I/O control method		Combination of the cyclic scan and immediate refresh processing methods.			
Programming language		Ladder diagram			
Instruction word		1 step per instruction, 1 to 5 words per instruction			
Types of instructions	Basic instructions	14 types			
	Special instructions	79 types, 139 instructions			
Instruction execution time	Basic instructions	0.72 to 16.2 μs			
	Special instructions	MOV instruction = 16.3 μs			
Program capacity		2,048 words			
Maximum I/O points	CPU only	10 points (6 input/4 output points)	20 points (12 input/8 output points)	30 points (18 input/12 output points)	40 points (24 input/16 output points)
	With Expansion I/O Unit	---	---	90 points (54 input/36 output points)	100 points (60 input/40 output points)
Input bits		00000 to 00915 (Words 0 to 9)			
Output bits		01000 to 01915 (Words 10 to 19)			
Work bits (IR Area)		512: IR 20000 to IR 23115 (IR 200 to IR 231)			
System bits (SR Area)		384: SR 23200 to SR 25515 (SR 232 to SR 255)			
Temporary bits (TR Area)		8: TR 0 to TR 7			
Holding bits (HR Area)		320: HR 0000 to HR 1915 (HR 00 to HR 19)			
Auxiliary bits (AR Area)		256: AR 0000 to AR 1515 (AR 00 to AR 15)			
Link bits (LR Area)		256: LR 0000 to LR 1515 (LR 00 to LR 15)			
Timers/Counters		128:TIM/CNT 000 to 127 100-ms timer: TIM 000 to TIM 127 10-ms timer: TIM 000 to TIM 127 Decremental counter, reversible counter			
Data memory	Read/Write	1,024 words (DM 0000 to DM 1023)			
	Read only	512 words (DM 6144 to DM 6655)			
Interrupt processing: External interrupt		2 points (Response time of 0.3 ms max.)	4 points (Response time of 0.3 ms max.)		
Memory protection		Maintains the contents of the HR, AR, Counter and Data Memory Areas.			
Memory backup		Flash memory:User program, data memory (Read only) (Non-battery powered storage) Super capacitor:Data memory (Read/Write), holding bits, auxiliary memory bits, counter (20-day storage at an ambient temperature of 25°C)			
Self-diagnostic function		CPU error (watchdog timer), memory errors, I/O bus errors			
Program check		No END instruction, programming errors (constantly checked during operation)			
Pulse output		1 point: 2 kHz			
High-speed counter		1 point:Single phase at 5 kHz or two-phase at 2.5 kHz (linear counting method) Incremental mode: 0 to 65535 (16-bit) Decremental mode:–32767 to 32767 (16-bit) 1 point:Single phase at 5 kHz or two-phase at 2.5 kHz (linear counting method) Incremental mode: 0 to 65535 (16-bit) Decremental mode:–32767 to 32767 (16-bit)			
Quick-response inputs		Together with the external interrupt input (minimum pulse width of 0.2 ms)			
Input time constant		Can be set at 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, or 128 ms.			
Analog settings		2 points: (0 to 200)			

Note: Bits that are not used for the I/O bits can be used as work bits.

I/O Specifications

Input Circuit

CPU

Item	Specifications	Circuit
Input voltage	24 V DC +10%/–15%	
Input impedance	IN00000 to IN00002: 2 kΩ Others: 4.7 kΩ	
Input current (typical)	IN00000 to IN00002: 12 mA Others: 5 mA	
ON voltage	14.4 V DC min.	
OFF voltage	5.0 V DC max.	
ON delay (see note 1)	1 to 128 ms max. (default: 8 ms) (see note 1)	
OFF delay (see note 1)	1 to 128 ms max. (default: 8 ms) (see note 1)	

Note: The polarity of the input power supply can be either positive or negative.
Resistance values in parentheses are for inputs IN00000 to IN00002.

Note: 1. The actual ON/OFF delay includes a digital filter with a time constant of 1, 2, 4, 8, 16, 32, 64, or 128 ms (default: 8 ms).

2. The delays for IN00000 to IN00002 are as follows when used for the high-speed counter.

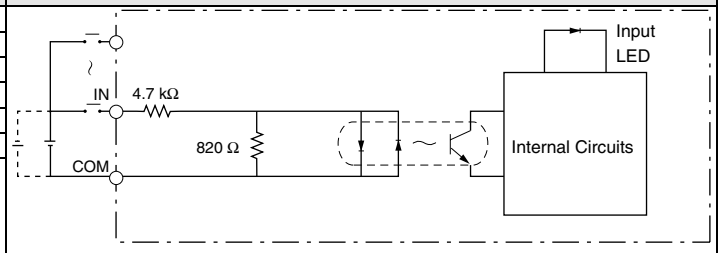
Input	Increment mode	Differential phase mode
IN00000 (A-phase)	5 kHz	2.5 kHz
IN00001 (B-phase)	Normal input	
IN00002 (Z-phase)	ON: 100 μs max. OFF: 500 μs max.	

3. The delays for IN00003 to IN00006 are as follows when used for the high-speed counter.

Delay	0.3 ms max. (From the time of input ON until the interrupt subroutine is executed.)*1

*1 For detailed specifications of expansion I/O units, see page 68.

Expansion I/O Unit

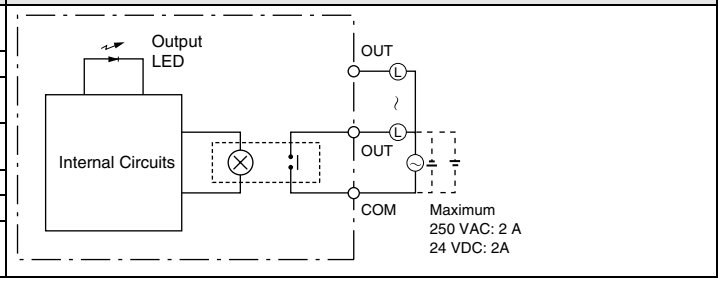
Item	Specifications	Circuit
Input voltage	24 V DC +10%/–15%	
Input impedance	4.7 kΩ	
Input current (typical)	5 mA	
ON voltage	14.4 V DC min.	
OFF voltage	5.0 V DC max.	
ON delay (see note 1)	1 to 128 ms max. (default: 8 ms) (see note 1)	
OFF delay (see note 1)	1 to 128 ms max. (default: 8 ms) (see note 1)	

Note: The polarity of the input power supply can be either positive or negative.

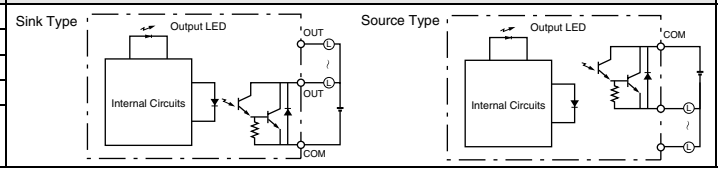
Note: The actual ON/OFF delay includes an input constant of 1, 2, 4, 8, 16, 32, 64, or 128 ms (default: 8 ms).

Output Circuit

CPU and Expansion I/O Unit
Relay Output

Item			Specifications	Circuit
Maximum switching capacity			250 V AC/2 A (cosϕ =1) 24 V DC/2 A (4 A/common)	
Minimum switching capacity			5 V DC, 10 mA	
Relay service life	Electrical	Resistive load	150,000 times (at 24 V DC)	
		Inductive load	100,000 times (at 200 V AC, cosϕ =0.4)	
	Mechanical		20 million times	
ON delay			15 ms max.	
OFF delay			15 ms max.	

Transistor Output (Sink Type/Source Type) (CPU/Expansion I/O Unit)

Item	Specifications	Circuit
Maximum switching capacity	24 V DC +10%/–15%, 300 mA (see note 1)	
Leakage current	0.1 mA max.	
Residual voltage	1.5 V max.	
ON delay	0.1 ms max.	
OFF delay	1 ms max. (see note 2)	

Note: 1. The maximum switching capacity of the CPM1A with transistor outputs (sink type and source type) is limited to the currents shown in the following table for the common and for the Unit.

Item	10CDT-V1/ 10CDT1-A-V1/D-V1	20CDT-D-V1/ 20CDT1-A-V1/D-V1	30CDT-D-V1/ 30CDT1-A-V1/D-V1	40CDT-D-V1/ 40CDT1-A-V1/D-V1	20EDT/20EDT1	CPM1A-8ET/8ET1
Max. switching capacity	0.9 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 2.7 A/Unit	0.9 A/common 3.6 A/Unit	0.9 A/common 1.8 A/Unit	

2. When using the pulse output function of the CPM1A with transistor outputs (sink type and source type):
The output current must be between 100 to 200 mA when using the output 01000 or 01001 as a pulse output with the maximum frequency of 2 kHz.
The off-delay of outpus 01000 and 01001 will vary depending on the output current.

Load current	OFF delay
100 to 200 mA	0.2 ms max.
0 to 300 mA except for the above range	0.5 ms max.

Analog I/O Unit

Item		CPM1A-MAD01		CPM1A-MAD11		CPM1A-AD041		CPM1A-DA041	
		Voltage I/O	Current I/O	Voltage I/O	Current I/O	Voltage I/O	Current I/O	Voltage I/O	Current I/O
Analog inputs	Number of inputs	2		2 (allocated 2 words)		4 (allocated 4 words in + 2 words out)			
	Input signal ranges	0 to 10 V or 1 to 5 V	4 to 20 mA	0 to 5 V, 1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA	0 to 5 V, 1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA		
	Maximum rated input	±15 V	±30 mA	±15 V	±30 mA	±15 V	±30 mA		
	External input impedance	1 MΩ min.	250 Ω rated	1 MΩ min.	250 Ω	1 MΩ min.	250 Ω		
	Resolution	1/256		1/6,000 (full scale)		1/6,000 (full scale)			
	Overall precision	1.0% of full scale		25°C:±0.3% of full scale	25°C:±0.4% of full scale	25°C:±0.3% of full scale	25°C:±0.4% of full scale		
				0 to 55°C:±0.6% of full scale	0 to 55°C:±0.8% of full scale	0 to 55°C:±0.6% of full scale	0 to 55°C:±0.8% of full scale		
	Converted A/D data	8-bit binary data Full scale = 0000 to 00FF Hex		Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale		Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale			
	Averaging	---		Supported (set for each input with DIP switch)		Supported (set for each input with DIP switch)			
	Disconnection detection	---		Supported		Supported			
Analog output (See note 1.)	Number of outputs	1		1 (1 word allocated)				4 (4 words allocated)	
	Output signal ranges	0 to 10 V or –10 to 10 V	4 to 20 mA	1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA			1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA
	External output allowed load resistance	2 kΩ min.	350 Ω max.	1 kΩ min.	600 Ω max.			1 kΩ min.	600 Ω max.
	External output impedance	---		0.5 Ω max.	---			0.5 Ω max.	---
	Resolution	1/256 (1/512 when the output signal range is –10 to 10 V.)		1/6,000 (full scale)				1/6,000 (full scale)	
	Overall precision	1.0% of full scale		25°C:±0.4% of full scale				25°C:±0.4% of full scale	
				0 to 55°C:±0.8% of full scale				0 to 55°C:±0.8% of full scale	
	D/A data setting	8-bit plus sign binary data -10 to 10 V output range: Full scale = 80FF to 00FF Hex 4 to 20 mA output range: Full scale = 0000 to 00FF Hex		Binary data (hexadecimal, 4-digit) –10 to 10 V output range: Full scale = F448 to 0BB8 Hex Other output ranges: Full scale = 0000 to 1770 Hex				Binary data (hexadecimal, 4-digit) –10 to 10 V output range: Full scale = F448 to 0BB8 Hex Other output ranges: Full scale = 0000 to 1770 Hex	
Conversion time		10 ms/Unit max. (See note 2.)		2 ms/point		2 ms/point		2 ms/point	
Isolation method		Photocoupler isolation between I/O terminals and PC (There is no isolation between the analog I/O signals.)		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)	

Note: 1. The voltage output and current output can be used at the same time, but the total output current cannot exceed 21 mA.
2. The conversion time is the total time for 2 analog inputs and 1 analog output.

Temperature Sensor Units

By mounting a Temperature Sensor Unit (CPM1A-TS001/TS002/TS101/TS102) to the PLC, input can be obtained from a thermocouple or platinum resistance thermometer, and temperature measurements can be converted to binary data (4-digit hexadecimal) and cyclically updated in the input area of the CPU Unit.

Specifications

Item	Specifications	
Model	CPM1A-TS001/002	CPM1A-TS101/102
Number of inputs	2 (TS001), 4 (TS002)	2 (TS101), 4 (TS102)
Input types	Thermocouple K, J switchable (**Note:** Same type for all input points.)	Pt100, JPt100 switchable (**Note:** Same type for all input points.)
Indication accuracy	The larger of ±0.5% of the indicated value and ±2°C ±1 digit max.	[The larger of ±0.5%of the indicated value and ±1°C] ±1 digit max.
Conversion time	250 ms/2 points (TS001, TS101); 250 ms/4 points (TS002, TS102)	
Converted temperature data	Binary (4-digit hexadecimal)	
Isolation method	Photocoupler isolation between the temperature input signals.	

Note: The indication accuracy when using a K-type thermocouple for temperatures less than –100°C is ±4°C ±1 digit max.

Input Temperature Ranges for CPM1A-TS001/002

The rotary switch can be used to make of the following range and input type settings for CPM1A-TS001/002 models.

Input type	Range (°C)	Range (°F)
K	–200 to 1300	–300 to 2300
	0.0 to 500.0	0.0 to 900.0
J	–100 to 850	–100 to 1500
	0.0 to 400.0	0.0 to 750.0

Input Temperature Ranges for CPM1A-TS101/102

The rotary switch can be used to make of the following range and input type settings for CPM1A-TS101/102 models.

Input type	Range (°C)	Range (°F)
Pt100	–200.0 to 650.0	–300 to 1200.0
JPt100	–200.0 to 650.0	–300 to 1200.0

Specifications CPM1A-TS101-DA

Item	Specifications
Model	CPM1A-TS101-DA
Number of inputs	2
Input types	Pt100
Temperature range	-40 to 250°C
Converted temperature data	16-bit, 2's complement, 0.1°C resolution
Indication accuracy	1.0% of full scale max.
Number of outputs	1
Output type	0 to 10 V, -10 to 10 V, 4 to 20 mA
Load resistance	2 kΩ min. (voltage output), 500Ω max. (current output)
Output resolution	8 bit + sign (1/256, 1/512 for -10 to 10 V)
Output accuracy	1.0% of full scale max.
Conversion time	60 ms (all channels)
Isolation method	Photocoupler isolation between I/O signals and PLC

DeviceNet I/O Link Unit - CPM1A-DRT21

By connecting the DeviceNet I/O Link Unit (CPM1A-DRT21), the CPM1A can function as the slave of a DeviceNet Master Unit.
In this configuration, 32 input- and 32 output bits are exchanged with the Master Unit.

Specifications

Item	Specification
Master/slave	DeviceNet Slave
Number of I/O points allocated to Master	Input: 32 points / Output: 32 points
Number of words allocated from CPM1A's I/O memory	Input: 2 words / Output: 2 words (Allocated in the same way as other Expansion Units).
Node address setting method	Set using DIP switch.

PROFIBUS-DP I/O Link Unit - CPM1A-PRT21

By connecting the PROFIBUS-DP I/O Link Unit (CPM1A-PRT21), the CPM1A can function as the slave of any PROFIBUS-DP Master Unit.
In this configuration, 16 input- and 16 output bits are exchanged with the Master unit.

Specifications

Item	Specification
Master/slave	PROFIBUS-DP slave (OC_0658.GSD)
Number of I/O points allocated to Master	Input: 16 points / Output: 16 points (Intel/Motorola format selectable by DIP switch)
Number of words allocated from CPM1A's I/O memory	Input: 1 word / Output: 1 word (Allocated in the same way as other Expansion Units).
Node address setting method	0-99 using 2 rotary switches

CompoBus/S I/O Link Unit - CPM1A-SRT21

Specifications

Item	Specification
Master/Slave	CompoBus/S Slave
Number of I/O bits	8 input bits, 8 output bits
Number of words occupied in CPM2A I/O memory	1 input word, 1 output word (Allocated in the same way as other Expansion Units).
Node number setting	Set using the DIP switch. (Set before turning ON power for the CPU Unit.)

Communications Adapter Specifications CPM1-CIF01/CIF11

RS-232C Adapter and RS-422 Adapter

Item	Specifications	
	CPM1-CIF01	CPM1-CIF11
Functions	Level conversion between the CMOS level (CPU side) and the RS-232C level (peripheral device side)	Level conversion between the CMOS level (CPU side) and the RS-422 level (peripheral device side)
Isolation (all in this line)	The RS-232C (peripheral device side) is insulated by a DC/DC converter and photocoupler.	The RS-422 (peripheral device side) is insulated by a DC/DC converter and photocoupler.
Power supply	Power is supplied by the CPU.	
Weight	200 g max.	

Expansion Memory Unit CPM1A-EMU01-V1

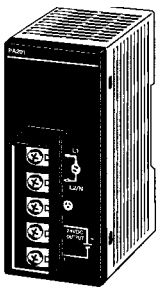
The CPM1-EMU01-V1 offers simple onsite transfer of user programs and data memory.

Item	Specifications
Supported PLCs	CPM1, CPM1A, CPM2A, CPM2C, SRM1(-V2), CQM1, CQM1H
Read/write memory areas	User Program: 15.2 kWords max. Data memory: DM 6144 to DM 6655
Espansion instructions	18 instructions
EEPROM	256-Kbit EEPROM, ATMEL: AT28C256, OMRON: EEROM-JD
Current consumption	130 mA max.
Dimensions (not including cables or connectors)	57 x 92 x 38 mm (W x H x D)
Weight	200 g max. (not including EEPROM)

Specifications

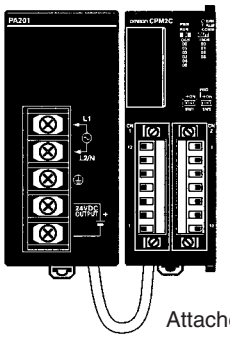
CPM2C-PA201 AC Power Supply Unit

- The CPM2C-PA201 is a slim and compact AC Power Supply Unit of the same shape as the CPM2C's CPU Unit. It can be connected simply using the connecting cable (23 cm) provided. It can also be used for CPM1A and CPM2A CPU Units and as display power supply (wired by the user).

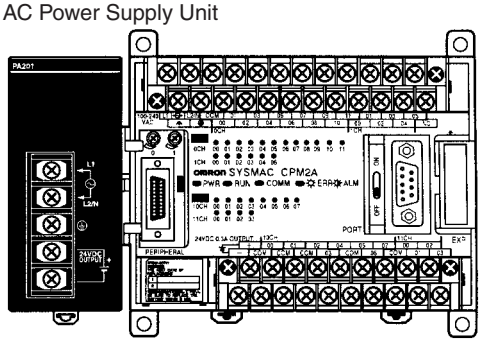


Service power supply for external devices such as sensors (24 V).

AC Power Supply Unit



AC Power Supply Unit

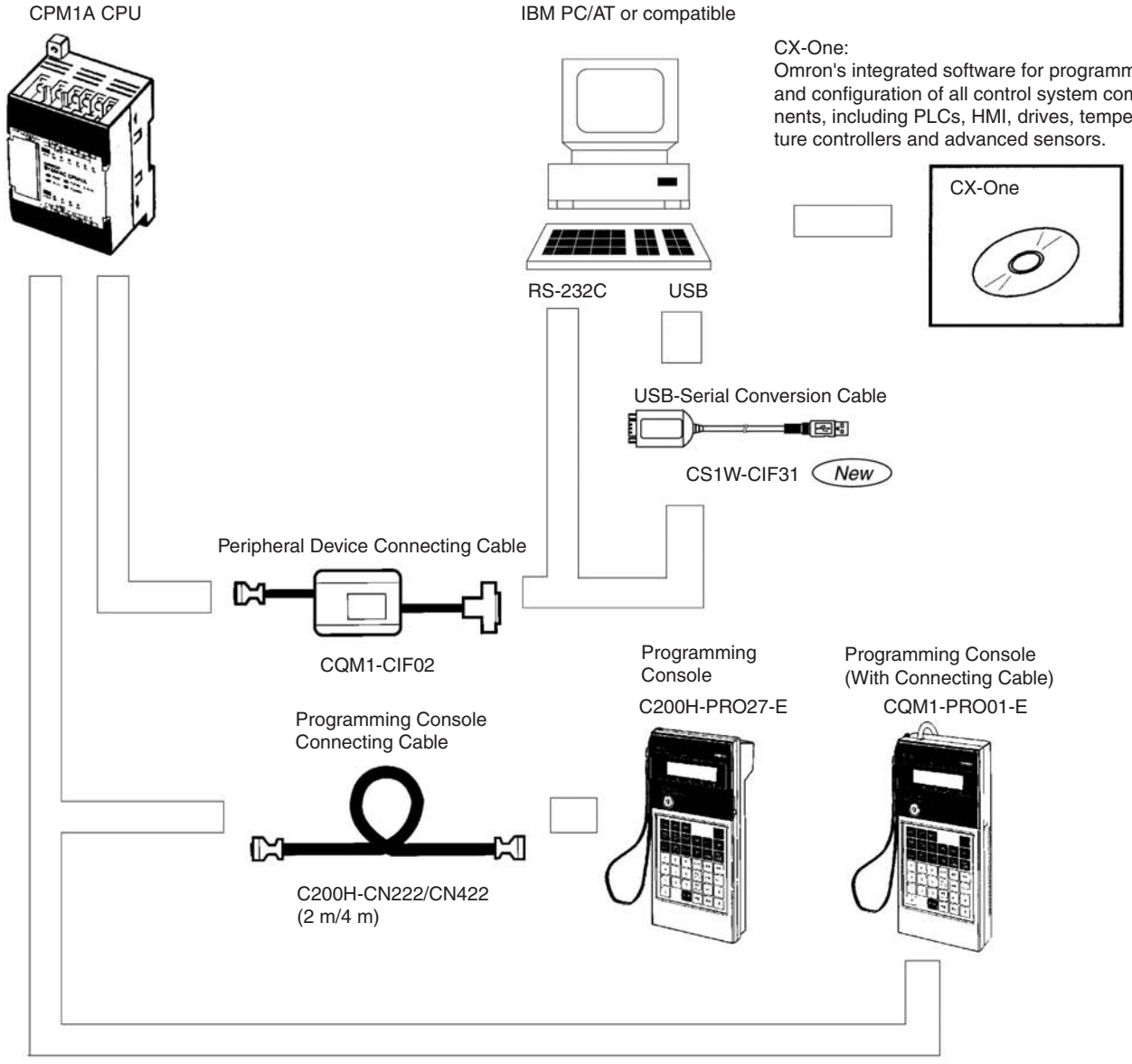


Attached connecting cable

Item			Specification
Rated output			15 W
Output voltage			24 V
Output current			600 mA
Efficiency			75% min. (at rated output)
Input conditions	Rated voltage		100 to 240 V AC
	Allowable voltage range		85 to 264 V AC
	Frequency		47 to 63 Hz
	Current	100 V	0.4 A
		200 V	0.2 A
	Leakage current	100 V	0.5 mA max. (at rated output)
		200 V	1 mA max. (at rated output)
	Inrush current	100 V	15 A max. (at 25°C cold start)
		200 V	30 A max. (at 25°C cold start)

Item		Specification
Output characteristics	Output voltage accuracy	10%/–15% (including input, load, and temperature fluctuations)
	Minimum output current	30 mA
	Ripple noise voltage	2% (p-p) max.
	Input fluctuation	0.75% max.
	Load fluctuation	4% max.
	Temperature fluctuation	0.05%/°C max.
	Startup time	300 ms max. (at input voltage of 100 V AC or 200 V AC and the rated output)
	Output hold time	10 ms (at input voltage of 100 V AC or 200 V AC and the rated output)
Overcurrent protection		Self-resetting, operates at 105% to 335% of the rated current, suspended and independent operation
Overvoltage protection		None
Ambient operating temperature		0° to 55°C
Ambient storage temperature		–20° to 75°C (no condensation or icing)
Ambient operating humidity		10% to 90% (no condensation)
Dielectric strength		2,000 V for 1 min between all inputs and GR Leakage current: 10 mA 3,000 V for 1 min between all inputs and all outputs Leakage current: 10 mA 1,000 V for 1 min between all outputs and GR Leakage current: 10 mA
Insulation resistance		100 MΩ min. at 500 V DC between all outputs and any input, and between all outputs and GR
Vibration resistance		10 to 57 Hz, amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes according (Time coefficient: 8 minutes × coefficient factor 10 = total time 80 min.)
Shock resistance		147 m/s^2 3 times each in X, Y, and Z directions
Noise terminal voltage		FCC class A
Weight		250 g max.

Peripheral Devices



CPM1A Ordering Information

International Standards

The products shown in the attached tables are those that conform to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of September 2003.
(U: UL, C: CSA, UC: cULus, CU: cUL, N: NK, L: Lloyd, CE: EC Directives)
Please contact OMRON representative for application conditions.

CPU Units

Name	Power supply	Output method	Input points	Output points	Model	Standards
10-point I/O	AC power supply	Relay output	6 points	4 points	CPM1A-10CDR-A-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-10CDT-A-V1	U, C, CE
		Transistor output (source type)			CPM1A-10CDT1-A-V1	
	DC power supply	Relay output			CPM1A-10CDR-D-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-10CDT-D-V1	U, C, CE, N
		Transistor output (source type)			CPM1A-10CDT1-D-V1	
20-point I/O	AC power supply	Relay output	12 points	8 points	CPM1A-20CDR-A-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-20CDT-A-V1	U, C, CE
		Transistor output (source type)			CPM1A-20CDT1-A-V1	
	DC power supply	Relay output			CPM1A-20CDR-D-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-20CDT-D-V1	U, C, CE, N
		Transistor output (source type)			CPM1A-20CDT1-D-V1	
30-point I/O	AC power supply	Relay output	18 points	12 points	CPM1A-30CDR-A-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-30CDT-A-V1	U, C, CE
		Transistor output (source type)			CPM1A-30CDT1-A-V1	
	DC power supply	Relay output			CPM1A-30CDR-D-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-30CDT-D-V1	U, C, CE, N
		Transistor output (source type)			CPM1A-30CDT1-D-V1	
40-point I/O	AC power supply	Relay output	24 points	16 points	CPM1A-40CDR-A-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-40CDT-A-V1	U, C, CE
		Transistor output (source type)			CPM1A-40CDT1-A-V1	
	DC power supply	Relay output			CPM1A-40CDR-D-V1	U, C, N, L, CE
		Transistor output (sink type)			CPM1A-40CDT-D-V1	U, C, CE, N
		Transistor output (source type)			CPM1A-40CDT1-D-V1	

Expansion Units and Expansion I/O Units

Unit	Input/Output type	Inputs	Outputs	Model	Standards
Expansion I/O Units	Relay	24	16	CPM1A-40EDR	CE, N
	Transistor (sinking)			CPM1A-40EDT	CE, N
	Transistor (sourcing)			CPM1A-40EDT1	CE, N
	Relay	12	8	CPM1A-20EDR1	U, C, CE, N
	Transistor (sinking)			CPM1A-20EDT	U, C, CE, N
	Transistor (sourcing)			CPM1A-20EDT1	U, C, CE, N
	---	8	---	CPM1A-8ED	U, C, CE, N
	Relay	---	8	CPM1A-8ER	U, C, CE, N
	Transistor (sinking)	---	8	CPM1A-8ET	U, C, CE, N
	Transistor (sourcing)			CPM1A-8ET1	U, C, L, CE, N
Analog I/O Unit	Analog (resolution: 1/256)	2	1	CPM1A-MAD01	U, C, CE, N
	Analog (resolution: 1/6000)	2	1	CPM1A-MAD11	U, C, CE, N
	Analog (resolution: 1/6000)	4	---	CPM1A-AD041	U, C, CE
	Analog (resolution: 1/6000)	---	4	CPM1A-DA041	U, C, CE
DeviceNet I/O Link Unit	---	I/O Link of 32 input bits and 32 output bits		CPM1A-DRT21	U, C, CE, N
PROFIBUS-DP I/O Link Unit	---	I/O Link of 16 input bits and 16 output bits		CPM1A-PRT21	CE
CompoBus/S I/O Link Unit	---	I/O Link of 8 input bits and 8 output bits		CPM1A-SRT21	U, C, CE, N
Temperature Sensor Units	2 thermocouple inputs			CPM1A-TS001	U, C, CE, N
	4 thermocouple inputs			CPM1A-TS002	U, C, CE, N
	2 platinum resistance thermometer inputs			CPM1A-TS101	U, C, CE, N
	4 platinum resistance thermometer inputs			CPM1A-TS102	U, C, CE, N
	2 Platinum resistance thermometer inputs (-40 to 250 °C) and one output (-10 to 10V, 4 to 20 mA)			CPM1A-TS101-DA	U, C, L, CE

RS-232C Adapter, RS-422 Adapter, Connecting Cable, Link Adapter

Name	Function	Model	Standards
RS-232C Adapter	Converts peripheral port levels.	CPM1-CIF01	N, L, CE
RS-422 Adapter		CPM1-CIF11	
Connecting Cable	3.3-m cable used to connect IBM PC/AT or compatible personal computers.	CQM1-CIF02	U, C, N, L, CE
Link Adapter	Converts RS-232C and RS-422 levels.	3G2A9-AL004-E	---

Programming Consoles and Cables

Product		Model	Standards
Programming Console (2-m cable attached)		CQM1-PRO01-E	U, C, N, CE
Programming Console (Requires separate cable. See below.)		C200H-PRO27-E	U, C, N, CE
Connecting Cable for C200H-PRO27-E	2-m cable	C200H-CN222	N
	4-m cable	C200H-CN422	---

Support Software

Product	Functions	Model	Standards
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.	CX-ONE-AL□□C-E*1	---

*1 □□ = Number of licenses (01, 03, 10)

Product	Model	Standards
Expansion Memory Unit	CPM1-EMU01-V1	---
EEPROM (256 K)	EEROM-JD	---

Power Supply Unit

Unit	Input	Output	Model	Standards
Power Supply	100 to 240 V AC	24 V DC/600 mA	CPM2C-PA201	U, C, CE

Compact PLC series

CPM2A/CPM2B/CPM2C

Advanced functions and high performance in a compact shape.
Ideal for automation of packaging and conveyor systems. Provides increased performance and added value to any compact machine.

High Performance

Versatile Functions for More Advanced Systems

- High-speed counter inputs for position sensing or object counting.
- Synchronous control simplifies timing adjustment.
- High-speed processing with an interrupt function for immediate response.
- Supports both stand-alone and distributed control.

Efficient and effective

Highly Economical

The combination of advanced functions and high performance in an economical PLC range will add value to your machines.

Compact

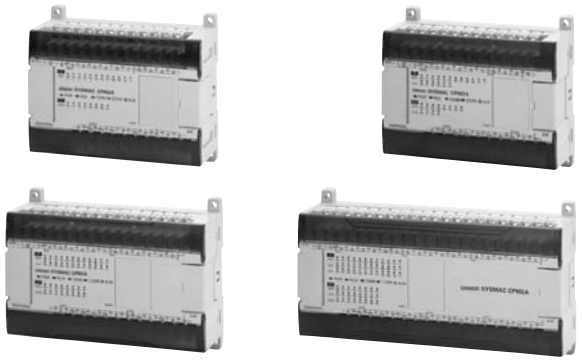
Fits into your available space

A choice of three different compact form factors means you can more easily fit the functions you need in the space you have available in your control cabinet or machine.

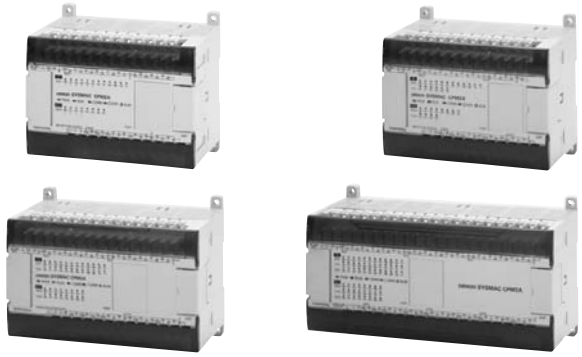
Compact block-type PLCs

SYSMAC CPM2A

AC Power Supply



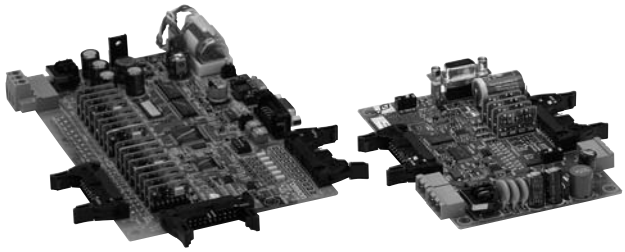
DC Power Supply



Modular Board PLCs

SYSMAC CPM2B

Proven CPM2 technology to fit in the tightest spaces. And if the standard models do not fit, we'll make the exact shape and I/O combination you need.



Compact slim-line PLCs

SYSMAC CPM2C

10 I/O Points **20 I/O Points** **32 I/O Points**



Power Supply **Communication Adapter**



Expansion I/O: Digital, Analog **Temperature Sensor**

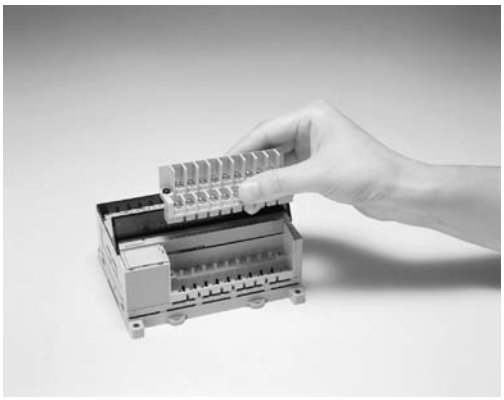


A full line-up to fit your needs

A wide range of models is available to achieve the machine or line controller that you require. Select from 16 CPU types, for AC power, DC power, relay output, transistor output, etc. Match the power supply, output, number of I/O points, and size to your particular needs. Expansion I/O Units can also be easily added to increase I/O points.

Removable Terminal Blocks for Easy Maintenance

Removable terminal blocks* simplify installation, troubleshooting and machine maintenence.
(*CPU Unit only)

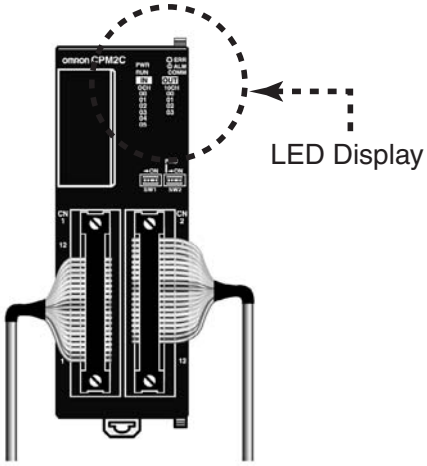


Expandable up to 140 I/O Points

Even with its ultracompact size, the CPM2C features a wide range of models for efficient machine control. Ten CPU types, all with DC power supply, allow selection of relay output or transistor output, terminal block or connector wiring, clock function, and other functions. Choose the output type, number of I/O points and other features to meet your needs. Expansion I/O Units (8, 10, 16, or 24 I/O points) are also available to provide control for a maximum of 140 I/O points.

Easy-to-Read LED Display

The LED display on the upper part of the CPM2C is easy to read, even when cables are connected.

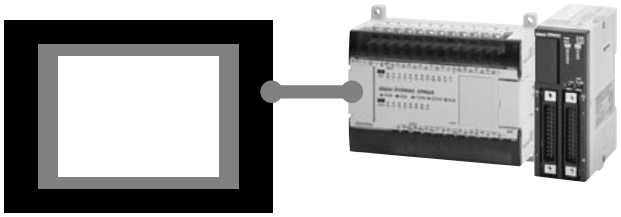


Built-in RS-232C Port

The built-in RS-232C port enables connection with a variety of equipment. The communication port can be used for configuration, maintenance, troubleshooting, visualisation or general-purpose serial communication.

PT Connection

Compatible with the OMRON Programmable Terminal's Programming Console functions. Maintenance is simplified with the on-screen programming operations.



Host Link

Host Link allows reading and writing of the I/O memory and operation modes of the CPM2A or CPM2C by a personal computer. The following RS422/RS-232C Communications Adapters also provide 1:n communications.

CPM2A: CPM1-CIF11

CPM2C: CPM2C-CIF11



One-to-one Link

A 1:1 PLC Link connection can be established with another CPM2C, or a CQM1(H), CPM1, CPM1A, CPM2A, SRM1(-V2), C200HS, or C200HX/HG/HE PLC.

Windows-based Programming Support

The Windows-based CX-One Support Software is available for programming all OMRON PLC's, including the CPM2A or CPM2C. Being able to program in the Windows environment reduces programming steps, and gives you access to a large number of display monitor and debugging functions. It also means that you can use existing Windows applications to help with CPM2A or CPM2C programming, which adds up to a highly advanced programming environment.

CPM2-series Features

The illustrations in this section show CPM2A PLCs, but the same functions are available in CPM2B/CPM2C PLCs unless otherwise stated.

Interrupts

The CPM2-series PLCs provide the following kinds of interrupt processing.

Interrupt Inputs

Interrupt programs are executed when inputs to the CPU Unit's built-in input points (00003 to 00006) are turned from OFF to ON. Interrupt subroutine numbers 000 to 003 are allocated to input points 00003 to 00006.

Interval Timer Interrupts

Interval timer interrupt programs are executed with a precision of 0.1 ms. Interrupt subroutine numbers 000 to 049 are allocated by instructions.

Count-up Interrupts

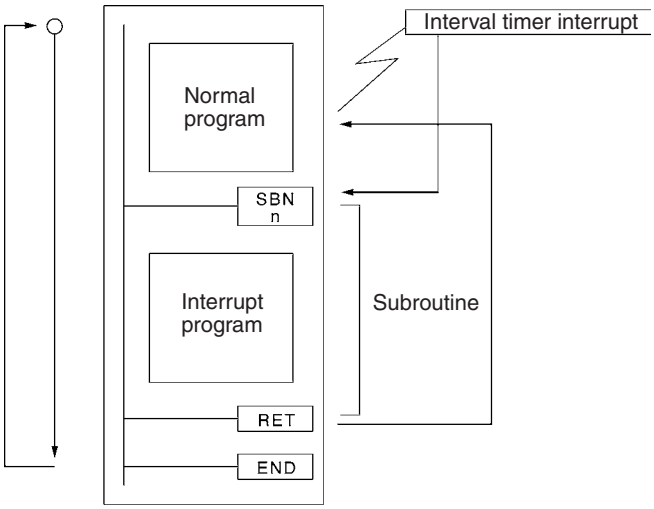
Input signals to the CPU Unit's built-in input points (00003 to 00006) are counted at high speed (up to 2 kHz), and the normal program is stopped and an interrupt program is executed when the count reaches the SV. Interrupt subroutine numbers 000 to 003 are allocated to input points 00003 to 00006.

Count-check Interrupts Using the High-speed Counter

Pulse inputs to the CPU Unit's built-in input points (00000 to 00002) are counted at high speed (up to 20 kHz or 5 kHz), and an interrupt program is executed when the present value matches the target value or falls within a given range. Interrupt subroutine numbers 000 to 049 are allocated by instructions.

Interval Timer Interrupts

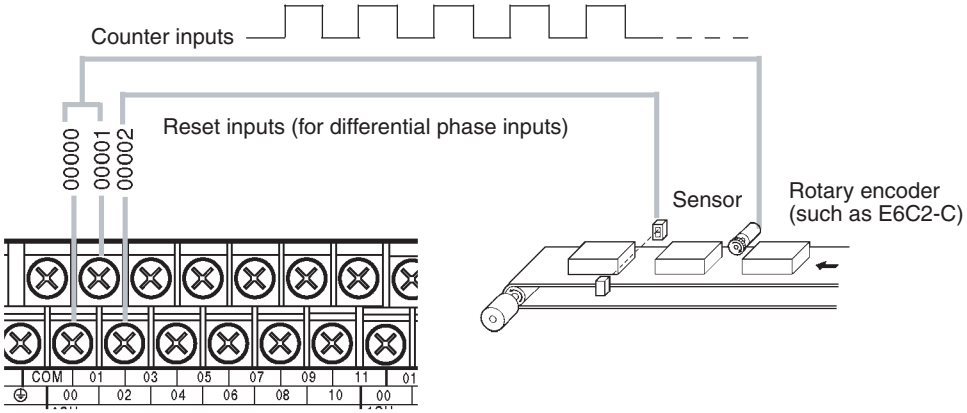
The CPM2 has one interval timer (precision: 0.1 ms) that can be set from 0.5 ms to 319,968 ms. There are two interrupt modes: the single-interrupt mode, in which a single interrupt is executed when the time is up, and the scheduled-interrupt mode, in which interrupts are executed at regular intervals.



Item	Single-interrupt mode	Scheduled-interrupt mode
Operation	Interrupt is executed once when time has elapsed.	Interrupts are executed at regular intervals.
Set time	0.5 to 319,968 ms (Unit: 0.1 ms)	
Interrupt response time	0.3 ms (from when time has elapsed until execution of interrupt program)	

High-speed Counters

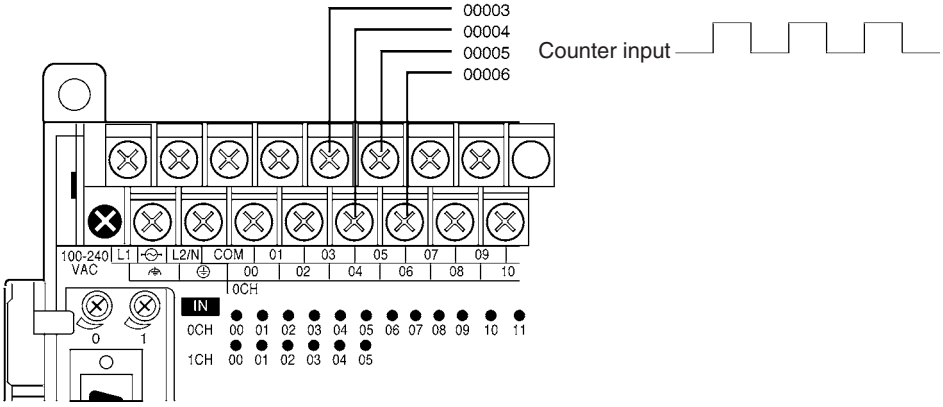
The CPM2 CPU Unit has a built-in high-speed counter that can count input pulses at up to 20 kHz. When combined with the interrupt function, the high-speed counter can be used for target-value comparison or range comparison control that is unaffected by the cycle time.



Input	Response frequency	Input mode (count value)	Counter PV Storage	Control method
00000	5 kHz	Differential phase input mode (-8,388,608 to 8,388,607)	SR 248 and SR 249	Target value comparison interrupts Range comparison interrupts
00001 00002	20 kHz	Pulse + direction input mode (-8,388,608 to 8,388,607) Up/down pulse input mode (-8,388,608 to 8,388,607) Increment mode (0 to 16,777,215)		

Interrupt Inputs (Counter Mode)

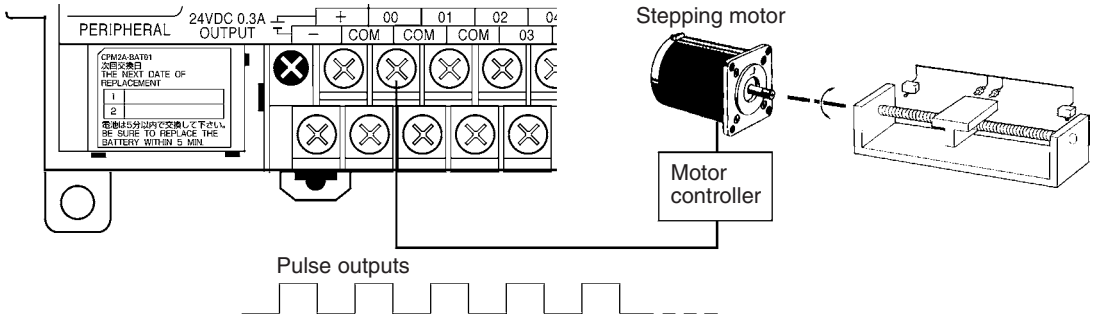
The four built-in interrupt inputs in the CPM2 CPU Unit can be used in counter mode to count inputs of up to 2 kHz. These inputs can be used as either incrementing counters or decrementing counters and can trigger an interrupt (i.e., execute an interrupt subroutine) when the count matches the set value.



Input	Counter number	Set value location	Present value location	Response frequency	Input mode (count value)	Control method
00003	Counter 0	SR 240	SR 244	2 kHz	Incrementing counter (0000 to FFFF) Decrementing counter (0000 to FFFF)	Count-up interrupts
00004	Counter 1	SR 241	SR 245			
00005	Counter 2	SR 242	SR 246			
00006	Counter 3	SR 243	SR 247			

Pulse Outputs

The CPM2 has two pulse outputs. The PLC Setup can be set to use these outputs as two single-phase outputs without acceleration and deceleration, two variable duty-ratio pulse outputs, or pulse outputs with trapezoidal acceleration/deceleration (one pulse + direction output and one up/down pulse output). The pulse output's PV coordinate system can also be specified in the PC Setup as either relative or absolute.

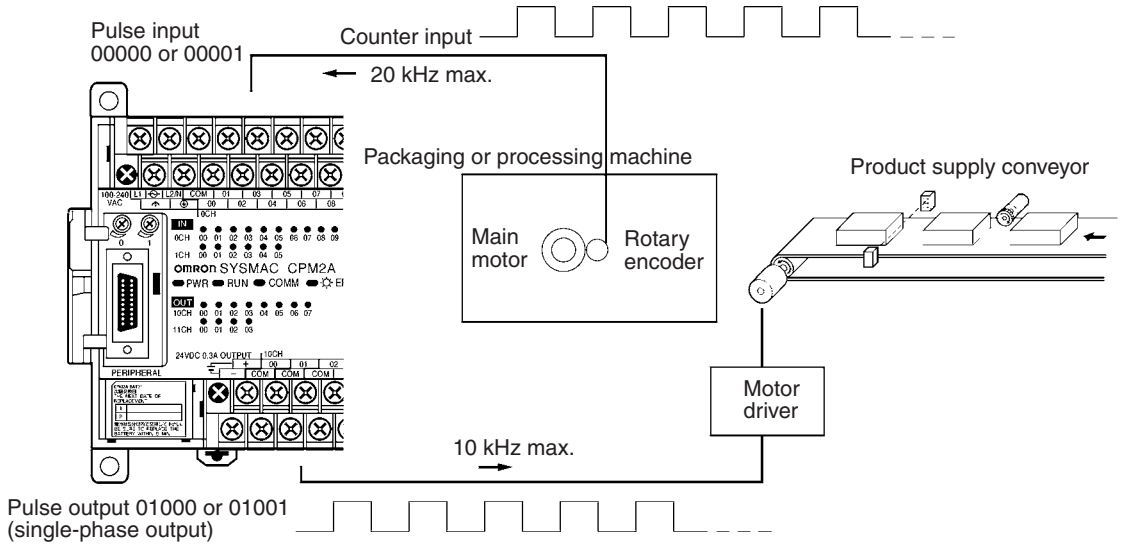


Item		Single-phase pulse output without accel/decel	Variable duty-ratio pulse output	Single-phase pulse output with trapezoidal acceleration/deceleration			
				Pulse + direction output		Up/down pulse output	
Controlling instruction(s)		PULS(65) and SPED(64)	PWM(—)	PULS(65) and ACC(—)			
Output number	01000	Pulse output 0 (See note.)	Pulse output 0 (See note.)	Pulse output 0	Pulse output	Pulse output 0	CW pulse output
	01001	Pulse output 1 (See note.)	Pulse output 1 (See note.)		Direction output		CCW pulse output
Output frequency range		10 Hz to 10 kHz	0.1 Hz to 999.9 Hz	10 Hz to 10 kHz		10 Hz to 10 kHz	
	Pitch	10 Hz	0.1 Hz	10 Hz		10 Hz	
Duty ratio		50%	0 to 100%	50%		50%	

Note: With single-phase pulse outputs, pulse outputs 0 and 1 can each be output independently.

Synchronized Pulse Control

The CPM2's high-speed counter function can be combined with the pulse output function to generate an output pulse at a specified multiple of the input pulse frequency.



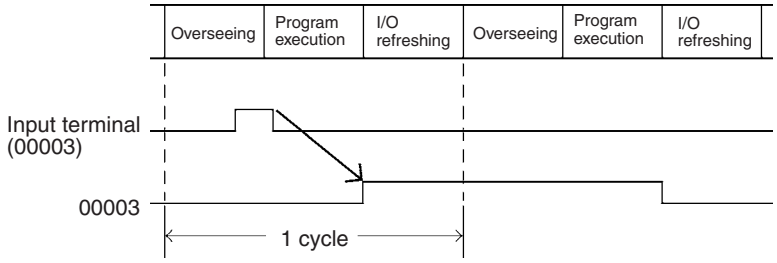
Item		Input mode			
		Phase differential input mode	Pulse + direction input mode	Up/down pulse input mode	Increment mode
Input number	00000	A-phase input	Count input	CW input	Count input
	00001	B-phase input	Direction input	CCW input	See note 1.
Input method		Phase differential quadruple input	Single-phase input	Single-phase input	Single-phase input
Input frequency range		10 Hz to 500 Hz (accuracy ±1 Hz) 20 Hz to 1 kHz (accuracy ±1 Hz) 300 Hz to 20 kHz (accuracy ±25 Hz) (See note 2.)			
Output frequency range		10 Hz to 10 kHz (accuracy 10 Hz)			
Frequency ratio (scaling factor)		1 % to 1,000% (Can be specified in units of 1%.)			
Synchronized control cycle		10 ms			

Note: 1. Can be used as an ordinary input.

2. The accuracy is ±10 Hz when the input frequency is 10 kHz or less.

Quick-response Inputs

The CPM2A/CPM2B CPU Units and CPM2C CPU Units with 20 I/O points have four inputs that can be used for quick-response inputs. The CPM2C CPU Units with 10 I/O points have two inputs that can be used for quick response inputs. These inputs are shared with interrupt inputs and 2-kHz high-speed counter inputs. Quick-response inputs are received into an internal buffer, so signals that change status within a cycle can be received.



Input number	Min. input signal
00003	50 μs
00004	
00005	
00006	

Inputs 00003 through 00006 can be used as interrupt inputs, 2-kHz high-speed counter inputs, or quick-response inputs. These inputs can be used as ordinary inputs if they are not used as interrupt inputs, 2-kHz high-speed counter inputs, or quick-response inputs.

Inputs 00005 and 00006 cannot be used with the CPM2C CPU Unit with 10 I/O points.

Analog Controls (CPM2A Only)

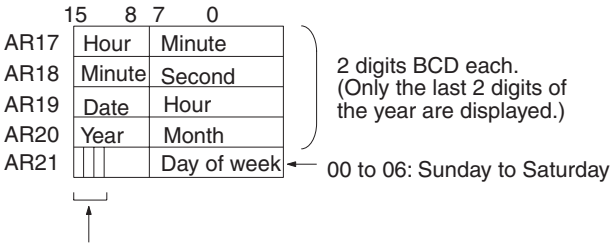
The CPM2A CPU Unit has two analog controls that can be used for a wide range of timer and counter analog settings. As these controls are turned, values from 0 to 200 (BCD) are stored in the SR Area.

Control	Storage area	Set value (BCD)
Analog control 0	SR 250	0000 to 0200
Analog control 1	SR 251	0000 to 0200

Clock Function

The CPM2A and some CPM2B/2Cs have a built-in clock (accuracy: ±1 minute/month) that allows the date and time to be read from the ladder program. The time can be overwritten from a Programming Console or other Programming Device, but the CPM2A is also equipped with a 30-second Compensation Bit. The time will be rounded off to the nearest minute when this bit is turned ON, so the time can be set very accurately by turning ON this bit when the “time tone” is heard on the radio.

(The CPM2B/CPM2C CPU Units have models with the clock function and models without.)



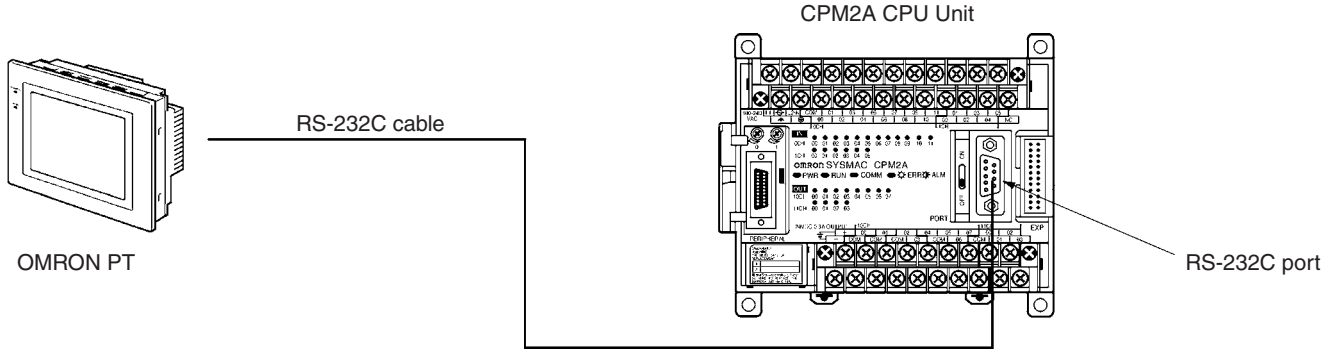
AR2115	Clock Set Bit
AR2114	Clock Stop Bit
AR2113	30-second Adjustment Bit

Additional Timer Functions

VERY HIGH-SPEED TIMER (Units: 1 ms)	Starts a very high-speed decrementing ON-delay timer with the specified timer number. The set value can be 0 to 9,999 ms. (Set in 1-ms units.)
LONG TIMER (Units: 1 s or 10 s)	Starts a long-term decrementing ON-delay timer with the specified timer number. The set value can be 0 to 9,999 s (when set in 1-s units) or 0 to 99,990 s (when set in 10-s units).

NT Links

The CPM2 can be connected to an OMRON PT (Programmable Terminal) in NT Link mode (1:1). A communications program is not required in the CPM2. The RS-232C port can be used for the NT Link.

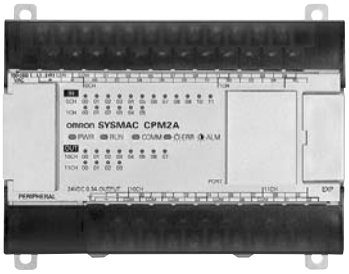


Compact PLC series

CPM2A

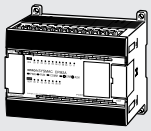
An extensive line-up lets you easily configure machines and production lines to meet your needs

SYSMAC CPM2A

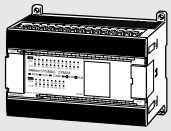


Every CPM2A CPU comes equipped with an RS-232C interface as standard, e.g. to provide easy connection with a Programmable Terminal for fast and easy machine monitoring, temperature setting, etc. Simple positioning with the pulse I/O function is another example of the many advanced functions and high added value that the CPM2A brings to compact machines. Removable terminal blocks ensure easy maintenance, and the CPM2A uses the same Expansion I/O Units as the CPM1A for easy and economical sharing of system components.

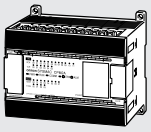
CPU Units with AC Power Supply Depth: 90 mm



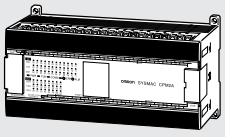
■Relay Output CPU Unit
CPM2A-20CDR-A
●Input points: 12, DC input
●Output points: 8



■Relay Output CPU Unit
CPM2A-40CDR-A
●Input points: 24, DC input
●Output points: 16

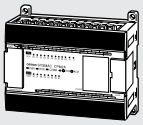


■Relay Output CPU Unit
CPM2A-30CDR-A
●Input points: 18, DC input
●Output points: 12

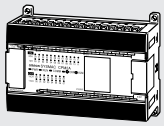


■Relay Output CPU Unit
CPM2A-60CDR-A
●Input points: 36, DC input
●Output points: 24

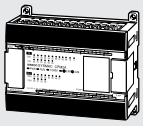
CPU Units with DC Power Supply Depth: 55 mm



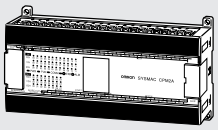
■Relay Output CPU Unit
CPM2A-20CDR-D
■Transistor Output CPU Units
CPM2A-20CDT-D (Sink)
CPM2A-20CDT1-D (Source)
●Input points: 12, DC input
●Output points: 8



■Relay Output CPU Unit
CPM2A-40CDR-D
■Transistor Output CPU Units
CPM2A-40CDT-D (Sink)
CPM2A-40CDT1-D (Source)
●Input points: 24, DC input
●Output points: 16

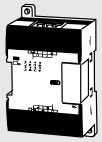


■Relay Output CPU Unit
CPM2A-30CDR-D
■Transistor Output CPU Units
CPM2A-30CDT-D (Sink)
CPM2A-30CDT1-D (Source)
●Input points: 18, DC input
●Output points: 12

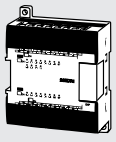


■Relay Output CPU Unit
CPM2A-60CDR-D
■Transistor Output CPU Units
CPM2A-60CDT-D (Sink)
CPM2A-60CDT1-D (Source)
●Input points: 36, DC input
●Output points: 24

Expansion I/O Units

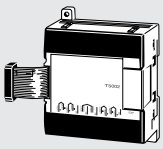


CPM1A-8ED
●Input points: 8, DC input
CPM1A-8ER
Output points: 8, RY output
CPM1A-8ET
●Output points: 8, TR output (Sink)
CPM1A-8ET1
●Output points: 8, TR output (Source)



CPM1A-20EDR1
●Input points: 12, DC input
●Output points: 8, RY output
CPM1A-20EDT
●Input points: 12, DC input
●Output points: 8, TR output (Sink)
CPM1A-20EDT1
●Input points: 12, DC input
●Output points: 8, TR output (Source)

Temperature Sensor Units



CPM1A-TS001
●Thermocouple inputs: 2
CPM1A-TS002
●Thermocouple inputs: 4
CPM1A-TS101
●Pt100 inputs: 2
CPM1A-TS-101-DA
●Pt100 inputs: 2,
Analog inputs: 1
CPM1A-TS102
●Pt100 inputs: 4

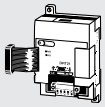
Analog I/O Units

CPM1A-MAD01
(Resolution: 256)
CPM1A-MAD11
(Resolution: 6,000)
2 inputs + 1 output
CPM1A-AD041 (4 inputs)
CPM1A-DA041 (4 outputs)



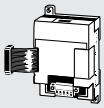
DeviceNet

CPM1A-DRT21
●I/O Link
inputs: 32
●I/O Link o
utputs: 32



PROFIBUS-DP

CPM1A-PRT21
●I/O Link
inputs: 16
●I/O Link
outputs: 16



CompoBus/S

CompoBus/S
I/O Unit
CPM1A-SRT21
●I/O Link inputs: 8
●I/O Link outputs: 8



Specifications

General

Item		CPU Units with 20 I/O points	CPU Units with 30 I/O points	CPU Units with 40 I/O points	CPU Units with 60 I/O points
Supply voltage	AC power	100 to 240 V AC, 50/60 Hz			
	DC power	24 V DC			
Operating voltage range	AC power	85 to 264 V AC			
	DC power	20.4 to 26.4 V DC			
Power consumption	AC power	60 VA max.			
	DC power	20 W max. (See separate table following this one for details.)			
Inrush current	AC power	60 A max.			
	DC power	20 A max.			
External power supply (AC power supplies only)	Supply voltage	24 V DC			
	Output capacity	300 mA (See note)			
Insulation resistance		20 MΩ min. (at 500 V DC) between the external AC terminals and protective earth terminals			
Dielectric strength		2,300 V AC 50/60 Hz for 1 min between the external AC and protective earth terminals, leakage current: 10 mA max.			
Noise immunity		Conforms to IEC61000-4-4, 2 kV (power lines)			
Vibration resistance		10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes each (Time coefficient; 8 minutes × coefficient factor 10 = total time 80 minutes)			
Shock resistance		147 m/s^2 three times each in X, Y, and Z directions			
Ambient temperature		Operating: 0° to 55°C Storage: –20° to 75°C			
Humidity		10% to 90% (with no condensation)			
Atmosphere		Must be free from corrosive gas			
Terminal screw size		M3			
Power interrupt time		AC power supply: 10 ms min. DC power supply: 2 ms min.			
CPU Unit weight	AC power	650 g max.	700 g max.	800 g max.	1,000 g max.
	DC power	550 g max.	600 g max.	700 g max.	900 g max.
Expansion Unit weight		Units with 20 I/O Points: 300 g max. Units with 8 Output Points: 250 g max. Units with 8 Input Points: 200 g max. MAD01 Analog I/O Unit: 150 g max. MAD11 Analog I/O Unit: 250 g max. AD041/DA041 Analog I/O units: 200 g max. Temperature Sensor Units 250 g max. CompoBus/S I/O Link Units: 200 g max. DeviceNet I/O Link Unit: 200 g max. PROFIBUS-DP I/O Link Unit: 150 g max.			

Note: Use the external power supply as the power supply for input devices only. (It cannot be used as to drive output devices.) If the external power supply current exceeds the rated current, or there is a short-circuit, the external power supply voltage will drop and PC operation will stop. If there are 3 CPM1A-MAD11 Units mounted to a CPM2A-60CDR-A, the current for the external power supply must not exceed 200 mA.

Power Consumption for CPM2A CPU Units with DC Power Supplies

Use the following information when computing CPM2A power capacities.

CPM2A CPU Unit	Power consumption (W)
CPM2A-20CDR-D	4
CPM2A-30CDR-D	4.5
CPM2A-40CDR-D	6
CPM2A-60CDR-D	7.5
CPM2A-20CDT/T1-D	3.5
CPM2A-30CDT/T1-D	4
CPM2A-40CDT/T1-D	4.5
CPM2A-60CDT/T1-D	5

CPM1A Expansion I/O Unit or Expansion Unit	Power consumption (W)
CPM1A-20EDR1	2.5
CPM1A-20EDT/T1	1.5
CPM1A-8ED	1
CPM1A-8ER	2
CPM1A-8ET/T1	1
CPM1A-DRT21	1
CPM1A-SRT21	1
CPM1A-MAD01/MAD11	3.5
CPM1A-TS001/TS101	3
CPM1A-TS002/TS102	3
CPM1A-PRT21	1
CPM1A-TS101-DA	1.5
CPM1A-AD041	3
CPM1A-DA041	3.3

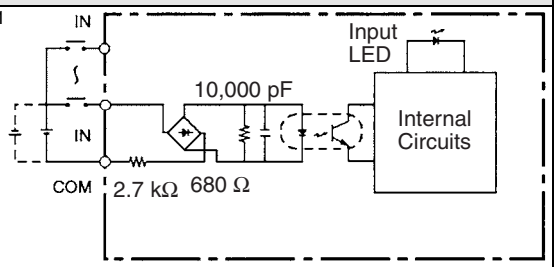
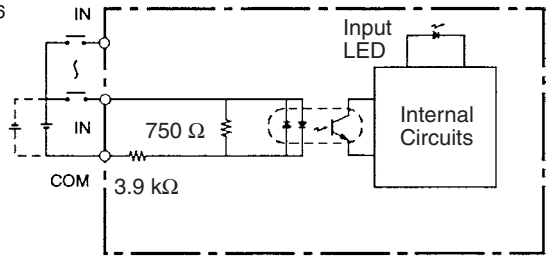
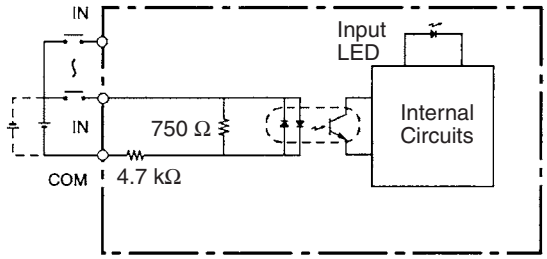
Note: When calculating the total power consumption, it is also necessary to include the power consumption of Programming Consoles, RS-232C Adapter Units, and other devices.

CPM2A Characteristics

Item		Specification			
Control method		Stored program method			
I/O control method		Cyclic scan with direct output (Immediate refreshing can be performed with IORF(97).)			
Programming language		Ladder diagram			
Instruction length		1 step per instruction, 1 to 5 words per instruction			
Instructions		Basic instructions: 14 Special instructions:105 instructions, 185 variations			
Execution time		Basic instructions: 0.64 μs (LD instruction) Special instructions:7.8 μs (MOV instruction)			
Program capacity		4,096 words			
I/O capacity	CPU Unit only	20 points	30 points	40 points	60 points
	With Expansion I/O Units	80 points max.	90 points max.	100 points max.	120 points max.
Input bits		IR 00000 to IR 00915 (Words not used for input bits can be used for work bits.)			
Output bits		IR 01000 to IR 01915 (Words not used for output bits can be used for work bits.)			
Work bits		928 bits: IR 02000 to IR 04915 (Words IR 020 to IR 049) and IR 20000 to IR 22715 (Words IR 200 to IR 227)			
Special bits (SR area)		448 bits: SR 22800 to SR 25515 (Words IR 228 to IR 255)			
Temporary bits (TR area)		8 bits (TR0 to TR7)			
Holding bits (HR area)		320 bits: HR 0000 to HR 1915 (Words HR 00 to HR 19)			
Auxiliary bits (AR area)		384 bits: AR 0000 to AR 2315 (Words AR 00 to AR 23)			
Link bits (LR area)		256 bits: LR 0000 to LR 1515 (Words LR 00 to LR 15)			
Timers/Counters		256 timers/counters (TIM/CNT 000 to TIM/CNT 255) 1-ms timers: TMHH(—) 10-ms timers: TIMH(15) 100-ms timers: TIM 1-s/10-s timers: TIML(—) Decrementing counters: CNT Reversible counters: CNTR(12)			
Data memory		Read/Write: 2,048 words (DM 0000 to DM 2047)* Read-only: 456 words (DM 6144 to DM 6599) PC Setup: 56 words (DM 6600 to DM 6655) *The Error Log is contained in DM 2000 to DM 2021.			
Basic interrupts	Interrupt processing	External interrupts: 4 (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)			
	Interval timer interrupts	1 (Scheduled Interrupt Mode or Single Interrupt Mode)			
High-speed counter	High-speed counter	One high-speed counter: 20 kHz single-phase or 5 kHz two-phase (linear count method) Counter interrupt: 1 (set value comparison or set-value range comparison)			
	Interrupt Inputs (counter mode)	Four inputs (Shared with external interrupt inputs (counter mode) and quick-response inputs.) Counter interrupts: 4 (Shared by the external interrupt inputs and quick-response inputs.)			
Pulse output		Two points with no acceleration/deceleration, 10 Hz to 10 kHz each, and no direction control. One point with waveform acceleration/deceleration, 10 Hz to 10 kHz, and direction control. Two points with variable duty-ratio outputs using PWM(—). (Pulse outputs can be used with transistor outputs only, they cannot be used with relay outputs.)			
Synchronized pulse control		One point: A pulse output can be created by combining the high-speed counter with the pulse output and multiplying the frequency of the input pulses from the high-speed counter by a fixed factor. (This output is possible with transistor outputs only, it cannot be used with relay outputs.)			
Quick-response inputs		Four points (Min. input pulse width: 50 μs min.)			
Analog controls		2 controls, setting range: 0 to 200			
Input time constant		Can be set for all input points. (1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms; default setting: 10 ms)			
Clock function		Shows the year, month, day of the week, day, hour, minute, and second. (Battery backup)			
Communications functions		Built-in peripheral port: Supports host link, peripheral bus, no-protocol, or Programming Console connections. Built-in RS-232C port: Supports host link, no-protocol, 1:1 Slave Unit link, 1:1 Master Unit link, or 1:1 NT Link connections.			
Functions provided by Expansion Units		Analog I/O Unit: Provides 2 analog inputs and 1 analog output. CompoBus/S I/O Link Unit: Provides 8 inputs and 8 outputs as a CompoBus/S Slave. Temperature Sensor Units: Provide 2 or 4 thermocouple inputs, or 2 or 4 temperature-resistance thermometer inputs.			
Memory protection		HR area, AR area, program contents, read/write DM area contents, and counter values maintained during power interruptions.			
Memory backup		Flash memory: Program, read-only DM area, and PC Setup Battery backup: The read/write DM area, HR area, AR area, and counter values are backed up by a battery. (Battery life is approximately 5 years at an ambient temperature of 25°C.)			
Self-diagnostic functions		CPU Unit failure (watchdog timer), I/O bus error, and memory failure, battery error			
Program checks		No END instruction and programming errors are checked at the start of operation.			

CPM2A I/O Specifications

1. CPU Unit Input Specifications

Item	Inputs	Specification	Circuit configuration
Input voltage	All	24 V DC $^{+10\%}/_{-15\%}$	IN00000 to IN00001 
Input impedance	IN00000 to IN00001	2.7 kΩ	
	IN00002 to IN00006	3.9 kΩ	
	IN00007 and up	4.7 kΩ	
Input current	IN00000 to IN00001	8 mA	IN00002 to IN00006 
	IN00002 to IN00006	6 mA	
	IN00007 and up	5 mA	
ON voltage/current	IN00000 to IN00001	17 V DC min., 5 mA	
	IN00002 and up	14.4 V DC min., 3 mA	IN00007 and up 
OFF voltage/current	All	5.0 V DC max., 1 mA	
ON delay	All	1 to 80 ms max. Default: 10 ms (See note.)	
OFF delay	All	1 to 80 ms max. Default: 10 ms (See note.)	

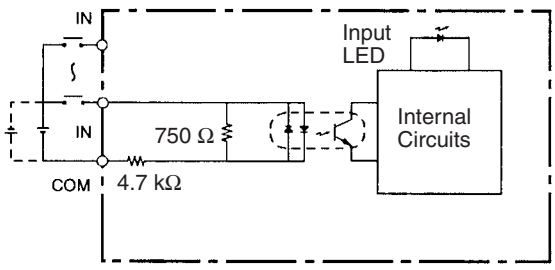
Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PC Setup.

High-speed Counter Inputs
Inputs IN00000 through IN00002 can be used as high-speed counter inputs, as shown in the following table. The maximum count frequency is 5 kHz in differential phase mode and 20 kHz in the other modes.

Input	Function			
	Differential phase mode	Pulse + direction input mode	Up/down input mode	Increment mode
IN00000	A-phase pulse input	Pulse input	Increment pulse input	Increment pulse input
IN00001	B-phase pulse input	Direction input	Decrement pulse input	Normal input
IN00002	Z-phase pulse input/Hardware reset input (IN00002 can be used as a normal input when it is not used as a high-speed counter input.)			

Interrupt Inputs
Inputs IN00003 through IN00006 can be used as interrupt inputs (interrupt input mode or counter mode) and quick-response inputs. The minimum pulse width for these inputs is 0.05 ms.

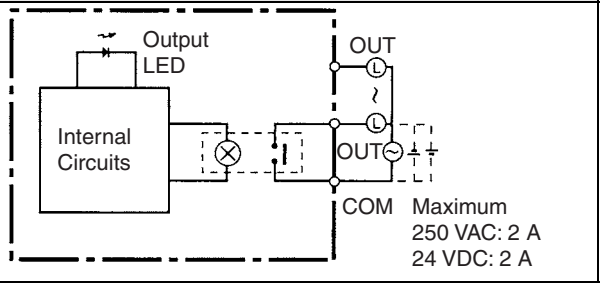
2. Expansion I/O Unit Input Specifications

Item	Specification	Circuit configuration
Input voltage	24 V DC $^{+10\%}/_{-15\%}$	
Input impedance	4.7 kΩ	
Input current	5 mA	
ON voltage	14.4 V DC min.	
OFF voltage	5.0 V DC max.	
ON delay	1 to 80 ms max. Default: 10 ms (See note.)	
OFF delay	1 to 80 ms max. Default: 10 ms (See note.)	

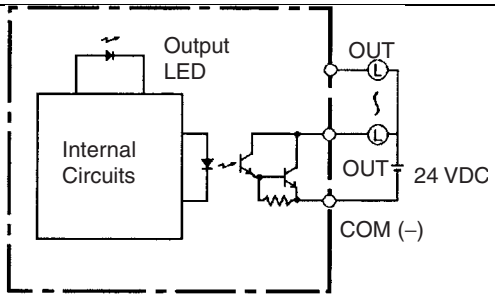
Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PC Setup.

3. CPM2A Output Specifications (CPU Units and Expansion I/O Unit)

Relay Output

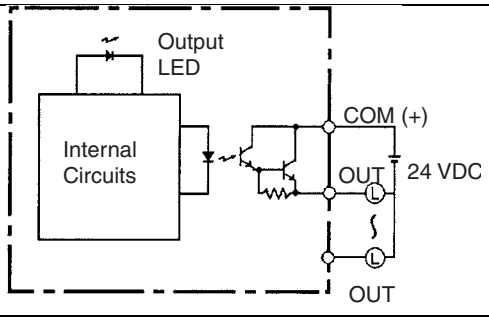
Item	Specification	Circuit configuration
Max. switching capacity	2 A, 250 V AC (cosϕ = 1) 2 A, 24 V DC (4 A/common)	
Min. switching capacity	10 mA, 5 V DC	
Service life of relay	Electrical:150,000 operations (24- V DC resistive load) 100,000 operations (240- V AC inductive load, cosϕ = 4) Mechanical:20,000,000 operations	
ON delay	15 ms max.	
OFF delay	15 ms max.	

Transistor Output (Sinking)

Item	Specification					
	CPM2A-20CDT-D	CPM2A-30CDT-D	CPM2A-40CDT-D	CPM2A-60CDT-D	CPM1A-8ET	CPM1A-20EDT
Max. switching capacity	OUT01000, 01001: 4.5 to 30 V DC, 0.2 A/output OUT01002 and up: 4.5 to 30 V DC, 0.3 A/output					24 V DC$^{+10\%}_{-5\%}$, 0.3 A/output
	0.8 A/common 1.6 A/Unit	0.8 A/common 2.4 A/Unit	0.8 A/common 3.2 A/Unit	0.8 A/common 4.8 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 1.8 A/Unit
Leakage current	0.1 mA max.					
Residual voltage	1.5 V max.					
ON delay	OUT01000 and OUT01001:20 μs max. OUT01002 and up:0.1 ms max.					0.1 ms max.
OFF delay	OUT01000 and OUT01001:40 μs max. (4.5 to 26.4 V, 10 to 100 mA) 0.1 ms max. (4.5 to 30 V, 10 to 200 mA) OUT01002 and up:1 ms max. (4.5 to 30 V, 10 to 300 mA)					1 ms max. (24 V DC$^{+10\%}_{-5\%}$, 5 to 300 mA)
Fuse (see note)	1 fuse/output					1 fuse/common
Circuit configuration	4.5 to 30 VDC, 0.3 A/output 					

Note: Cannot be replaced by the user.

Transistor Output (Sourcing)

Item	Specification					
	CPM2A-20CDT1-D	CPM2A-30CDT1-D	CPM2A-40CDT1-D	CPM2A-60CDT1-D	CPM1A-8ET1	CPM1A-20DET1
Max. switching capacity	OUT01000, 01001: 4.5 to 30 V DC, 0.2 A/output OUT01002 and up: 4.5 to 30 V DC, 0.3 A/output					24 V DC$^{+10\%}_{-5\%}$, 0.3 A/output
	0.8 A/common 1.6 A/Unit	0.8 A/common 2.4 A/Unit	0.8 A/common 3.2 A/Unit	0.8 A/common 4.8 A/Unit	0.9 A/common 1.8 A/Unit	0.9 A/common 1.8 A/Unit
Leakage current	0.1 mA max.					
Residual voltage	1.5 V max.					
ON delay	OUT01000 and OUT01001:20 μs max. OUT01002 and up:0.1 ms max.					0.1 ms max.
OFF delay	OUT01000 and OUT01001:40 μs max. (4.5 to 26.4 V, 10 to 100 mA) 0.1 ms max. (4.5 to 30 V, 10 to 200 mA) OUT01002 and up:1 ms max. (4.5 to 30 V, 10 to 300 mA)					1 ms max. (24 V DC$^{+10\%}_{-5\%}$, 5 to 300 mA)
Fuse (see note)	1 fuse/output					1 fuse/common
Circuit configuration	4.5 to 30 VDC, 0.3 A/output 					

Note: Cannot be replaced by the user.

CPM1A-MAD□1

Analog I/O units



Handles 2 Analog Inputs and 1 Analog Output

- Resolution: up to 1/6000
- Conversion time: up to 2 ms per point

Specifications

General

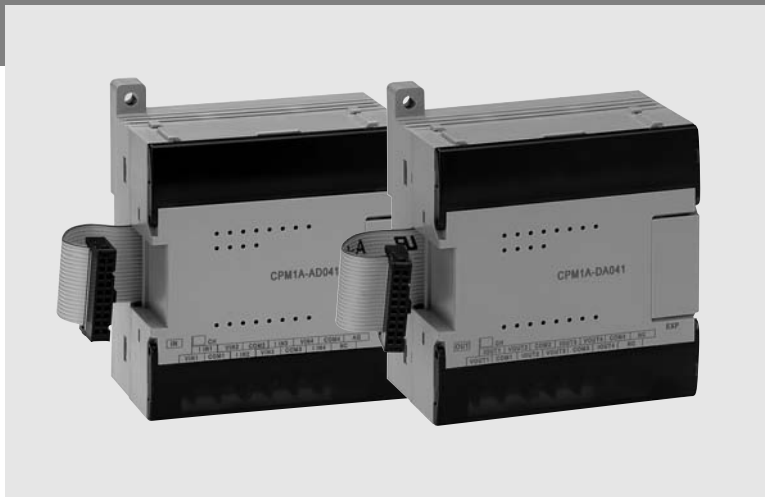
Item		CPM1A-MAD01		CPM1A-MAD11	
		Voltage I/O	Current I/O	Voltage I/O	Current I/O
Analog inputs	Number of inputs	2		2 (allocated 2 words)	
	Input signal ranges	0 to 10 V or 1 to 5 V	4 to 20 mA	0 to 5 V, 1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA
	Maximum rated input	±15 V	±30 mA	±15 V	±30 mA
	External input impedance	1 MΩ min.	250 Ω rated	1 MΩ min.	250 Ω
	Resolution	1/256		1/6,000 (full scale)	
	Overall precision	1.0% of full scale		25°C:±0.3% of full scale	25°C:±0.4% of full scale
				0 to 55°C:±0.6% of full scale	0 to 55°C:±0.8% of full scale
	Converted A/D data	8-bit binary		Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale	
	Averaging	---		Supported (set for each input with DIP switch)	
	Disconnected line detection	---		Supported	
Analog output (See note 1.)	Number of outputs	1		1 (allocated 1 word)	
	Output signal ranges	0 to 10 V or –10 to 10 V	4 to 20 mA	1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA
	External output max. current	5 mA	---	---	---
	External output allowed load resistance	---	350 Ω	1 kΩ min.	600 Ω max.
	External output impedance	---		0.5 Ω max.	---
	Resolution	1/256 (1/512 when the output signal range is –10 to 10 V.)		1/6,000 (full scale)	
	Overall precision	1.0% of full scale		25°C:±0.4% of full scale	
				0 to 55°C:±0.8% of full scale	
	Data setting	8-bit binary with sign bit		---	
	D/A data setting	---		Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale	
Conversion time (See note 2.)		10 ms/Unit max.		2 ms/point (6 ms/all analog I/O)	
Isolation method		Photocoupler isolation between I/O terminals and PC (There is no isolation between the analog I/O signals.)		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)	

Note: 1. The voltage output and current output can be used at the same time, but the total output current cannot exceed 21 mA.

2. The conversion time is the total time for 2 analog inputs and 1 analog output.

CPM1A-AD041/DA041

Analog I/O units



Handles 4 Analog Inputs or 4 Analog Outputs

- Conversion time: 2ms per point
- Resolution : 1/6000
- Range selection per Input/Output
- Averaging function (Inputs)
- Open circuit detection (Inputs)

Specifications

General

Item		CPM1A-AD041		CPM1A-DA041	
		Voltage I/O	Current I/O	Voltage I/O	Current I/O
Analog inputs	Number of inputs	4 (allocated 4 words in + 2 words out)			
	Input signal ranges	0 to 5 V, 1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA		
	Maximum rated input	±15 V	±30 mA		
	External input impedance	1 MΩ min.	250 Ω		
	Resolution	1/6,000 (full scale)			
	Overall precision	25°C:±0.3% of full scale	25°C:±0.4% of full scale		
		0 to 55°C:±0.6% of full scale	0 to 55°C:±0.8% of full scale		
	Converted A/D data	Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale			
	Averaging	Supported (set for each input with DIP switch)			
	Disconnection detection	Supported			
Analog output (See note 1.)	Number of outputs			4 (4 words allocated)	
	Output signal ranges			1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA
	External output allowed load resistance			1 kΩ min.	600 Ω max.
	External output impedance			0.5 Ω max.	---
	Resolution			1/6,000 (full scale)	
	Overall precision			25°C:±0.4% of full scale	
				0 to 55°C:±0.8% of full scale	
	D/A data setting			Binary data (hexadecimal, 4-digit) –10 to 10 V output range: Full scale = F448 to 0BB8 Hex Other output ranges: Full scale = 0000 to 1770 Hex	
Conversion time		2 ms/point		2 ms/point	
Isolation method		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)	

CPM1A-TS□0□

Temperature Sensor Units

- By connecting a Temperature Sensor Unit (CPM1A-TS001/TS002/TS101/TS102, TS101-DA) to the CPM2A, inputs can be received from thermocouples or temperature-resistance thermometers.
- Inputs converted to binary data (4-digit hexadecimal) and stored in the IR area. Refer to page 76 for details on the maximum number of connectable Units.



Specifications

General

Item	Specification		
Model	CPM1A-TS001/002	CPM1A-TS101/102	CPM1A-TS101-DA
Number of inputs	TS001: 2; TS002: 4	TS101: 2; TS102: 4	2
Input types	K or J selectable (The same input type must be used for all inputs.)	Pt100, JPt1100 selectable (The same input type must be used for all inputs.)	Pt100 only
Accuracy	±0.5% or ±2 °C of the stored value whichever is larger (see note) ± 1 digit max.	±0.5% or ±1 °C of the stored value whichever is larger (see note) ± 1 digit max.	1% of full scale
Conversion cycle	250 ms/2 points (TS001 or TS101) or 250 ms/4 points (TS002 or TS102)		60 ms (for all points)
Converted temperature data	Binary data (4-digit hexadecimal)		
Isolation method	Photocoupler isolation between input signals		
Number of outputs	---		one point
Output range	---		0 to 10 V, -10 to 10 V, 4 to 20 mA
Accuracy	---		1% of full scale

Note: Accuracy for K thermocouples at temperatures less than –100°C: ±4°C ± 1 digit max.

Input Temperature Ranges for CPM1A-TS001/002

The input type is selected with a rotary switch. The ranges for each of the input types are shown in the following table.

Item	Range in °C	Range in °F
K	–200 to 1,300	–300 to 2,300
	0.0 to 500.0	0.0 to 900.0
J	–100 to 850	–100 to 1,500
	0.0 to 400.0	0.0 to 750.0

Input Temperature Ranges for CPM1A-TS101/102

The input type is selected with a rotary switch. The ranges for each of the input types are shown in the following table.

Item	Range in °C	Range in °F
Pt100	–200.0 to 650.0	–300 to 1,200.0
JPt100	–200.0 to 650.0	–300 to 1,200.0

Input Temperature Ranges for CPM1A-TS101-DA

The input type is selected with a rotary switch. The ranges for each of the input types are shown in the following table.

Item	Range in °C
Pt100	–40.0 to 250.0

CPM1A-DRT21

DeviceNet I/O Link Unit



I/O Link Unit for CPM2A/CPM1A PLCs

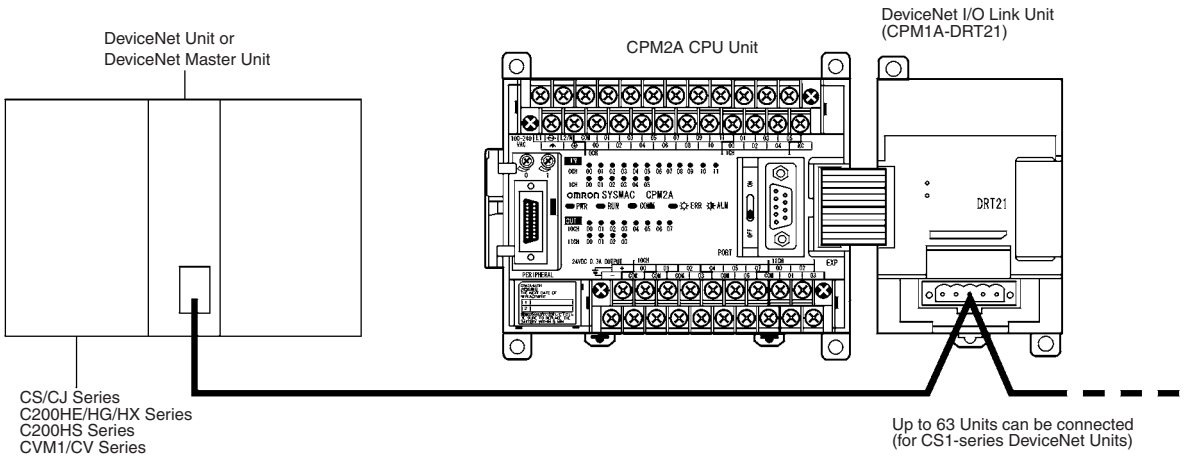
- Functions as a slave for DeviceNet.
- Provides 32 input points and 32 output points for I/O exchange with the master.
- International standards: UL, CSA, CE.

Specifications

Communications power supply voltage	11 to 25 V DC
Current consumption	10 mA max. at 24 V DC
Max. number of I/O points	Inputs: 32; Outputs: 32
Number of allocated words in CPM2A I/O memory	Input: 2 words; Output: 2 words (Same allocation as for other Expansion Units.)
Node address setting method	Set using DIP switch.
Max. number of connectable Units	3 max.

Application Examples

Configuration Example



Note: Up to 3 DeviceNet I/O Link Units and other Expansion I/O Units can be mounted to CPM1A/CPM2A CPU Units.

Precautions

Refer to the relevant catalog for details on CPM1A and CPM2A PLCs (CPM1: Cat. No. P035; CPM2A/CPM2C: Cat. No. P049).

CPM1A-PRT21

PROFIBUS-DP I/O Link Unit



I/O Link Unit for CPM2A/CPM1A PLCs

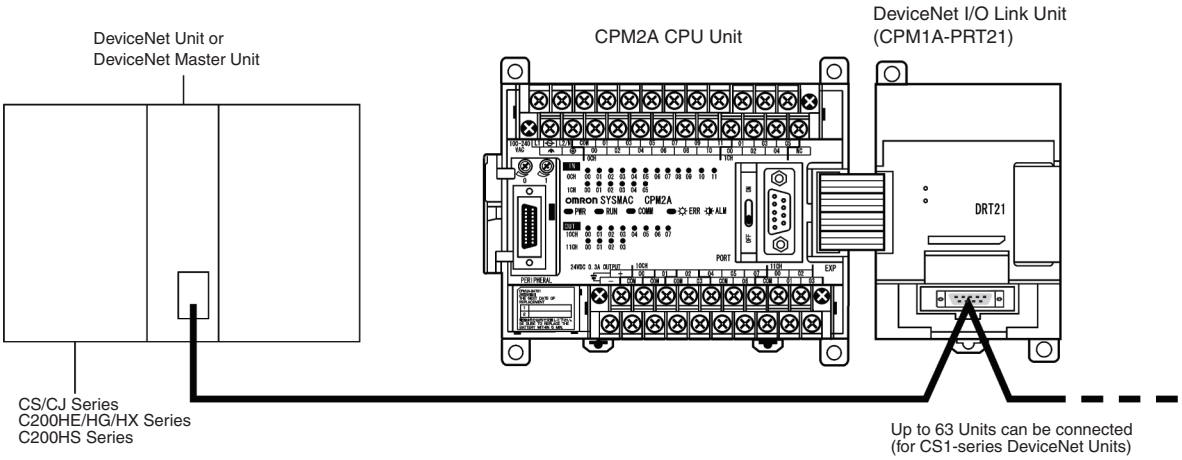
- Functions as a slave for PROFIBUS-DP.
- Provides 16 input points and 16 output points for I/O exchange with the PROFIBUS-DP master.

Specifications

Item	Specification
Model number	CPM1A-PRT21
Master/slave	PROFIBUS-DP slave (OC_0658.GSD)
I/O capacity to master	16 input und 16 output points (no consistency), Intel/Motorola format selectable by DIP switch.
I/O memory allocated in CPM2A	1 input word and 1 output word (allocated in the same as other Expansion Units)
Node address setting	2 rotary switches (00-99)
Maximum number of nodes per PROFIBUS network	C200H master, CS1 / CJ1 master: 125 nodes

Application Examples

Configuration Example



Note: Up to 3 PROFIBUS DP I/O Link Units and other Expansion I/O Units can be mounted to CPM1A/CPM2A CPU Units.

Precautions

Refer to the relevant catalog for details on CPM1A and CPM2A PLCs (CPM1: Cat. No. P035; CPM2A/CPM2C: Cat. No. P049).

I/O Link Unit CPM1A-SRT21

CompoBus/S I/O Link Unit



I/O Link Unit for CPM2A/CPM1A PLCs

- Operates as a Slave of the CompoBus/S Master Unit.
- Exchanges eight inputs and eight outputs with the Master.
- Approved by UL and CSA standards, and bears the CE marking.

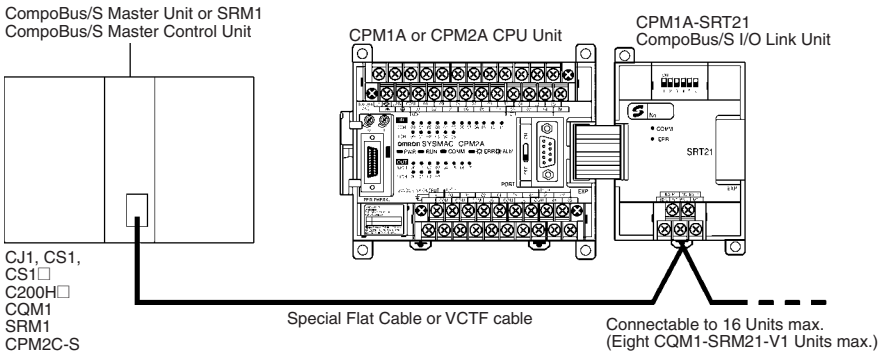
Specifications

Master/Slave	CompoBus/S Slave
Number of I/O points	8 inputs and 8 outputs
Number of words occupied in CPM2A's I/O memory	1 input word and 1 output word (allocated in the same way as for other Expansion Units)
Node address setting	DIP switch

Note: For details of CPM1A PLCs, refer to the CPM1A catalog (Cat. No. P039). For details of CPM2A PLCs, refer to the CPM2A catalog (Cat. No. P049)

Installation

Connection Examples

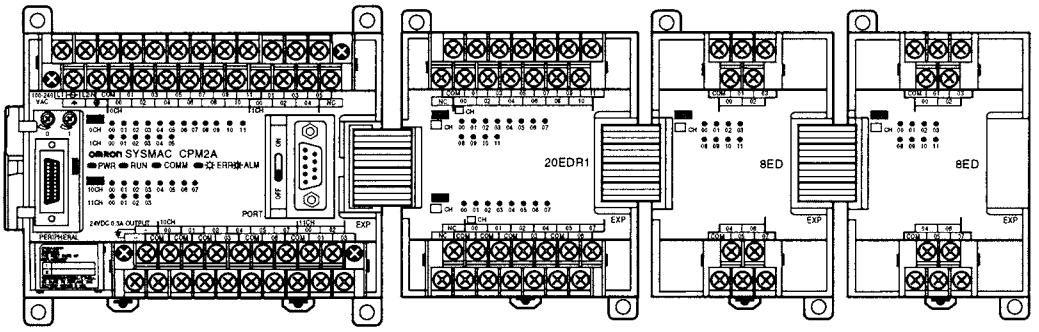


Note: A single CompoBus/S I/O Link Unit together with a maximum of two other Expansion I/O Units can be connected to the CPM1A or CPM2A CPU Unit.

CPM2A General Information

System Configuration

Up to three Expansion I/O Units or Expansion Units can be connected to a CPM2A CPU Unit. Group 2 Units are counted as 2 Expansion Units; therefore only one Group 2 Unit can be connected per CPU.



CPU Unit | Expansion Unit or Expansion I/O Unit | Expansion Unit or Expansion I/O | Expansion Unit or Expansion I/O

Expansion Unit Connection Groups

Group 1 (G1)	Group 2 (G2)
Expansion I/O Units Analog I/O Units CompoBus/S I/O Link Units CPM1A-TS001/TS101(-DA) Temperature Sensor Units DeviceNet I/O Link Unit PROFIBUS-DP I/O Link Unit	CPM1A-TS002/TS102 Temperature Sensor Units CPM1A-AD041/DA041 Analog I/O Units

The sequences in which Units in the above groups can be connected to the CPU Unit are shown in the following table.

Expansion Unit Group Combinations

Expansion sequence 1	Expansion sequence 2	Expansion sequence 3
G1	G1	G1
G2	G1	G2 Units cannot be connected after a G1 Unit.

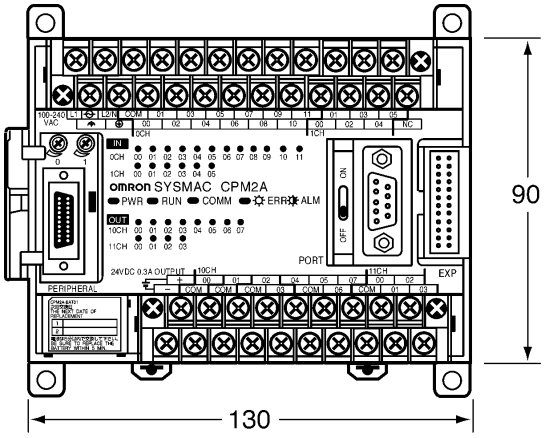
Note: 1. The mounting sequence does not affect the number of Units that can be mounted.

2. If the NT-AL001 RS-422 Adapter is connected to the RS-232C port, only one Expansion Unit or Expansion I/O Unit can be added.

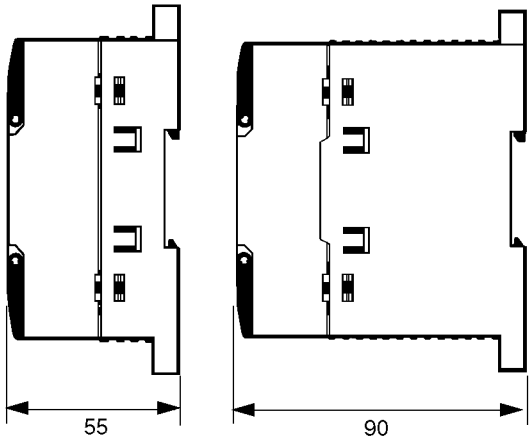
3. If three CPM1A-MAD11/MAD01 Analog I/O Units are connected to a CPM2A-60CDR-A CPU Unit, keep the output capacity of the external power supply (24 V DC) to 200 mA or less.

Dimensions

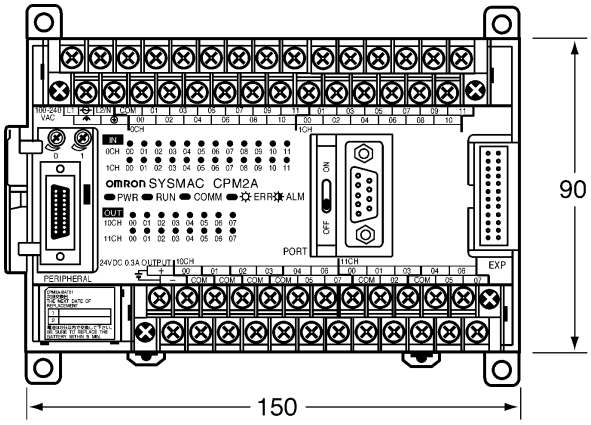
CPM2A-20CD□-□/30CD□-□ CPU Units



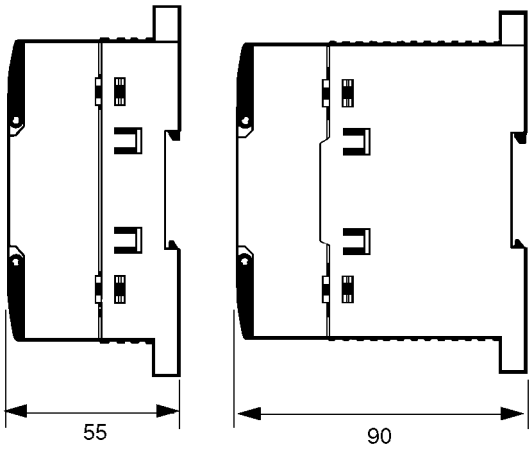
CPU Units with DC Power CPU Units with AC Power



CPM2A-40CD□-□ CPU Units

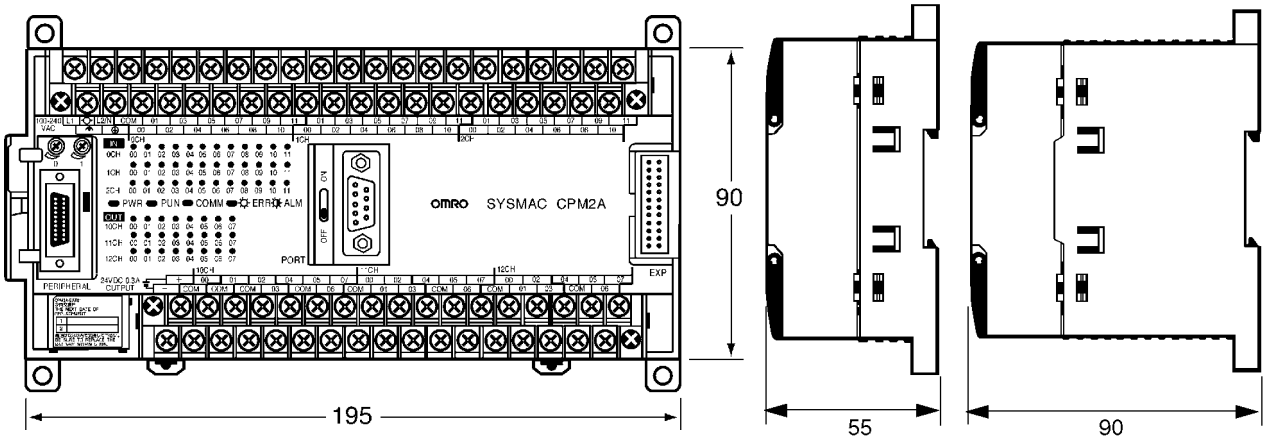


CPU Units with DC Power CPU Units with AC Power



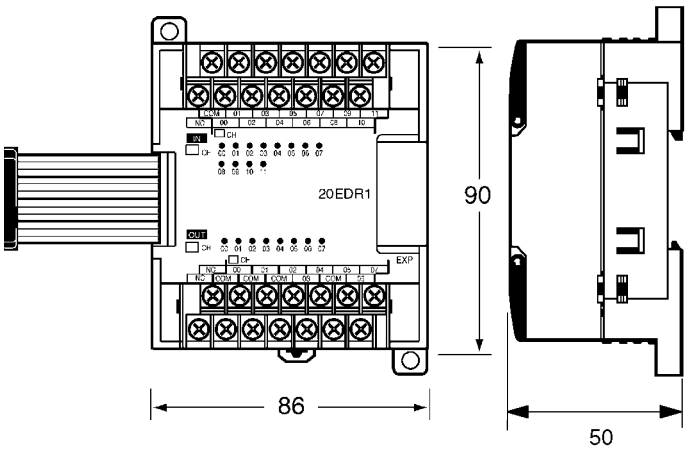
CPM2A-60CD□-□ CPU Units

CPU Units with DC Power CPU Units with AC Power

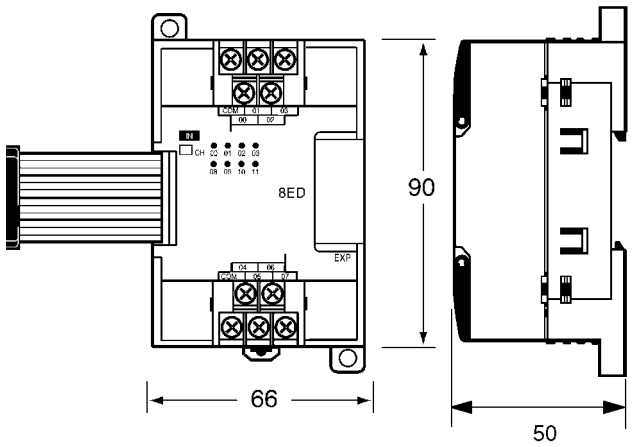


Note: All dimensions are in mm.

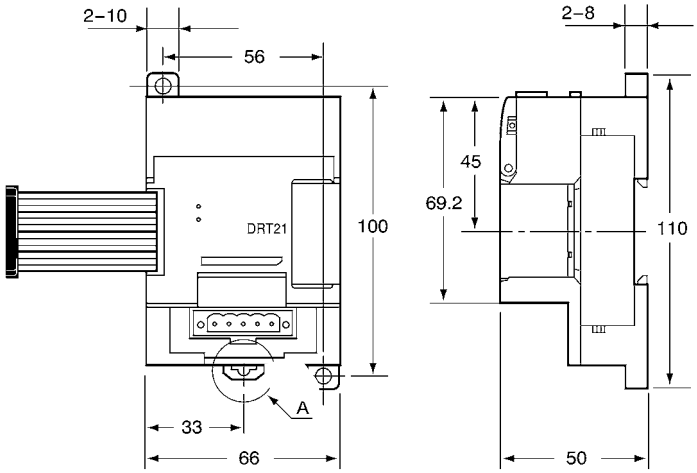
CPM1A-20ED□ Expansion I/O Units



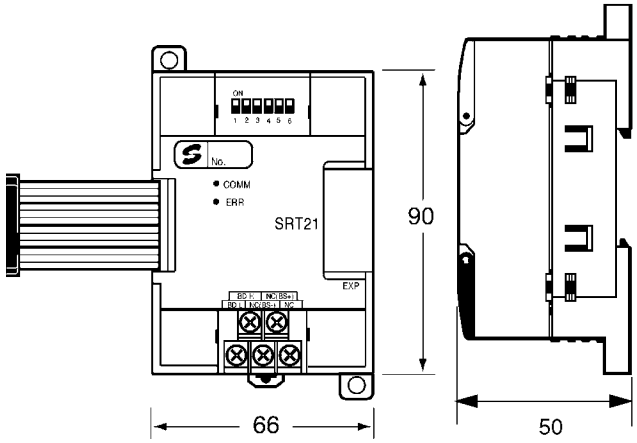
CPM1A-8□□□ Expansion I/O Units



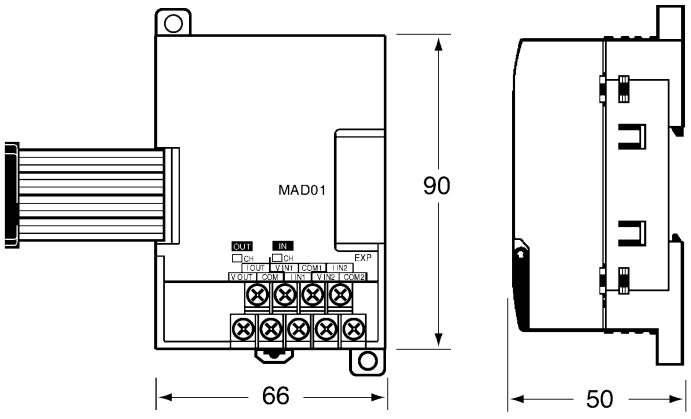
CPM1A-DRT21 DeviceNet I/O Link Unit
CPM1A-PRT21 PROFIBUS-DP I/O Link Unit



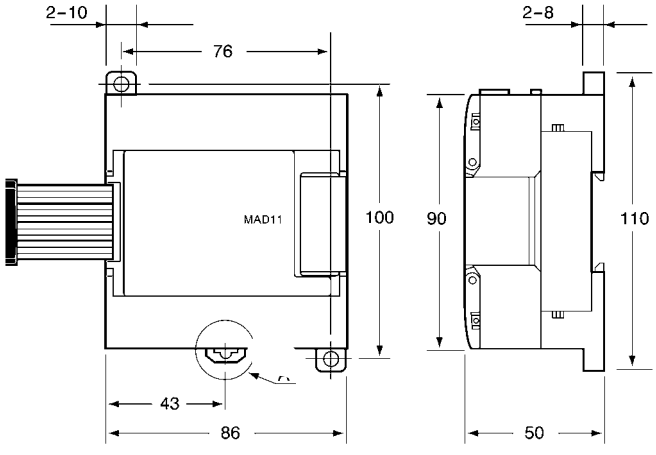
CPM1A-SRT21 CompoBus/S I/O Link Unit



CPM1A-MAD01 Analog I/O Unit

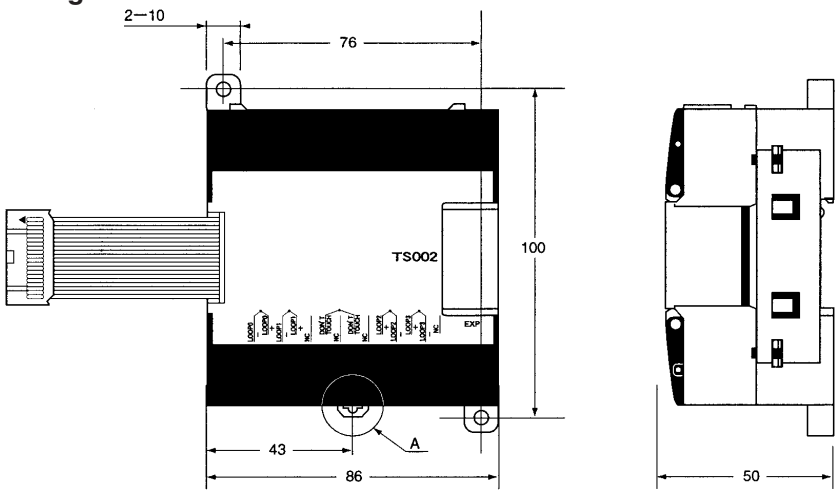


CPM1A-MAD11 Analog I/O Unit



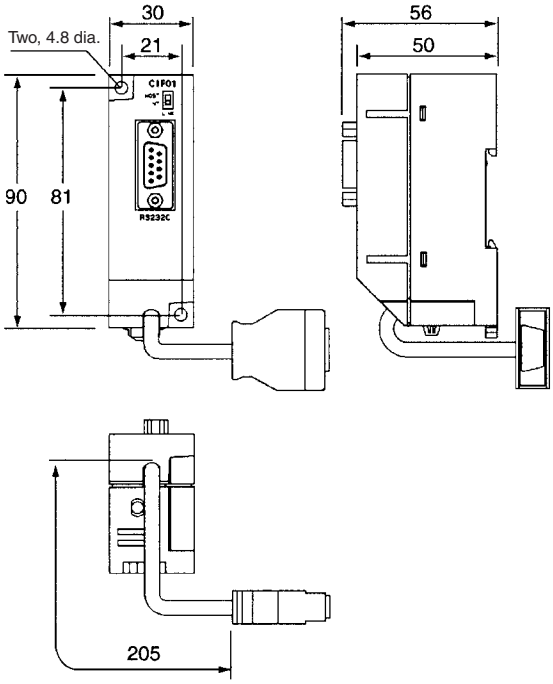
Note: All dimensions are in mm.

CPM1A-TS□□□ Temperature Sensor Unit
CPM1A-AD041/DA041 Analog I/O Units

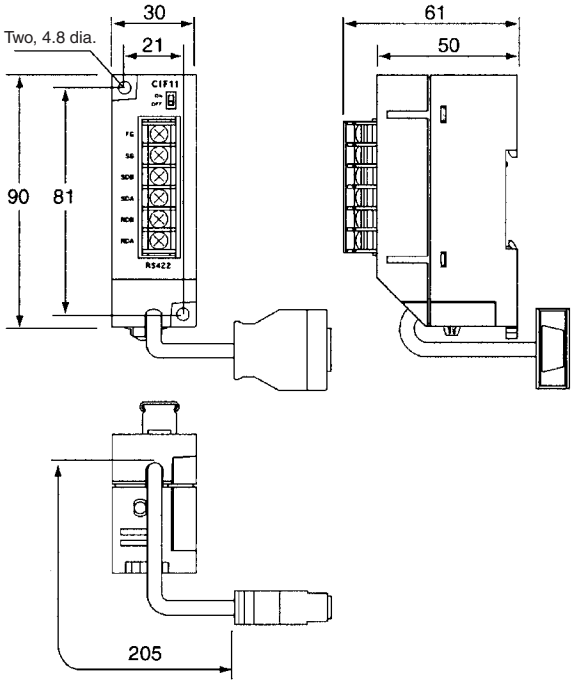


Note: All dimensions are in mm.

CPM1-CIF01 RS-232C Adapter



CPM1-CIF11 RS-422 Adapter



OMRON

CPM2A Ordering Information

International Standards

The products shown in the attached tables are those that conform to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of September 2003.
(U: UL, C: CSA, UC: cULus, CU: cUL, N: NK, L: Lloyd, CE: EC Directives)
Please contact OMRON representative for application conditions.

CPM2A CPU Units

CPU Unit	Power supply	Output type	Inputs	Outputs	Model	Standards
20 I/O points	AC	Relay	12	8	CPM2A-20CDR-A	U, C, CE, N, L
	DC	Relay			CPM2A-20CDR-D	U, C, CE, N, L
		Transistor (sinking)			CPM2A-20CDT-D	U, C, CE, N, L
		Transistor (sourcing)			CPM2A-20CDT1-D	U, C, CE, N, L
30 I/O points	AC	Relay	18	12	CPM2A-30CDR-A	U, C, CE, N, L
	DC	Relay			CPM2A-30CDR-D	U, C, CE, N, L
		Transistor (sinking)			CPM2A-30CDT-D	U, C, CE, N, L
		Transistor (sourcing)			CPM2A-30CDT1-D	U, C, CE, N, L
40 I/O points	AC	Relay	24	16	CPM2A-40CDR-A	U, C, CE, N, L
	DC	Relay			CPM2A-40CDR-D	U, C, CE, N, L
		Transistor (sinking)			CPM2A-40CDT-D	U, C, CE, N, L
		Transistor (sourcing)			CPM2A-40CDT1-D	U, C, CE, N, L
60 I/O points	AC	Relay	36	24	CPM2A-60CDR-A	U, C, CE, N, L
	DC	Relay			CPM2A-60CDR-D	U, C, CE, N, L
		Transistor (sinking)			CPM2A-60CDT-D	U, C, CE, N, L
		Transistor (sourcing)			CPM2A-60CDT1-D	U, C, CE, N, L

Expansion Units and Expansion I/O Units

Unit	Input/Output type	Inputs	Outputs	Model	Standards
Expansion I/O Units	Relay	24	16	CPM1A-40EDR	CE, N
	Transistor (sinking)			CPM1A-40EDT	CE, N
	Transistor (sourcing)			CPM1A-40EDT1	CE, N
	Relay	12	8	CPM1A-20EDR1	U, C, CE, N, L
	Transistor (sinking)			CPM1A-20EDT	U, C, CE, N, L
	Transistor (sourcing)			CPM1A-20EDT1	U, C, CE, N, L
	---	8	---	CPM1A-8ED	U, C, CE, N, L
	Relay	---	8	CPM1A-8ER	U, C, CE, N, L
	Transistor (sinking)	---	8	CPM1A-8ET	U, C, CE, N, L
	Transistor (sourcing)			CPM1A-8ET1	U, C, CE, N, L
Analog I/O Unit	Analog (resolution: 1/256)	2	1	CPM1A-MAD01	U, C, CE
	Analog (resolution: 1/6,000)	2	1	CPM1A-MAD11	U, C, CE
	Analog (resolution 1/6000)	4	---	CPM1A-AD041	U, C, CE
	Analog (resolution 1/6000)	---	4	CPM1A-DA041	U, C, CE
DeviceNet I/O Link Unit	---	I/O Link of 32 input bits and 32 output bits		CPM1A-DRT21	U, C, CE
PROFIBUS-DP I/O Link Unit	---	I/O Link of 16 input bits and 16 output bits		CPM1A-PRT21	CE
CompoBus/S I/O Link Unit	---	I/O Link of 8 input bits and 8 output bits		CPM1A-SRT21	U, C, CE, N, L
Temperature Sensor Units	2 thermocouple inputs			CPM1A-TS001	U, C, CE, N, L
	4 thermocouple inputs			CPM1A-TS002	U, C, CE, N, L
	2 platinum resistance thermometer inputs			CPM1A-TS101	U, C, CE, N, L
	4 platinum resistance thermometer inputs			CPM1A-TS102	U, C, CE, N, L
	2 Platinum resistance thermometer inputs (-40 to 250 °C) and one output (-10 to 10V, 4 to 20 mA)			CPM1A-TS101-DA	U, C, CE, N, L

Programming Consoles and Cables

Product		Model	Standards
Programming Console (2-m cable attached)		CQM1H-PRO01-E	U, C, N, CE
Programming Console (Requires separate cable. See below.)		C200H-PRO27-E	U, C, N, CE
Connecting Cable for C200H-PRO27-E	2-m cable	C200H-CN222	N
	4-m cable	C200H-CN422	---

Support Software

Product	Functions	Model	Standards
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.	CX-ONE-AL□□C-E[*1]	---

*1 □□ = Number of licenses (01, 03, 10)

Product	Model	Standards
Expansion Memory Unit	CPM1-EMU01-V1	---
EEPROM (256 K)	EEROM-JD	---

Personal Computer Connecting Cables

CPM2A port	Computer port	Specifications	Cable length	Model	Standards
Peripheral	For a D-sub 9-pin port	---	3.3 m	CQM1-CIF02	U, C, N, L, CE
RS-232C	For a D-sub 9-pin port	---	2 m	XW2Z-200S-V	---
			5 m	XW2Z-500S-V	---
		Can be used with a peripheral bus or Host Link. Uses connector that prevents ESD (electrostatic discharge.)	2 m	XW2Z-200S-CV	---
			5 m	XW2Z-500S-CV	---
	For a D-sub 25-pin port	---	2 m	XW2Z-200S	---
			5 m	XW2Z-500S	---
	For a half-pitch 14-pin port	---	2 m + 0.15 m	XW2Z-200S	---
				XW2Z-S001	---
			5 m + 0.15 m	XW2Z-500S	---
				XW2Z-S001	---

Adapters

Product	Function		Model	Standards
RS-232C Adapter	Peripheral port level conversion		CPM1-CIF01	N, L, CE
RS-422 Adapter			CPM1-CIF11	N, L, CE
Link Adapter	RS-232C to RS-422A conversion	For personal computer connection (Can also be connected to the CPM2A.)	3G2A9-AL004-E	---
RS-232C to RS422A Conversion Adapter		For CPM2A connection (Can also be connected to a personal computer, but requires an external 5-V power supply.)	NT-AL001	---

Battery

Product	Function	Model	Standards
Backup Battery (See note.)	Backs up memory in the CPM2A CPU Unit.	CPM2A-BAT01	---

Note: One internal Backup Battery is provided as standard.

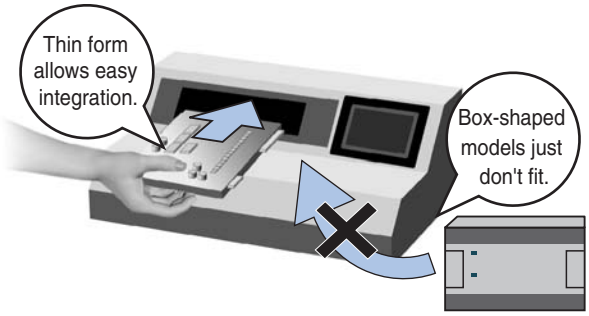
Board PLC

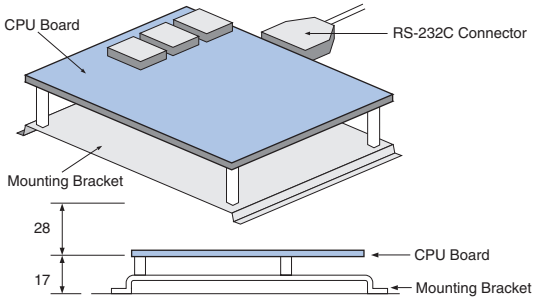
CPM2B

Proven PLC technology, made to fit anywhere.

Fits into the narrowest slots.

Requiring only 45-mm height, the CPM2B easily fits into narrow spaces.





Note: Dimensions using a CPU Board. Horizontal expansion using CPM2B-CN411 Cable with an Expansion Board is possible.

Full integration into your machine

The case-free board format of the CPM2B can be used like an in-house controller.

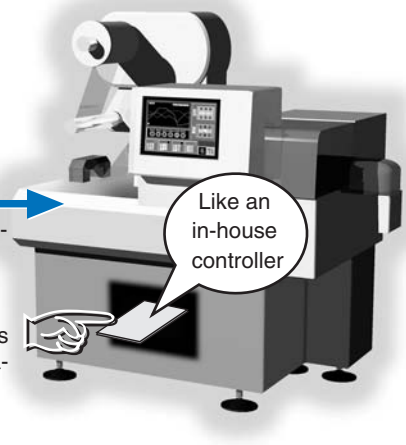
Conventional PLC

Company A or Company B PLC built in as specified by end user.



CPM2B

The board shape solves problems with end user specifications, eliminating the need to build in PLCs from different companies.



12-V Power Supply

Lineup includes Board PLCs that support a 12-V power supply, allowing battery-powered applications, such as notification of power failures via wireless error information transmissions.

- 32-point CPU Board (transistor outputs)
- 32-point Expansion I/O Board (transistor outputs)

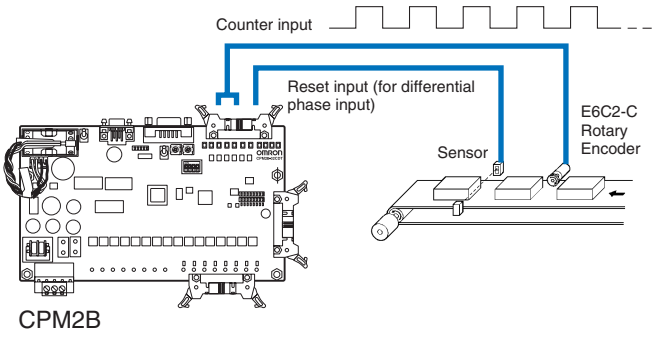
Use with Devices Requiring Analog I/O

- Lineup includes Analog I/O Expansion Boards (Resolution: 6,000)
- Use to set speed and other settings for Pressure Sensors and Inverters.

Provides Machine Control Functions

Includes Two High-speed Counter Functions

One high-speed counter input can be used in any one of the four input modes: Differential phase pulse mode (5 kHz), pulse plus direction input mode (20 kHz), up/down pulse input mode (20 kHz), and increment mode (20 kHz). The four interrupt inputs in counter mode can be used for incrementing counters or decrementing counters (2 kHz).



Reliably Reads Short Pulses of 50 µs

Quick-response input allows short ON-time pulse input. Four inputs are used for quick-response inputs (shared with interrupt inputs and interrupt inputs in counter mode) that can reliably read inputs with a minimum input signal width as short as 50 µs, regardless of the cycle time.

Analog Settings

Two controls on the CPU Board can be turned to change the analog settings. The rotation angle is stored as BCD data (0 to 200 BCD) in IR 250 and IR 251. These controls can be used to easily change or fine-tune machine settings such as a conveyor belt's pause time or feed rate.

Calendar/Clock

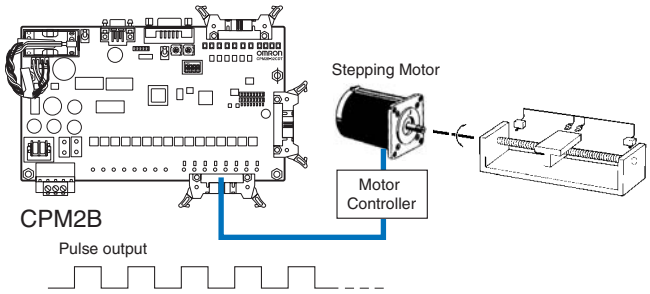
CPU Boards that have a built-in clock (accuracy: 1 minute/month), can read from the program to show the current year, month, day, day of the week, and time (hour, minute, second).

Easy Position Control with Pulse Outputs

(Transistor Outputs Only)

CPM2B PLCs with transistor outputs have two outputs that can produce 10-Hz to 10-kHz pulses (single-phase outputs).

- When used as single-phase pulse outputs, there can be two outputs. When used as pulse plus direction or up/down pulse outputs, there can be just one output. Output of 0.1 to 999.9 Hz with a variable duty ratio (0 to 100% duty ratio) is also possible.

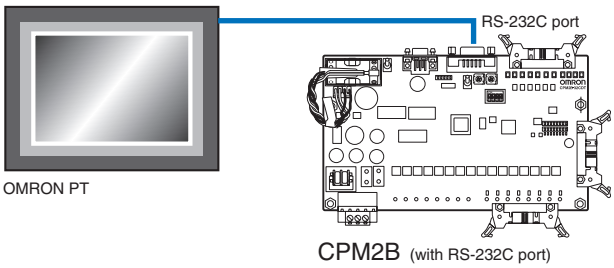


Indispensable interrupt Functions for Machine Control

When an interrupt input goes ON, the main program is stopped and the interrupt program is executed. The interrupt functions can be used as high-speed counters and for quick response, in addition to timer functions.

High-speed Communications with the PT Using a 1:1 NT Link

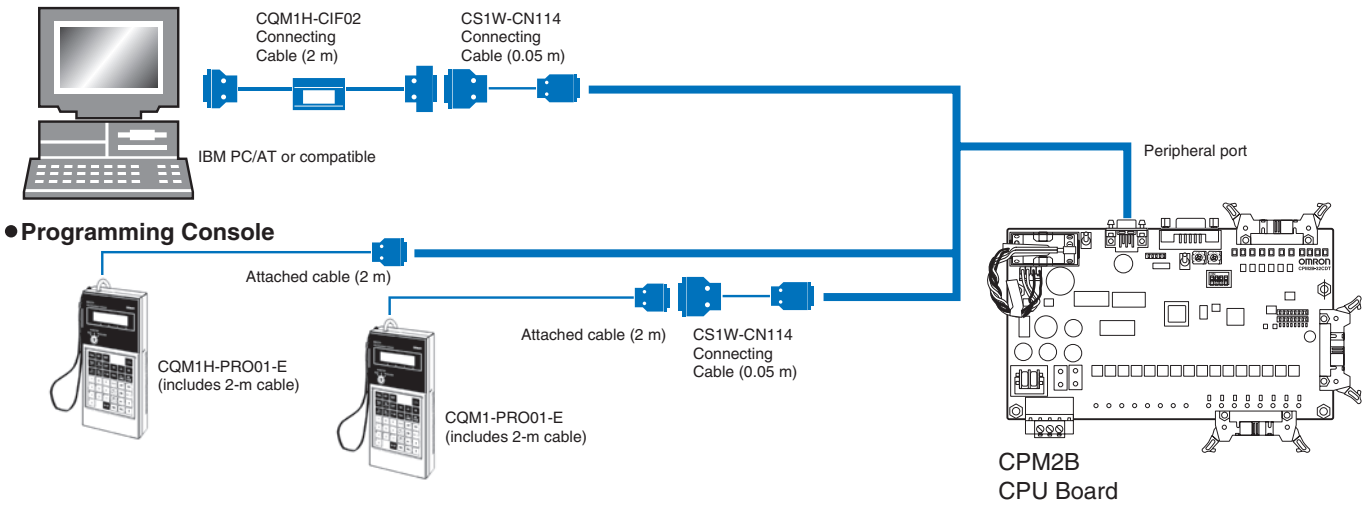
With a 1:1 NT Link, an OMRON Programmable Terminal (PT) can be connected directly to the CPM2B.



Device Connections and System Configuration

●CX-Programmer (CX-One)

(Compatible with version 1.2 or later.)



CPU Boards

Board type		Inputs	Outputs	Battery	Clock	RS-232C port	Model
32 I/O points (16 inputs, 16 outputs)	Terminal block outputs	16 inputs, 24 V DC	16 relay outputs	---	---	---	CPM2B-32C1DR-D
				●	●	●	CPM2B-32C2DR-D
	Connector outputs	16 inputs, 24 V DC	16 sinking transistor outputs	---	---	---	CPM2B-32C1DT-D
				●	●	●	CPM2B-32C2DT-D
	Connector outputs	16 inputs, 12 V DC	16 sinking transistor outputs	---	---	---	CPM2B-32C1D1T-D12
				●	●	●	CPM2B-32C2D1T-D12
40 I/O points (24 inputs, 26 outputs)	Terminal block outputs	24 inputs, 24 V DC	16 relay outputs	●	●	●	CPM2B-32C2D1T-D12
				●	●	●	CPM2B-40C2DR-D

Expansion I/O Boards

Board type		Inputs	Outputs	Model
32 I/O points (16 inputs, 16 outputs)	Terminal block outputs	16 inputs, 24 V DC	16 relay outputs	CPM2B-32EDR
	Connector outputs	16 inputs, 24 V DC	16 sinking transistor outputs	CPM2B-32EDT
		16 inputs, 12 V DC	16 sinking transistor outputs	CPM2B-32ED1T
40 I/O points (24 inputs, 26 outputs)	Terminal block outputs	24 inputs, 24 V DC	16 relay outputs	CPM2B-40EDR
64 I/O points (32 inputs, 32 outputs)	Connector output	32 inputs, 24 V DC	32 sinking transistor outputs	CPM2B-64EDT

Note: 1. A maximum of two CPM2B-64EDT 64-point Expansion I/O Boards can be connected, due to the current consumption.

2. Only one Expansion I/O Board can be connected if connecting an NT-AL001 to the RS-232C port.

General Specifications

	CPU Board		Expansion Board	
Item	32 or 40 I/O points (relay output)	32 I/O points (transistor output)	32 or 64 I/O points (relay output)	32 or 64 I/O points (transistor output)
Supply voltage	24 V DC		Supplied from the CPU Board	
Allowable supply voltage	20.4 to 26.4 V DC			
Power consumption	20 W max.		---	
Inrush current	20 A max.		---	
Insulation resistance	20 MW min. (at 500 V DC) between the external DC terminals and non-current carrying metal parts			
Dielectric strength	1,000 V AC for 1 min between the external DC terminals and non-current carrying metal parts			
Noise immunity	Conforms to IEC61000-4-4; 2 kV (power lines)			
Vibration resistance	Conforms to JIS C0040. 10 to 57 Hz, 0.075 mm amplitude, 57 to 150 Hz, 9.8 m/s^2 acceleration in X, Y and Z directions for 80 minutes each (8 minutes of vibration x 10 repetitions = total time 80 minutes)			
Shock resistance	Conforme to JIS C0041, 147 m/s^2 three times each in X, Y and Z directions			
Ambient operating temperature	0 to 55 °C			
Ambient operating humidity	10% to 90% (with no condensation)			
Ambient operating atmosphere	Must be free from corrosive gas.			
Ambient storage temperature	-20 to 75 °C (excluding the battery)			
Power supply retention time	2 ms min.			

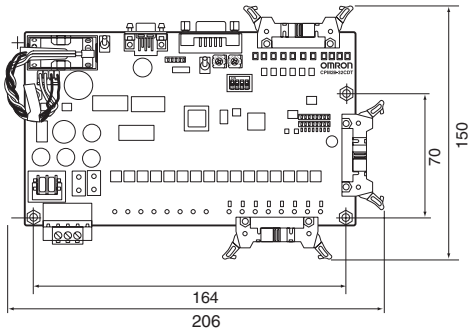
Performance Specifications

		CPU Board	
Item		32 I/O points (relay outputs) 32 I/O points (transistor outputs) 40 I/O points (relay outputs)	
Control method		Stored program method	
I/O control method		Cyclic scan (immediate refreshing can be performed with IORF/97).)	
Programming language		Ladder diagram	
Instruction length		1 step per instruction, 1 to 5 words per instrucon	
Instructions	Basic instructions	14 instructions	
	Special instructions	105 instructions, 185 variations	
Execution time	Basic instructions	0.64 μs (LD instruction)	
	Special instructions	7.8 μs (MOV instruction)	
Program capacity		4,096 words	
Max. I/O capacity	CPU Board only	32 points/40 points	
	With Expansion I/O Boards	168 points max.	
Input bits		IR 00000 to IR 00915	(Words not used for input bits can be used for work bits).
Output bits		IR 01000 to IR 01915	
Work bits		928 bits: IR 02000 to IR 04915 (words IR 020 to IR 049) and IR 20000 to IR 22715 (words IR 200 to IR 227)	
Special bits (SR Area)		448 bits: IR 22800 to IR 25515 (words IR 228 to 256)	
Temporary bits (TR Area)		8 bits (TR0 to TR7)	
Holding bits (HR Area)		320 bits: HR 0000 to HR 1915 (words HR 00 or HR 19)	
Auxiliary bits (AR Area)		384 bits: AR 0000 to AR 2315 (words AR 00 to AR 23)	
Link bits (LR Area)		256 bits: LR 0000 to LR 1515 (words LR 00 to LR 15)	
Timers/Counters		256 bits: TIM/CNT 000 to TIM/CNT 255 1-ms timers: TMHH 10-ms timers: TIMH 100-ms timers: TIM 1-s/10-s timers: TIML Decrementing timers: CNT Reversible counters: CNTR	
Data memory	Read/Write	2,048 words (DM 0000 to DM 2047). The Error Log is contained in DM 2000 to DM 2021.	
	Read only	456 words (DM 6144 to DM 6599)	
	PLC Setup	54 words (DM 6600 to DM 6655)	

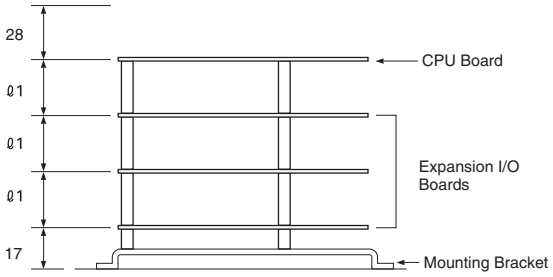
Assembly Dimensions

32 or 64 I/O points

• Front View



• Height (When Stacked Vertically)



	32-point Expansion I/O Boards	32/64-point Expansion I/O Boards
⁄1	28 mm	24 mm

Compact PLC series

CPM2C

A versatile controller for up to 192 I/O points in an ultra-compact package

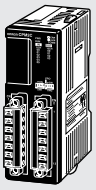
SYSMAC CPM2C



An extensive range of models assures efficient machine control in an ultracompact package. CPU Units (DC power supply only) are available with relay or transistor output, terminal block or various connector options, and an optional real-time clock function. Select the output type, number of I/O points and other specifications to meet your needs. Expansion I/O Units with 8 to 32 I/O points make it possible to configure a control system with a maximum of 192 I/O points.

CPU Units Depth: 65 mm

10 I/O Points



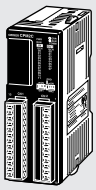
■Relay Output CPU Units
(Terminal-block type)
CPM2C-10CDR-D (No clock)
CPM2C-10C1DR-D (Clock)
●Input points: 6, DC input
●Output points: 4



■Transistor Output (Sink) CPU Units
(Connector type)
CPM2C-10CDTC-D (No clock)
CPM2C-10C1DTC-D (Clock)
(MIL-connector type)
CPM2C-10CDTM-D (No clock)
CPM2C-10C1DTM-D (Clock)

■Transistor Output (Source) CPU Units
(Connector type)
CPM2C-10CDT1C-D (No clock)
CPM2C-10C1DT1C-D (Clock)
(MIL-connector type)
CPM2C-10CDT1M-D (No clock)
CPM2C-10C1DT1M-D (Clock)
●Input points: 6, DC input
●Output points: 4

20 I/O Points



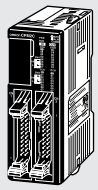
■Relay Output CPU Units
(Terminal-block type)
CPM2C-20CDR-D (No clock)
CPM2C-20C1DR-D (Clock)
●Input points: 12, DC input
●Output points: 8



■Transistor Output (Sink) CPU Units
(Connector type)
CPM2C-20CDTC-D (No clock)
CPM2C-20C1DTC-D (Clock)
(MIL-connector type)
CPM2C-20CDTM-D (No clock)
CPM2C-20C1DTM-D (Clock)

■Transistor Output (Source) CPU Units
(Connector type)
CPM2C-20CDT1C-D (No clock)
CPM2C-20C1DT1C-D (Clock)
(MIL-connector type)
CPM2C-20CDT1M-D (No clock)
CPM2C-20C1DT1M-D (Clock)
●Input points: 12, DC input
●Output points: 8

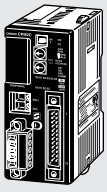
32 I/O Points



■Transistor Output (Sink) CPU Units
(Connector type)
CPM2C-32CDTC-D (No clock)
(MIL-connector type)
CPM2C-32CDTM-D (No clock)

■Transistor Output (Source) CPU Units
(Connector type)
CPM2C-32CDT1C-D (No clock)
(MIL-connector type)
CPM2C-32CDT1M-D (No clock)
●Input points: 16, DC input
●Output points: 16

Programmable DeviceNet Slaves



■Transistor Output (Sink)
CPU Unit
(Connector type)
CPM2C-S100C-DRT (Clock)

■Transistor Output (Source)
CPU Unit
(Connector type)
CPM2C-S110C-DRT (Clock)
●Input points: 6, DC input
●Output points: 4

CPU Units with CompoBus/S Master Function



■Transistor Output (Sink)
CPU Unit
(Connector type)
CPM2C-S100C (Clock)

■Transistor Output (Source)
CPU Unit
(Connector type)
CPM2C-S110C (Clock)
●Input points: 6, DC input
●Output points: 4

AC Power Supply Unit



CPM2C-PA201
●100- to 240-V AC input
●24-V AC/600-mA output

Analog I/O Units



CPM2C-MAD11
- Analog inputs: 2 (Resolution: 6,000)
- Analog output: 1 (Resolution: 6,000)

Temperature Sensor Units



CPM2C-TS001
- Thermocouple inputs: 2

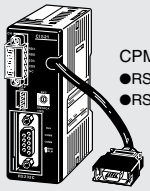
CPM2C-TS101
- Platinum-resistance thermometer inputs: 2

CompoBus/S I/O Link Unit



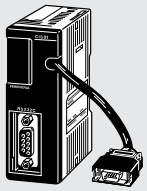
CPM2C-SRT21
- I/O Link inputs: 8
- I/O Link outputs: 8

Simple Communications Unit



CPM2C-CIF21
- RS-485 component connection
- RS-232C

Adapters

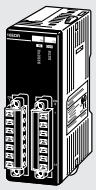


■Peripheral/ RS-232C Adapter
CPM2C-CIF01-V1

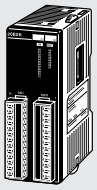
■RS-422/RS-485 + RS-232C Adapter
CPM2C-CIF11

Expansion I/O Units Depth: 65 mm

Input/Output Expansion I/O Units



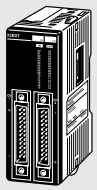
■Relay Output I/O Unit (Terminal-block type)
CPM2C-10EDR
- Input points: 6, DC input
- Output points: 4



■Relay Output I/O Unit (Terminal-block type)
CPM2C-20EDR
- Input points: 12, DC input
- Output points: 8



■Transistor Output (Sink) I/O Unit (Connector type)
CPM2C-24EDTC
■Transistor Output (Source) I/O Unit (Connector type)
CPM2C-24EDT1C
■Transistor Output (Sink) I/O Unit (MIL-connector type)
CPM2C-24EDTM
■Transistor Output (Source) I/O Unit (MIL-connector type)
CPM2C-24EDT1M
- Input points: 16, DC input
- Output points: 8



■Transistor Output (Sink) I/O Unit (Connector type)
CPM2C-32EDTC
■Transistor Output (Source) I/O Unit (Connector type)
CPM2C-32EDT1C
■Transistor Output (Sink) I/O Unit (MIL-connector type)
CPM2C-32EDTM
■Transistor Output (Source) I/O Unit (MIL-connector type)
CPM2C-32EDT1M
- Input points: 16, DC input
- Output points: 16

Input Expansion I/O Units



CPM2C-8EDC

(Connector type)
CPM2C-8EDC
(MIL-connector type)
CPM2C-8EDM
- Input points: 8, DC input



CPM2C-16EDC

(Connector type)
CPM2C-16EDC
(MIL-connector type)
CPM2C-16EDM
- Input points: 16, DC input

Output Expansion I/O Units



■Relay Output I/O Unit (Terminal-block type)
CPM2C-8ER
- Output points: 8



■Transistor Output (Sink) I/O Unit (Connector type)
CPM2C-8ETC
■Transistor Output (Source) I/O Unit (Connector type)
CPM2C-8ET1C
■Transistor Output (Sink) I/O Unit (MIL-connector type)
CPM2C-8ETM
■Transistor Output (Source) I/O Unit (MIL-connector type)
CPM2C-8ET1M
- Output points: 8



■Transistor Output (Sink) I/O Unit (Connector type)
CPM2C-16ETC
■Transistor Output (Source) I/O Unit (Connector type)
CPM2C-16ET1C
■Transistor Output (Sink) I/O Unit (MIL-connector type)
CPM2C-16ETM
■Transistor Output (Source) I/O Unit (MIL-connector type)
CPM2C-16ET1M
- Output points: 16

Specifications

General

Item	CPU Unit Specification					
	CPU Units with 10 I/O points (relay outputs)	CPU Units with 10 I/O points (transistor outputs)	CPU Units with 20 I/O points (relay outputs)	CPU Units with 20 I/O points (transistor outputs)	CPU Units with 32 I/O points (transistor outputs)	CPM2C-S CPU Unit with 10 I/O points (transistor outputs)
Supply voltage	24 V DC					
Operating voltage range	20.4 to 26.4 V DC					
Power consumption (Add Expansion Unit consumption from following tables.)	4 W	3 W	4 W	3 W	3 W	3 W
Inrush current	25 A max.					
Insulation resistance	20 MΩ min. (at 500 V DC) between isolated circuits					
Dielectric strength	2,300 V AC for 1 min (between isolated circuits)					
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)					
Vibration resistance	Conforming to IEC 60068-2-6, JIS C0040: 10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes each (Time coefficient; 8 minutes × coefficient factor 10 = total time 80 minutes)					
Shock resistance	Conforming to IEC 60068-2-27, JIS C0041: 147 m/s^2 three times each in X, Y, and Z directions					
Ambient temperature	Operating: 0° to 55°C Storage: –20° to 75°C (except for the battery)					
Humidity	10% to 90% (with no condensation)					
Atmosphere	Must be free from corrosive gas					
I/O interface	Terminal block	Connector	Terminal block	Connector		
Power interrupt time	2 ms min.					
Weight	200 g max.	200 g max.	250 g max.	200 g max.	200 g max.	160 g max.
	Expansion I/O Unit with 10 I/O points (relay outputs)			200 g max.		
	Expansion I/O Unit with 20 I/O points (relay outputs)			200 g max.		
	Expansion I/O Units with 24 I/O points (transistor outputs)			200 g max.		
	Expansion I/O Unit with 32 I/O points (transistor outputs)			200 g max.		
	Expansion I/O Unit with 8 input points			150 g max.		
	Expansion I/O Unit with 16 input points			150 g max.		
	Expansion I/O Units with 8 output points (transistor outputs)			150 g max.		
	Expansion I/O Units with 16 output points (transistor outputs)			150 g max.		
	Expansion I/O Unit with 8 output points (relay outputs)			200 g max.		
	Simple Communications Unit			150 g max.		
	Peripheral/RS232C Adapter Unit			150 g max.		
	RS422/RS232C Adapter Unit			150 g max.		
	AC Power Supply Unit			250 g max.		
	Analog I/O Unit			200 g max.		
	Temperature Sensor Unit			200 g max.		
	CompoBus/S I/O Link Unit			150 g max.		

CPM2C Power Consumption

Use the following power consumption tables to calculate the total power capacity required when using a CPM2C PLC. The rated output for the CPM2C-PA201 AC Power Supply Unit is 15 W. Any surplus power not required for the PLC directly can be used as service power supply for sensors and other devices.

CPU Unit	Power consumption (W)
CPM2C-10C(1)DR-D	4
CPM2C-20C(1)DR-D	4
CPM2C-S1□0C-DRT1	3
CPM2C-S1□0C	3
CPM2C-10C(1)DT(1)□-D	3
CPM2C-20C(1)DT(1)□-D	3
CPM2C-32C(1)DT(1)□-D	3

The power consumption of the CPU Unit includes power for the Programming Consoles and Adapter Units.

Add the following consumptions when using Expansion I/O Units.

Expansion I/O Unit	Power consumption (W)
CPM2C-10EDR	1
CPM2C-20EDR	2
CPM2C-24EDT(1)□	1
CPM2C-32EDT(1)□	1
CPM2C-MAD11	3.5
CPM2C-SRT21	1
CPM2C-TS001/002	1.5
CPM2C-8ED□/16ED□	1
CPM2C-8ER	2
CPM2C-8ET(1)□/16ET(1)□	1

CPM2C Characteristics

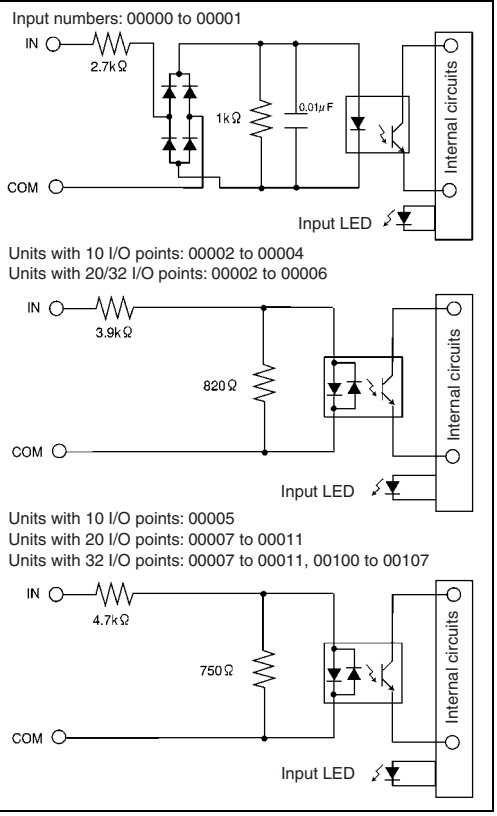
Item		CPU Unit Specification					
		CPU Units with 10 I/O points (relay outputs)	**CPU Units with 10 I/O points (transistor outputs)**	**CPU Units with 20 I/O points (relay outputs)**	**CPU Units with 20 I/O points (transistor outputs)**	**CPU Units with 32 I/O points (transistor outputs)**	**CPM2C-S CPU Unit with 10 I/O points (transistor outputs) and CompoBus/S Master function**
Control method		Stored program method					
I/O control method		Cyclic scan with direct output (Immediate refreshing can be performed with IORF(97).)					
Programming language		Ladder diagram					
Instruction length		1 step per instruction, 1 to 5 words per instruction					
Instructions		Basic instructions: 14 Special instructions:105 instructions, 185 variations					
Execution time		Basic instructions: 0.64 μs (LD instruction) Special instructions:7.8 μs (MOV instruction)					
Program capacity		4,096 words					
I/O capacity	CPU Unit only	10 points		20 points		32 points	10 points
	With Expansion I/O Units	170 points max.		180 points max.		192 points max.	362 points max. (106 local + 256 remote)
Input bits		IR 00000 to IR 00915 (Words not used for input bits can be used for work bits.)					
Output bits		IR 01000 to IR 01915 (Words not used for output bits can be used for work bits.)					
CompoBus/S input bits		---					128 inputs: IR 02000 to IR 02715 (I/O bits not used for I/O be used as work bits.)
CompoBus/S output bits		---					128 outputs: IR 03000 to IR 03715
Work bits		928 bits:IR 02000 to IR 04915 (Words IR 020 to IR 049) and IR 20000 to IR 22715 (Words IR 200 to IR 227)					672 bits: IR 02800 to IR 02915 (Words IR 028 to IR 029), IR 03800 to IR 04915 (Words IR 038 to IR 049)and IR 20000 to IR 22715 (Words IR 200 to IR 227
Special bits (SR area)		448 bits: SR 22800 to SR 25515 (Words SR 228 to SR 255)					
Temporary bits (TR area)		8 bits (TR0 to TR7)					
Holding bits (HR area)		320 bits: HR 0000 to HR 1915 (Words HR 00 to HR 19)					
Auxiliary bits (AR area)		384 bits: AR 0000 to AR 2315 (Words AR 00 to AR 23)					
Link bits (LR area)		256 bits: LR 0000 to LR 1515 (Words LR 00 to LR 15)					
Timers/Counters		256 timers/counters (TIM/CNT 000 to TIM/CNT 255) 1-ms timers: TMHH(—) 10-ms timers: TIMH(15) 100-ms timers: TIM 1-s/10-s timers: TIML(—) Decrementing counters: CNT Reversible counters: CNTR(12)					
Data memory		Read/Write: 2,048 words (DM 0000 to DM 2047)* Read-only: 456 words (DM 6144 to DM 6599) PC Setup: 56 words (DM 6600 to DM 6655) *The Error Log is contained in DM 2000 to DM 2021.					
CompoBus/S master functions		---		---			Connects to up to 32 slaves with up to 256 I/O link points
DeviceNet slave functions		---		---			DeviceNet remote I/O link (DRT model only) Up to 1,024 I/O link points Explicit messages Read/write of specified areas from PLC with Master Unit
Basic interrupts	Interrupt processing	2 interrupts	2 interrupts	4 interrupts	4 interrupts	4 interrupts	2 interrupts
		Shared by the external interrupt inputs (counter mode) and the quick-response inputs.					
	Interval timer interrupts	1 (Scheduled Interrupt Mode or Single Interrupt Mode)					
High-speed counter	High-speed counter	One high-speed counter: 20 kHz single-phase or 5 kHz two-phase (linear count method) Counter interrupt: 1 (set value comparison or set-value range comparison)					
High-speed counter	Interrupt inputs (Counter mode)	2 inputs	2 inputs	4 inputs	4 inputs	4 inputs	2 inputs
		Shared by the external interrupt inputs and the quick-response inputs.					
	Counter interrupts	2 inputs	2 inputs	4 inputs	4 inputs	4 inputs	2 inputs
		Shared by the external interrupt inputs and the quick-response inputs.					
Pulse output		Two points with no acceleration/deceleration, 10 Hz to 10 kHz each, and no direction control. One point with trapezoid acceleration/deceleration, 10 Hz to 10 kHz, and direction control. Two points with variable duty-ratio outputs (using PWM(—)). (Pulse outputs can be used with transistor outputs only, they cannot be used with relay outputs.)					
Synchronized pulse control		One point: A pulse output can be created by combining the high-speed counter with pulse outputs and multiplying the frequency of the input pulses from the high-speed counter by a fixed factor. (This output is possible with transistor outputs only, it cannot be used with relay outputs.)					
Quick-response inputs		2 inputs	2 inputs	4 inputs	4 inputs	4 inputs	2 inputs
		Shared by the external interrupt inputs and the interrupt inputs (counter mode). Min. input pulse width: 50 μs max.					
Input time constant (ON response time = OFF response time)		Can be set for all input points. (1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 40 ms, or 80 ms)					
Clock function		Shows the year, month, day of the week, day, hour, minute, and second. (Battery backup)					

Item	CPU Unit Specification					
	CPU Units with 10 I/O points (relay outputs)	CPU Units with 10 I/O points (transistor outputs)	CPU Units with 20 I/O points (relay outputs)	CPU Units with 20 I/O points (transistor outputs)	CPU Units with 32 I/O points (transistor outputs)	CPM2C-S CPU Unit with 10 I/O points (transistor outputs) and CompoBus/S Master function
Communications functions	Peripheral port: Supports Host Link, peripheral bus, no-protocol, or Programming Console connections. RS-232C port: Supports Host Link, no-protocol, 1:1 Slave Unit Link, 1:1 Master Unit Link, or 1:1 NT Link connections. A CPM2C-CN111, CS1W-CN114, or CS1W-CN118 Connecting Cable, or an Interface Unit (CPM2C-CIF01-V1 or CPM2C-CIF11) is required to connect to the CPM2C's communications port.					
Memory protection	HR area, AR area, program contents, read/write DM area contents, and counter values are maintained during power interruptions.					
Memory backup	Flash memory: Program, read-only DM area, and PC Setup Memory backup: The read/write DM area, HR area, AR area, and counter values are backed up. With CPU Units that are equipped with a clock, the battery will backup memory for 2 years at 25°C. With CPU Units that are not equipped with a clock, if a battery is not installed, the internal capacitor will backup memory for 10 days at 25°C. If a battery (optional CPM2C-BAT01 Battery) is installed, it will backup memory for 5 years at 25°C.					
Self-diagnostic functions	CPU Unit failure (watchdog timer), I/O bus error, battery error, and memory failure					
Program checks	No END instruction, programming errors (checked when operation is started)					

CPM2C I/O Specifications

1. CPU Unit Input Specifications

Item	Specifications			Circuit configuration
	Units with 10 I/O points	Units with 20 I/O points	Units with 32 I/O points	
Input voltage	24 V DC $^{+10\%}_{-15\%}$			
Input impedance	IN00000 to IN00001: 2.7 kΩ IN00002 to IN00004: 3.9 kΩ IN00005: 4.7 kΩ	IN00000 to IN00001: 2.7 kΩ IN00002 to IN00006: 3.9 kΩ IN00007 and up: 4.7 kΩ	IN00000 to IN00001: 2.7 kΩ IN00002 to IN00006: 3.9 kΩ IN00007: 4.7 kΩ IN00100 to IN00107: 4.7 kΩ	
Input current	IN00000 to IN00001: 8 mA IN00002 to IN00004: 6 mA IN00005: 5 mA	IN00000 to IN00001: 8 mA IN00002 to IN00006: 6 mA IN00007 and up: 5 mA	IN00000 to IN00001: 8 mA IN00002 to IN00006: 6 mA IN00007: 5 mA IN00100 to IN00107: 5 mA	
ON voltage/ current	IN00000 to IN00001:17 V DC min., 5 mA IN00002 and up:14.4 V DC min., 3.5 mA			
OFF voltage/ current	5.0 V DC max., 1.1 mA			
ON delay	1 to 80 ms max. Default: 10 ms (See note.)			
OFF delay	1 to 80 ms max. Default: 10 ms (See note.)			



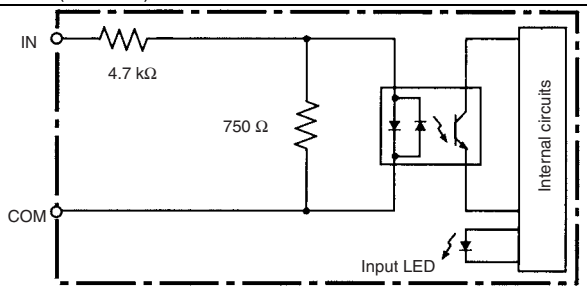
Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PC Setup.

High-speed Counter Inputs
The following CPU Unit input bits can be used as high-speed counter inputs. The maximum count frequency is 5 kHz in differential phase mode and 20 kHz in the other modes.

Input	Function			
	Differential phase mode	Pulse plus direction input mode	Up/down input mode	Increment mode
IN00000	A-phase pulse input	Pulse input	Increment pulse input	Increment pulse input
IN00001	B-phase pulse input	Direction input	Decrement pulse input	Normal input
IN00002	Z-phase pulse input or hardware reset input (IN00002 can be used as a normal input when it is not used as a high-speed counter input.)			

Interrupt Inputs
CPM2C PCs have inputs that can be used as interrupt inputs (interrupt input mode or counter mode) and quick-response inputs. The minimum pulse width for these inputs is 50 μs.
In CPU Units with 10 I/O points, inputs IN00003 and IN00004 can be used as interrupt inputs. In CPU Units with 20 or 32 I/O points, inputs IN00003 through IN00006 can be used as interrupt inputs.

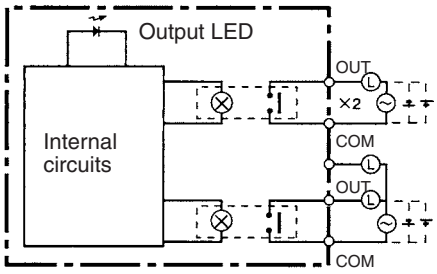
2. Expansion I/O Unit Input Specifications

Item	Specification
Input voltage	24 V DC $^{+10\%}/_{-15\%}$
Input impedance	4.7 kΩ
Input current	5 mA
ON voltage/current	14.4 V DC min., 3.5 mA
OFF voltage/current	5.0 V DC max., 1.1 mA
ON delay	1 to 80 ms max. Default: 10 ms (See note.)
OFF delay	1 to 80 ms max. Default: 10 ms (See note.)
Circuit configuration	

Note: The input time constant can be set to 1, 2, 3, 5, 10, 20, 40, or 80 ms in the PC Setup.

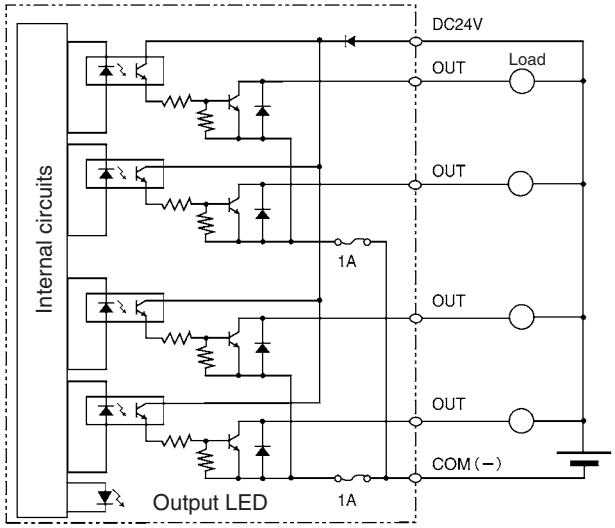
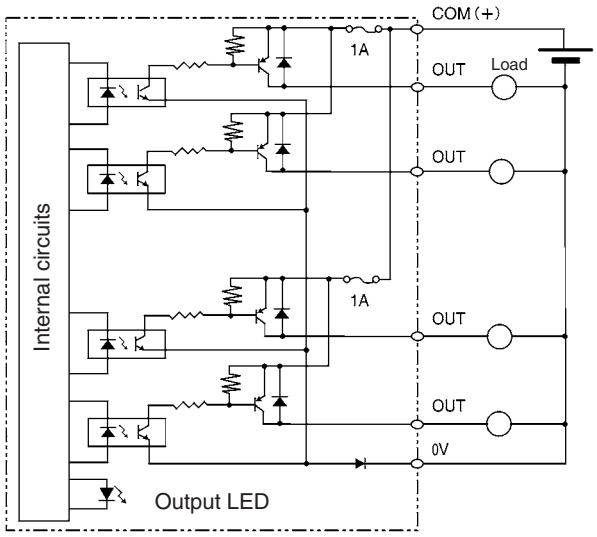
3. CPM2C Output Specifications (CPU Units and Expansion I/O Units)

Relay Output

Item	Specification
Max. switching capacity	2 A, 250 V AC (cosϕ = 1) 2 A, 24 V DC (4 A/common)
Min. switching capacity	10 mA, 5 V DC
Service life of relay	Electrical:150,000 operations (24- V DC resistive load) 100,000 operations (240- V AC inductive load, cosϕ = 0.4) Mechanical:20,000,000 operations
ON delay	15 ms max.
OFF delay	15 ms max.
Circuit configuration	

Transistor Outputs (Sinking or Sourcing) for CPU Units and Expansion I/O Units

Item	Specification
Max. switching capacity	CPU Units with 10 or 20 I/O Points 01000 to 01007: 40 mA at 4.5 V DC to 300 mA at 20.4 V DC, 300 mA (20.4 to 26.4 V) CPU Units with 32 I/O Points 01000 to 01007: 40 mA at 4.5 V DC to 300 mA at 20.4 V DC, 300 mA (20.4 to 26.4 V) 01100 to 01107: 40 mA at 4.5 V DC to 100 mA at 20.4 V DC, 100 mA (20.4 to 26.4 V) (See note.) Expansion I/O Units 01□00 to 01□07: 40 mA at 4.5 V DC to 300 mA at 20.4 V DC, 300 mA (20.4 to 26.4 V) 01□08 to 01□15: 40 mA at 4.5 V DC to 100 mA at 20.4 V DC, 100 mA (20.4 to 26.4 V) (See note.)
Min. switching capacity	0.5 mA
Max. inrush current	0.9 A for 10 ms (charging and discharging waveform)
Leakage current	0.1 mA max.
Residual voltage	0.8 V max.
ON delay	OUT01000 and OUT01001:20 μs max. OUT01002 and up:0.1 ms max.
OFF delay	OUT01000 and OUT01001:40 μs max. for 4.5 to 26.5 V, 10 to 300 mA 0.1 ms max. for 4.5 to 30 V, 0.5 to 10 mA OUT01002 and up:1 ms max.
Fuse	1 fuse for each 2 outputs (The fuse cannot be replaced by the user.)

Item	Specification
Circuit configuration	**Sinking Outputs**  **Sourcing Outputs** 

Note: Connect dummy resistance as required and maintain the load current between 10 and 150 mA when using 01000 and 01001 for pulse outputs. The ON/OFF response time will increase if the load current is below 10 mA, preventing outputting high-speed pulses. The transistors will heat if the output current is greater than 150 mA, possibly destroying the elements.

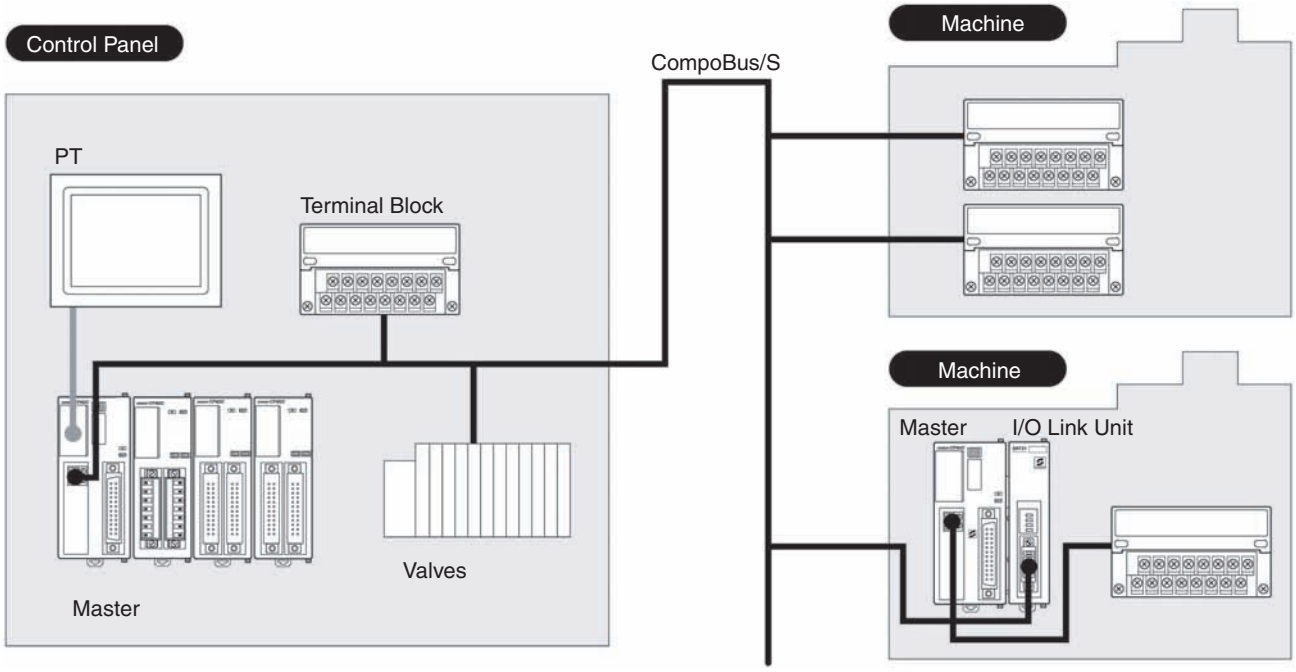
CPM2C-S1□0C

CPU Units with CompoBus/S Master



Ultra-compact CPM2C CPU unit with CompoBus/S master offering high speed remote I/O communication.

- The compact design makes this unit ideal for local control applications.
  At 40 x 90 x 65 mm (W x H x D) with 10 I/O points and CompoBus/S master offering versatile expandability it is possible to fullfill constrol systems needs.
- A large number of expansion I/O points reduces system construction cost.
  Up to three Expansion Up to three expansion terminals can be connected to the CPU unit.
  Furthermore, CompoBus/S remote I/O terminals can be used for expansion I/O points.
  Not only in-panel wiring but also external wiring is simplified. The miniaturization of the control panel reduces cable, terminal block, and wiring cost.
- Easy system designing, modification, and expansion by CompoBus/S remote I/O terminals.
  With this high-speed communication bus and no complicated wiring they can be used as expansion terminal blocks with minimal modifications to the system layout as long as room for expansion is reserved at the first designing stage.
- A calendar/clock ensures timed machine control, including data collection and error logs with date and time stamps.



Ordering Information

Unit		Inputs	Outputs	Clock	Model
10 points (6 inputs/4 outputs)	Connector model	6 points at 24 V DC	4 transistor sinking outputs	Yes	CPM2C-S100C
			4 transistor sourcing outputs	Yes	CPM2C-S110C

Specifications

General Specifications

Item		Specification
Control method		Stored program method
I/O control method		Cyclic scan method (Immediate refreshing can be performed with IORF(97).)
Programming language		Ladder diagram
Instruction length		1 step per instruction 1 to 5 words per instruction
Instructions	Basic instructions	14
	Special instructions	105 instructions, 185 variations
Execution time	Basic instructions	0.64 μs (LD instruction)
	Special instructions	7.8 μs (MOV instruction)
Program capacity		4,096 words
Max. I/O capacity		CPU Unit only: 10 points Expansion I/O Unit: 96 points (32-point Expansion I/O Unit x 3) (Up to 3 Expansion Units can be connected.) CompoBus/S: 256 points (362 points in total)
Input bits		IR 00000 to IR 00915 (Bits not used for input bits can be used for work bits.)
Output bits		IR 01000 to IR 01915 (Bits not used for output bits can be used for work bits.)
CompoBus/S input bits		128 bits: IR 02000 to IR 02715 (words IR 020 to IR 027)
CompoBus/S output bits		128 bits: IR 03000 to IR 03715 (words IR 030 to IR 037)
Work bits		672 bits:IR 02800 to IR 02915 (words IR 028 to IR 029) IR 03800 to IR 03915 (words IR 038 to IR 039) IR 04000 to IR 04915 (words IR 040 to IR 049) IR 20000 to IR 22715 (words IR 200 to IR 227)
Special bits (SR area)		440 bits: SR 22800 to SR 25507 (words SR 228 to SR 255)
Temporary bits (TR area)		8 bits: (TR 0 to TR 7)
Holding bits (HR area)		320 bits: HR 0000 to HR 1915 (words HR 00 to HR 19)
Auxiliary bits (AR area)		384 bits: AR 0000 to AR 2315 (words AR 00 to AR 23) These include CompoBus/S slave status flags (words AR 04 to AR 07).
Link bits (LR area)		256 points: LR 0000 to LR 1515 (words LR 00 to LR 15)
Timers/Counters		256 timers/counters: TIM/CNT 000 to TIM/CNT 255 1-ms timers: TMHH (--) 10-ms timers: TIMH (15) 100-ms timers TIM 1-s/10-s timers: TIML (--) Decrementing counters: CNT Reversible counters: CNTR (12)
Data memory	Read/Write	2,048 words (DM 0000 to DM 2047) The Error Log is contained in DM 2000 to DM 2021.
	Read only	456 words (DM 6144 to DM 6599)
	PC Setup	56 words (DM 6600 to DM 6655)
Basic interrupt functions	Interrupt inputs	2 interrupts (Used for both counter mode interrupts inputs and quick-response inputs.
	Scheduled interrupts	1 interrupt
High-speed counter functions	High-speed counters	1 counter (single phase at 20 kHz or 2 phases at 5 kHz)
	Counter interrupts	1 interrupt (set value comparison or set-value range comparison)
	Interrupt inputs (counter mode)	2 interrupts (Used for both external interrupts inputs and quick-response inputs.)
	Count-up interrupts	2 interrupts (Used for both external interrupts inputs and quick-response inputs.)
Quick-response inputs		2 points (Used for both external interrupts inputs and counter mode interrupt inputs.) Min. input pulse width: 50 μs max.
Pulse output		2 points with no acceleration/deceleration, 10 Hz to 10 kHz each, and no direction control: 1 point with trapezoid acceleration/deceleration, 10 Hz to 10 kHz with direction control: or 2 points with variable duty-ratio outputs
Synchronized pulse control		1 point
Input time constant (ON response time = OFF response time)		Can be set for CPU Unit inputs and Expansion Unit inputs only (1, 2, 3, 5, 10, 20, 40, or 80 ms)
Clock		Equipped with clock (built-in RTC)
Communications functions		Peripheral port: Supports Host Link, peripheral bus, no-protocol communications, and Programming Console connections. RS-232C port: Supports Host Link, no-protocol communications, 1-to-1 Link, or 1-to-1 NT Link connections.
Power failure backup function		Data in HR, AR, Counter (CNT), and Data Memory (DM) areas is held.
Memory backup		Non-volatile (flash) memory: Program, read-only DM area, and PC Setup
		Memory backup (lithium battery: 2 years lifetime): DM area, HR area, AR area, and counter values
Self-diagnostic functions		CPU error (watchdog timer), memory errors, communications errors, setting errors, battery errors, and expansion I/O bus errors
Program check		No END instruction, programming errors (checked when operation is started)

Item		Specification
Programming devices	Programming Console	C200H-PRO27, CQM1-PRO01, or CQM1H-PRO01
	CX-One	Windows 2000 / XP

Note: Connecting Cable (CPM2C-CN111, CS1W-CN114, or CS1W-CN118) is required to connect to the communications peripheral /RS-232C port.

Communications Specifications

Communications method		Special CompoBus/S protocol
Coding method		Manchester coding
Connection form		Combination of multi-drop method and T-branch connections (see note 1)
Baud rate		High-speed Communications Mode: 750 kbps Long-distance Communications Mode: 93.75 kbps (see note 2)
Communications cycle time	High-speed Communications Mode	0.5 ms (with 8 input and 8 output slaves connected)
		0.8 ms (with 16 input and 16 output slaves connected)
	Long-distance Communications Mode	4.0 ms (with 8 input and 8 output slaves connected)
		6.0 ms (with 16 input and 16 output slaves connected)
Communications media		2-conductor cable (VCTF 0.75 x 2), 4-conductor cable (VCTF 0.75 x 4), or Special Flat Cable
Communications distance	High-speed Communications Mode	2-conductor VCTF cable: Main line length:100 m max. Branch line length:3 m max. Total branch line length:50 m max. Special Flat Cable, 4-conductor VCTF cable: Main line length:30 m max. Branch line length:3 m max. Total branch line length:30 m max. (When Special Flat Cable is used to connect fewer than 16 Slaves, the main line can be up to 100 m long and the total branch line length can be up to 50 m.)
	Long-distance Communications Mode	2-conductor VCTF cable: Main line length:500 m max. Branch line length:6 m max. Total branch line length:120 m max. Special Flat Cable, 4-conductor VCTF cable: Variable branch wiring (total cable length 200 m max.) (There are no limits on the branching format or main, branch, or total line lengths. The terminator must be connected to the point in the system farthest from the master.)
Maximum number of nodes		32
Error control checks		Manchester code check, frame length check, and parity check

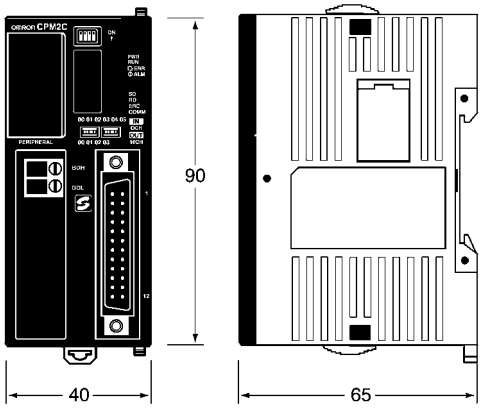
Note: 1. A terminator must be connected to the point in the system farthest from the Master.

2. The baud rate is switched using DM settings (default setting is 750 kbps).

Dimensions

Note: All units are in millimeters unless otherwise indicated.

CPM2C-S100C
CPM2C-S110C



Note: Refer to *CPM2C-S Programmable Controller Operation Manual* (W377) for detailed specifications.

CPM2C-S1□0C-DRT

Programmable Slave PLC



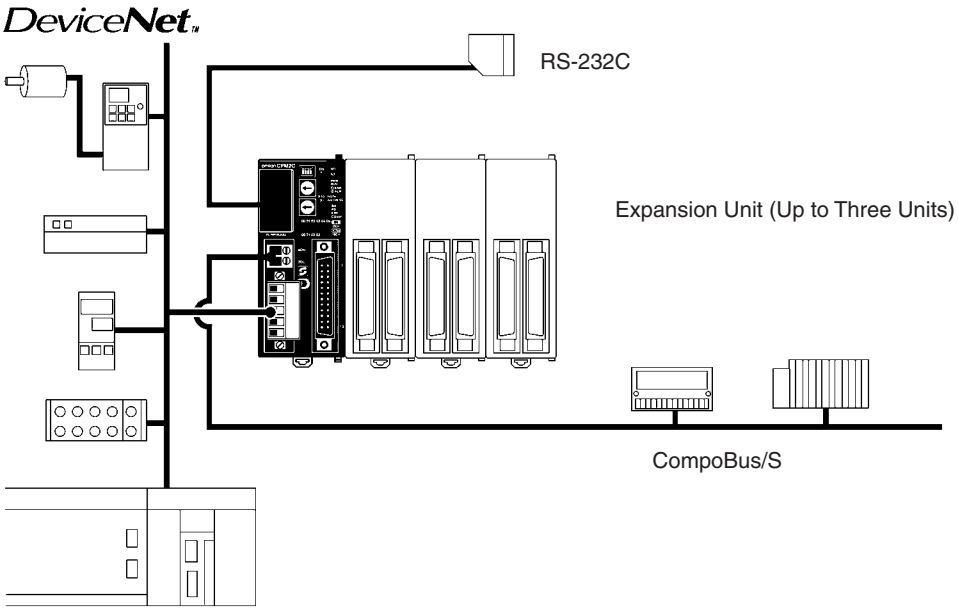
Multi-functional programmable slave for distributed control

A part of an installation consisting of sensors, actuators and control is handled as one DeviceNet slave.

The distribution of device control enables the production of standard units with standardized programs and decreasing the load on the system master PLC. Conventional distributed I/O control networks do not allow I/O checks or operation checks until all devices on the networks are assembled and connected. Programmable slaves, however, allow I/O and operation checks

on any distributed unit independently.

- DeviceNet slave functionality
  Supports multi-word I/O links and explicit message communication, making it possible for the master to control the data of all the slaves on the network. Data that does not need immediate transmission, such as log data, can be transmitted in blocks using explicit message communication.
- CompoBus/S master functionality
  Connects to remote signal lights, pushbutton switches, terminal blocks, and pneumatic valves from other companies over VCTF or easy-to-branch flat cable.
- RS-232C Communications
  Barcodereaders and PTs can be connected to serial port. The data then will be processed locally and thus reduces the load on the central controlling PLC.
- Expansion unit (Up to three units)
  A wide variaty of different expansion units is available to fit the application needs.



Ordering Information

Unit		Inputs	Outputs	Clock	Model
10 points (6 inputs/4 outputs)	Connector model	6 points at 24 V DC	4 transistor sinking outputs	Yes	CPM2C-S100C-DRT
			4 transistor sourcing outputs	Yes	CPM2C-S110C-DRT

Specifications

General Specifications

Item		Specification
Control method		Stored program method
I/O control method		Cyclic scan method (Immediate refreshing can be performed with IORF(97).)
Programming language		Ladder diagram
Instruction length		1 step per instruction 1 to 5 words per instruction
Instructions	Basic instructions	14
	Special instructions	105 instructions, 185 variations
Execution time	Basic instructions	0.64 μs (LD instruction)
	Special instructions	7.8 μs (MOV instruction)
Program capacity		4,096 words
Max. I/O capacity		CPU Unit only: 10 points Expansion I/O Unit: 96 points (32-point Expansion I/O Unit x 3) (Up to 3 Expansion Units can be connected.) CompoBus/S: 256 points (362 points in total)
Input bits		IR 00000 to IR 00915 (Bits not used for input bits can be used for work bits.)
Output bits		IR 01000 to IR 01915 (Bits not used for output bits can be used for work bits.)
CompoBus/S input bits		128 bits: IR 02000 to IR 02715 (words IR 020 to IR 027)
CompoBus/S output bits		128 bits: IR 03000 to IR 03715 (words IR 030 to IR 037)
Work bits		672 bits:IR 02800 to IR 02915 (words IR 028 to IR 029) IR 03800 to IR 03915 (words IR 038 to IR 039) IR 04000 to IR 04915 (words IR 040 to IR 049) IR 20000 to IR 22715 (words IR 200 to IR 227)
Special bits (SR area)		440 bits: SR 22800 to SR 25507 (words SR 228 to SR 255)
Temporary bits (TR area)		8 bits: (TR 0 to TR 7)
Holding bits (HR area)		320 bits: HR 0000 to HR 1915 (words HR 00 to HR 19)
Auxiliary bits (AR area)		384 bits: AR 0000 to AR 2315 (words AR 00 to AR 23) These include CompoBus/S slave status flags (words AR 04 to AR 07).
Link bits (LR area)		256 points: LR 0000 to LR 1515 (words LR 00 to LR 15)
Timers/Counters		256 timers/counters: TIM/CNT 000 to TIM/CNT 255 1-ms timers: TMHH (--) 10-ms timers: TIMH (15) 100-ms timers TIM 1-s/10-s timers: TIML (--) Decrementing counters: CNT Reversible counters: CNTR (12)
Data memory	Read/Write	2,048 words (DM 0000 to DM 2047) The Error Log is contained in DM 2000 to DM 2021.
	Read only	456 words (DM 6144 to DM 6599)
	PC Setup	56 words (DM 6600 to DM 6655)
DeviceNet slave functions		DeviceNet Remote I/O Link No. of I/O Link points: 1,024 max. Explicit message communications Any PC data area can be accessed from the master.
Basic interrupt functions	Interrupt inputs	2 interrupts (Used for both counter mode interrupts inputs and quick-response inputs.
	Scheduled interrupts	1 interrupt

Item		Specification
High-speed counter functions	High-speed counters	1 counter (single phase at 20 kHz or 2 phases at 5 kHz)
	Counter interrupts	1 interrupt (set value comparison or set-value range comparison)
	Interrupt inputs (counter mode)	2 interrupts (Used for both external interrupts inputs and quick-response inputs.)
	Count-up interrupts	2 interrupts (Used for both external interrupts inputs and quick-response inputs.)
Quick-response inputs		2 points (Used for both external interrupts inputs and counter mode interrupt inputs.) Min. input pulse width: 50 μs max.
Pulse output		2 points with no acceleration/deceleration, 10 Hz to 10 kHz each, and no direction control: 1 point with trapezoid acceleration/deceleration, 10 Hz and 10 kHz with no direction control: or 2 points with variable duty-ratio outputs
Synchronized pulse control		1 point
Input time constant (ON response time = OFF response time)		Can be set for CPU Unit inputs and Expansion Unit inputs only (1, 2, 3, 5, 10, 20, 40, or 80 ms)
Clock		Equipped with clock (built-in RTC)
Communications functions		Peripheral port: Supports Host Link, peripheral bus, no-protocol communications, and Programming Console connections. RS-232C port: Supports Host Link, no-protocol communications, 1-to-1 Link, or 1-to-1 NT Link connections.
Power failure backup function		Data in HR, AR, Counter (CNT), and Data Memory (DM) areas is held.
Memory backup		Non-volatile (flash) memory: Program, read-only DM area, and PC Setup
		Memory backup (lithium battery: 2 years lifetime): DM area, HR area, AR area, and counter values
Self-diagnostic functions		CPU error (watchdog timer), memory errors, communications errors, setting errors, battery errors, and expansion I/O bus errors
Program check		No END instruction, programming errors (checked when operation is started)
Programming devices	Programming Console	C200H-PRO27, CQM1-PRO01, or CQM1H-PRO01
	CX-One	Windows 2000 / XP

Note: Connecting Cable (CPM2C-CN111, CS1W-CN114, or CS1W-CN118) is required to connect to the communications peripheral /RS-232C port.

Communications Specifications

DeviceNet

Communications protocol		DeviceNet
Connection form		Combination of multi-drop and T-branch connections (see note 1)
Baud rate		500, 250, or 125 kbps (switchable)
Communications media		Special 5-conductor cable (2 signal lines, 2 power supply lines, and 1 shield line)
Communications distance	Baud rate	500 kbps: Max. network length (see note 2):100 m max. (see note 3) Main line length:6 m max. Total branch line length:39 m max. 250 kbps: Max. network length (see note 2):250 m max. (see note 3) Main line length:6 m max. Total branch line length:78 m max. 125 kbps: Max. network length (see note 2):500 m max. (see note 3) Main line length:6 m max. Total branch line length:156 m max.
Max. number of connecting nodes		64 (63 slaves and 1 master)
Error control checks		CRC error, node address duplication check, and scan list verification

Note: 1. A terminator must be connected to both ends of the trunk line.

2. The maximum network length is the lenght of the trunk line.

3. When Thin Cable is used for the main line, the main line must be 100 m or less in length.

CompoBus/S

Communications method		Special CompoBus/S protocol
Coding method		Manchester coding
Connection form		Combination of multi-drop method and T-branch connections (see note 1)
Baud rate		High-speed Communications Mode: 750 kbps Long-distance Communications Mode: 93.75 kbps (see note 2)
Communications cycle time	High-speed Communications Mode	0.5 ms (with 8 input and 8 output slaves connected)
		0.8 ms (with 16 input and 16 output slaves connected)
	Long-distance Communications Mode	4.0 ms (with 8 input and 8 output slaves connected)
		6.0 ms (with 16 input and 16 output slaves connected)
Communications media		2-conductor cable (VCTF 0.75 x 2), 4-conductor cable (VCTF 0.75 x 4), or Special Flat Cable
Communications distance	High-speed Communications Mode	2-conductor VCTF cable: Main line length:100 m max. Branch line length:3 m max. Total branch line length:50 m max. Special Flat Cable, 4-conductor VCTF cable: Main line length:30 m max. Branch line length:3 m max. Total branch line length:30 m max. (When Special Flat Cable is used to connect fewer than 16 Slaves, the main line can be up to 100 m long and the total branch line length can be up to 50 m.)
	Long-distance Communications Mode	2-conductor VCTF cable: Main line length:500 m max. Branch line length:6 m max. Total branch line length:120 m max. Special Flat Cable, 4-conductor VCTF cable: Variable branch wiring (total cable length 200 m max.) (There are no limits on the branching format or main, branch, or total line lengths. The terminator must be connected to the point in the system farthest from the master.)
Maximum number of nodes		32
Error control checks		Manchester code check, frame length check, and parity check

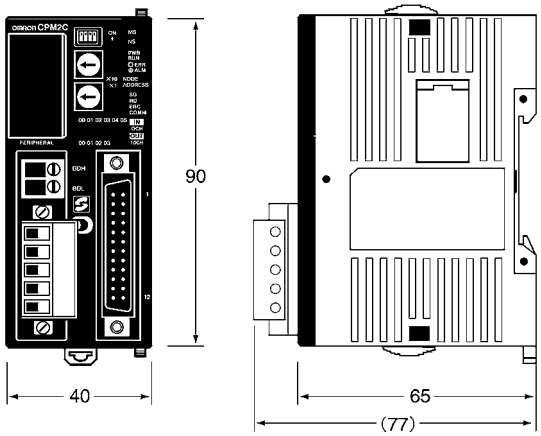
Note: 1. A terminator must be connected to the point in the system farthest from the Master.

2. The baud rate is switched using DM settings (default setting is 750 kbps).

Dimensions

Note: All units are in millimeters unless otherwise indicated.

CPM2C-S100C-DRT
CPM2C-S110C-DRT

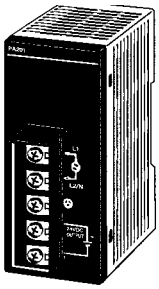


Note: Refer to *CPM2C-S Programmable Controller Operation Manual* (W377) for detailed specifications.

CPM2C-PA201

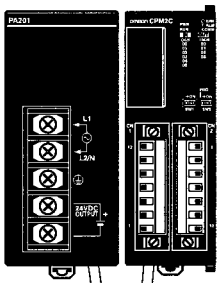
AC Power Supply Unit

- The CPM2C-PA201 is a slim and compact AC Power Supply Unit of the same shape as the CPM2C's CPU Unit. It can be connected simply using the connecting cable (23 cm) provided. It can also be used for CPM1A and CPM2A CPU Units and as display power supply (wired by the user).

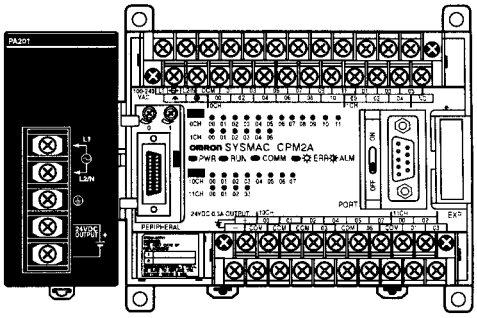


Service power supply for external devices such as sensors (24 V).

AC Power Supply Unit



AC Power Supply Unit



Attached connecting cable

Specifications

Item			Specification
Rated output			15 W
Output voltage			24 V
Output current			600 mA
Efficiency			75% min. (at rated output)
Input conditions	Rated voltage		100 to 240 V AC
	Allowable voltage range		85 to 264 V AC
	Frequency		47 to 63 Hz
	Current	100 V	0.4 A
		200 V	0.2 A
	Leakage current	100 V	0.5 mA max. (at rated output)
		200 V	1 mA max. (at rated output)
	Inrush current	100 V	15 A max. (at 25°C cold start)
		200 V	30 A max. (at 25°C cold start)
Output characteristics	Output voltage accuracy		10%/–15% (including input, load, and temperature fluctuations)
	Minimum output current		30 mA
	Ripple noise voltage		2% (p-p) max.
	Input fluctuation		0.75% max.
	Load fluctuation		4% max.
	Temperature fluctuation		0.05%/°C max.
	Startup time		300 ms max. (at input voltage of 100 V AC or 200 V AC and the rated output)
	Output hold time		10 ms (at input voltage of 100 V AC or 200 V AC and the rated output)
Overcurrent protection			Self-resetting, operates at 105% to 335% of the rated current, suspended and independent operation
Overvoltage protection			None
Ambient operating temperature			0° to 55°C
Ambient storage temperature			–20° to 70°C (no condensation or icing)
Ambient operating humidity			10% to 90% (no condensation)
Dielectric strength			2,000 V for 1 min between all inputs and GR Leakage current: 10 mA 3,000 V for 1 min between all inputs and all outputs Leakage current: 10 mA 1,000 V for 1 min between all outputs and GR Leakage current: 10 mA
Insulation resistance			100 MΩ min. at 500 V DC between all outputs and any input, and between all outputs and GR
Vibration resistance			10 to 57 Hz, amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes according (Time coefficient: 8 minutes × coefficient factor 10 = total time 80 min.)
Shock resistance			147 m/s^2 3 times each in X, Y, and Z directions
Noise terminal voltage			FCC class A
Weight			250 g max.

CPM2C-MAD11

Analog I/O Unit

- Up to four CPM2C-MAD11 Analog I/O Units can be connected to the CPM2C. Each Unit provides 2 analog inputs and 1 analog output, i.e., up to 8 analog inputs and 4 analog outputs can be supported by one CPM2C.
- Example Application: Packaging Machines



Specifications

Item		Voltage I/O	Current I/O
Analog inputs	Number of inputs	2 (allocated 2 words)	
	Input signal ranges	0 to 5 V, 1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA
	Maximum rated input	±15 V	±30 mA
	External input impedance	1 MΩ min.	Approx. 250 Ω
	Resolution	1/6,000 (full scale)	
	Overall precision	25°C:±0.3% of full scale	25°C:±0.4% of full scale
		0 to 55°C:±0.6% of full scale	0 to 55°C:±0.8% of full scale
	Converted A/D data	Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale	
	Averaging	Supported (set for each input with DIP switch)	
	Disconnected line detection	Supported	
Analog output	Number of outputs	1 (allocated 1 word)	
	Output signal ranges	1 to 5 V, 0 to 10 V, –10 to 10 V	0 to 20 mA, 4 to 20 mA
	External output allowed load resistance	1 kΩ min.	600 Ω max.
	External output impedance	0.5 Ω max.	---
	Resolution	1/6,000 (full scale)	
	Overall precision	25°C:±0.4% of full scale	
		0 to 55°C:±0.8% of full scale	
	D/A data setting	Binary data (4-digit hexadecimal) –10 to 10 V: F448 to 0BB8 Hex full scale Other:0000 to 1770 Hex full scale	
Conversion time		2 ms/point (6 ms/all analog I/O)	
Isolation method		Photocoupler isolation between analog I/O and internal circuits. (Individual analog I/O signals are not isolated.)	
Power consumption		3.5 W	
Weight		200 g max.	

CPM2C-TS001/-TS101

Temperature Sensor Units

- Up to four CPM2C-TS001/TS101 Temperature Sensor Units can be connected to the CPM2C. Each Unit provides 2 input points for temperature sensors, including thermocouples or temperature resistance thermometers , i.e., up to 8 temperature sensors can be input to one CPM2C.
- Application Examples: Foodstuff Equipment and Packaging Machines



Specifications

General

Item	CPM2C-TS001	CPM2C-TS101
Temperature sensor	Thermocouple	Temperature resistance thermometer
Input types	K or J selectable (The same input type must be used for all inputs.)	Pt100, JPt1100 selectable (The same input type must be used for all inputs.)
Number of inputs	2 (2 words allocated)	
Accuracy	±0.5% or ±2°C of the stored value whichever is larger ± 1 digit max. (see note)	±0.5% or ±1°C of the stored value whichever is larger (see note) ± 1 digit max.
Conversion cycle	250 ms/2 inputs	
Converted temperature data	Binary data (4-digit hexadecimal)	
Isolation method	Photocoupler isolation between input signals	
Power consumption	1.5 W	
Weight	200 g max.	

Note: Accuracy for K thermocouples at temperatures less than –100°C: ±4°C ± 1 digit max.

Input Temperature Ranges for CPM2C-TS001

The input type is selected with a rotary switch. The ranges for each of the input types are shown in the following table.

Item	Range in °C	Range in °F
K	–200 to 1,300	–300 to 2,300
	0.0 to 500.0	0.0 to 900.0
J	–100 to 850	–100 to 1,500
	0.0 to 400.0	0.0 to 750.0

Input Temperature Ranges for CPM2C-TS101

The input type is selected with a rotary switch. The ranges for each of the input types are shown in the following table.

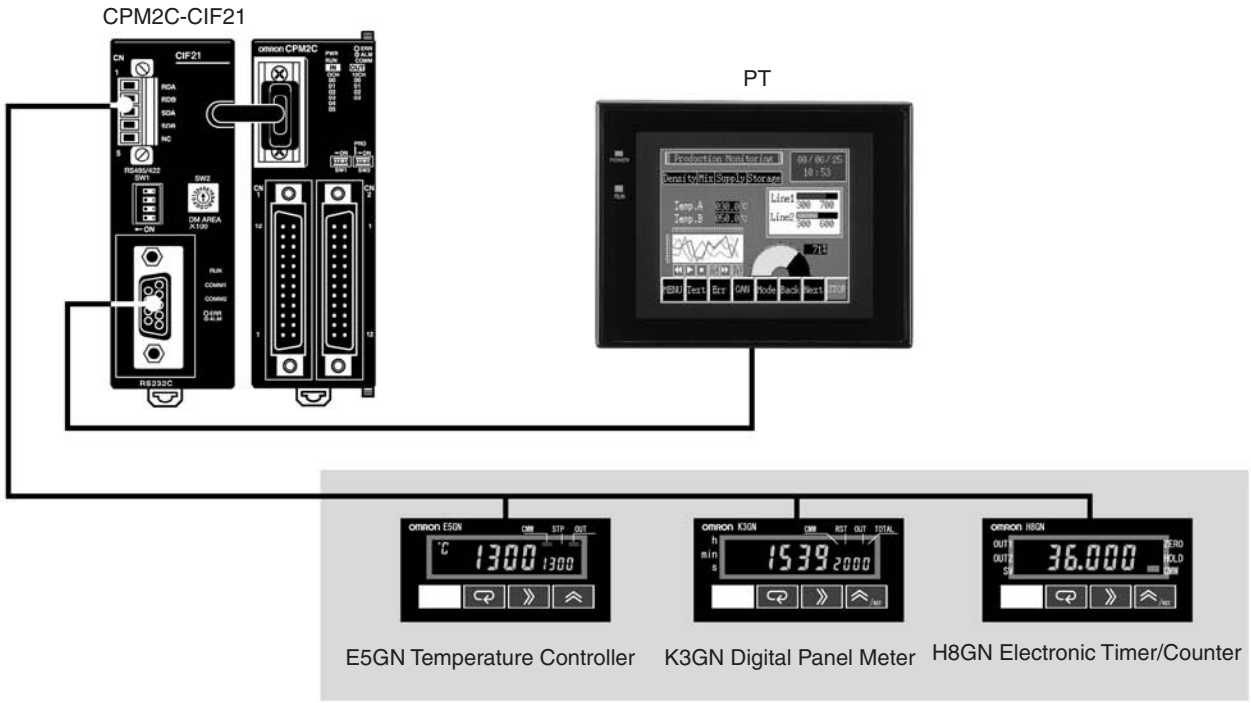
Item	Range in °C	Range in °F
Pt100	–200.0 to 650.0	–300 to 1,200.0
JPt100	–200.0 to 650.0	–300 to 1,200.0

CPM2C-CIF21

Simple Communications Unit

Easy initial settings enable data exchange between the CPM2C and components.

System Configuration



Connectable Devices

A Wide Range of Devices Supporting CompoWay/F or SYSWAY Communications

Classification	Product	Model	SYSWAY		CompoWay/F	Remarks
				Segments		
Controllers	Temperature Controllers	E5GN	Yes	1	Yes	---
		E5CN	Yes	1	Yes	---
		E5EN	Yes	1	Yes	---
		E5AN	Yes	1	Yes	---
	Modular Temperature Controller	E5ZN	No	---	Yes	---
	Digital Controllers	E5CK	Yes	1	No	---
		E5EK	Yes	1	No	---
		E5AK	Yes	1	No	---
	Digital Controllers for control valves	E5EK	Yes	1	No	Valve system communications not supported.
		E5AK	Yes	1	No	
	Digital Controller, basic type	E5CK-T	No	---	No	---
		E5EK-T	No	---	No	---
		E5AK-T	No	---	No	---
	Digital Controllers for control valves, programmable	E5EK-T	No	---	No	---
		E5AK-T	No	---	No	---
	Temperature Controllers	E5EJ	Yes	1	No	---
		E5AJ	Yes	1	No	---
	Fuzzy Temperature Controller	E5AF	Yes	1	No	---
Timers	Electronic Timer/Counter	H8GN	No	---	Yes	---

Classification	Product	Model	SYSWAY		CompoWay/F	Remarks
				Segments		
Digital Panels	Digital Panel Meter	K3GN	No	---	Yes	---
	Process Meter	K3NX	Yes	2	Limited	Some commands cannot be used with some models (options). Only the CompoWay/F variable area can be read.
	Weighing Meter	K3NV	Yes	2	Limited	
	Frequency/Rate Meter	K3NR	Yes	2	Limited	
	Period Meter	K3NP	Yes	2	Limited	
	Up/Down Counter Meter	K3NC	Yes	2	Limited	
	Temperature Meter	K3NH	Yes	2	Limited	
	Intelligent Signal Processor	K3TS	Yes	2	No	SYSWAY communications only (See note 2.)

Limited: Connection possible for limited functions.

Note: 1. SYSWAY segment 1 and SYSWAY segment 2 can be combined.

2. When a K3TS is connected, connect the other components via SYSWAY as well.

Component Parameters Supported for Communications

The communications protocol for components can be set in the CPM2C's DM Area to CompoWay/F or SYSWAY. The data that can be read and written depends on the protocol that is set.

CompoWay/F

Reading and writing is possible for all component data (except for some Digital Panel Meters). The amount of data that can be read/written in one operation per component is limited to 12 data items for reading and 12 data items for writing. Reading and writing is enabled by setting the address for each parameter in DM.

SYSWAY

Reading and writing is possible for the data shown in the following table.

Segment	Read/write	Item	Command group				
			1	2	3	4	5
1: Controllers	Read	Present temperature	Yes	Yes	Yes	Yes	Yes
		Status	Yes	Yes	Yes	Yes	Yes
		Temperature set value	Yes	Yes	Yes	Yes	Yes
		Alarm 1 set value			Yes	Yes	Yes
		Alarm 2 set value			Yes	Yes	Yes
		Proportional band				Yes	Yes
		Integral time				Yes	Yes
		Derivative time				Yes	Yes
		Heater current					Yes
		Heater current status					Yes
	Write	Temperature set value	Yes	Yes	Yes	Yes	Yes
		Operation command		Yes	Yes	Yes	Yes
		Alarm 1 set value			Yes	Yes	Yes
		Alarm 2 set value			Yes	Yes	Yes
		Proportional band				Yes	Yes
		Integral time				Yes	Yes
		Derivative time				Yes	Yes
		Heater burnout detection value					Yes
2: Digital Meters	Read	Display value	Yes	Yes	Yes	Yes	Yes
		Display status	Yes	Yes	Yes	Yes	Yes
		Peak hold		Yes	Yes		Yes
		Peak hold status		Yes	Yes		Yes
		Bottom hold		Yes	Yes		Yes
		Bottom hold status		Yes	Yes		Yes
		HH comparison value				Yes	Yes
		H comparison value				Yes	Yes
		L comparison value				Yes	Yes
		LL comparison value				Yes	Yes
	Write	Operation command			Yes		Yes
		HH comparison value				Yes	Yes
		H comparison value				Yes	Yes
		L comparison value				Yes	Yes
		LL comparison value				Yes	Yes

The command groups for which reading or writing is performed are determined by settings in the DM area.

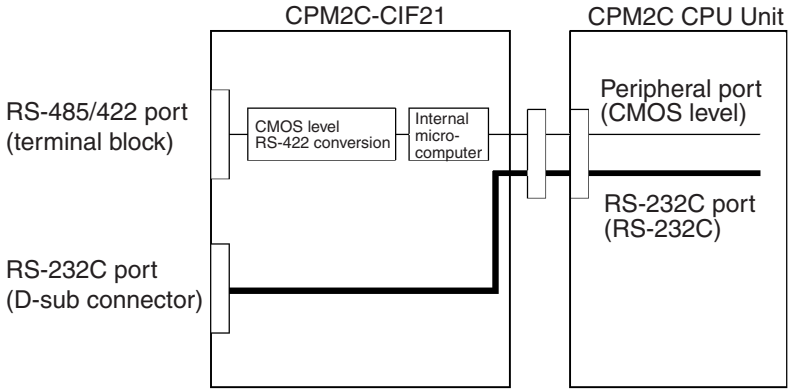
Specifications

General

Item		Specification
Applicable PLC		CPM2C
RS-485/422 (top port)	Maximum number of connectable components	32
	Component connection port	Components connected to RS-485/422 terminal block. Connected to CPM2C CPU Unit via peripheral port (see diagram below).
	Baud rate for connection to components	9.6, 19.2, 38.4, or 57.6 kbps
	Baud rate for connection to CPU Unit	9.6 or 19.2 kbps
RS-232C (bottom port)	Signal conversion	Output from CPU Unit's RS-232C interface with no conversion
	Communications functions	One of the following: Host Link, no-protocol, 1:1 Link, 1:1 NT Link
Power supply		From CPU Unit
Power consumption		1 W
Weight		150 g max.

System Configuration

Internal

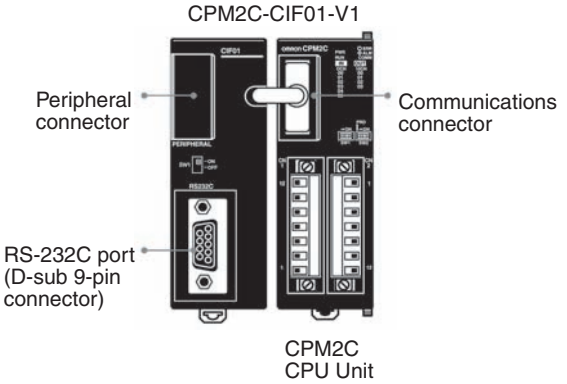


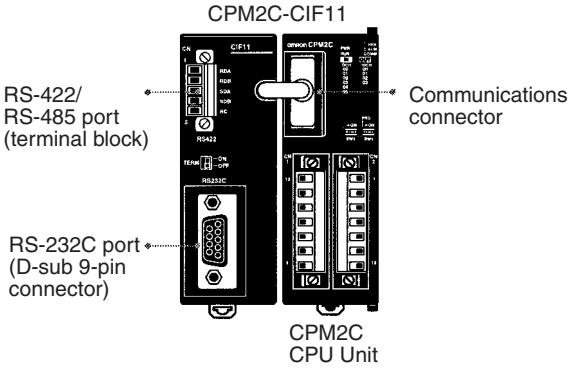
CPM2C-CIF□1(-V1)

RS-232C / RS-422 / RS-485 Adapter Units

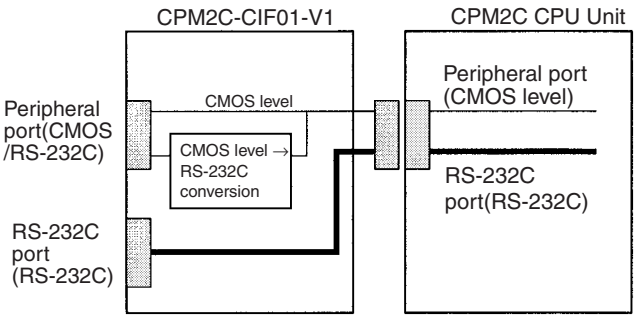
System Configuration

External Configuration

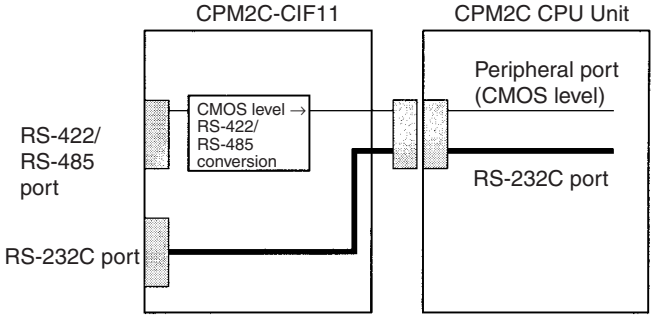




Internal Configuration



Note: When using the CS1W-CN226/CN626 Connecting Cable for personal computer connection, turn ON the switch.



Note: A Programming Console cannot be connected to the RS-422 port.

Specifications

General

Item		Specification	
		CPM2C-CIF01-V1	**CPM2C-CIF11**
Upper port	Signal conversion	Outputs signals from the CPU Unit's CMOS interface without conversion, or converts CMOS level (CPU Unit side) to RS-232C (connected device side).	Converts CMOS level (CPU Unit side) to RS-422 or RS-485 (connected device side). The externally connected device is insulated.
	Function	Host Link, peripheral bus, no-protocol, or Programming Console connections.	Host Link, peripheral bus, or no-protocol connections.
Lower port	Signal conversion	Outputs signals from the CPU Unit's CMOS interface without conversion.	Outputs signals from the CPU Unit's CMOS interface without conversion.
	Function	Host Link, no-protocol, 1:1 Link, or 1:1 NT Link connections.	Host Link, no-protocol, 1:1 Link, or 1:1 NT Link connections.
Power supply		Power supplied from CPU Unit.	
Current consumption		0.3 A max. at 5 V	
Weight		150 g max.	

Note: Neither the CPM2C-CIF01-V1 nor the CPM2C-CIF11 can be used with any PLC other than the CPM2C. A CPM2C-CIF11 or another CPM2C-CIF01-V1 cannot be connected to the CPM2C if a CPM2C-CIF01-V1 is already connected to it.

CPM2C-SRT21

CompoBus/S I/O Link Unit



I/O Link Unit for CPM2C

- Operates as a Slave of the CompoBus/S Master Unit.
- Exchanges eight inputs and eight outputs with the Master.

Ordering Information

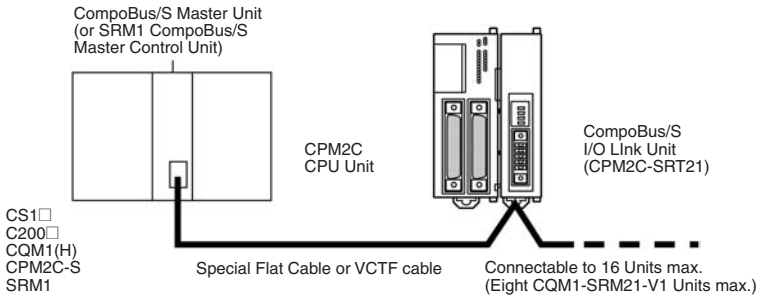
CompoBus I/O Link Unit

Name	Specifications	Model
CompoBus/S I/O Link Unit	Number of points for I/O links: 8 inputs and 8 outputs	CPM2C-SRT21

Application Examples

Conveyor Line

Processing speed can be increased and system setup labor reduced by creating a distributed system with a CPM2C at each conveyor.



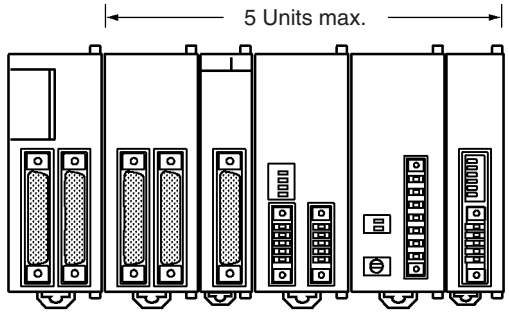
Specifications

Item	CPM2C-SRT21
Master/Slave	CompoBus/S Slave
Number of I/O points	8 inputs and 8 outputs
Number of words occupied in CPM2C's I/O memory	1 input word and 1 output word (allocated in the same way as for other Expansion Units)
Node address setting	DIP switch
Power consumption	1 W
Weight	150 g

Note: For details of CPM2C PLCs, refer to the CPM2C catalog (Cat. No. P049).

CPM2C General Information

System Configuration



CPU Unit

Unit	Model number	Inputs	Outputs
CPU Unit	CPM2C-20CDTC-D	IR 000	IR 010
Expansion I/O Unit	CPM2C-24EDTC	IR 001	IR 011
Expansion Output Unit	CPM2C-16ETC	---	IR 012
Analog I/O Unit	CPM2C-MAD11	IR 002 IR 003	IR 013
Temperature Sensor Unit	CPM2C-TS001	IR 004 IR 005	---
CompoBus/S I/O Link Unit	CPM2C-SRT21	IR 006	IR 014

Number of Connectable Units

Up to 5 Units can be connected to a CPM2C CPU Unit except for the CPM2C-S1□OC-DRT Programmable Slave and CPM2C-S1□OC CompoBus/S Master Unit, which are limited to 3 Units. The number of words that can be used by Expansion Units, however, is limited, and these limits must not be exceeded.

Model	Max. No. of Units	Applicable I/O words
CPU Units except those listed below	5	Inputs: IR 001 to IR 009 (CPU Unit uses IR 000) Outputs: IR 011 to IR 019 (CPU Unit uses IR 010)
CPU Units with 32 I/O points (CMP2C-32CDT□C-D)	5	Inputs: IR 002 to IR 009 (CPU Unit uses IR 000 and IR 001) Outputs: IR 012 to IR 019 (CPU Unit uses IR 010 and IR 011)
CPM2C-S1□OC-DRT Programmable Slave and CPM2C-S1□OC CompoBus/S Master Unit	3	Inputs: IR 001 to IR 009 (CPU Unit uses IR 000) Outputs: IR 011 to IR 019 (CPU Unit uses IR 010)

Number of I/O Words Allocated to Expansion Units

Unit	Model number	Input words	Output words
Expansion Input Units	CPM2C-8ED□	1	---
	CPM2C-16ED□	1	---
Expansion Output Units	CPM2C-8ER	---	1
	CPM2C-8ET(1)□	---	1
	CPM2C-16ET(1)□	---	1
Expansion I/O Units	CPM2C-10EDR	1	1
	CPM2C-24EDT(1)□	1	1
Expansion I/O Units	CPM2C-20EDR	1	1
	CPM2C-32EDT(1)□	1	1
Analog I/O Unit	CPM2C-MAD11	2	1
Temperature Sensor Units	CPM2C-TS001	2	---
	CPM2C-TS101	2	---
CompoBus/S I/O Link Unit	CPM2C-SRT21	1	1

Note: 1. An AC Power Supply Unit can be used for the CPU Units.

2. The CPM2C-CIF01-V1/CIF11/CIF21 can be used with the CPU Units

CPM2C Power Consumption

Use the following power consumption tables to calculate the total power capacity required when using a CPM2C PC. The rated output for the CPM2C-PA201 AC Power Supply Unit is 15 W. Any surplus power not required for the PC directly can be used as service power supply for sensors and other devices.

CPM2C Power Supplies

CPU Unit	Power consumption (W)
CPM2C-10C(1)DR-D	4
CPM2C-20C(1)DR-D	4
CPM2C-S1□0C-DRT1	3
CPM2C-S1□0C	3
CPM2C-10C(1)DT(1)□-D	3
CPM2C-20C(1)DT(1)□-D	3
CPM2C-32C(1)DT(1)□-D	3

The power consumption of the CPU Unit includes power for the Programming Consoles and Adapter Units.

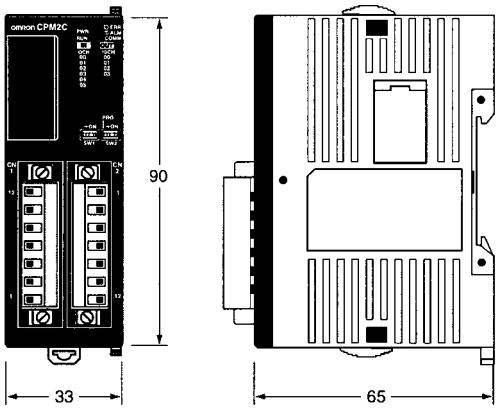
Add the following consumptions when using Expansion I/O Units.

Expansion I/O Unit	Power consumption (W)
CPM2C-10EDR	1
CPM2C-20EDR	2
CPM2C-24EDT(1)□	1
CPM2C-32EDT(1)□	1
CPM2C-MAD11	3.5
CPM2C-SRT21	1
CPM2C-TS001/002	1.5
CPM2C-8ED□/16ED□	1
CPM2C-8ER	2
CPM2C-8ET(1)□/16ET(1)□	1

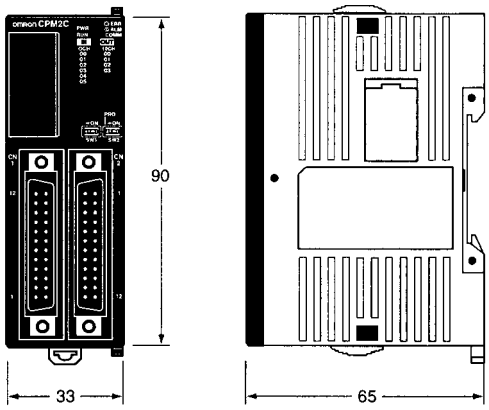
Dimensions

CPU Units

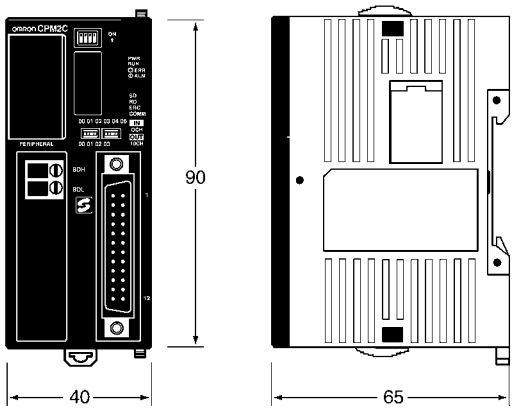
CPU Units with Relay Outputs (CPM2C-10C(1)DR-D, CPM2C-20C(1)DR-D)



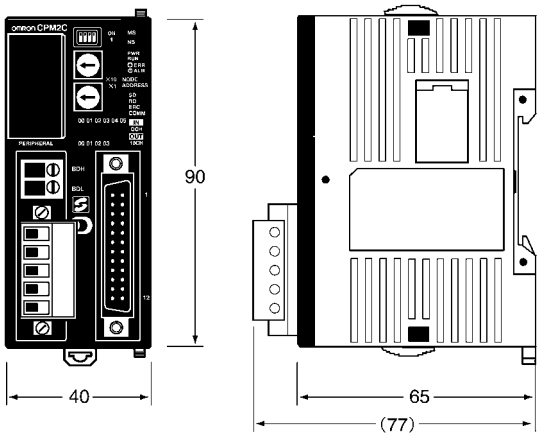
CPU Units with Transistor Outputs (CPM2C-10C(1)DT(1)C-D, CPM2C-10C(1)DT(1)M-D, CPM2C-20C(1)DT(1)C-D, CPM2C-20C(1)DT(1)M-D, CPM2C-32CDT(1)C-D, CPM2C-32CDT(1)M-D)



CPU Units with Relay Outputs (CPM2C-S1□0C)



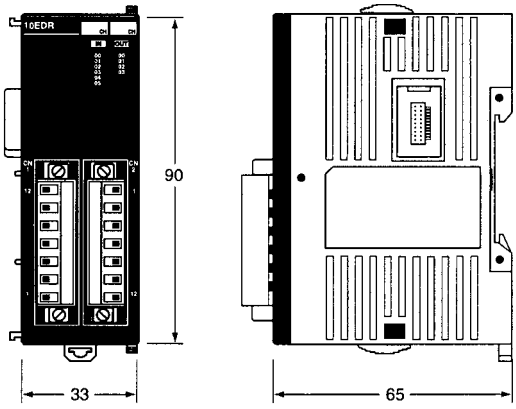
CPU Units with Transistor Outputs (CPM2C-S1□0C-DRT)



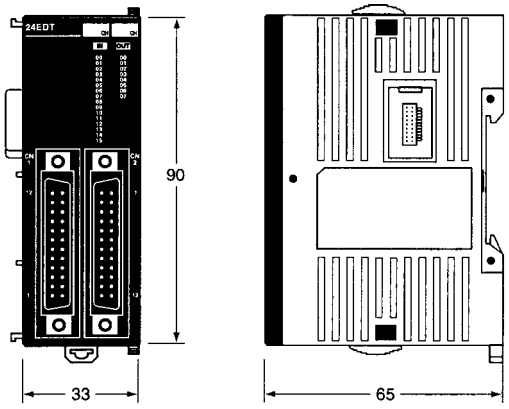
Note: All dimensions are in mm.

I/O Expansion Units

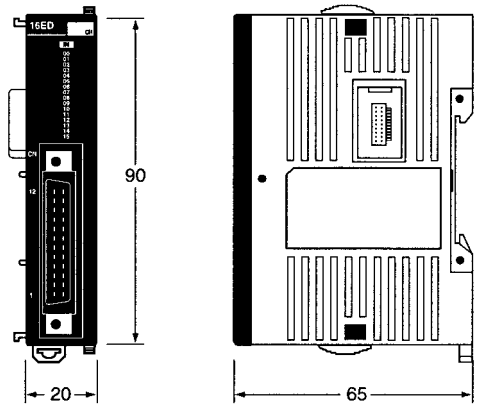
Units with Relay Outputs (CPM2C-8ER, CPM2C-10EDR, CPM2C-20EDR)



Units with Transistor Outputs (CPM2C-24EDT(1)C, CPM2C-24EDT(1)M, CPM2C-32EDT(1)C, CPM2C-32EDT(1)M)

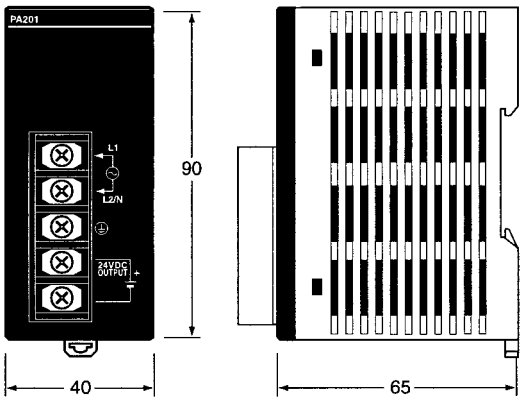


Units with Transistor Outputs Only and Units with Inputs Only (CPM2C-8ED(1), CPM2C-8ET(1)C, CPM2C-8ET(1)M, CPM2C-16ED(1), CPM2C-16ET(1)C, CPM2C-16ET(1)M)

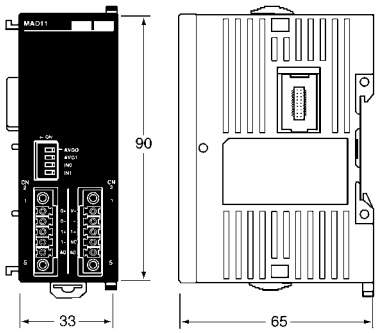


Note: All dimensions are in mm.

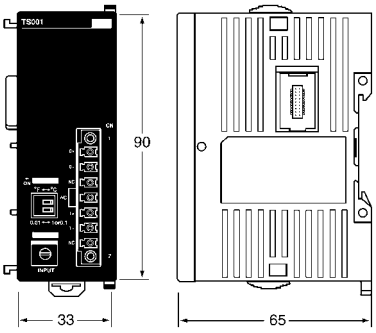
AC Power Supply Unit (CPM2C-PA201)



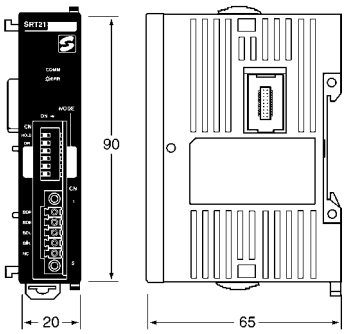
Analog I/O Unit (CPM2C-MAD11)



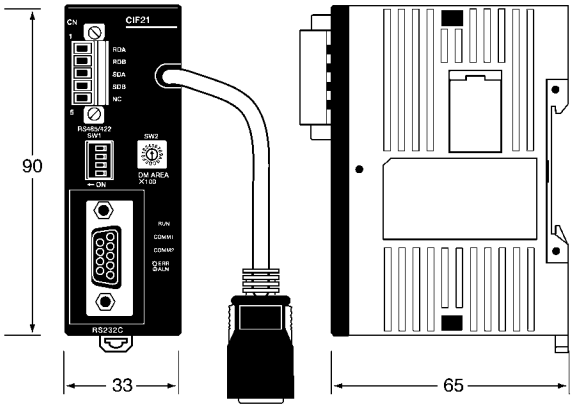
Temperature Sensor Unit (CPM2C-TS001, CPM2C-TS101)



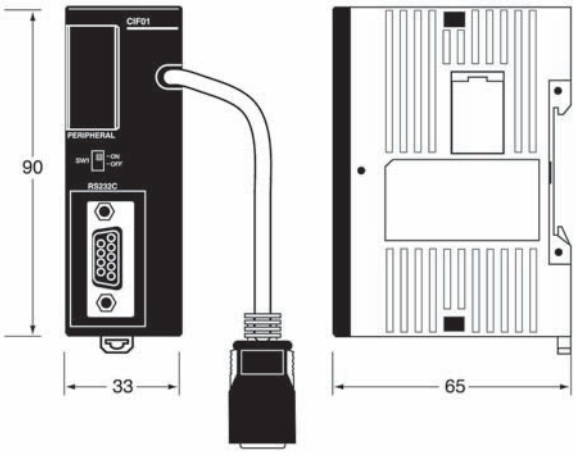
CompoBus/S I/O Link Unit (CPM2C-SRT21)



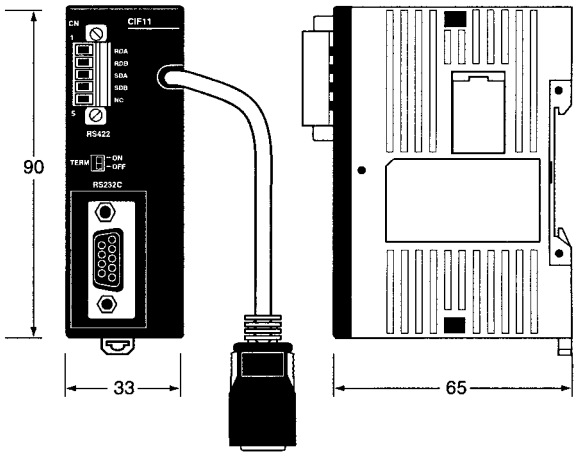
Simple Communications Unit (CPM2C-CIF21)



Peripheral/RS-232C Adapter Unit (CPM2C-CIF01-V1)



RS-422/RS-485/RS-232C Adapter Unit (CPM2C-CIF11)



OMRON

CPM2C Ordering Information

International Standards

The products shown in the attached tables are those that conform to the UL, CSA, cULus, cUL, NK, Lloyd's Register, and EC Directives as of September 2003.
(U: UL, C: CSA, UC: cULus, CU: cUL, N: NK, L: Lloyd, CE: EC Directives)
Please contact OMRON representative for application conditions.

CPM2C CPU Units

CPU Unit		Inputs	Outputs	Internal clock	Model	Standards
Units with 10 I/O points Inputs: 6 Outputs: 4	I/O terminal block	6 inputs (24 V DC)	4 relay outputs	---	CPM2C-10CDR-D	U, C, CE
				Yes	CPM2C-10C1DR-D	U, C, CE
Units with 10 I/O points Inputs: 6 Outputs: 4	2 Fujitsu connectors	6 inputs (24 V DC)	4 sinking transistor outputs	---	CPM2C-10CDTC-D	U, C, CE
				Yes	CPM2C-10C1DTC-D	U, C, CE
			4 sourcing transistor outputs	---	CPM2C-10CDT1C-D	U, C, CE
				Yes	CPM2C-10C1DT1C-D	U, C, CE
	2 MIL connectors	6 inputs (24 V DC)	4 sinking transistor outputs	---	CPM2C-10CDTM-D	U, C, CE
			4 sinking transistor outputs	Yes	CPM2C-10C1DTM-D	
			4 sourcing transistor outputs	---	CPM2C-10CDT1M-D	
			4 sourcing transistor outputs	Yes	CPM2C-10C1DT1M-D	
Units with 20 I/O points Inputs: 12 Outputs: 8	2 terminal blocks	12 inputs (24 V DC)	8 relays	---	CPM2C-20CDR-D	U, C, CE
				Yes	CPM2C-20C1DR-D	
	2 Fujitsu connectors		8 sinking transistor outputs	---	CPM2C-20CDTC-D	U, C, CE
				Yes	CPM2C-20C1DTC-D	U, C, CE
			8 sourcing transistor outputs	---	CPM2C-20CDT1C-D	U, C, CE
				Yes	CPM2C-20C1DT1C-D	U, C, CE
	2 MIL connectors	12 inputs (24 V DC)	8 sinking transistor outputs	---	CPM2C-20CDTM-D	U, C, CE
			8 sinking transistor outputs	Yes	CPM2C-20C1DTM-D	
			8 sourcing transistor outputs	---	CPM2C-20CDT1M-D	
			8 sourcing transistor outputs	Yes	CPM2C-20C1DT1M-D	
Units with 32 I/O points Inputs: 16 Outputs: 16	2 Fujitsu connectors	16 inputs (24 V DC)	16 sinking transistor outputs	---	CPM2C-32CDTC-D	U, C, CE
			16 sourcing transistor outputs	---	CPM2C-32CDT1C-D	
	2 MIL connectors	16 inputs (24 V DC)	16 sinking transistor outputs	---	CPM2C-32CDTM-D	U, C, CE
			16 sourcing transistor outputs	---	CPM2C-32CDT1M-D	
Programmable Slave with DeviceNet slave and CompoBus/S Master, 10 I/O points Inputs: 6 Outputs: 4	1 Fujitsu connector	6 inputs (24 V DC)	4 sinking transistor outputs	Yes	CPM2C-S100C-DRT	U, C, CE
			4 sourcing transistor outputs	Yes	CPM2C-S110C-DRT	
Units with CompoBus/S Master, 10 I/O points Inputs: 6 Outputs: 4	1 Fujitsu connector	6 inputs (24 V DC)	4 sinking transistor outputs	Yes	CPM2C-S100C	U, C, CE
			4 sourcing transistor outputs	Yes	CPM2C-S110C	

Power Supply Unit

Unit	Input	Output	Model	Standards
AC Power Supply Unit	100 to 240 V AC	24 V DC/600 mA	CPM2C-PA201	U, C, CE

Expansion I/O Units

Expansion I/O Unit		Inputs	Outputs	Model	Standards
Units with inputs only Inputs: 8	1 Fujitsu connector	8 inputs (24 V DC)	---	CPM2C-8EDC	U, C, CE
	1 MIL connector	8 inputs (24 V DC)	---	CPM2C-8EDM	U, C, CE
Units with inputs only Inputs: 16	1Fujitsu connector	16 inputs (24 V DC)	---	CPM2C-16EDC	U, C, CE
	1 MIL connector	16 inputs (24 V DC)	---	CPM2C-16EDM	U, C, CE
Units with relay outputs only Outputs: 8	I/O terminal block	---	8 relay outputs	CPM2C-8ER	U, C, CE
	1 Fujitsu connector	---	8 sinking transistor outputs	CPM2C-8ETC	U, C, CE
		---	8 sourcing transistor outputs	CPM2C-8ET1C	U, C, CE
	1 MIL connector	---	8 sinking transistor outputs	CPM2C-8ETM	U, C, CE
		---	8 sourcing transistor outputs	CPM2C-8ET1M	U, C, CE
Units with transistor outputs only Outputs: 8	1 Fujitsu connector	---	16 sinking transistor outputs	CPM2C-16ETC	U, C, CE
		---	16 sourcing transistor outputs	CPM2C-16ET1C	U, C, CE
	1 MIL connector	---	16 sinking transistor outputs	CPM2C-16ETM	U, C, CE
		---	16 sourcing transistor outputs	CPM2C-16ET1M	U, C, CE
Units with 10 I/O points Inputs: 6 Outputs: 4	1 I/O terminal block	6 inputs (24 V DC)	4 relay outputs	CPM2C-10EDR	U, C, CE

Expansion I/O Unit		Inputs	Outputs	Model	Standards
Units with 20 I/O points Inputs: 12 Outputs: 8	1 I/O terminal block	12 inputs (24 V DC)	8 relay outputs	CPM2C-20EDR	U, C, CE
Units with 24 I/O points Inputs: 16 Outputs: 8	2 Fujitsu connectors	16 inputs (24 V DC)	8 sinking transistor outputs	CPM2C-24EDTC	U, C, CE
			8 sourcing transistor outputs	CPM2C-24EDT1	U, C, CE
	2 MIL connectors	16 inputs (24 V DC)	8 sinking transistor outputs	CPM2C-24EDTM	U, C, CE
			8 sourcing transistor outputs	CPM2C-24EDT1M	U, C, CE
Units with 32 I/O points Inputs: 16 Outputs: 16	2 Fujitsu connectors	16 inputs (24 V DC)	16 sinking transistor outputs	CPM2C-32EDTC	U, C, CE
			16 sourcing transistor outputs	CPM2C-32EDT1C	U, C, CE
	2 MIL connectors	16 inputs (24 V DC)	16 sinking transistor outputs	CPM2C-32EDTM	U, C, CE
			16 sourcing transistor outputs	CPM2C-32EDT1M	U, C, CE

Analog I/O Units

Product	Specifications	Model	Standards
Analog I/O Unit	2 analog inputs and 1 analog output	CPM2C-MAD11	CE

Temperature Sensor Unit

Product	Specifications	Model	Standards
Temperature Sensor Unit	2 inputs for thermocouples	CPM2C-TS001	CE
	2 inputs for temperature resistance thermometers	CPM2C-TS101	

CompoBus/S I/O Link Units

Product	Specifications	Model	Standards
CompoBus/S I/O Link Units	I/O Links: 8 inputs, 8 outputs	CPM2C-SRT21	CE

I/O Connectors

(Connectors are not provided with CPU Unit. Select the appropriate ones from the following table. One CPU Unit requires two sets of Connectors.)

Fujitsu Connectors

Connection method	From OMRON		From Fujitsu
Soldered	C500-CE241	1 set	FCN-361J024-AUConnector FCN-360C024-J2Connector Cover
Crimped	C500-CE242		FCN-363J024Housing FCN-363J-AUContacts FCN-360C024-J2Connector Cover
Pressure-welded	C500-CE243		FCN-367J024-AU/F

MIL Connectors

Connection method	Model	Number in box	Specifications
Pressure-welded	XG4M-2030-T	100	Poles: 20

Note: Any commercially available 20-pole (IDC) connectors, according to MIL-C-83503, DIN 41651 or IEC 60603-1 specification, can be used.

Programming Consoles and Cables

Product		Model	Standards
Programming Console (2-m cable attached)		CQM1-PRO01-E	U, C, CE, N
Programming Console (Requires separate cable. See below.)		C200H-PRO27-E	U, C, N, CE
Connecting Cable for connecting CQM1-PRO01-E to a peripheral port		CS1W-CN114	CE
Connecting Cable for C200H-PRO27-E	2-m cable	C200H-CN222	N
	4-m cable	C200H-CN422	---
Connecting Cable for C200H-PRO27-E allowing direct connection to the CPM2C CPU Unit	2-m cable	CS1W-CN224	CE
	6-m cable	CS1W-CN624	CE

Support Software

Product	Functions	Model	Standards
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.	CX-ONE-AL□□C-E[*1]	---

[*1] □□ = Number of licenses (01, 03, 10)

Product	Model	Standards
Expansion Memory Unit	CPM1-EMU01-V1	---
EEPROM (256 K)	EEROM-JD	---

Peripheral Port Adapters and Connecting Cables

Description		Computer port	Length	Model	Standards
Personal Computer Connecting Cables		For a D-sub 9-pin port	2 m	CS1W-CN226	CE
			6 m	CS1W-CN626	CE
			3.3 m	CQM1-CIF02	U, C, N, L, CE
	Peripheral Port Cable		0.05 m	CS1W-CN114	CE

RS-232C Cables

Product	Computer port	Specifications	Length	Model	Standards
RS-232C Cable	For a D-sub 9-pin port	---	2 m	XW2Z-200S-V	---
			5 m	XW2Z-500S-V	---
		Can be used with a peripheral bus or Host Link. Uses connector that prevents ESD (electrostatic discharge.)	2 m	XW2Z-200S-CV	---
			5 m	XW2Z-500S-CV	---

Communications Port Connecting Cables

Description	Cable length	Model	Standards
Converts to a Peripheral port and RS-232C port.	0.1 m (about 4")	CPM2C-CN111	CE
Converts to a Peripheral port only.	0.05 m (about 2")	CS1W-CN114	CE
Converts to an RS-232C port only.	0.1 m (about 4")	CS1W-CN118	CE

Simple Communications Unit

Product	Specifications	Model	Standards
Simple Communications Unit	RS-485/RS-232C ports for connection to components	CPM2C-CIF21	U, C, CE

Adapters

Product	Function		Model	Standards
Peripheral/RS 232C Adapter Unit	Peripheral port level conversion		CPM2C-CIF01-V1	---
RS-422/RS-485/RS-232C Adapter Unit			CPM2C-CIF11	U, C, CE
Link Adapter	RS-232C to RS-422A conversion	For personal computer connection (Can also be connected to the CPM2A.)	3G2A9-AL004-E	---
RS-422A Adapter		For CPM2A connection (Can also be connected to a personal computer, but requires an external 5-V power supply.)	NT-AL001	---

Battery

Product	Function	Model	Standards
Battery	Backs up memory in the CPM2C CPU Unit.	CPM2C-BAT01	CE

I/O Terminal Blocks and Connecting Cables

Product	Description	No. of inputs/ outputs	Model	Comments
I/O Terminal Blocks	Slim type with M3 slotted screw terminal block	20	XW2D-20G6	For more information refer to "Wiring Systems" on page 384
	Flat cable connector with M2.5 slotted screw terminal block	20	XW2B-20G4	
Common terminals (3-tier inputs)	---		XW2E-20G5-IN16	
Common terminals (2-tier outputs)	---		XW2C-20G6-IO16	

Product	Cable length		Model	Comments
Special Connecting Cable	With Fujitsu connector	0.5 m	XW2Z-050A	For more information refer to "Wiring Systems" on page 384
		1 m	XW2Z-100A	
		1.5 m	XW2Z-150A	
		2 m	XW2Z-200A	
		3 m	XW2Z-300A	
		5 m	XW2Z-500A	
	With MIL connector	2.5 m	G79-025C	
		5 m	G79-050C	

Relay I/O Terminals and Connecting Cables

Product	Mounted relay	I/O points	Processing	Rated voltage	Model	Standards	Output	Fujitsu connector	MIL connector
Relay I/O terminals	G7TC	16 inputs	NPN (– common)	24 V DC	G7TC-ID16	---	---	G79-□00C	G79-O□00C
				100 (110) V AC	G7TC-IA16			G79-□00C	G79-O□00C
				200 (220) V AC				G79-□00C	G79-O□00C
		16 outputs	NPN (+ common, sinking output)	24 V DC	G7TC-OC16		Sink	G79-□00C	G79-O□00C
		16 outputs	PNP (– common, sourcing output)	24 V DC	G7TC-OC16-1		Source	G79-□00C	G79-O□00C
		8 outputs	NPN (+ common, sinking output)	24 V DC	G7TC-OC08	---	Sink	G79-□00C	G79-O□00C
	G6D	16 outputs	NPN (+ common, sinking output)	24 V DC	G70D-SOC16	---	Sink	G79-□00C	G79-O□00C
			PNP (– common, sourcing output)	24 V DC	G70D-SOC16-1	---	Source		G79-I□00C
	G3DZ (Power MOS FET Relay)		NPN (+ common, sinking output)	24 V DC	G70D-FOM16	---	Sink	G79-□00C	G79-O□00C
			PNP (– common, sourcing output)	24 V DC	G70D-FOM16-1	---	Source		G79-I□00C
	G6D		NPN (+ common, sinking output)	24 V DC	G70D-VSOC16	---	Sink	G79-□00C	G79-O□00C
	G3DZ (Power MOS FET Relay)		NPN (+ common, sinking output)	24 V DC	G70D-VFOM16	---	Sink	G79-□00C	G79-O□00C
	(Sold separately) G2R G3R G3RN H3RN		NPN (+ common, sinking output)	24 V DC	G70A-ZOC16-3	---	Sink	G79-□00C	G79-O□00C
			PNP (– common, sourcing output)		G70A-ZOC16-4	---	Source	---	G79-I□00C

Product	Cable length		Model	Comments
Connecting Cable with connector (1:1)	With Fujitsu connector	1 m	G79-100C	For more information refer to “Wiring Systems” on page 384
		1.5 m	G79-150C	
		2 m	G79-200C	
		3 m	G79-300C	
		5 m	G79-500C	
	With MIL connector	0.25 m	G79-O25C	
		5 m	G79-O50C	
		0.25 m	G79-I25C	
		0.5 m	G79-I50C	

DC Power Supplies

Product	Output voltage/current	Input voltage	Model	Standards
DC Power Supply (3 W)	24 V DC, 0.13 A	85 V AC to 264 V AC	S82K-00324	U, C
DC Power Supply (7.5 W)	24 V DC, 0.3 A	85 V AC to 264 V AC	S82K-00724	U, C
DC Power Supply (15 W)	24 V DC, 0.6 A	85 V AC to 264 V AC	S82K-01524	U, C
DC Power Supply (30 W)	24 V DC, 1.3 A	85 V AC to 264 V AC	S82K-03024	U, C
DC Power Supply (50 W)	24 V DC, 2.1 A	85 V AC to 264 V AC	S82K-05024	U, C

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P06E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

OMRON

Compact PLC series

CP1H

The All-in-One Controller



Combining the processing power and data capacity of the CJ1M series and the built-in digital I/O functionality of the CPM2A series in a compact PLC outline, the CP1H CPU series sets new standards.

With 4 high-speed encoder inputs up to 1 MHz (single phase) and 4 pulse outputs up to 1 MHz (line driver), CP1H CPUs are ideal for positioning and speed control.

Their optional 4 analogue inputs and 2 analogue outputs plus advanced PID control with auto-tuning also make them ideal for continuous control applications.

What's more, expandable with CPM1A I/O units (up to 320 I/O points) and up to two CJ1 Special I/O units or CPU bus units, CP1H CPUs offer a wide range of communication interfaces and advanced I/O units.

Equipped with a USB interface as standard for programming and monitoring, the new CPUs allows up to two serial ports to be plugged in for communication with HMI or field devices. And, of course, they provide 'Smart Platform' communication routing over multiple network layers.

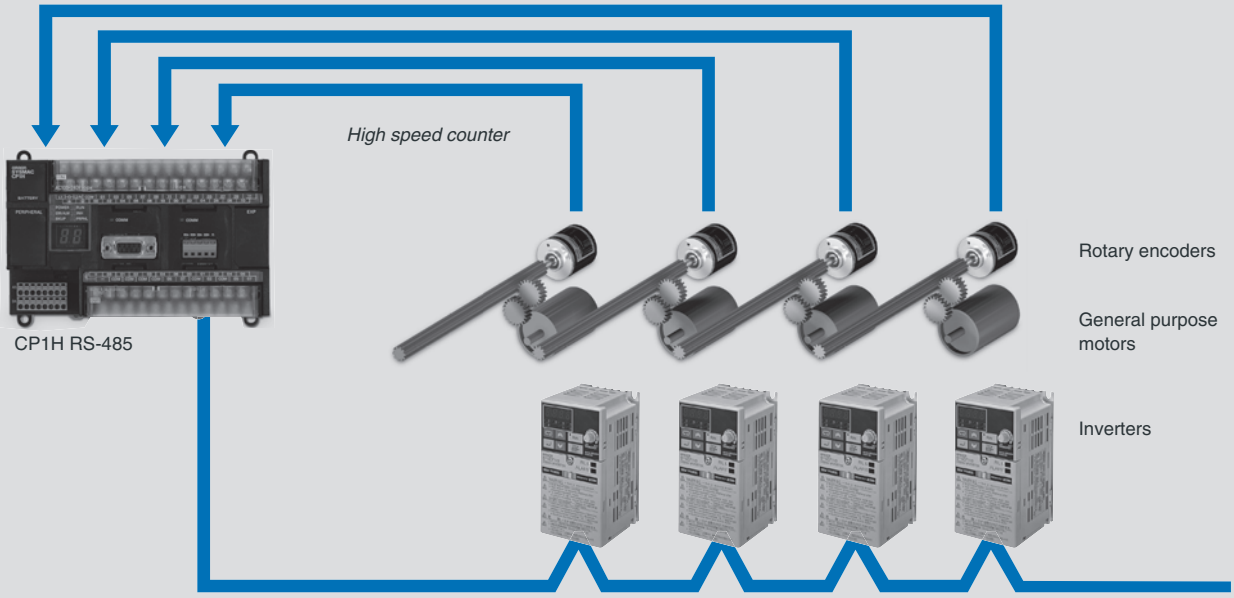
Using CX-One, programs can be created that enable the user to build, configure and program networks, PLCs, HMIs, motion-control systems, drives, temperature controllers and sensors.

The CP1H CPU series has the same architecture as the CS/CJ PLC series, which means programs are compatible for memory allocations and instructions and also support Function Blocks and Structured Text.

High-speed counter / encoder input

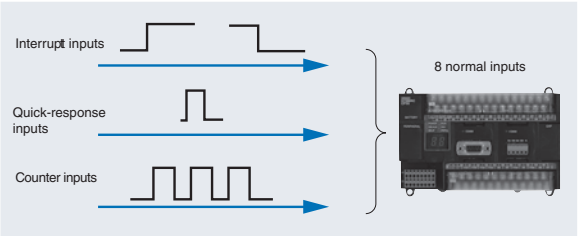
Four axes Counter Function (single phase or differential phase)

CP1H-X(A) CPU Units: Four axes, single-phase at 100 kHz or differential phases at 50 kHz
CP1H-Y CPU Units: Two axes, single phase at 1 MHz or differential phases at 500 kHz plus two axes, single phase at 100 kHz or differential phases at 50 kHz



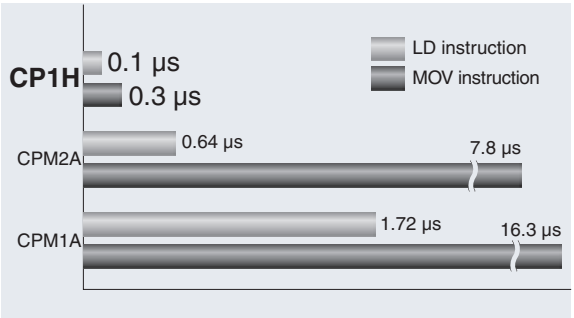
Eight Interrupt Inputs

Eight inputs be used as:
- 50 µs pulse catch inputs
- interrupt inputs
- simple counter inputs (<5 kHz)

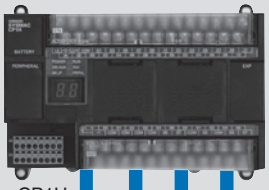


Program execution speed

Fast I/O requires fast response, the CJ1M core provides classleading program execution speed.



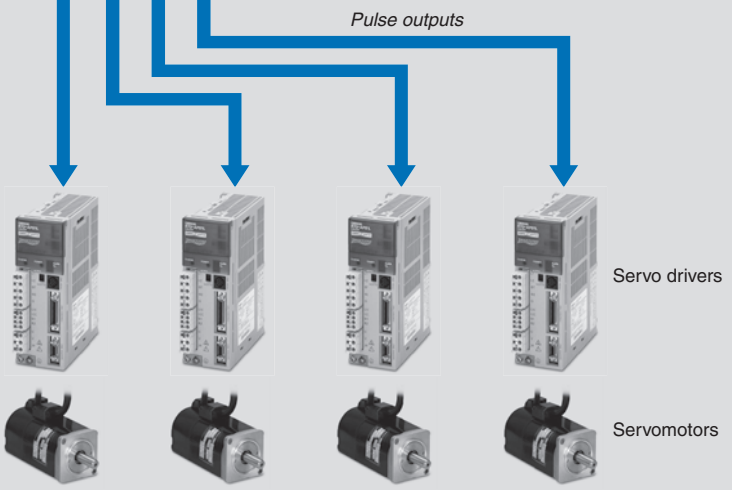
4 Pulse outputs for precise positioning



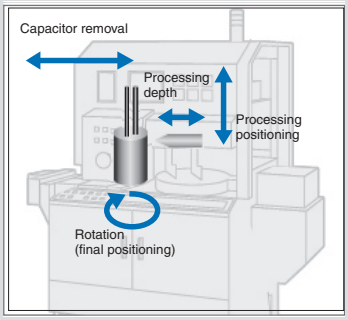
CP1H

Pulse Output Function for Up to Four Axes.

CP1H-X(A) CPU Units: Two axes at 100 kHz and two axes at 30 kHz
CP1H-Y CPU Units: Two axes at 1 MHz and two axes at 100 kHz

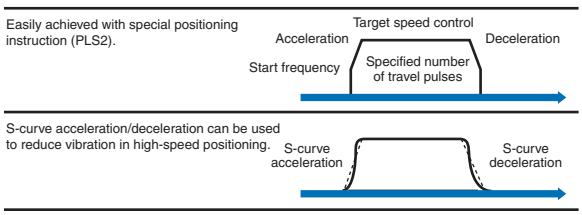


Example: Four-axes Control in Electronic Component manufacturing equipment

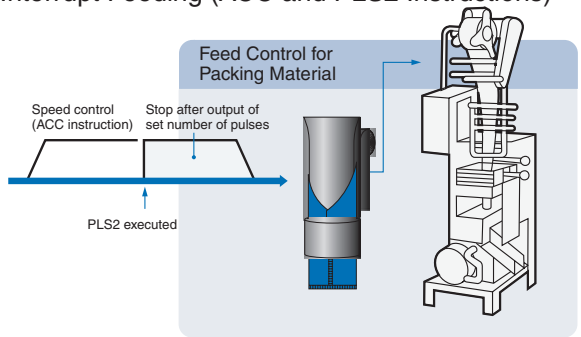


Easy engineering with standard functions

- Single-instruction Origin Search Function
- Positioning with Trapezoidal Acceleration and Deceleration (PLS2 Instruction)

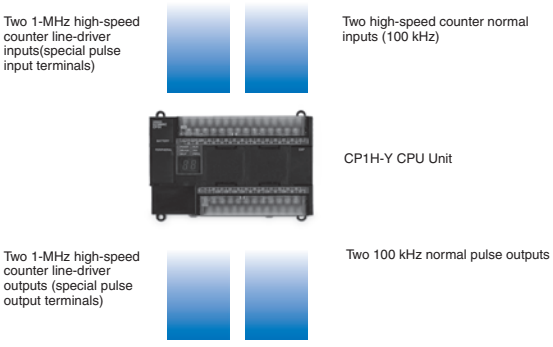


Interrupt Feeding (ACC and PLS2 Instructions)



1MHz High-speed Pulse Output

(CP1H-Y CPU Units : To be released soon.)



CP1H-Y CPU Units offer built-in 1-MHz line-driver I/O.

- Line-driver outputs: Two each for CW and CCW.
- Line-driver inputs: Two each for phases A, B, and Z.

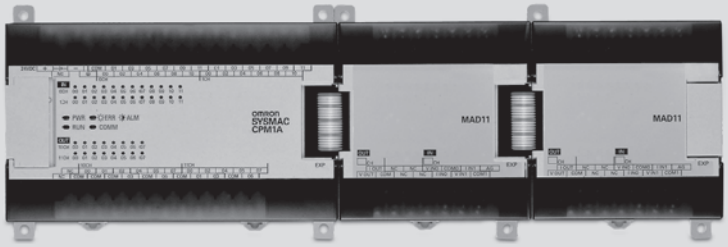
CP1H-Y CPU Units also have 20 normal I/O points (12 inputs and 8 outputs), and can provide 100-kHz high-speed counter inputs for two axes and 100 kHz pulse outputs for two axes.

Analogue I/O

Analogue Control without Using Expansion Units

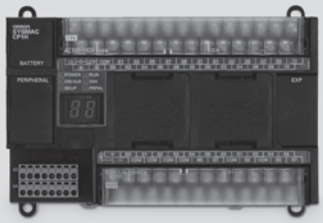
CP1H-XA CPU Units have four analogue inputs and two analogue outputs built in.

Previously



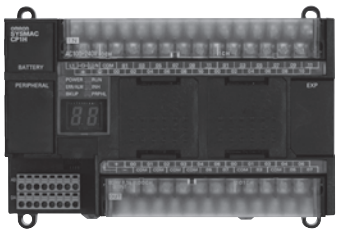
CPM2A CPU Unit with Two CPM1A-MAD11 Analogue I/O Units (2 Analogue Inputs and 1 Analogue Output)

CP1H

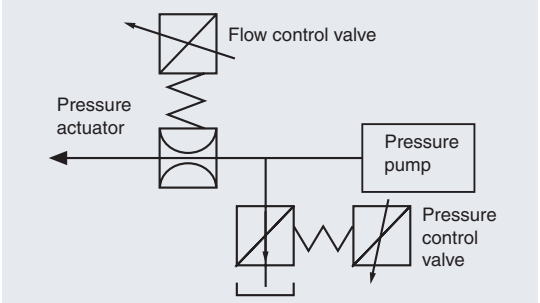


CP1H-XA

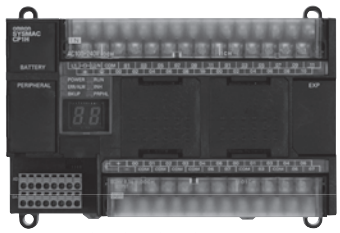
• Oil Pressure Control

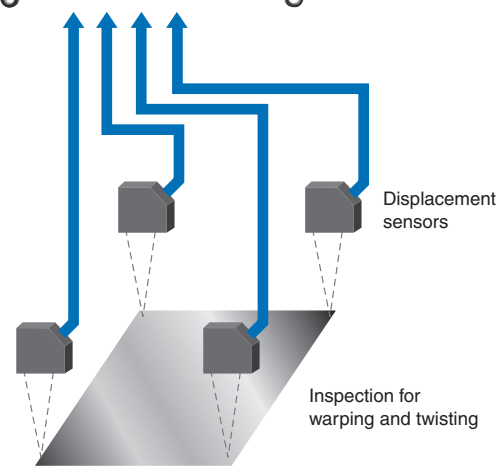


Pressure Position Control valves



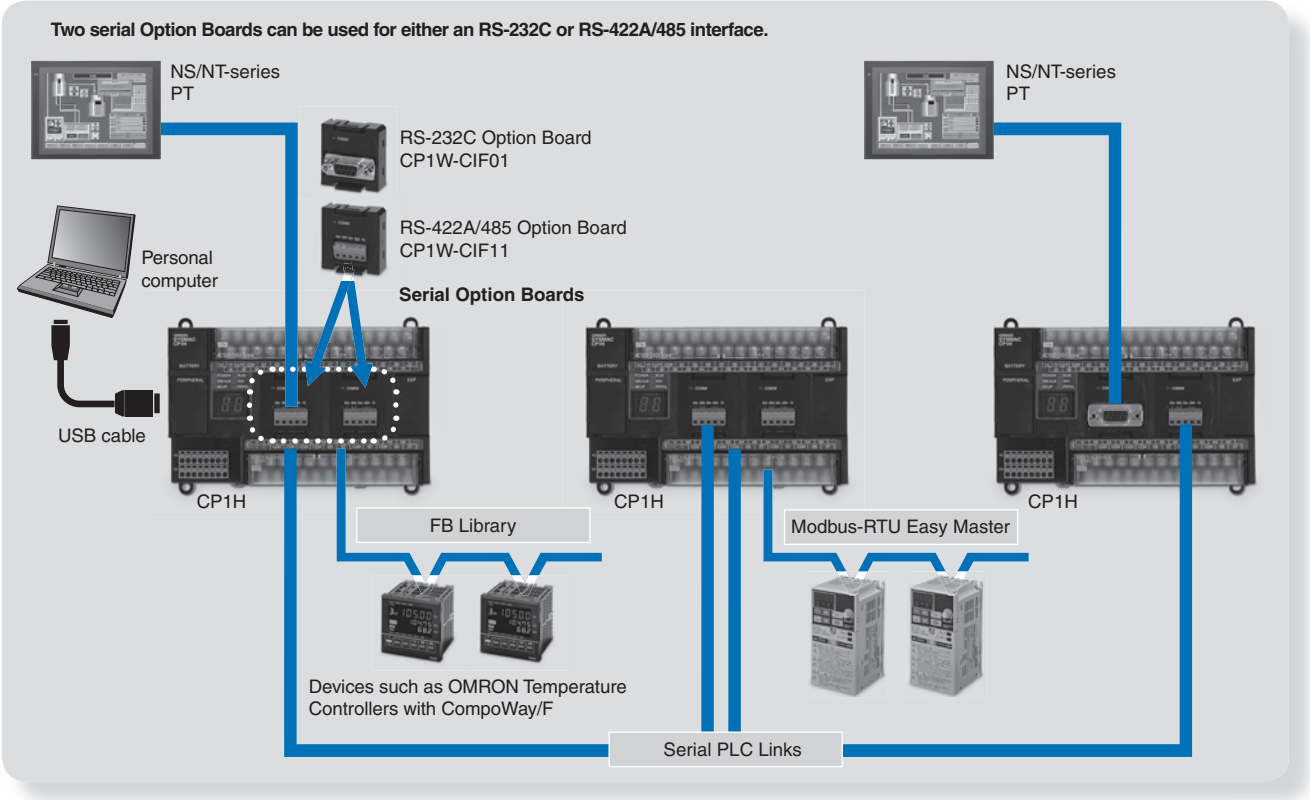
• Inspection Devices





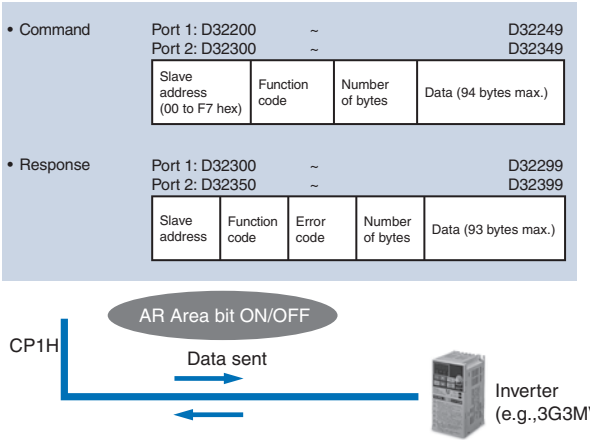
Serial communications

Two Option Boards can be mounted for RS-232C or RS-422A/485 communications making it easy to simultaneously connect to a PT, and other devices such as Inverters, Temperature controllers, Smart Sensors or Serial PLC link. The standard USB port is used for connection to a personal computer.



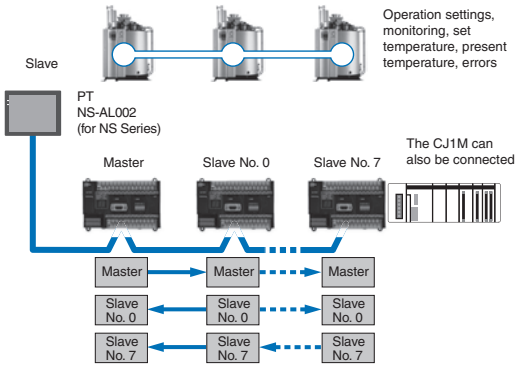
Modbus-RTU Easy Master

The Modbus-RTU Easy Master makes it easy to control Modbus slaves (such as Inverters). Serial communications can be executed independently of the program simply by setting a Modbus command in a fixed memory area and turning ON software switches.



Serial PLC Links

Up to 10 Words/Unit of data can be exchanged between up to nine CP1H (or CJ1M) CPU units.

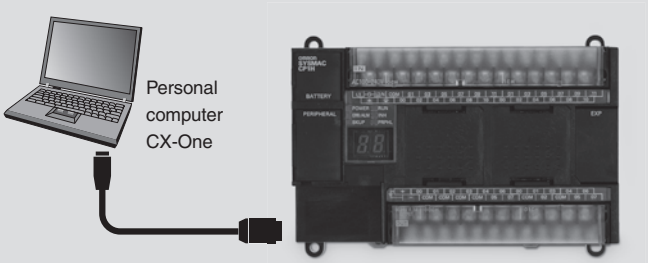


NS/NT-series PTs can also be incorporated as slaves (1:N NT Link connections) to exchange data using the NT Links with only the master CP1H. Each is treated as one slave node.

Reduce development time with efficient tools

• Plug-and-play USB Connection

Just install the CX-Programmer (Ver. 6.1 or higher) and connect the USB cable to the CP1H. The driver will be installed automatically.



• A Built-in USB Port (USB 1.1, Type B) Enables a Personal Computer to Be Connected using a standard USB cable.

Standard A-type male to B-type male USB cables can be used.



Note: Programming Consoles (e.g., CQM1H-PRO01 and C200H-PRO27) cannot be used with the CP1H.

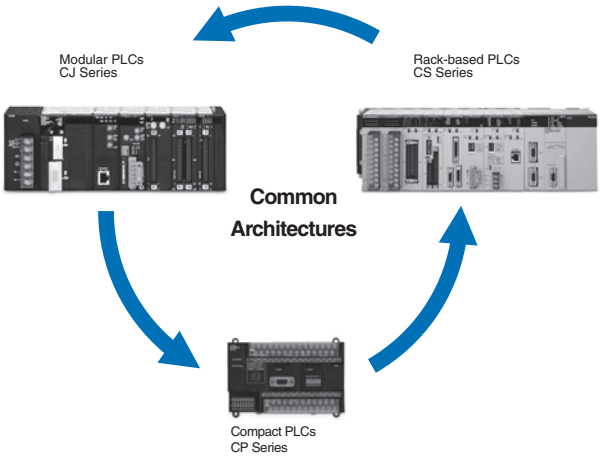
A Wealth of Instructions

• PID Instruction with Autotuning

PID constants can be automatically tuned for the PID instruction. The limit cycle method is used for tuning, allowing tuning to be completed quickly

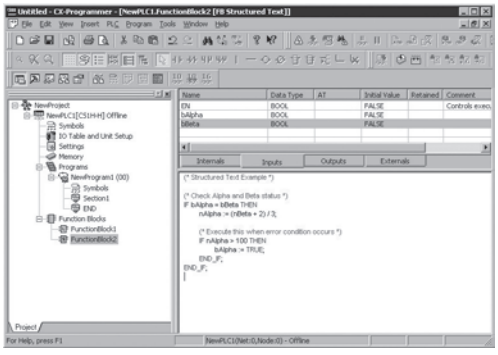
• Floating-point Decimal Instructions, Trigonometric Instructions, and More.

Just like the CS/CJ-series PLCs, the CP1H has approximately 400 instructions for ladder programming.



The Structured Text (ST) language makes arithmetic operations even easier.

In addition to ladder programming, function block logic can be written in ST language, which conforms to IEC 61131-3. Arithmetic processing is also possible with ST, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing that is difficult to write in ladder programming becomes easy using structured text.

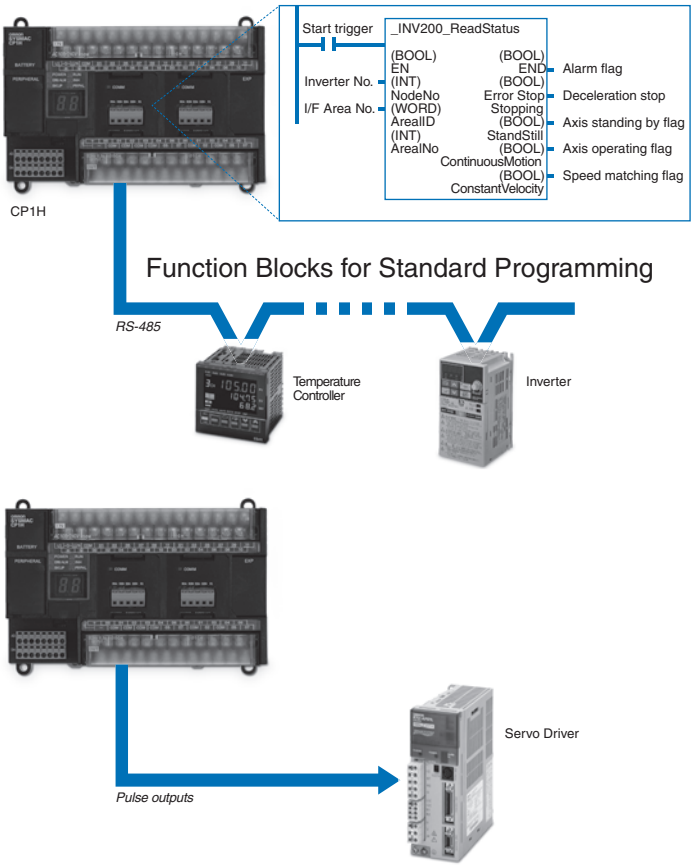


Communications programs are provided by the Function Block library.

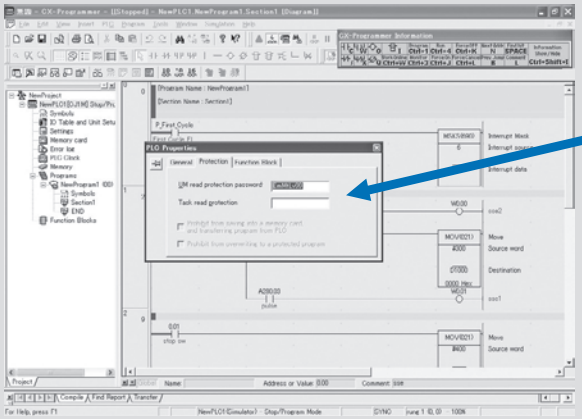
OMRONs Function Block Libraries drastically reduce the amount of programming needed to communicate with field devices. Just drag and drop a pre-tested function block in your program and set the parameters. You'll be up and running within one minute.

• A FB Library for Pulse Outputs.

Function blocks are also provided for pulse outputs to make it easy to write programs for positioning in addition to communications function blocks. These function blocks will reduce the time required for developing programs for applications such as for OMRON's Smartstep Servo System.



Security



Programs can be protected by setting a password from the CX-Programmer (with the PLC online).

Password setting: Up to 8 alphanumeric characters (A-Z, a–z, 0-9)

One software, one connection, one minute

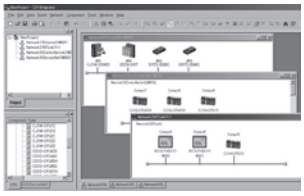
CX-One

CX-One is a single programming and configuration environment that enables the user to build, configure and program networks, PLCs, HMIs, Motion Control systems, Drives, Temperature Controllers and Sensors. The result of a single software is to reduce complexity of the configuration, allowing automation systems to be programmed or configured with minimal training.

❶ Network Software	CX-Integrator CX-Protocol CX-FLnet
❷ PLC Software	CX-Programmer CX-Simulator SwitchBox
❸ HMI Software	CX-Designer
❹ Motion Controller Software	CX-Motion CX-Motion-NCF CX-Motion-MCH CX-Position CX-Drive
❺ PLC-based Process Control Software	CX-Process Tool NS-series Face Plate Auto-Builder
❻ Component Software	CX-Thermo

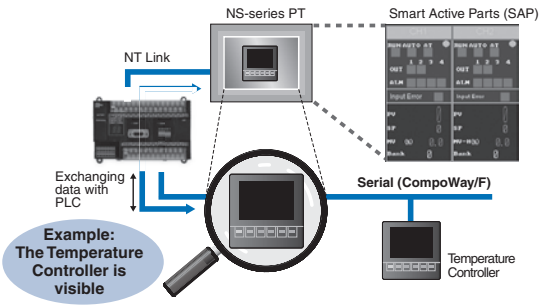
• CX-Integrator

Settings and configurations for devices can be made from any PLC in the network.



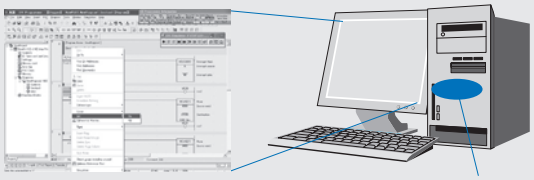
• CX-Designer

The CX-Designer can be started from the CX-Integrator. Settings such as the PLC and Unit information are passed to the CXDesigner, so you can start developing screens immediately after CX-Designer starts.



• CX-Simulator

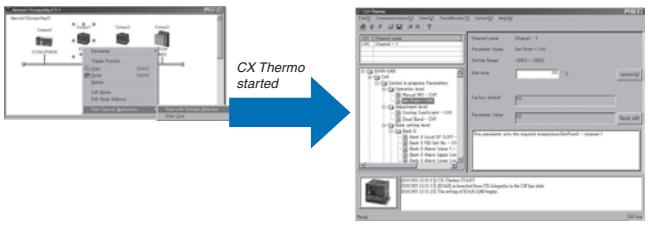
Online CPU Unit operations, such as program monitoring, I/O memory manipulation, PV monitoring, forced setting/resetting memory bits, differential monitoring, data tracing, and online editing, can be executed without the actual PLC.



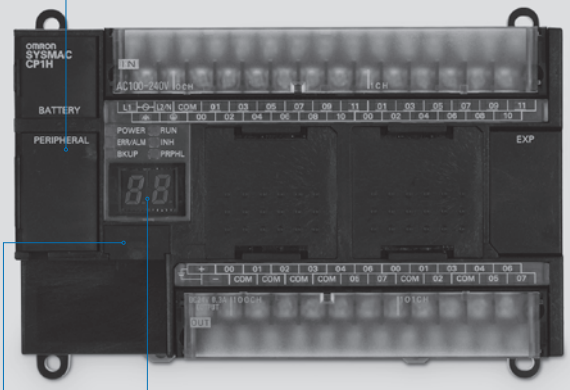
The CX-Simulator can be used for debugging with the CX-Programmer in online status, even without the PLC connected.

• CX-Thermo

The Support Software for Temperature Controllers (CX-Thermo) can be started from the CX-Integrator's Serial Communications (CompoWay/F) network.
Parameters can be created, edited, and transferred at the computer. The time required to make settings can be reduced when setting the same parameters in multiple devices.

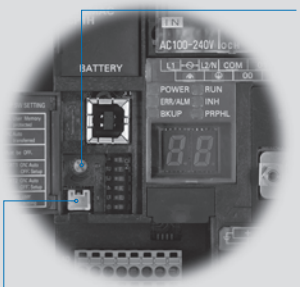


Handy built-in functions make maintenance easier



❶ Analogue Inputs Are Made Simple

An analogue control setting and an analogue input are provided.



Analogue setting

The analogue control setting has a resolution of 256 steps.
When the value is changed it is displayed (hexadecimal) for three seconds on the 7-segment display.



Analogue Input

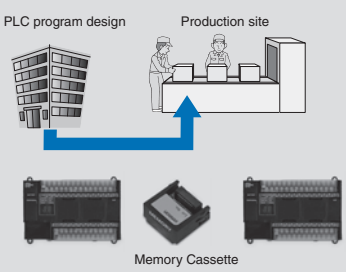
This input has a resolution of 256 steps and is used for an analogue input set of 0 to 10 V. Each CP1H CPU Unit has one of these connectors built in. (The built-in analogue I/O for CP1HXA CPU Units is separate.) A device, such as a potentiometer, can be connected to enable direct manual operation and control from a control panel. The maximum cable length is 3 meters. A connecting cable (1 m) is included with the CPU Unit.

● Memory Cassette

- Data, such as programs and initial memory values, can be stored on a Memory Cassette (optional) and copied to other systems.
- The Memory Cassette can also be used when installing new versions of application programs.

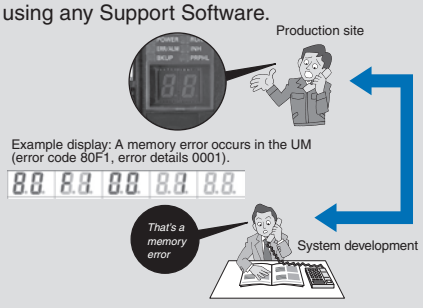


CP1W-ME05M
Memory Cassette



● 7-segment Status Display

- The 7-segment Display provides two display digits.
- In addition to displaying error codes for errors detected by the PLC, codes can be displayed on the display from the ladder program.
- The 7-segment display is useful for maintenance as well, allowing problems that arise during system operation to be grasped without using any Support Software.



❹ Battery-free Operation

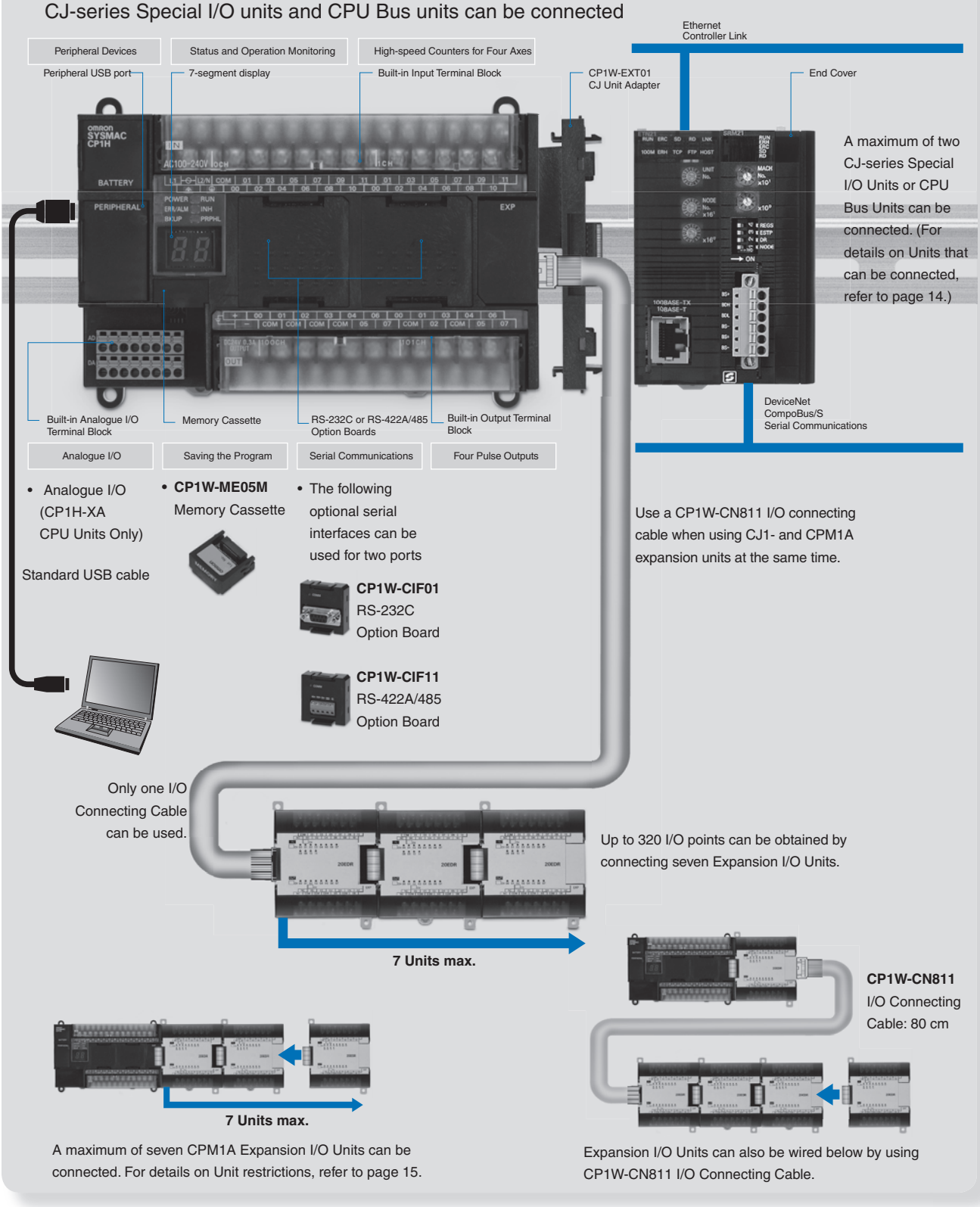
- The values in the DM Area (32 Kwords) are saved in the CPU Unit's built-in flash memory as initial values, and can be read at startup.
- Battery-free operation is also possible when saving production data and machine parameters in the DM Area, turning OFF the power, and using the same data again for the next production run.

Note:
- A battery is required for the clock function and to retain the status of HR
- Area bits and counter values.A battery is provided as a standard feature with the CPU Unit.
- The user program (ladder program) is stored in built-in flash memory, so no battery is required to back it up.

Expansion I/O units

Expand as needed

CJ-series Special I/O units and CPU Bus units can be connected



A maximum of two CJ-series Special I/O Units or CPU Bus Units can be connected. (For details on Units that can be connected, refer to page 14.)

Use a CP1W-CN811 I/O connecting cable when using CJ1- and CPM1A expansion units at the same time.

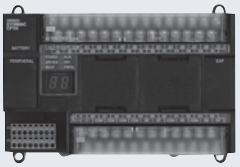
Up to 320 I/O points can be obtained by connecting seven Expansion I/O Units.

A maximum of seven CPM1A Expansion I/O Units can be connected. For details on Unit restrictions, refer to page 15.

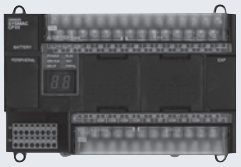
Expansion I/O Units can also be wired below by using CP1W-CN811 I/O Connecting Cable.

CPU unit overview

CP1H-XA40D□-□
Built-in Analogue I/O



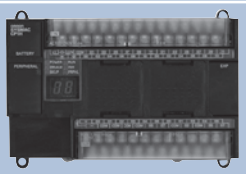
CP1H-XA40DR-A
AC power supply, 24 DC inputs,
16 relay outputs, 4 analogue inputs,
2 analogue outputs



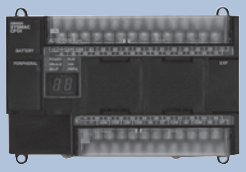
CP1H-XA40DT-D
DC power supply, 24 DC inputs,
16 transistor (sinking) outputs,
4 analogue inputs, 2 analogue outputs

CP1H-XA40DT1-D
DC power supply, 24 DC inputs,
16 transistor (sourcing) outputs,
4 analogue inputs, 2 analogue outputs

CP1H-X40D□-□
Basic Model



CP1H-X40DR-A
AC power supply, 24 DC inputs,
16 relay outputs



CP1H-X40DT-D
DC power supply, 24 DC inputs,
16 transistor (sinking) outputs

CP1H-X40DT1-D
DC power supply, 24 DC inputs,
16 transistor (sourcing) outputs

CP1H-Y20D□-□
High-speed Positioning
(To be released soon)



CP1H-Y20DT-D
DC power supply, 12 DC inputs,
8 transistor (sinking) outputs

Two 1-MHz line-driver inputs (phases A, B, and Z) and two 1-MHz line-driver outputs (CW and CCW) are provided separately.

	CP1H-XA CPU Units	CP1H-X CPU Units	CP1H-Y CPU Unit
I/O capacity	24 inputs, 16 outputs		12 inputs, 8 outputs Line-driver inputs: Phases A, B, and Z for 2 axes Line-driver outputs: CW and CCW for 2 axes
High-speed counter	100 kHz (single phase), 50 kHz (differential phases), 4 axes		1 MHz (single phase), 500 kHz (differential phases) for 2 axes (line-driver input), 100 kHz (single phase), 50 kHz (differential phases) for 2 axes (4 axes total)
Pulse output function (Models with Transistor Outputs only)	100 kHz for 2 axes and 30 kHz for 2 axes (4 axes total)		1 MHz for 2 axes (line-driver output), 100 kHz for 2 axes (4 axes total)
Serial communications	USB port (peripheral port) and 2 optional serial ports (either RS-232C or RS-422A/485 Option Boards)		
Analogue I/O	4 analogue inputs and 2 analogue outputs	-	-
Interrupt inputs Quick-response inputs (50-ms width min.)	8 inputs		6 inputs
User program capacity	20 kstep		
DM capacity	32 kwords		
Maximum number of CPM1A Expansion I/O Units	7 (Refer to page16 for Unit restrictions.)		
Maximum number of CJ-series Units	2 (CJ-series Special I/O Units and CPU Bus Units only. Refer to page 14 for information on Units that can be used.)		

• Options



CP1W-ME05M
Memory Cassette



CP1W-CIF01
RS-232C Option Board



CP1W-CIF11
RS-422A/485
Option Board

CP-series expansion units

• Expansion I/O Units



CPM1A-8ED
Input points: 8 DC input
CPM1A-8ER
Output points:
8 Relay output
CPM1A-8ET
Output points: 8 Transistor output (sinking)
CPM1A-8ET1
Output points: 8 Transistor output (sourcing)



CPM1A-20EDR1
Input points: 12 DC inputs
Output points: 8 relay outputs
CPM1A-20EDT
Input points: 12 DC inputs
Output points: 8, transistor outputs (sinking)
CPM1A-20EDT1
Input points: 12 DC inputs
Output points: 8, transistor outputs (sourcing)



CPM1A-40EDR
Input points: 24 DC inputs
Output points: 16 relay outputs
CPM1A-40EDT
Input points: 24 DC inputs
Output points: 16 transistor outputs (sinking)
CPM1A-40EDT1
Input points: 24 DC inputs
Output points: 16 transistor outputs (sourcing)

• Analogue Units



Analogue Input Unit
CPM1A-AD041
Analogue inputs: 4
(resolution: 6,000)



Analogue Output Unit
CPM1A-DA041
Analogue outputs: 4
(resolution: 6,000)



Analogue I/O Unit
CPM1A- MAD11
Analogue inputs: 2 (resolution: 6,000)
Analogue outputs: 1 (resolution: 6,000)



Analogue I/O Unit
CPM1A- MAD01
Analogue inputs: 2 (resolution: 256)
Analogue outputs: 1 (resolution: 256)

• Temperature Sensor Units

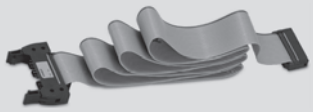
CPM1A-TS001
Thermocouple inputs: 2
CPM1A-TS002
Thermocouple inputs: 4

CPM1A-TS101
Platinum resistance
thermometer inputs: 2
CPM1A-TS102
Platinum resistance
thermometer inputs: 4

CPM1A-TS101-DA
Platinum resistance
thermometer inputs: 2
Analogue output: 1
(resolution: 256)



• I/O Connecting



CP1W-CN811
80 cm

• CompoBus/S - I/O Link Unit

CPM1A-SRT21
Input points: 8
Output points: 8



• DeviceNet I/O Link Unit

CPM1A-DRT21
Input points: 32
Output points: 32



• PROFIBUS-DP I/O Link Unit

CPM1A-PRT21
Input points: 16
Output points: 16



• CJ-series Special I/O Units and CPU Bus Units

Two CJ-series Special I/O Units or CPU Bus Units can be connected by using a CJ Unit Adapter.

CJ Unit Adapter
CP1W-EXT01



CJ-series Special I/O Units
Analogue Input Unit
CJ1W-AD□□□-V1
Analogue Output Unit
CJ1W-DA□□□
Analogue I/O Unit
CJ1W-MAD42
Process Input Unit
CJ1W-PTS□□
CJ1W-PDC15
Temperature Control Unit
CJ1W-TC□□□
CompoBus/S Master Unit
CJ1W-SRM21
PROFIBUS-DP Slave Unit
CJ1W-PRT21

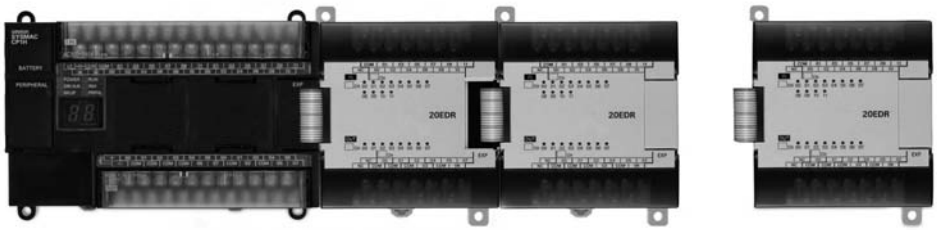


CJ-series CPU Bus Units
Ethernet Unit
CJ1W-ETN21
Controller Link Unit
CJ1W-CLK21-V1
Serial Communications Unit
CJ1W-SCU□□-V1
DeviceNet Unit
CJ1W-DRM21
PROFIBUS-DP Master Unit
CJ1W-PRM21
CAN unit
CJ1W-CORT21



System configuration

A maximum of seven CPM1A Expansion I/O Units can be connected.



Group A

Unit type		Model
Expansion I/O Units	40 I/O points	CPM1A-40EDR
		CPM1A-40EDT
		CPM1A-40EDT1
	20 I/O points	CPM1A-20EDR1
		CPM1A-20EDT
		CPM1A-20EDT1
	8 inputs	CPM1A-8ED
	8 outputs	CPM1A-8ER
		CPM1A-8ET
		CPM1A-8ET1
Analogue Unit	2 analogue inputs, 1 analogue output	CPM1A-MAD01
		CPM1A-MAD11
Temperature Sensor Units	2 thermocouple inputs	CPM1A-TS001
	2 platinum resistance thermometer inputs	CPM1A-TS101
	2 platinum resistance thermometer inputs, 1 analogue output	CPM1A-TS101-DA
CompoBus/S I/O Link Unit	8 inputs, 8 outputs	CPM1A-SRT21
DeviceNet I/O Link Unit	32 inputs, 32 outputs	CPM1A-DRT21
PROFIBUS-DP I/O Link Unit	16 inputs, 16 outputs	CPM1A-PRT21

Group B Units that each count as two units

Unit type		Model
Analogue Units	4 analogue inputs	CPM1A-AD041
	4 analogue outputs	CPM1A-DA041
Temperature Sensor Units	4 thermocouple inputs	CPM1A-TS002
	4 platinum resistance thermometer inputs	CPM1A-TS102

CJ-series Special I/O Units and CPU Bus Units

A maximum of two CJ-series Special I/O Units or CPU Bus Units can be connected by using a CP1W-EXT01 CJ Unit Adapter.

CJ-series Special I/O Units				CJ-series CPU Bus Units	
Unit name	Model	Unit name	Model	Unit name	Model
Analogue Input Units	CJ1W-AD081-V1	Process Input Units	CJ1W-PDC15	Serial Communications Units	CJ1W-SCU41-V1
	CJ1W-AD041-V1	Temperature Control Units	CJ1W-TC001		CJ1W-SCU21-V1
Analogue Output Units	CJ1W-DA08V		CJ1W-TC002	Ethernet Unit	CJ1W-ETN21
	CJ1W-DA08C		CJ1W-TC003	DeviceNet Unit	CJ1W-DRM21
	CJ1W-DA041		CJ1W-TC004	Controller Link Unit	CJ1W-CLK21-V1
	CJ1W-DA021		CJ1W-TC101	PROFIBUS-DP Master Unit	CJ1W-PRM21
Analogue I/O Unit	CJ1W-MAD42		CJ1W-TC102	CAN Unit	CJ1W-CORT21
Process Input Units	CJ1W-PTS51		CJ1W-TC103		
	CJ1W-PTS52		CJ1W-TC104		
	CJ1W-PTS15	CompoBus/S Master Unit	CJ1W-SRM21		
	CJ1W-PTS16	PROFIBUS-DP Slave Unit	CJ1W-PRT21		

Specifications

CPU Unit Specifications

Item	AC power supply models: CP1H-□□□-A	DC power supply models: CP1H-□□□-D
Power Supply	100 to 240 VAC 50/60 Hz	24 VDC
Operating voltage range	85 to 264 VAC	20.4 to 26.4 VDC (21.6 to 26.4 VDC with four or more Expansion Units.)
Power consumption	Can be used for backing up programs or auto-booting.	50 W max.
Inrush current	100 to 120 VAC inputs: 20 A max. 8 ms max./200 to 240 VAC inputs: 40 A max. 8 ms max.	30 A max. 20 ms max.
External power supply	300 mA at 24 VDC	None
Insulation resistance	20 MΩ min. (at 500 VDC) between the external AC terminals and GR terminals	20 MΩ min. (at 500 VDC) between the external DC terminals and GR terminals
Dielectric strength	2,300 VAC at 50/60 Hz for 1 min between the external AC and GR terminals, leakage current: 5 mA max.	1,000 VAC at 50/60 Hz for 1 min between the external DC and GR terminals, leakage current: 5 mA max.
Noise immunity	Conforming to IEC 61000-4-4. 2 kV (power supply line)	
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s2 in X, Y, and Z directions for 80 minutes each (Sweep time: 8 minutes x 10 sweeps = total time 80 minutes)	
Shock resistance	147 m/s2, three times each in X, Y, and Z directions	
Ambient operating temperature	0 to 55°C	
Ambient humidity	10% to 90% (with no condensation)	
Ambient operating environment	No corrosive gas	
Ambient storage temperature	-20 to 75°C (Excluding battery.)	
Power holding time	10 ms min.	2 ms min.
Dimensions	150 x 90 x 85 mm (W x H x D)	
Weight	740 g max.	590 g max.

Item		XA CPU Units: CP1H-XA□□□-□	X CPU Units: CP1H-X□□□-□	Y CPU Units: CP1H-Y□□□-□
Control method		Stored program method		
I/O control method		Cyclic scan with immediate refreshing		
Program language		Ladder diagram		
Function blocks		Maximum number of function block defi nitions: 128 Maximum number of instances: 256 Languages usable in function block defi nitions: Ladder diagrams, structured text (ST)		
Instruction length		1 to 7 steps per instruction		
Instructions		Approx. 400 (function codes: 3 digits)		
Instruction execution time		Basic instructions: 0.10 ìs min. Special instructions: 0.15 ìs min.		
Common processing time		0.7 ms		
Program capacity		20 Ksteps		
Number of tasks		288 (32 cyclic tasks and 256 interrupt tasks) Scheduled interrupt tasks: 1 (interrupt task No. 2, fi xed) Input interrupt tasks: 8 (interrupt task No. 140 to 147, fi xed), 6 for Y CPU Units High-speed counter interrupt tasks: 256 (interrupt task No. 0 to 255)		
Maximum subroutine number		256		
Maximum jump number		256		
I/O areas	Input bits	1,600 bits (100 words): CIO 0.00 to CIO 99.15 (The 24 built-in inputs are allocated in CIO 0.00 to CIO 0.11 and CIO 1.00 to CIO 1.11.)		
	Output bits	1,600 bits (100 words): CIO 100.00 to CIO 199.15 (The 16 built-in outputs are allocated in CIO 100.00 to CIO 100.07 and CIO 101.00 to CIO 101.07.)		
	Built-in Analog Inputs	CIO 200 to CIO 203		
	Built-in Analog Outputs	CIO 210 to CIO 211		
	Serial PLC Link Area	1,440 bits (90 words): CIO 3100.00 to CIO 3189.15 (CIO 3100 to CIO 3189)		
Work bits		8,192 bits (512 words): W000.00 to W511.15 (W0 to W511) 37,504 bits (2,344 words): CIO 3800.00 to CIO 6143.15 (CIO 3800 to CIO 6143)		
TR Area		16 bits: TR0 to TR15		
Holding Area		8,192 bits (512 words): H0.00 to H511.15 (H0 to H511)		
AR Area		Read-only (Write-prohibited): 7168 bits (448 words): A0.00 to A447.15 (A0 to A447) Read/Write: 8192 bits (512 words): A448.00 to A959.15 (A448 to A959)		
Timers		4,096 bits: T0 to T4095		
Counters		4,096 bits: C0 to C4095		
DM Area (See note.)		32 Kwords: D0 to D32767		
Data Register Area		16 registers (16 bits): DR0 to DR15		
Index Register Area		6 registers (16 bits): IR0 to IR15		
Task Flag Area		32 flags (32 bits): TK0000 to TK0031		
Trace Memory		4,000 words (500 samples for the trace data maximum of 31 bits and 6 words.)		
Memory Cassette		A special Memory Cassette (CP1W-ME05M) can be mounted. Note: Can be used for program backups and auto-booting.		
Clock function		Supported. Accuracy (monthly deviation): -3.5 min to -0.5 min (ambient temperature: 55°C), -1.5 min to +1.5 min (ambient temperature: 25°C), -3 min to +1 min (ambient temperature: 0°C)		
Communications functions		One built-in peripheral port (USB1.1): For connecting Support Software only. A maximum of two Serial Communications Option Boards can be mounted.		
Memory backup		Flash memory: User programs, parameters (such as the PLC Setup), comment data, and the entire DM Area can be saved to fl ash memory as initial values. Battery backup: The Holding Area, DM Area, and counter values (fl ags, PV) are backed up by a battery.		
Battery service life		5 years at 25 °C. (Use the replacement battery within two years of manufacture.)		
Built-in input terminals		40 (24 inputs, 16 outputs)		20 (12 inputs, 8 outputs) Line-driver inputs: Two axes for phases A, B, and Z Line-driver outputs: Two axes for CW and CCW
Number of connectable Expansion (I/O) Units		CPM1A Expansion I/O Units: 7 max.; CJ-series Special I/O Units or CPU Bus Units: 2 max.		
Max. number of I/O points		320 (40 built in + 40 per Expansion (I/O) Unit x 7 Units)		300 (20 built in + 40 per Expansion (I/O) Unit x 7 Units)

Item	XA CPU Units: CP1H-XA□□□-□	X CPU Units: CP1H-X□□□-□	Y CPU Units: CP1H-Y□□□-□
Interrupt inputs	8 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)		6 inputs (Shared by the external interrupt inputs (counter mode) and the quick-response inputs.)
Interrupt inputs counter mode	8 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits		6 inputs (Response frequency: 5 kHz max. for all interrupt inputs), 16 bits
Quick-response inputs	8 points (Min. input pulse width: 50 ìs max.)		6 points (Min. input pulse width: 50 ìs max.)
Scheduled interrupts	1		
High-speed counters	4 inputs: Differential phases (4x), 50 kHz or single phase (pulse plus direction, up/down, increment), Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison		2 inputs: Differential phases (4x), 500 kHz or single phase, 1 MHz and 2 inputs: Differential phases (4x), 50 kHz or single phase (pulse plus direction, up/down, increment), 100 kHz Value range: 32 bits, Linear mode or ring mode Interrupts: Target value comparison or range comparison
Pulse outputs (models with transistor outputs only)	Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fi xed) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction) 2 outputs, 1 Hz to 30 kHz (CCW/CW or pulse plus direction) PWM outputs :(Duty ratio: 0.0% to 100.0% (Unit: 0.1%)) 2 outputs, 0.1 to 1 kHz (Accuracy: ±5% at 1 kHz)		Trapezoidal or S-curve acceleration and deceleration (Duty ratio: 50% fi xed) 2 outputs, 1 Hz to 1 MHz (CCW/CW or pulse plus direction) 2 outputs, 1 Hz to 100 kHz (CCW/CW or pulse plus direction) PWM outputs :(Duty ratio: 0.0% to 100.0% (Unit: 0.1%)) 2 outputs, 0.1 to 1 kHz (Accuracy: ±5% at 1 kHz)
Built-in analog I/O terminals	4 analogue inputs and 2 analogue outputs (Refer to separate detailed specifi cations.)	None	
Analogue control	1 (Setting range: 0 to 255)		
External analogue input	1 input (Resolution: 1/256, Input range: 0 to 10 V)		

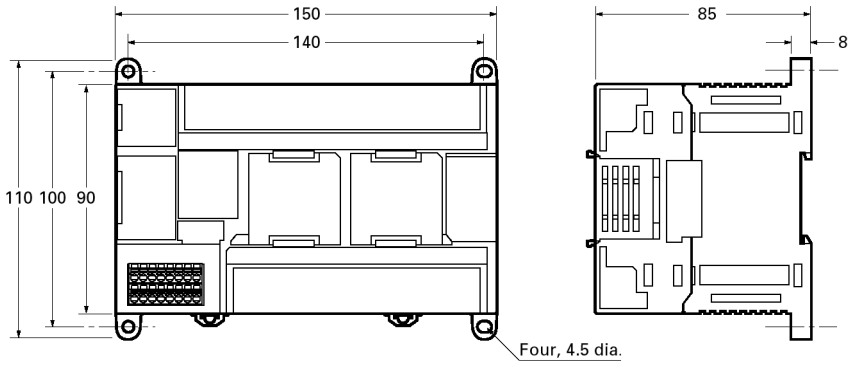
Serial Communications Specifications

Item	Function	Interface
Peripheral USB port	For connecting Peripheral Device.	Conforms to USB 1.1, B-type connector
Serial port 1	Host Link, No-protocol, NT Link (1: N), Serial PLC Link (See note.), Serial Gateway (CompoWay/F master, Modbus-RTU master), Modbus-RTU easy master function	The CP1W-CIF01 RS-232C Option Board  or the CP1W-CIF11 RS-422A/485 Option Board  can be used with either port.
Serial port 2	Host Link, No-protocol, NT Link (1: N), Serial PLC Link (See note.), Serial Gateway (CompoWay/F master, Modbus-RTU master), Modbus-RTU easy master function	

Analogue I/O Specifications (CP1H-XA CPU Units Only)

Item		Voltage I/O	Current I/O
Analogue Input Section	Number of analog inputs	4	
	Input signal range	0 to 5 V, 1 to 5 V, 0 to 10 V, or -10 to 10 V	0 to 20 mA or 4 to 20 mA
	Max. rated input	±15 V	±30 mA
	External input impedance	1 MΩ min.	Approx. 250
	Resolution	1/6,000 or 1/12,000 (full scale)	
	Overall accuracy	25 °C: ±0.3% full scale/0 to 55 °C: ±0.6% full scale	25°C: ±0.4% full scale/0 to 55°C: ±0.8% full scale
	A/D conversion data	Full scale for -10 to 10 V: F448 (E890) to 0BB8 (1770) Hex Full scale for other ranges: 0000 to 1770 (2EE0) Hex	
	Averaging	Supported (Set for individual inputs in the PLC Setup.)	
	Open-circuit detection	Supported (Value when disconnected: 8000 Hex)	
Analogue Output Section	Number of outputs	2 outputs	
	Output signal range	0 to 5 V, 1 to 5 V, 0 to 10 V, or -10 to 10 V	0 to 20 mA or 4 to 20 mA
	Allowable external output load resistance	1 kΩ min.	600 Ω max.
	External output impedance	0.5 max.	
	Resolution	1/6,000 or 1/12,000 (full scale)	
	Overall accuracy	25 °C: ±0.4% full scale/0 to 55 °C: ±0.8% full scale	
	D/A conversion data	Full scale for -10 to 10 V: F448 (E890) to 0BB8 (1770) hex Full scale for other ranges: 0000 to 1770 (2EE0) hex	
Conversion time		1 ms/point	
Isolation method		Photocoupler isolation between analogue I/O terminals and internal circuits. No isolation between analogue I/O signals.	

Dimensions CP1H CPU Units



Ordering Information

CPU Units

CPU Unit	Specifications				Model	Standards
	Power Supply	Output method	Inputs	Outputs		
CP1H-X CPU Units Memory capacity: 20 Ksteps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 kHz, 2 axes 30 kHz, 2 axes	AC	Relay	24	16	CP1H-X40DR-A	CE, N
	DC	Transistor (sinking)			CP1H-X40DT-D	CE, N
		Transistor (sourcing)			CP1H-X40DT1-D	CE, N
CP1H-XA CPU Units Memory capacity: 20 Ksteps High-speed counters: 100 kHz, 4 axes Pulse outputs: 100 Hz, 2 axes 30 kHz, 2 axes Analogue inputs: 4 Analogue outputs: 2	AC	Relay	24	16	CP1H-XA40DR-A	CE, N
	DC	Transistor (sinking)			CP1H-XA40DT-D	CE, N
		Transistor(sourcing)			CP1H-XA40DT1-D	CE, N
CP1H-Y CPU Units Memory capacity: 20 Ksteps High-speed counters:1 MHz, 2 axes 100 kHz, 2 axes Pulse outputs: 1 MHz, 2 axes 30 kHz, 2 axes	DC	Transistor (sinking)	12+line-driver input, 2 axes	8 +line-driver input, 2 axes	CP1H-Y20DT-D (To be released soon.)	-

Options (for CPU Units)

Name	Specifications	Model	Standards
RS-232C Option Board	For CPU Unit option port.	CP1W-CIF01	CE, N
RS-422A/485 Option Board	For CPU Unit option port.	CP1W-CIF11	CE, N
Memory Cassette	Can be used for backing up programs or auto-booting.	CP1W-ME05M	CE, N

Maintenance Products

Name	Specifications	Model	Standards
Battery Set	For CP1H CPU Units (Use batteries within two years of manufacture.)	CJ1W-BAT01	CE
DIN Track	Length: 0.5 m; Height: 7.3 mm	PFP-50N	
	Length: 1 m; Height: 7.3 mm	PFP-100N	
	Length: 1 m; Height: 16 mm	PFP-100N2	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN Track.	PFP-M	

I/O Connecting Cable

Name	Specifications	Model	Standards
I/O Connecting Cable	80 cm (for CPM1A Expansion Units)	CP1W-CN811	CE, N

Programming Devices

Name	Specifications		Model	Standards
CX-One FA Integrated Tool Package	CX-One is a package that integrates the Support Software for OMRON PLCs and components. CX-One runson the following OS. OS: Windows 98SE, Me, NT 4.0 (Service Pack 6a), 2000 (Service Pack 3 or higher), or XP CX-One Includes CX-Programmer Ver.6.® and CX-Simulator Ver.1.®.For details, refer to the CX-One catalog (Cat. No. R134). For CPU Unit option port. Can be used for backing up programs or auto-booting.	One license	CXONE-AL01C-E	-
		Three licenses	CXONE-AL03C-E	-
		Ten licenses	CXONE-AL10C-E	-
Computer Connecting Cable for CP1W-CIF01 RS-232C Option Board (See note.)	D-Sub 9-pin (Length: 2.0 m)	For anti-static connectors	XW2Z-200S-CV	-
	D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-CV	-
	D-Sub 9-pin (Length: 2.0 m)		XW2Z-200S-V	-
	D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-V	-
USB-Serial Conversion Cable *1	USB-RS-232C Conversion Cable (Length: 0.5 m) and PC Complies with USB Specifi cation 1.1 On personal computer side: USB (A plug connector, male) On PLC side: RS-232C (D-sub 9-pin, male) Driver: Supported by Windows 98, Me, 2000, and XP		CS1W-CIF31	-

*1 Cannot be used with a peripheral USB port. To connect to a personal computer via a peripheral USB port, use commercially-available USB cable (A to B type, male).

Technical Documentation

Name	Standards
CP1H CPU Unit Operation Manual	W450-E1
CP1H CPU Unit Programming Manual	W451-E1

Expansion Units

Name	Output method	Input	Output	Model	Standard
Expansion I/O Units	Relay	24	16	CPM1A-40EDR	CE, N
	Transistor (sinking)			CPM1A-40EDT	CE, N
	Transistor output (sourcing)			CPM1A-40EDT1	CE, N
	elay	12	8	CPM1A-20EDR1	U, C, CE
	Transistor (sinking)			CPM1A-20EDT	U, C, N, CE
	Transistor output (sourcing)			CPM1A-20EDT1	U, C, N, CE
	-	8	-	CPM1A-8ED	U, C, N, CE
	Relay	-	8	CPM1A-8ER	U, C, N, CE
	Transistor (sinking)	-	8	CPM1A-8ET	U, C, N, CE
	Transistor output (sourcing)			CPM1A-8ET1	U, C, N, CE
Analogue Input Unit	Analogue (resolution: 1/6000)	4	-	CPM1A-AD041	U, C, N, CE
Analogue Output Unit	Analogue (resolution: 1/6000)	-	4	CPM1A-DA041	UC1, CE
Analogue I/O Units	Analogue (resolution: 1/256)	2	1	CPM1A-MAD01	UC1, CE
	Analogue (resolution: 1/6000)	2	1	CPM1A-MAD11	U, C, N, CE
DeviceNet I/O Link Unit	-	32 (I/O link bits)	32 (I/O link bits)	CPM1A-DRT21	U, C, CE
CompoBus/S I/O Link Unit	-	8 (I/O link bits)	8 (I/O link bits)	CPM1A-SRT21	U, C, N, CE
PROFIBUS-DP I/O Link Unit		16 (I/O link bits)	16 (I/O link bits)	CPM1A-PRT21	CE
Temperature Sensor Units	2 thermocouple inputs			CPM1A-TS001	U, C, N, CE
	4 thermocouple inputs			CPM1A-TS002	U, C, N, CE
	2 platinum resistance thermometer inputs			CPM1A-TS101	U, C, N, CE
	4 platinum resistance thermometer inputs			CPM1A-TS102	U, C, N, CE
	2 platinum resistance thermometer inputs, 1 Analogue output (resolution: 256)			CPM1A-TS101-DA	U, C, L, CE

CJ-series Special I/O Units and CPU Bus Units

Category	Name	Specifications	Model	Standard
CP1H CPU Unit options	CJ Unit Adapter	Adapter for connecting CJ-series Special I/O Units and CPU Bus Units (includes CJ-series End Cover)	CP1W-EXT01	UC1, CE, N, L
CJ-series Special I/O Units	Analogue Input Units	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000; Conversion speed: 250 ìs/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD081-V1	
		4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/8,000; Conversion speed: 250 ìs/input max. (Can be set to 1/4,000 resolution and 1 ms/input.)	CJ1W-AD041-V1	
	Analogue Output Units	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8000, 250 ìs/output)	CJ1W-DA08V	
		8 outputs (4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max. (Can be set to 1/8,000, 250 ìs/ output)	CJ1W-DA08C	UC1, CE, N
		4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000, Conversion speed: 1 ms/point max.	CJ1W-DA041	UC1, CE, N, L
		2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4,000; Conversion speed: 1 ms/output max.	CJ1W-DA021	
	Analogue I/O Unit	4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, -10 to 10 V, 4 to 20 mA) Resolution: 1/4000; Conversion speed: 1 ms/point max. (Can be set to 1/8,000, 250 ìs/point)	CJ1W-MAD42	
	Process Input Units	4 inputs, B, J, K, L, R, S, T; Conversion speed: 250 ms/4 inputs	CJ1W-PTS51	UC1, CE
		4 inputs, Pt100 Ù (JIS, IEC), JPt100 Ù, Conversion speed: 250 ms/4 inputs	CJ1W-PTS52	
		2 inputs, B, E, J, K, L, N, R, S, T, U, W, Re5-26, PL ±100 mV, Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS15	
		2 inputs, Pt100, JPt100, Pt50, Ni508.4; Resolution: 1/64,000; Conversion speed: 10 ms/2 inputs	CJ1W-PTS16	
		2 inputs, 0 to 1.25 V, -1.25 to 1.25 V, 0 to 5 V, 1 to 5 V, -5 to 5 V, 0 to 10 V, -10 to 10V, ±10 V selectable range, 0 to 20 mA, 4 to 20 mA	CJ1W-PDC15	
	Temperature Control Units	4 loops, thermocouple input, NPN output	CJ1W-TC001	UC1, CE, N, L
		4 loops, thermocouple input, PNP output	CJ1W-TC002	
		2 loops, thermocouple input, NPN output, heater burnout detection function	CJ1W-TC003	
		2 loops, thermocouple input, PNP output, heater burnout detection function	CJ1W-TC004	
		4 loops, platinum resistance thermometer input, NPN output	CJ1W-TC101	
		4 loops, platinum resistance thermometer input, PNP output	CJ1W-TC102	
		22 loops, platinum resistance thermometer input, NPN output, heater burnout detection function	CJ1W-TC103	
		2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function	CJ1W-TC104	
	CompoBus/S Master Unit	CompoBus/S remote I/O, 256 points max.	CJ1W-SRM21	
	PROFIBUS-DP Slave Unit	Exchanges up to 180 words in any memory area with a PROFIBUS-DP Master Unit	CJ1W-PRT21	UC, CE
CJ-series CPU Bus Units	Controller Link Units	Wired (Shielded twisted-pair cable)	CJ1W-CLK21-V1	UC1, CE, N, L
	Serial Communications Units	1 RS-232C port and 1 RS-422A/485 port	CJ1W-SCU41-V1	
		2 RS-232C ports	CJ1W-SCU21-V1	
	Ethernet Unit	100Base-TX	CJ1W-ETN21	
	DeviceNet Unit	Functions as master and/or slave; allows control of 32,000 points max. per master.	CJ1W-DRM21	
	PROFIBUS-DP Master Unit	Controls up to 7000 words of remote I/O data over PROFIBUS-DP	CJ1W-PRM21	UC, CE
	CAN Unit	Can send and/or receive any CAN-Message	CJ1W-CORT21	CE

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P16E-EN-03A

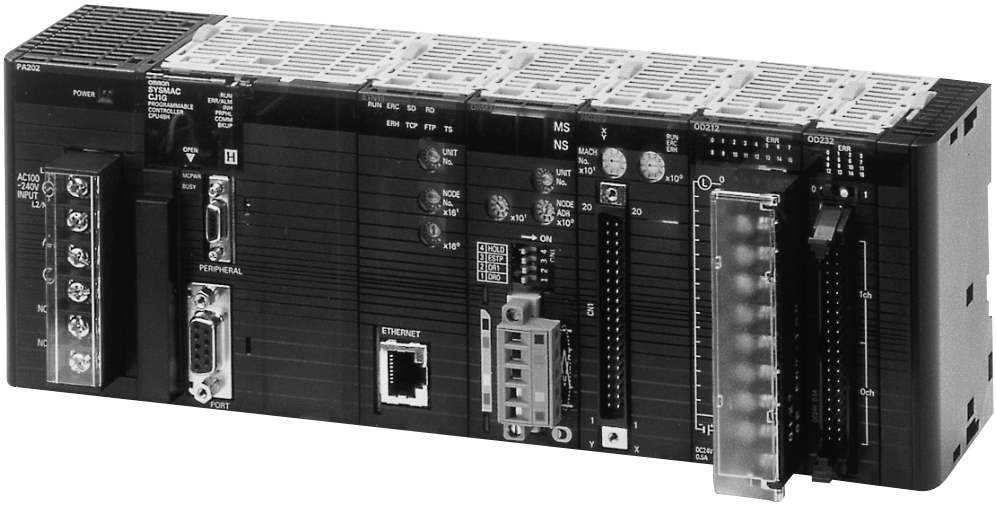
In the interest of product improvement, specifications are subject to change without notice.

Modular PLC series

CJ1 Series		
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Modular PLC series

CJ1



Sliceable Solutions

The family of CJ1 CPUs range from very small CPUs for simple sequence control to powerful and fast models that offer total machine control which can handle up to 2560 I/O points.
This enables yout to modularize or 'slice' your machine into logical sections without changing PLC series.

You don't even need to consider where to slice the machine: any I/O units can be mounted on any CPU, enabling you to distribute all the function you need to, wherever you need them. This reduces the number of different modules you have to keep in stock. And no matter how complex your machine becomes, there's always a CPU and a combination of I/Os to match your needs. It's the ultimate in machine sliceability and scalability!

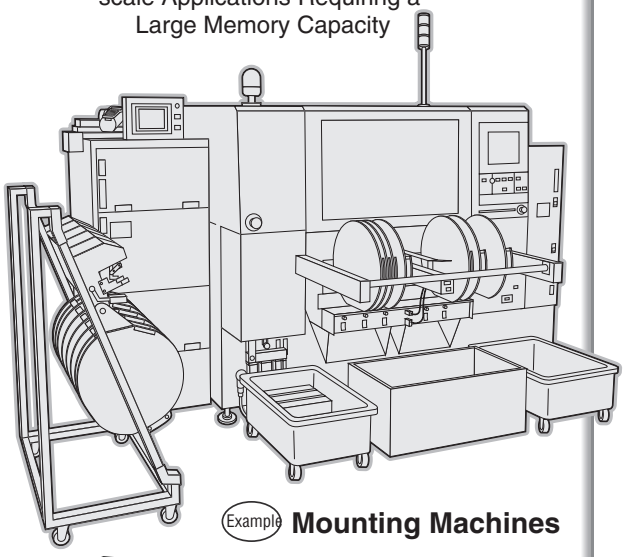
New features in this edition

- **All CPUs (Ver.3.0)** Function Block programming in IEC 61131-3 Structured Text, and pre-tested Omron Function Block Libraries to reduce machine development time.
- **CJ1H-CPU67H** The ultimate high-capacity CPU in the CJ1 range
- **CJ1M-CPU1□-ETN** CPUs with integrated Ethernet port
- **CJ1W-PD022** Low-end DC power supply unit
- **CJ1W-□□□□ (SL)** Digital and analog I/O units with screwless terminal blocks.
- **CJ1W-(P)TS** Temperature input units, from simple non-isolated to fast high-resolution models.
- **CJ1W-SCU□1-V1** Gateway function for easy linking of various communication networks.
- **CJ1W-CORT21** CAN communication unit, fully configurable to support any protocol.

Compact, fast and flexible. The CJ1-series offers the ultimate in scaleability and seamless communication. A wide variation of models to handle essentially any type of machine control. Build the perfect CJ1-series PLC for your application.

CJ1H

For Applications Requiring Speed or Large-scale Applications Requiring a Large Memory Capacity



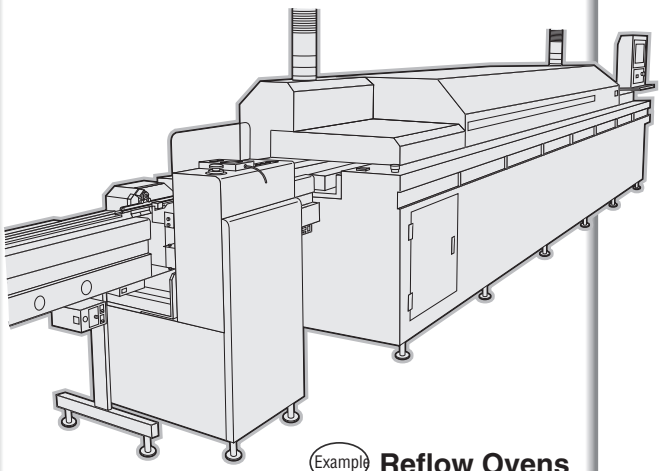
Example **Mounting Machines**



SYSMAC CJ1H-CPU□□H		
Small		YES 62 mm wide
Backplane-free structure		YES
Speed		LD instruction: 20 ns
Seamless		YES
Program capacity	NEW	250 to 60 Ksteps
Memory capacity	NEW	448 to 128 Kwords
I/O capacity		2,560 points
Memory Cards		YES Compact flash memory
Task programming		YES
Function Block	NEW	YES
Serial Gateway	NEW	YES

CJ1G

For Applications Requiring a Large Memory Capacity for Data Management



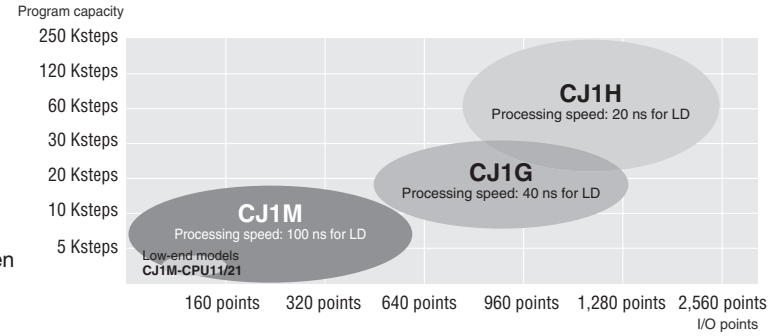
Example **Reflow Ovens**



SYSMAC CJ1G-CPU□□H		
Small		YES 62 mm wide
Backplane-free structure		YES
Speed		LD instruction: 40 ns
Seamless		YES
Program capacity		60 to 10 Ksteps
Memory capacity		128 to 64 Kwords
I/O capacity		960 to 1,280 points
Memory Cards		YES Compact flash memory
Task programming		YES
Function Block	NEW	YES
Serial Gateway	NEW	YES

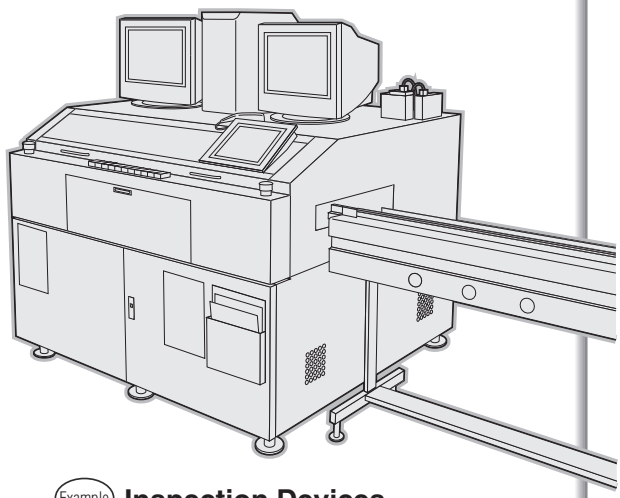
The CJ1H, CJ1G, and CJ1M are compatible for memory allocations, programming instructions, and I/O Units. Compatibility simplifies reusing designs from large-scale applications to small-scale applications.
Select from the range of CJ-series CPU Units including a lineup of low-end models with 160 I/O points and 5 Ksteps for use in even smaller machines.

NEW The CJ1H-CPU67H delivers control on an even larger scale.



CJ1M

For Small-scale Applications, such as Automatic Machines, Inspection Devices, etc.



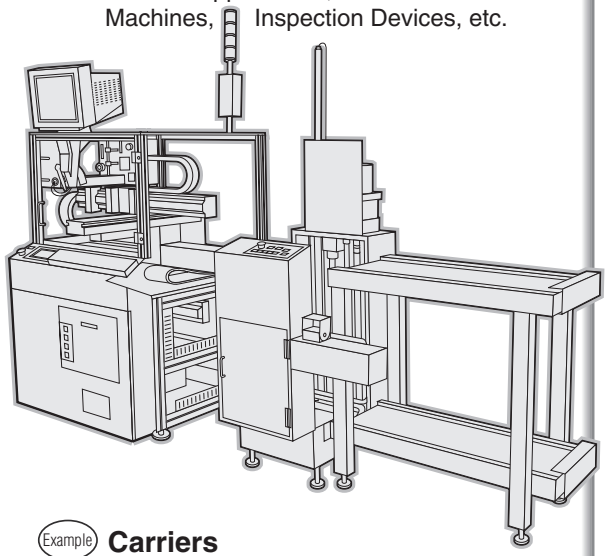
Example **Inspection Devices**



SYSMAC CJ1M-CPU11/12/13	
Small	YES 31 mm wide
Backplane-free structure	YES
Speed	LD instruction: 100 ns
Seamless	YES
Program capacity	20 to 5 Ksteps
Memory capacity	32 Kwords
I/O capacity	160 to 640 points
Memory Cards	YES Compact flash memory
Task programming	YES
Function Block *NEW*	YES
Serial Gateway *NEW*	YES
Serial PLC Link	YES

CJ1M Pulse I/O

For Small-scale Applications, such as Automatic Machines, Inspection Devices, etc.



Example **Carriers**

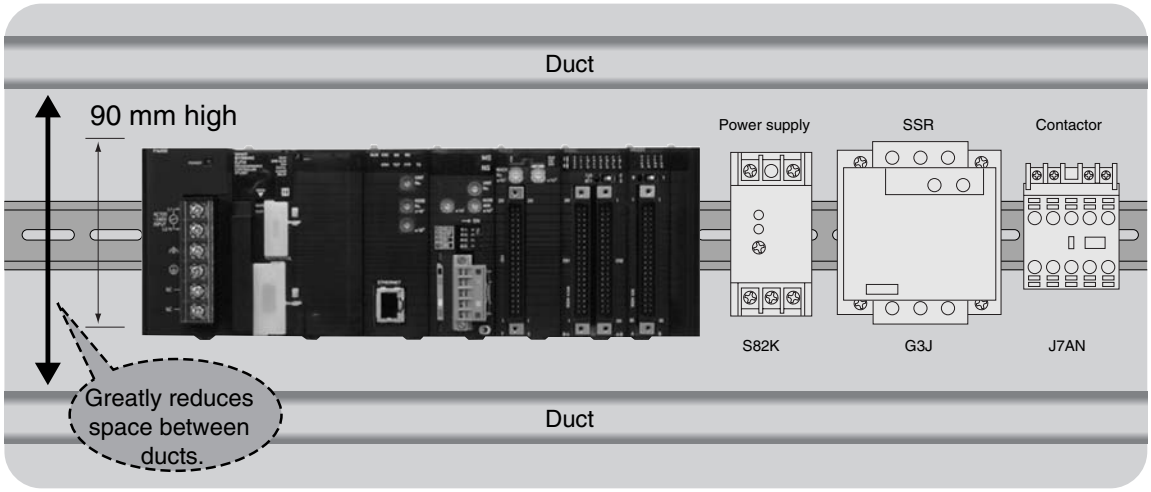


SYSMAC CJ1M-CPU21/22/23 Pulse I/O	
Small	YES 49 mm wide
Backplane-free structure	YES
Speed	LD instruction: 100 ns
Seamless	YES
Program capacity	20 to 5 Ksteps
Memory capacity	32 Kwords
I/O capacity	160 to 640 points
Memory Cards	YES Compact flash memory
Task programming	YES
Function Block *NEW*	YES
Serial Gateway *NEW*	YES
Serial PLC Link	YES
Built-in pulse I/O	YES

Downsize machines and control cabinets – fits anywhere.

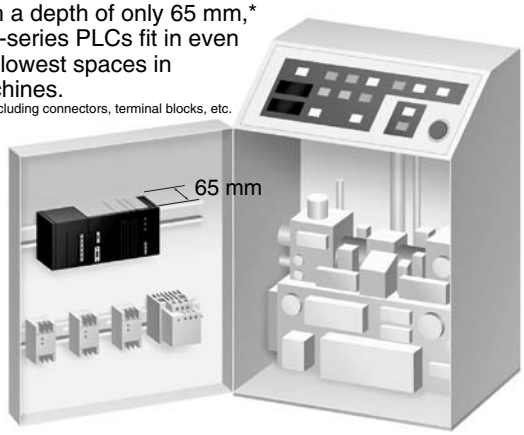
Super Compact: Only 90 mm High and 65 mm Deep, with I/O Units from 20 mm in width.

With a height of only 90 mm, CJ1-series PLCs fit between narrow ducts along with other components.

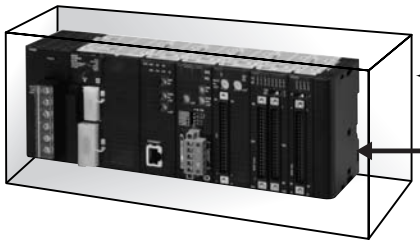


With a depth of only 65 mm,* CJ1-series PLCs fit in even shallowest spaces in machines.

*Not including connectors, terminal blocks, etc.



More power in a strongly reduced volume.



Volume compared to C200HX/HG/HE
Approx. 37%

Volume compared to CQM1H
Approx. 50%

Unit Downsizing

● CPU Units

CJ1M-CPU11/12/13

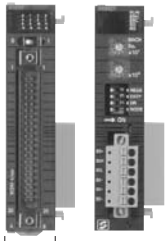


At only 31 mm wide, the CPU Units provide an RS-232C port in addition to a peripheral port. A CF memory card interface is also built in.

● I/O Units Only 20 mm Wide

32-point Unit

CompoBus/S Master Unit

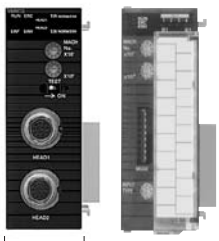


Minimum width with 20 mm space-saving I/O Units

● I/O Units Only 31 mm Wide

Double-head ID Sensor Unit

Temperature Control Unit (4 control loops)



High-density Units for greater downsizing and integrated control functions

Fast

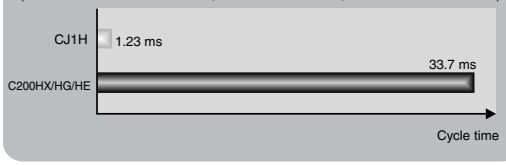
Reduce cycle Time and Increase Productivity with Higher Machine Speed.

High speed, from input through processing to output, for better application performance.

● Top-of-the-Line CJ1-series PLC: Executes 38-Kstep program in **1 ms** (with basic instructions only)
LD or OUT instruction is executed in 20 ns

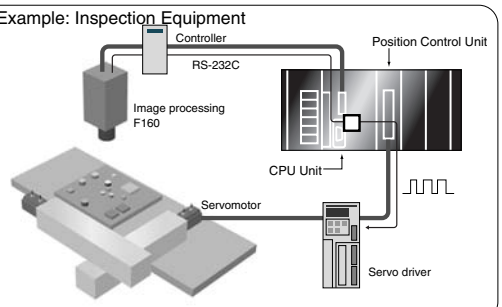
Cycle Time for 30-Kstep Program

(Conditions: Basic instructions: 50%; MOV instructions: 30%; Arithmetic instructions: 20%)

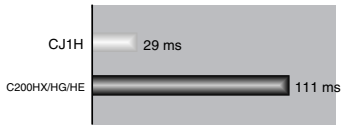


Application Examples

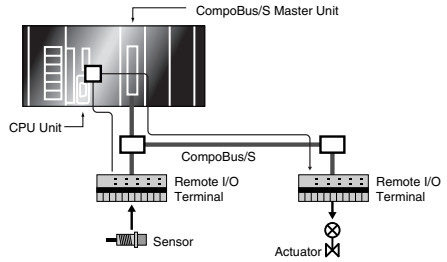
Example: Inspection Equipment



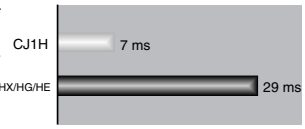
Time required to input image data, perform operations in the CPU Unit, and output pulses from the Position Control Unit (Conditions: 30-Kstep program; ratio of basic instructions to special instructions: 1:1)



Example: Assembling Equipment

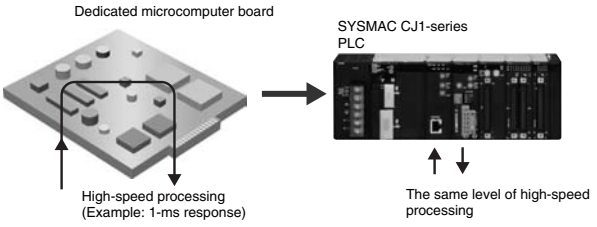


Time required to receive sensor input at the CompoBus/S Remote I/O Terminal, perform operations in the CPU Unit, and turn ON a solenoid valve via the CompoBus/S Remote I/O Terminal (Conditions: 10-Kstep program; ratio of basic instructions to special instructions: 1:1)



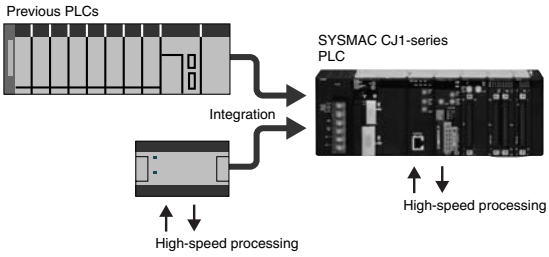
Replace High-speed Microcomputer Boards with PLCs.

Although previously microcomputer boards were used where processing speeds below 1 ms were required, the CJ1-series PLCs can now take this role, AND provide scalability, and easier debugging and maintenance.



Replace Two PLCs Used to Increase Processing Speed with One CJ1-series PLC.

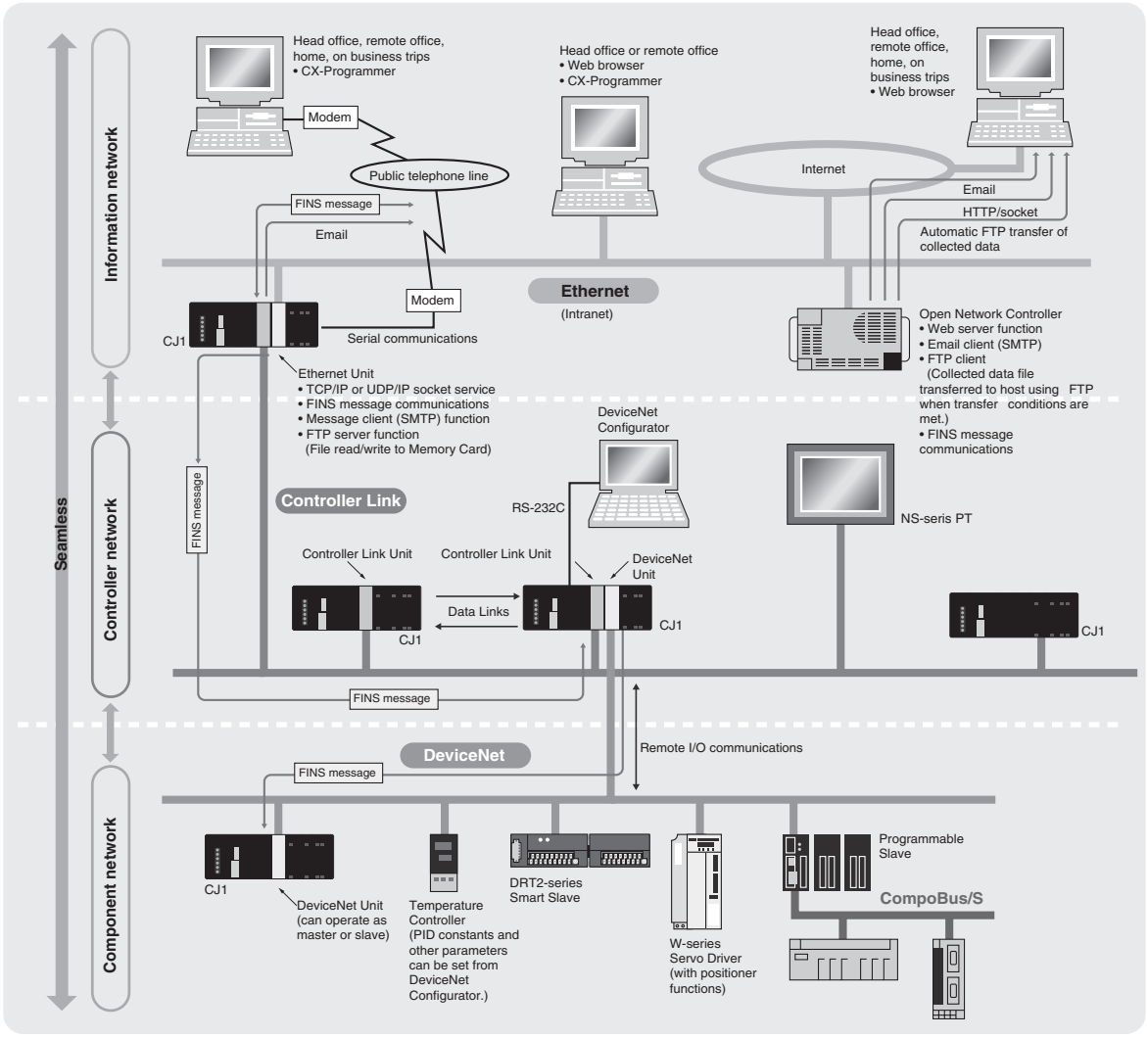
Although previously two PLCs were somtetimes used to enable reading short pulses, the CJ1-series PLCs can now take this role too.



Seamless

Seamless message communications across eight levels (See note) of component, controller, and information networks.

The CJ Series is suitable for equipment ranging from small to large scale, making it equally convenient for building systems for essentially any machine size.

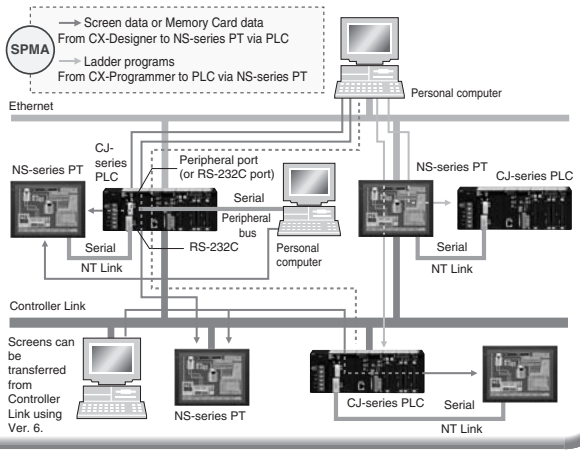


Note: Only Ethernet and Controller Link networks can be used for access across eight levels.

Use SPMA (Single Port Multi Access) to Transfer Ladder Programs, NS-series PT Screen Data, and Memory Card Data without Connecting to a Personal Computer.

Screen data can be transferred from the NS-Designer via the PLC to an NS-series PT connected to the PLC either serially or through the network. The CX-Programmer can be used to monitor ladder programs or transfer them via an NS-series PT to the PLC connected to an NS-series PT either serially or through the network.

- NS-series PT: System Ver. 3.0 or higher
- NS-Designer: Ver. 3.0 or higher
- CX-Programmer: Ver. 3.1 or higher
- PLC CJ1H/CJ1G-CPU□□H/CJ1M-CPU□□: Lot No. 030201 or later



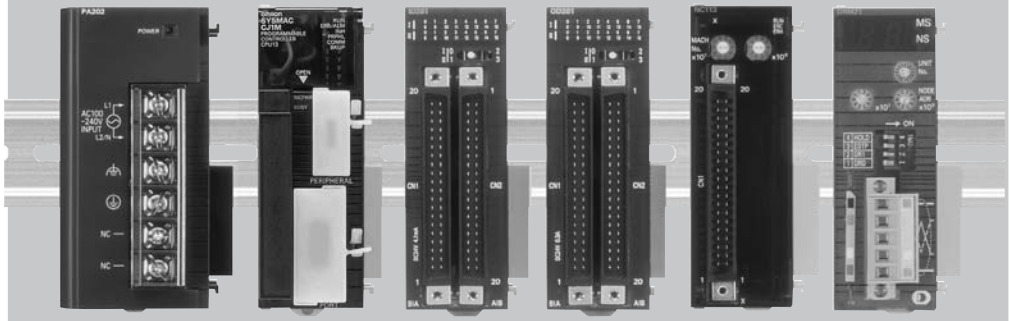
Scalable

Distribute functionality to where you need it.

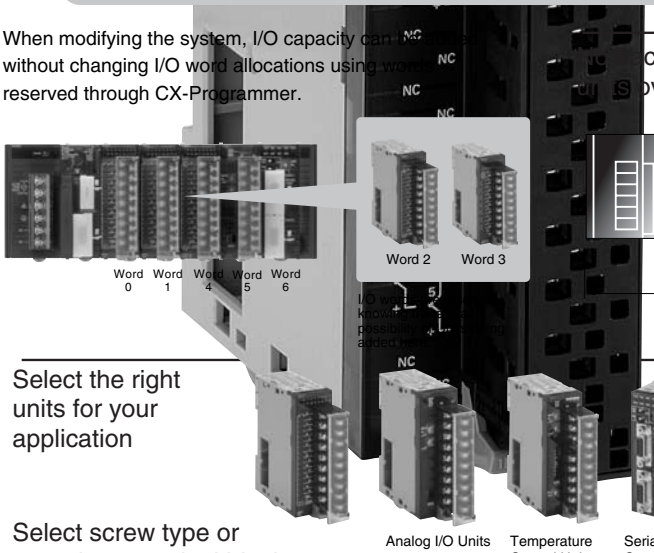
Any unit fits any CPU.

Eliminating the backplane enables more flexible combinations.
Configurable memory allocation allows for easy machine variations. Adding or removing units does not mean you need to change your PLC program.

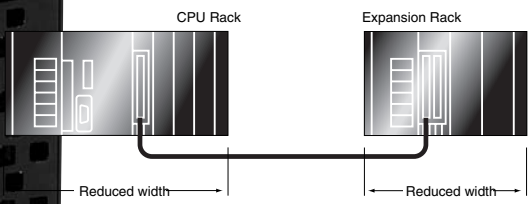
The high-density interconnecting system forms a high-speed parallel I/O bus.



When modifying the system, I/O capacity can be increased without changing I/O word allocations using words reserved through CX-Programmer.



ckplane means you can distribute the I/O over several blocks to reduce rack width.



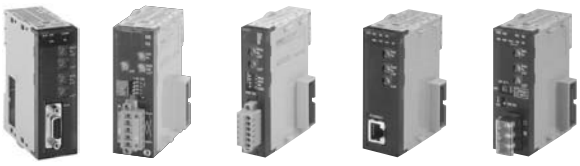
Select the right units for your application

Analog I/O Units | Temperature Control Units | Serial Communications Unit | Position Control Unit | High-speed Counter Unit

Select screw type or screwless terminal blocks



screwless terminals



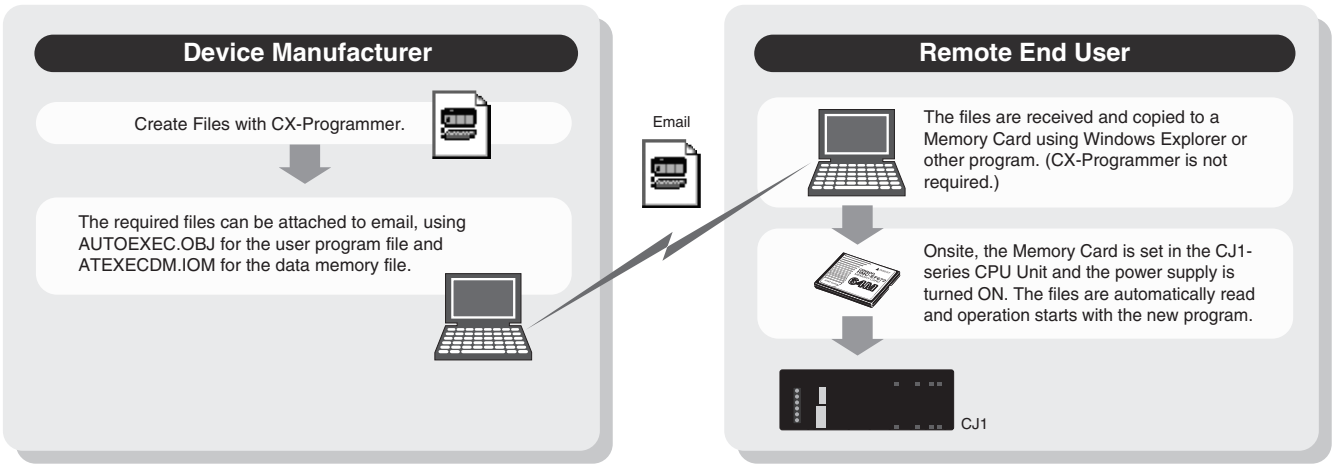
PROFIBUS-DP Unit | DeviceNet Unit | CompoBus/S Unit | Ethernet Unit | Controller Link Unit

Easier Maintenance with Memory Cards

Memory Cards

Easily change programs using Memory Cards.

Compact flash cards are used, enabling the Memory Cards to be shipped or mailed for speedy action even with offshore sites.

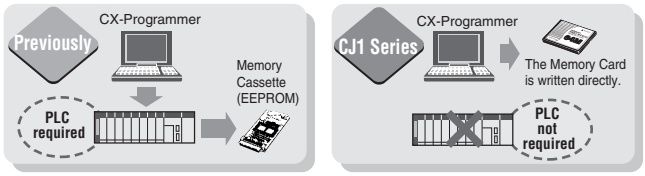


Handle as Windows Files from a Personal Computer.

User programs, parameters, I/O memory, names (including I/O comments), and rung comments can be handled as files, enabling standardization of programs and initial setting data for each system.

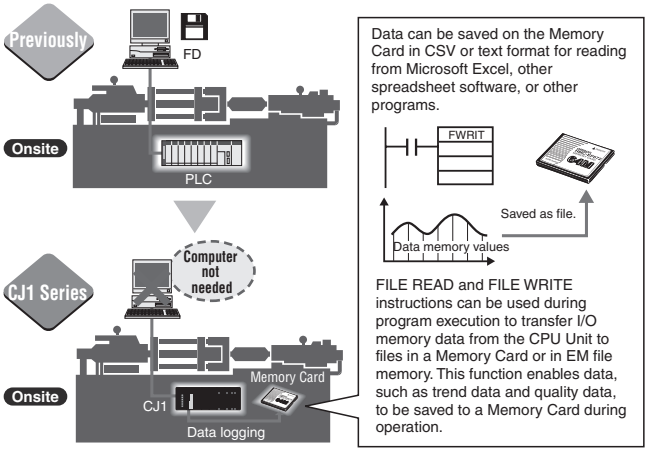
● Advantages in Using Windows Files

The Memory Card contains a compact flash card enabling programs to be written without a PLC. A PC card slot, available on many notebook computers, can be used instead of a Programming Device.



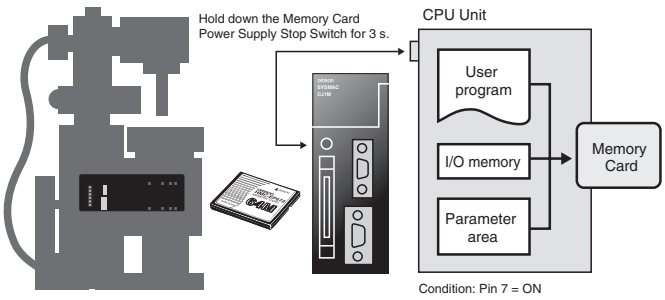
Log production conditions, inspection data, and other valuable information.

Eliminates the need for an onsite computer for a low-cost system that requires little space.



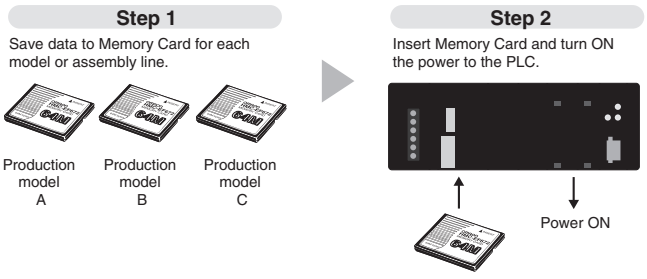
Backup is Simple.

Backup data for the entire PLC, including DeviceNet Units, Serial Communications Units, and other CPU Bus Units can be saved or read to a Memory Card. As a result, the same operation as that using ROM can be achieved using a Memory Card.



PLC Operation Can Be Switched by Changing the Memory Card.

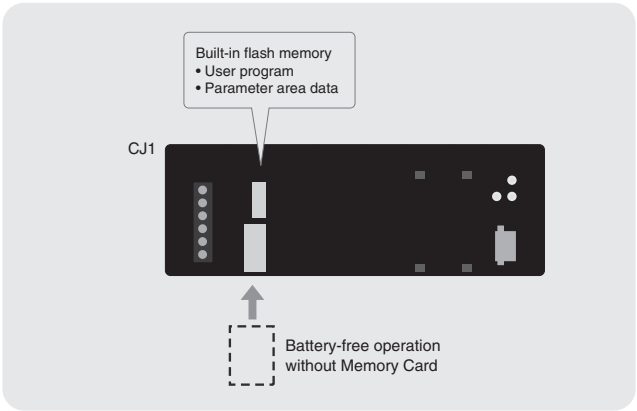
When the power is turned ON, the file in the Memory Card can be automatically transferred to the CPU Unit. As a result, the same operation as that using ROM can be achieved using a Memory Card.



Built-in Flash Memory (Standard Feature)

Battery-free Operation Using Flash Memory

When the user program or parameter area data is transferred to the CPU Unit, it is automatically backed up in flash memory in the CPU Unit. (The flash memory data is automatically restored to the working memory in the CPU Unit when the power supply is turned ON.) This enables battery-free operation without using a Memory Card.



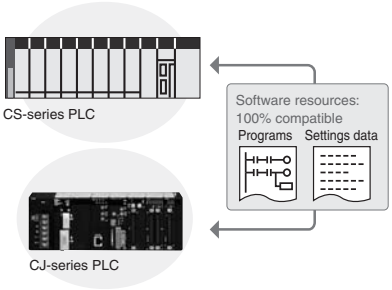
Reduce Maintenance Unit Stocks

The CJ1-series PLCs can be used for anything from small-scale to large-scale applications, helping to reduce the quantity of maintenance Units stocked for unexpected troubles or system expansion.



Software Compatibility with CS1-series PLCs

CJ-series architecture is 100% compatible with the CS-Series. User programs and other software resources can be shared to make standardizing software easier for all levels of the system.

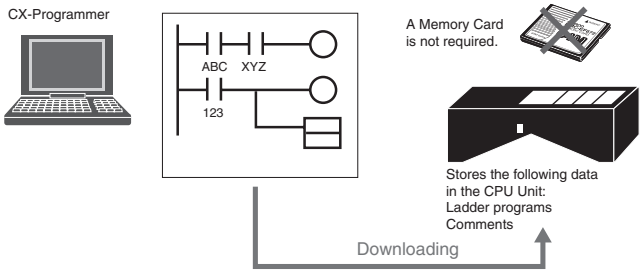


Built-in Comment Memory

NEW

(Unit version 3.0 or later and CX-Programmer Ver. 5.0 or higher are required.)

Comment memory is now provided in the CPU Unit.
This enables comments for the CJ1M and other PLCs to be stored without a Memory Card.



When downloading projects, the Memory Card, EM file memory, or comment memory (in the CPU Unit's flash memory) can be selected as the transfer destination for I/O comments, symbol names, rung comments, and other data. This enables data such as I/O comments, symbol names, and rung comments to be stored in the CPU Unit's internal comment memory when a Memory Card or EM file memory are both not available.

64 KB: Equivalent to the contents of EM bank 1

Comment memory capacity	CJ1M			CJ1G				CJ1H		
	CPU□1	CPU□2	CPU□3	CPU42H	CPU43H	CPU44H	CPU45H	CPU65H	CPU66H	CPU67H
Program indices	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	128 KB	128 KB
Comments	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	128 KB	128 KB
Symbol tables	64 KB	64 KB	64 KB	64 KB	64 KB	64 KB	128 KB	128 KB	128 KB	128 KB

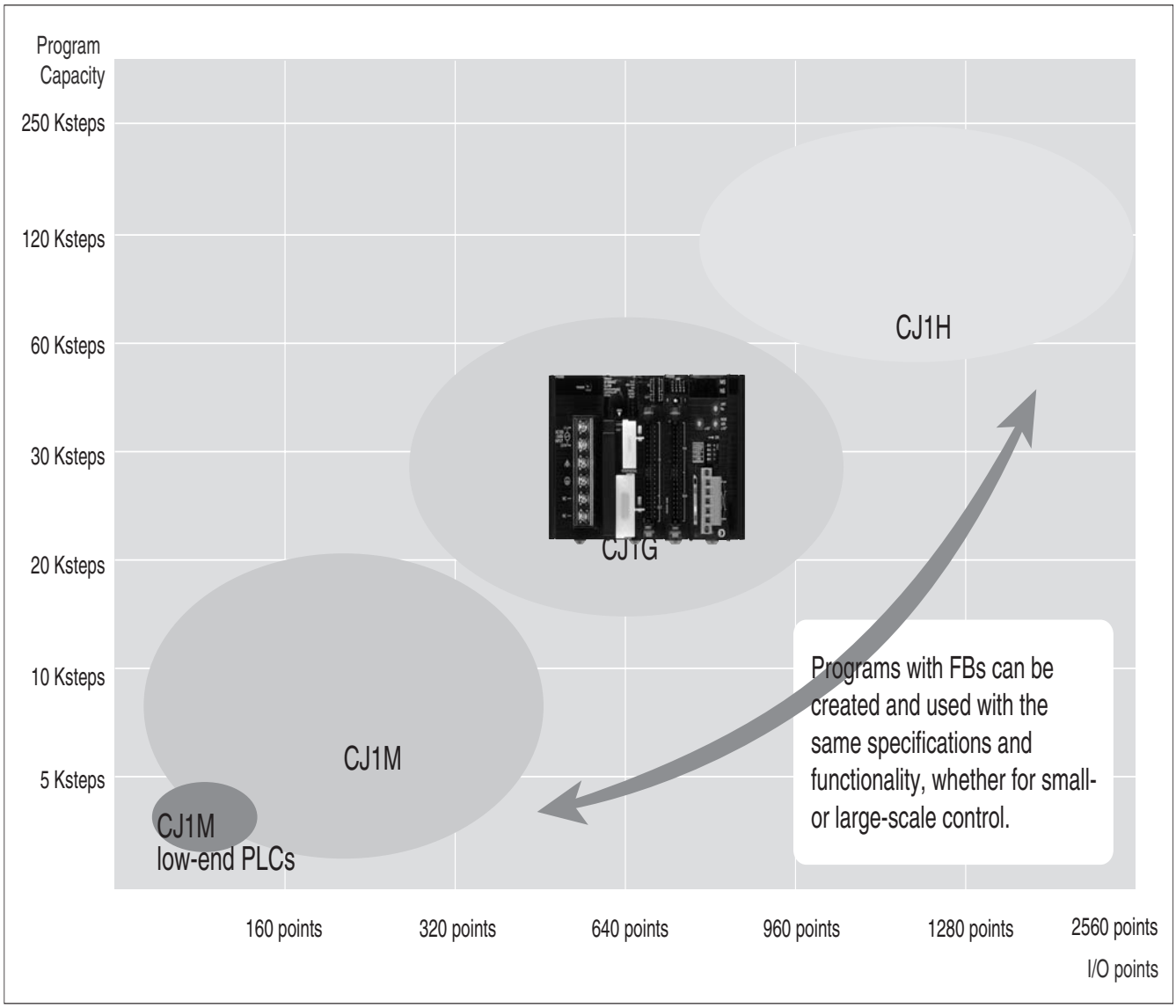
The comments can be stored in either of three locations: a) Memory Card, b) EM file memory, or c) Comment memory (added with this unit version). Select the location to store the comments in the user settings.

Greater Connectability with Component Products, with FB Compatibility (Ladder Programming/Structured Text) More Attractive to Use with Greater Development Efficiency and Maintainability

Function Block *NEW*

(Unit version 3.0 or later, and CX-Programmer Ver. 5.0 or higher are required.)

FB (Ladder Programming/Structured Text) Compatibility with all CS/CJ-series Models



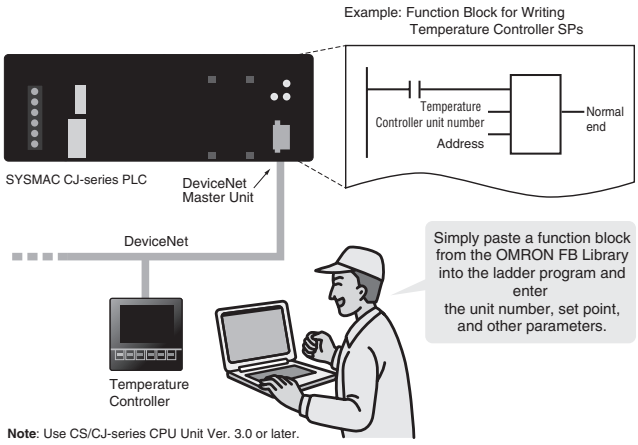
Ladder Programming Language Example

Structured Text Example

OMRON FB Library

The OMRON FB library provides function blocks for setting SPs, reading PVs, and reading/writing RUN/STOP status and other Temperature Controller parameters. The programmer simply pastes function blocks from the OMRON FB Library into the ladder program. The desired functions can be utilized simply by inputting the Temperature Controller unit number and address.

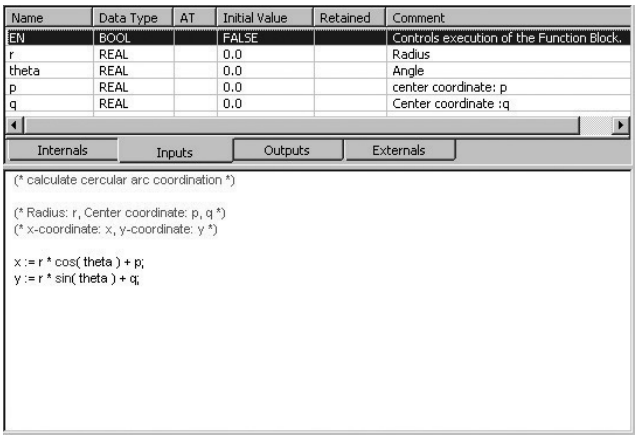
What Is the OMRON FB Library?
The OMRON FB Library is a set of functional objects for ladder programming for OMRON CS/CJ-series PLCs. By incorporating the OMRON function blocks provided by OMRON into a ladder program, the program interface for different control devices is easily completed. This reduces the number of working hours required for program development and, at the same time, improves product quality through standardization.



Note: Use CS/CJ-series CPU Unit Ver. 3.0 or later.

The Structured Text (ST) Language Enables Trigonometric Functions and Other Arithmetic Processes

In addition to ladder programming, function block logic can be written in ST, which conforms to IEC61131-3. With ST, arithmetic processing is also possible, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing difficult to achieve in ladder programs becomes easy to write.



Name	Data Type	AT	Initial Value	Retained	Comment
EN	BOOL		FALSE		Controls execution of the Function Block.
r	REAL		0.0		Radius
theta	REAL		0.0		Angle
p	REAL		0.0		center coordinate: p
q	REAL		0.0		Center coordinate :q

Internals | Inputs | Outputs | Externals

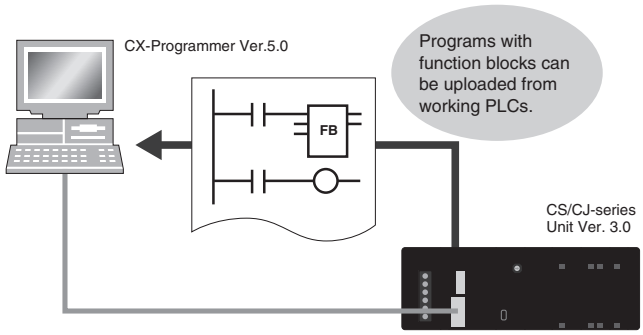
```
(* calculate cercular arc coordination *)

(* Radius: r, Center coordinate: p, q *)
(* x-coordinate: x, y-coordinate: y *)

x := r * cos( theta ) + p;
y := r * sin( theta ) + q;
```

Recovery Possible by Uploading Function Blocks from Working PLC

Programs with function blocks can be uploaded from CPU Units, just like normal programs, without the need for additional memory such as a Memory Card.



Truly Seamless Incorporation of OMRON Components and Other Devices into Networks

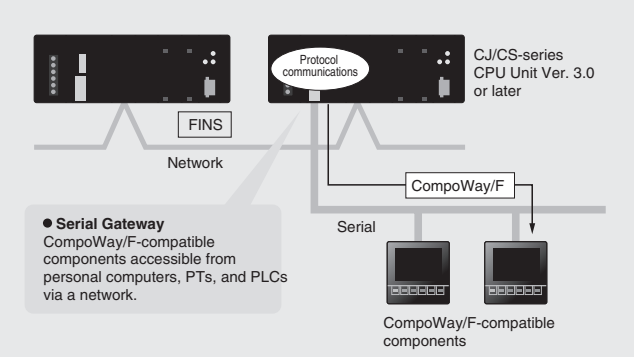
Serial Gateway

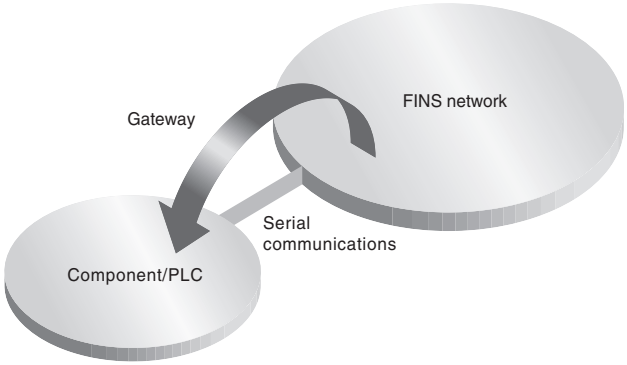
NEW CPU Units with Ver. 3.0 or later
Serial Communications Units with Ver. 1.2 or later

When the CPU Unit (Ver. 3.0 or later) or Serial Communications Board or Serial
Communications Unit (Ver. 1.2 or later) receives a FINS command containing a CompoWay/F command (See note 1.) via network or serial communications, the command is automatically converted to a protocol suitable for the message and forwarded using serial communications.

- CompoWay/F (See note 2.)
- Host Link FINS (Possible only with Serial Communications Boards or Serial Communications Units Ver. 1.2 or later)

FINS network



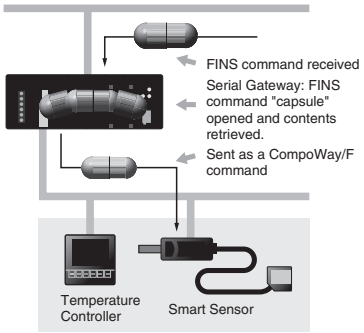


Note 1: FINS
Abbreviation for Factory Interface Network Service. A command system for message services common to OMRON networks. FINS commands can be sent across up to 8 network levels, including serial communications paths using a serial gateway. (Possible only with CS/CJ-series CPU Unit Ver. 2.0 or later.)

Note 2: CompoWay/F
CompoWay/F is an integrated communications protocol used for OMRON general-purpose serial communications. It is used by Temperature Controllers, Digital Panel Meters, Timer/Counters, Smart Sensors, Cam Positioners, Safety Controllers, etc. (as of July 2004).

● Serial Gateway System (Reference)

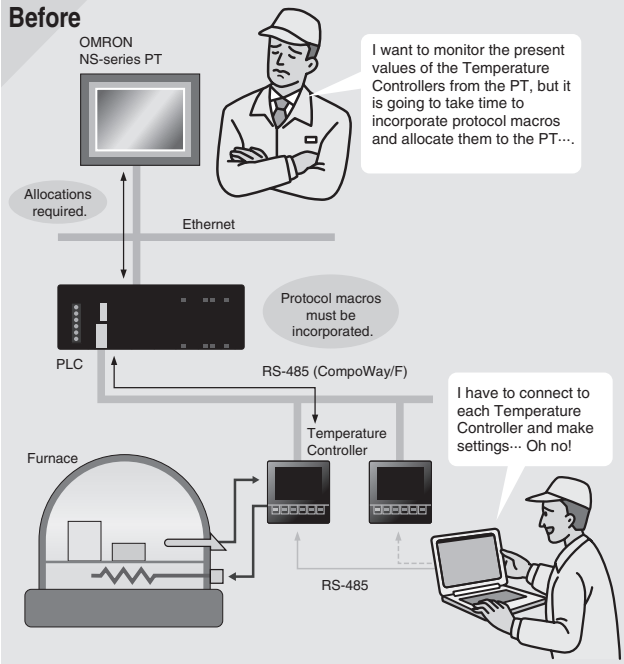
When CompoWay/F commands are enclosed in FINS commands and sent to Serial Communications Boards or Serial Communications Units (Ver. 1.2) or serial ports on CPU Unit Ver. 3.0, the enclosed CompoWay/F command is retrieved using a Serial Gateway Function and sent as a CompoWay/F command.



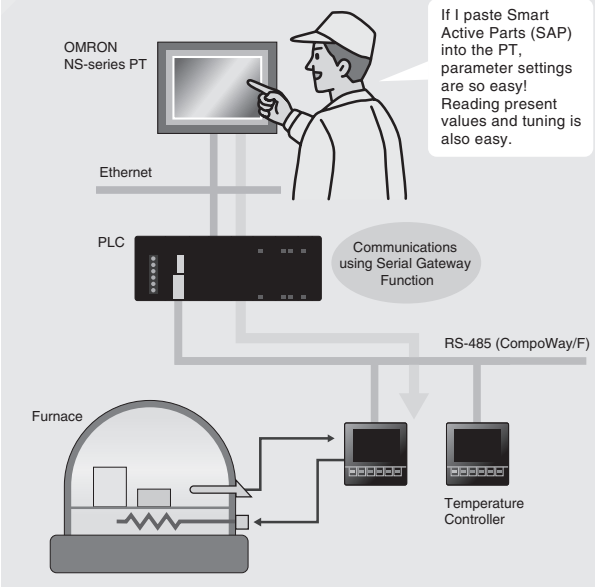
OMRON Components

Example Setting Parameters and Monitoring CompoWay/F-compatible OMRON Temperature Controllers in a Furnace System

Before



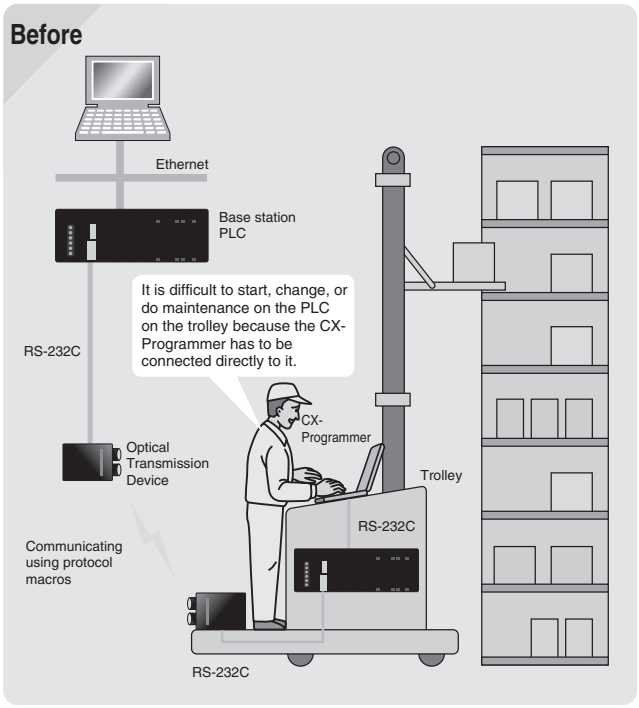
Now **Use the Serial Gateway with a Serial Communications Board or Serial Communications Unit**



Serial PLC Links

(Connecting Built-in RS-232C Ports on CJ1M CPU Units)

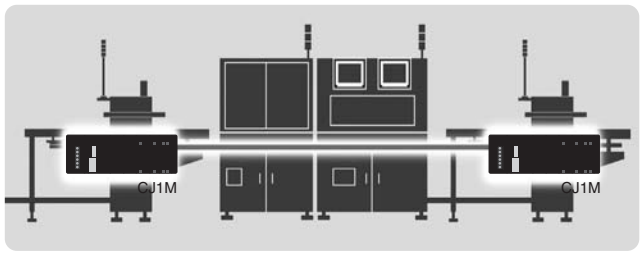
Example Remote Maintenance and Monitoring of a PLC on a Trolley in an Automated Warehouse

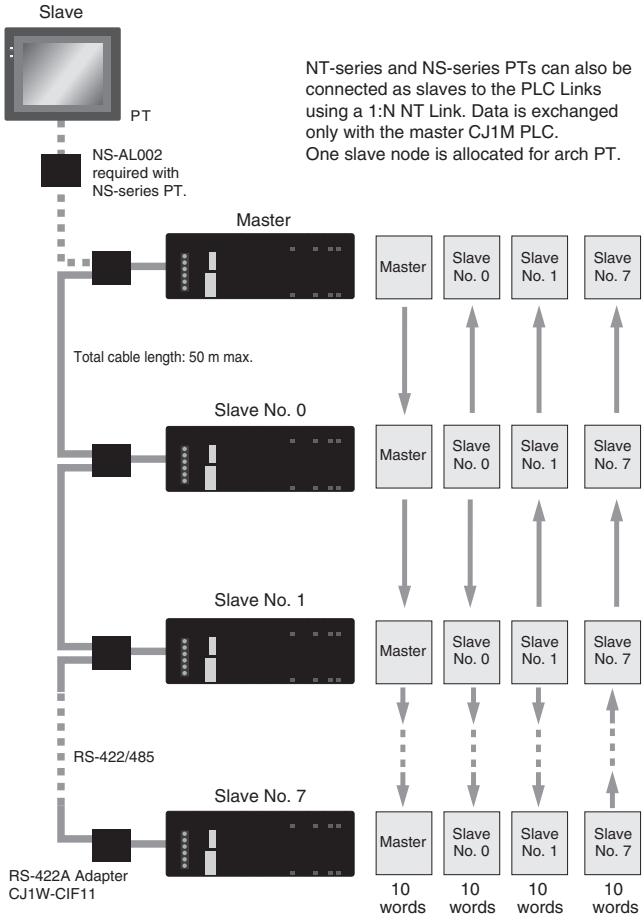


Note: Supported by Serial Communications Units only.

Use PLC Links for exclusive control on PCB carrier loaders and unloaders, or to exchange temperature and time information on conveyor ovens.

Data links can be created between up to nine CJ1M PLCs with up to 10 words each using the built-in RS-232C ports. RS-422A Adapters (CJ1W-CIF11) can be used to easily convert between RS-232C and RS-422A.





Achieve More Flexible, More Precise Machines with Pulse I/O Control

PULSE I/O Built-in Pulse I/O



SYSMAC CJ1M-CPU21/22/23

CJ1M-CPU21 (5-Kstep)
CJ1M-CPU22 (10-Kstep)
CJ1M-CPU23 (20-Kstep)



- Pulse outputs: 100 kHz, 2 axes
- Counters: Single-phase, 100 kHz, 2 counters or Differential phases, 50 kHz, 2 counters
- Interrupts: 4

The above can all be used simultaneously.

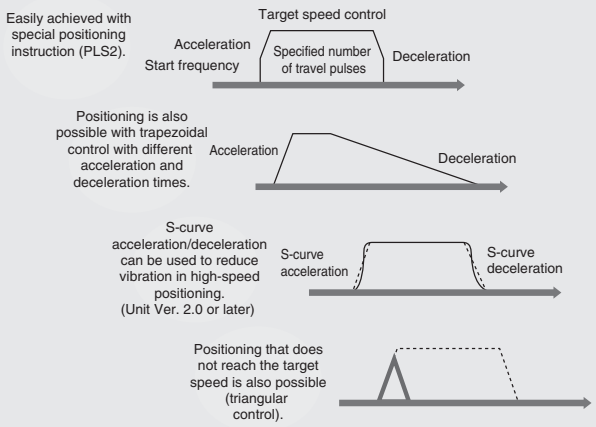
Pulse Outputs (CJ1M-CPU21/22/23)

Two Pulse Outputs at 100 kHz

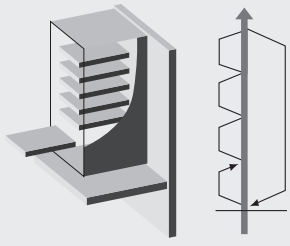
■ Origin Searches (ORG Instruction)

- Origin searches are possible with one ORG instruction.
- Even with servomotors, a differential-phase counter reset output minimizes position deviations for origin searches.

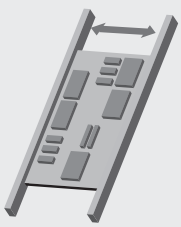
■ Positioning with Trapezoidal Acceleration/Deceleration (PLS2 Instruction)



PCB Rack Positioning

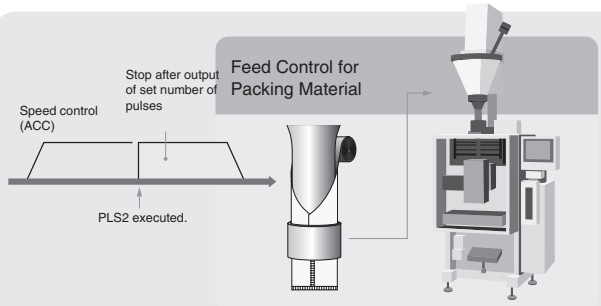


PCB Conveyor Rail Width Positioning



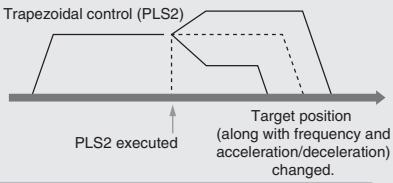
- Fast startup times (the time from instruction execution to start of pulse output): 46 μs minimum, 70 μs for trapezoidal acceleration/deceleration.

■ Interrupt Feeding (ACC and PLS2 Instructions)

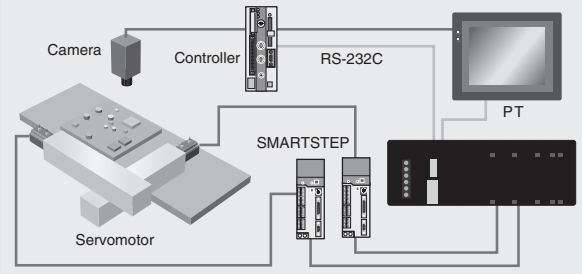


■ Changing Target Position during Positioning (PLS2 and PLS2 Instructions)

- The target position can be changed even after positioning has been started. Reversals (positioning in the opposite direction) are also possible.



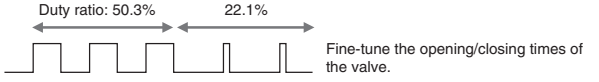
Position Control Using Length Measured at Startup



High-precision Variable Duty Ratio (PWM output)

(Unit Ver. 2.0 or later)

Specify a duty ratio in 0.1% units.

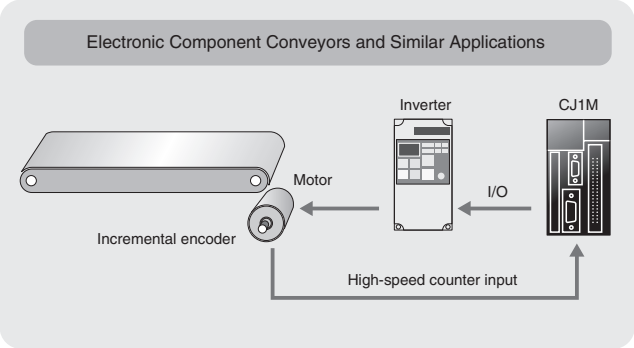


High-speed Counter Inputs (CJ1M-CPU21/22/23)

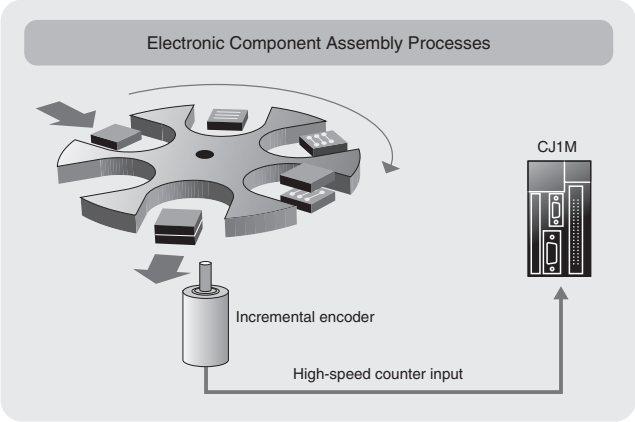
Two counter inputs, either single-phase, 100 kHz, or differential phases, 50 kHz

■ High-speed Counter in Linear Mode

High-speed line-driver inputs for either single-phase, 100 kHz, or differential phases, 50 kHz, can be input. (For 24 V DC: Single-phase, 60 kHz, or differential phases, 30 kHz)



■ High-speed Counter in Ring Mode

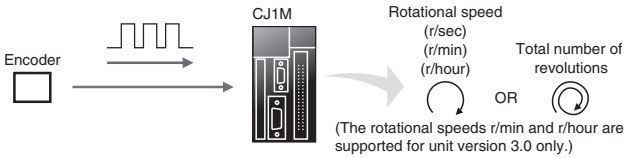


■ High-speed Counter Frequency (Speed) Measurements

For example, in rotational speed measurements in inspection applications or tact-time speed displays for conveyors, the speed can be monitored by counting pulses without using a special speed calculation device.
The present value can be monitored during high-speed counter input by using the PRV instruction.

Measure Revolution Data (Unit Ver. 2.0 or later)

High-speed counter input pulses can be converted to rotational speed (or total number of revolutions) using the new PRV2(883) instruction.

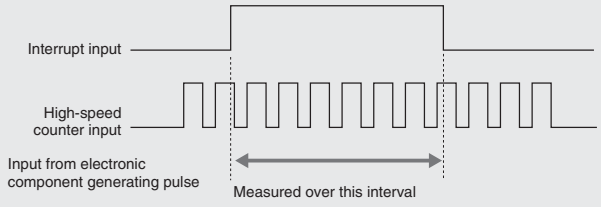


(The rotational speeds r/min and r/hour are supported for unit version 3.0 only.)

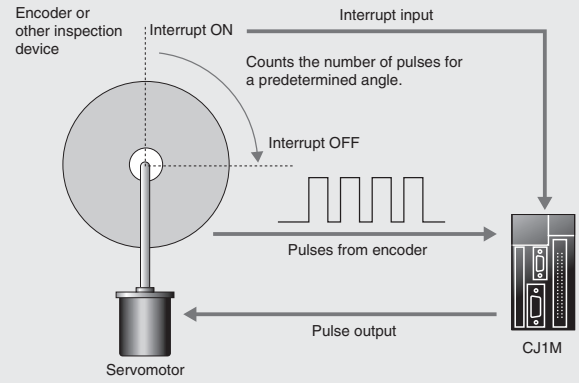
Interrupt Inputs (CJ1M-CPU21/22/23)

Use these inputs for either four interrupt inputs or four high-speed inputs (with a minimum pulse width of 30 µs).

● Interrupts can be generated either on the rising or falling edge to enable accurate recording or judgement of inspection data, such as that for electronic components.



● Application Example

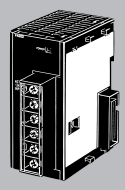


Use Five or More Interrupt Inputs, or Use High-speed Inputs for CPU Units Other Than the CJ1M-CPU21/22/23

Interrupt Input Units with 16 points and High-speed Input Units with 16 points can be used with any of the CJ1-series CPU Units to add high-speed input or interrupt input capabilities to CPU Units that do not support built-in pulse I/O. High-speed Input Units read pulse signals with a minimum pulse width of 50 µs, and Interrupt Input Units feature an interrupt response time of 370 µs.

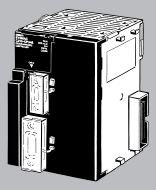
A Complete Lineup to mix-and-match for your application.

Power Supply Units



CJ1W-PA205R
CJ1W-PA202
CJ1W-PD025/PD022

CPU Units



CJ1H-CPU67/H66H/65H
CJ1G-CPU45H/44H/43H/42H

Loop Control CPU Units

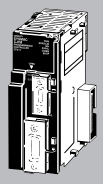


CJ1G-CPU45P/44P/43P/42P

End Cover



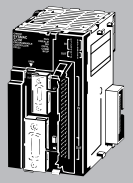
CJ1W-TER01
(included with CPU Unit)



CJ1M-CPU11/12/13

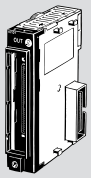


CJ1M-CPU11-ETN
CJ1M-CPU12-ETN
CJ1M-CPU13-ETN



CPU Unit with Pulse I/O
CJ1M-CPU21/22/23

I/O Control Unit



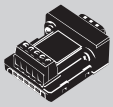
CJ1W-IC101 (required for Expansion Rack)

Memory Cards



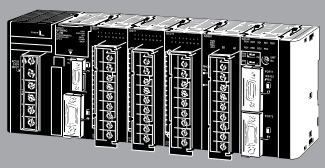
HMC-EF372/EF672

RS-422A Adapter

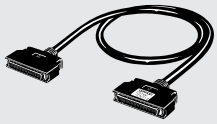


CJ1W-CIF11
(Converts RS-232C to RS-422A/485, no isolation)

CPU Rack

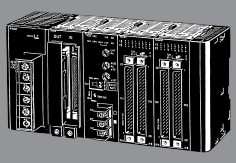


I/O Connecting Cables



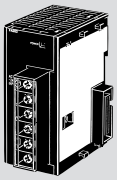
CS1W-CN□□3
(30 or 70 cm; 2, 3, 5, 10, or 12 m)

Expansion Rack



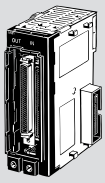
Expansion Racks are not supported by the CJ1M-CPU12/CPU22 CPU Units.

Power Supply Units



CJ1W-PA205R
CJ1W-PA202
CJ1W-PD025
CJ1W-PD022

I/O Interface Unit



CJ1W-II101

End Cover



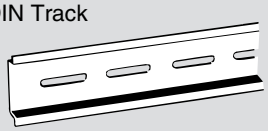
CJ1W-TER01
(included with CPU Unit and I/O Interface Unit)

End Plate



PFP-M
(included with CPU Unit and I/O Interface Unit)

DIN Track



PFP-50N/100N/100N2

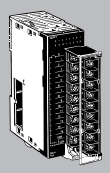
Note: HMC-172/372/672 Memory Cards cannot be used with CS1G-CPU□□H, CS1H-CPU□□H, CJ1G-CPU□□H, or CJ1H-CPU□□H CPU Units prior to Lot No. 02108 (manufactured prior to January 8, 2002, nor with NS-7-series PTs prior to Lot. No. 0852 (manufactured prior to May 8, 2002). Check lot numbers before ordering.

Basic I/O Units (See note.)

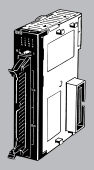
■ Input Units



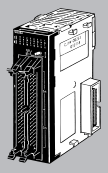
8 or 16-point
DC Input Unit
CJ1W-ID201/211



8 or 16-point
AC Input Units
CJ1W-IA111/201



32-point
DC Input Unit
CJ1W-ID231
CJ1W-ID232



64-point
DC Input Unit
CJ1W-ID261
CJ1W-ID262

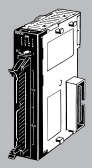
■ Output Units



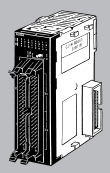
8-point
Transistor Output Units
CJ1W-OD201/202
CJ1W-OD203/204



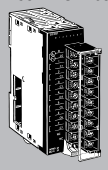
16-point
Transistor Output Units
CJ1W-OD211/212



32-point
Transistor Output Unit
CJ1W-OD231
CJ1W-OD232/233



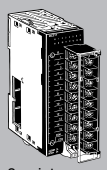
64-point
Transistor Output Unit
CJ1W-OD261
CJ1W-OD262/263



8-point (Independent)
Relay Contact
Output Unit
CJ1W-OC201



16-point
Relay Contact
Output Unit
CJ1W-OC211



8-point
Triac Output Unit
CJ1W-OA201

■ Interrupt Input Unit



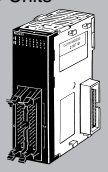
16-point
Interrupt Input Unit
CJ1W-INT01

■ High-speed Input Unit

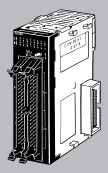


16-point
High-speed Input Unit
CJ1W-IDP01

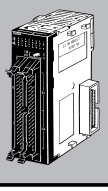
■ I/O Units



32-point
DC Input/Transistor
Output Unit
CJ1W-MD231/232/233



64-point
DC Input/Transistor
Output Unit
CJ1W-MD261
CJ1W-MD263



64-point
TTL I/O Unit
CJ1W-MD563

■ Temperature Sensor Units



6-channel Thermocouple
Input Unit
CJ1W-TS561
6-channel RTD
Input Unit
CJ1W-TS562

Special I/O Units (See note.)



Analog Input Units
CJ1W-AD081-V1
CJ1W-AD041-V1
(4 or 8 inputs)



Analog Output Units
CJ1W-DA041/021
CJ1W-DA08V/08C
(2, 4, or 8 outputs)



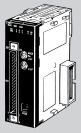
Analog I/O Unit
CJ1W-MAD42
(4 inputs and
2 outputs)



CJ1W-TC□□□
(2 or 4 temperature
control loops)



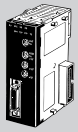
Position Control
Units
CJ1W-NC□□□
(1 to 4 axes)



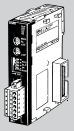
High-speed Counter
Unit
CJ1W-CT021
(2 counters)



ID Sensor Units
CJ1W-V600C1□
(For 1 or 2 Heads)



PROFIBUS-DP
slave Unit
CJ1W-PRT21



CompoBus/S
Master Unit
CJ1W-SRM21



Process Analog
Units
CJ1W-PTS□□
CJ1W-PDC11



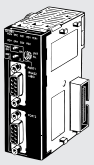
4-Channel Counter
Unit
CJ1W-CTL41-E



2-Cannel SSI Unit

CJ1W-CTS21-E

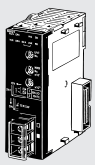
CPU Bus Units



Serial Communications Units
CJ1W-SCU41-V1
(RS-232C and RS-422/485)
CJ1W-SCU21-V1 (RS-232C x 2)



Ethernet Units
CJ1W-ETN21



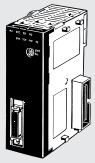
Controller Link Unit
CJ1W-CLK21-V1



CAN Unit
CJ1W-CORT21



Position Control Unit
CJ1W-NCF71



PROFIBUS-DP
master Unit
CJ1W-PRM21



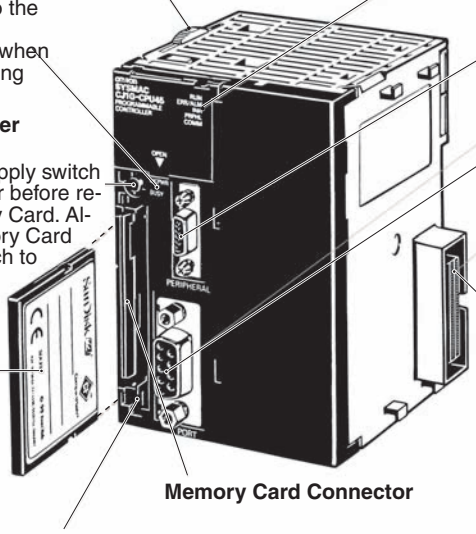
DeviceNet Units
CJ1W-DRM21

Note: Most units with 18-point front connector are available with screw terminals, or with screwless terminal block. Units with screwless terminal block have (SL) added to the model code.

CJ1H-, CJ1G-CPU□□H, CJ1M-CPU□□

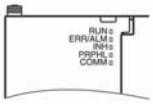
CJ1 series CPU Units

CJ1H-CPU6□H
CJ1G-CPU4□H



Slider
Secures the neighboring Unit.

Indicators



Memory Card Indicators
MCPWR (green): Lit when power is supplied to the Memory Card.
BUSY (orange): Lit when Memory Card is being accessed.

Memory Card Power Supply Switch
Press the power supply switch to disconnect power before removing the Memory Card. Also, press the Memory Card Power Supply Switch to perform an easy backup operation.

Peripheral Port
The peripheral port is connected to Programming Devices, such as Programming Consoles, or host computers.

RS-232C Port
The RS-232C port is connected to Programming Devices other than Programming Consoles, host computers, general-purpose external devices, or Programmable Terminals.

Connector
Connect to neighboring Unit by joining Connectors.

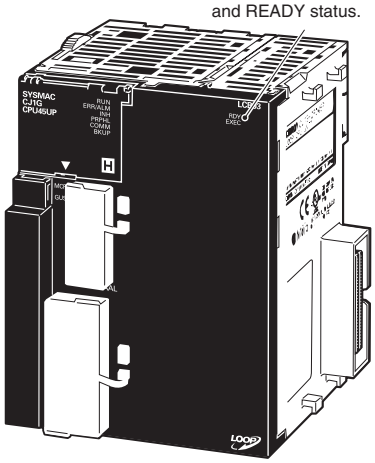
Memory Card

Memory Card Connector

Memory Card Eject Button
Press the eject button to remove the Memory Card from the CPU Unit.

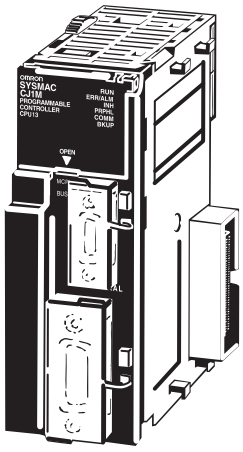
CJ1-CPU□□P

Loop Controller Element Indicators
Show the EXECUTING status and READY status.



Other components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

CJ1M-CPU1□



Components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

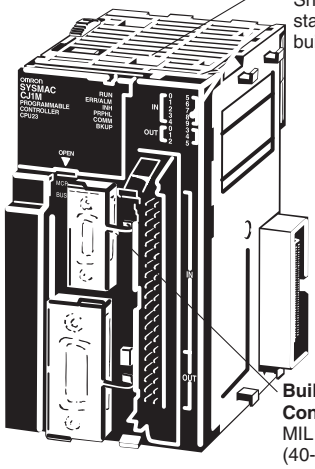
CJ1M-CPU1□-ETN



100Base-TX Ethernet Port
for data communication, programming, monitoring and FTP server functions

CJ1M-CPU2□

I/O Indicators
Show the status of the built-in I/O.



Built-in I/O Connector
MIL connector (40-pin)

Other components are the same as the CJ1H-CPU6□H and CJ1G-CPU4□H CPU Units.

CPU Units

Model	I/O bits	Program capacity	Data memory capacity (See note.)	LD instruction processing speed	Built-in ports	Options	Built-in I/O
CJ1H-CPU67H	2,560 bits (Up to 3 Expansion Racks)	250 kSteps	448 kWords (DM: 32 kWords, EM: 32 kWords x 13 banks)	0.02 µs	Peripheral port and RS-232C port. -ETN models include a 100Base-Tx Ethernet port.	Memory Cards	CPU□□P models include Process Control Engine
CJ1H-CPU66H		120 kSteps	256 kWords (DM: 32 kWords, EM: 32 kWords x 7 banks)				
CJ1H-CPU65H		60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)				
CJ1G-CPU45H CJ1G-CPU45P	1,280 bits (Up to 3 Expansion Racks)			0.04 µs			
CJ1G-CPU44H CJ1G-CPU44P		30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)				
CJ1G-CPU43H CJ1G-CPU43P	960 bits (Up to 2 Expansion Racks)	20 kSteps					
CJ1G-CPU42H CJ1G-CPU42P		10 kSteps					
CJ1M-CPU13 CJ1M-CPU13-ETN	640 bits (Only 1 Expansion Rack)	20 kSteps	32 kWords (DM: 32 kWords, EM: None)	0.10 µs			
CJ1M-CPU12 CJ1M-CPU12-ETN	320 bits (No Expansion Rack)	10 kSteps					
CJ1M-CPU11 CJ1M-CPU11-ETN	160 bits (No Expansion Rack)	5 kSteps					
CJ1M-CPU23	640 bits (Only 1 Expansion Rack)	20 kSteps					Inputs: 10 Outputs: 6
CJ1M-CPU22	320 bits (No Expansion Rack)	10 kSteps					
CJ1M-CPU21	160 bits (No Expansion Rack)	5 kSteps					

Note: The available data memory capacity is the sum of the Data Memory (DM) and the Extended Data Memory (EM).

Common Specifications

Item	Specification
Control method	Stored program
I/O control method	Cyclic scan and immediate processing are both possible.
Programming	Ladder diagram
Instruction length	1 to 7 steps per instruction
Ladder instructions	Approx. 400 (3-digit function codes)
Execution time	Basic instructions: 0.02 µs min.; Special instructions: 0.04 µs min.
Overhead time	CJ1G/H-CPU□□H: 0.3 ms CJ1G-CPU□□P: 0.3ms CJ1M-CPU□□(-ETN): 0.5 ms CJ1M-CPU□1(-ETN): 0.7 ms
Unit connection method	No backplane (Units joined together with connectors.)
Mounting method	DIN rail mounting (screw mounting not supported)
Maximum number of connectable Units	Per CPU or Expansion Rack: 10 Units max. (Basic I/O Units, Special I/O Units, or CPU Bus Units) Total per PLC: 10 Units on CPU Rack and 10 Units each on 3 Expansion Racks = 40 Units max. (See note.)
Maximum number of Expansion Racks	3 max. (A CJ-series I/O Control Unit is required on the CPU Rack and a CJ-series I/O Interface Unit is required on each Expansion Rack.) (See note.)
Number of tasks	288 (cyclic tasks: 32, interrupt tasks: 256) Interrupt tasks can be defined as cyclic tasks to create cyclic interrupt tasks. **Note: 1.** Cyclic tasks are executed each cycle and are controlled with TKON(820) and TKOF(821) instructions. **2.** The following 4 types of interrupt tasks are supported: Power OFF interrupt task: 1 max. Scheduled interrupt tasks: 2 max. I/O interrupt tasks: 32 max. External interrupt tasks: 256 max.
Interrupt types	Scheduled Interrupts:Interrupts generated at a time scheduled by CPU Unit's built-in timer (Interval: 1 to 9,999 ms or 10 to 99,990 ms; also 0.5 to 999.9 ms with CJ1M) I/O interrupt tasks:Interrupts from Interrupt Input Units or, with CJ1M, built-in I/O Power OFF Interrupts:Interrupts executed when CPU Unit's power is turned OFF External interrupt tasks:Interrupts from Special I/O Units and CPU Bus Units
Calling subroutines from multiple tasks	Supported using global subroutines.
Functions Blocks (CPU Ver. 3.0 or higher)	Languages supported for use in function block programming: Ladder program language and IEC 61131-3 Structured Text.

Note: The CJ1G-CPU43H/42H support a maximum of 2 Expansion Racks with a total maximum of 30 Units.
The CJ1M-CPU13/23 support only 1 Expansion Rack with a total maximum of 20 Units (19 Units for CJ1M-CPU13-ETN).
The CJ1M-CPU11/12/21/22 do not support Expansion Racks and support a total maximum of 10 Units (9 Units for CJ1M-CPU11/CPU12-ETN).

Item		Specification	
CIO (Core I/O) Area	I/O Area	2,560 (160 words): CIO 000000 to CIO 015915 (words CIO 0000 to CIO 0159) Setting of first rack words can be changed from default (CIO 0000) so that CIO 0000 to CIO 0999 can be used. I/O bits are allocated to Basic I/O Units.	These bits can be used as work bits when not used for the applications described on the left.
	Built-in I/O Area	10 points, Inputs: CIO 296000 to CIO 296009, Outputs: CIO 296100 to CIO 296105 Used for built-in I/O, CJ1M-CPU22/23 only	
	Link Area	3,200 (200 words): CIO 100000 to CIO 119915 (words CIO 1000 to CIO 1199) Link bits are used for data links and are allocated to Units in Controller Link Systems.	
	CPU Bus Unit Area	6,400 (400 words): CIO 150000 to CIO 189915 (words CIO 1500 to CIO 1899) CPU Bus Unit bits store the operating status of CPU Bus Units. (25 words per Unit, 16 Units max.)	
	Special I/O Unit Area	15,360 (960 words): CIO 200000 to CIO 295915 (words CIO 2000 to CIO 2959) Special I/O Unit bits are allocated to Special I/O Units. (10 words per Unit, 96 Units max.)	
	Serial PLC Link Area	90 words, CIO 3100 to CIO 3189 (bits CIO 310000 to CIO 318915) Used for data links in serial PLC links, CJ1M only	
	DeviceNet Area / PROFIBUS-DP Area **Note:** Other areas than these default areas can be allocated	9,600 (600 words): CIO 320000 to CIO 379915 (words CIO3200 to CIO 3799) DeviceNet bits are allocated to Slaves for DeviceNet Unit remote I/O communications when the master function is used with fixed allocations. Fixed allocation setting 1Outputs:CIO 3200 to CIO 3263 Inputs:CIO 3300 to CIO 3363 Fixed allocation setting 2Outputs:CIO 3400 to CIO 3463 Inputs:CIO 3500 to CIO 3563 Fixed allocation setting 3Outputs:CIO 3600 to CIO 3663 Inputs:CIO 3700 to CIO 3763 The following words are allocated to the master function even when the DeviceNet Unit is used as a slave. Fixed allocation setting 1Outputs:CIO 3370 (master to slave) Inputs:CIO 3270 (slave to master) Fixed allocation setting 2Outputs:CIO 3570 (master to slave) Inputs:CIO 3470 (slave to master) Fixed allocation setting 3Outputs:CIO 3770 (master to slave) Inputs:CIO 3670 (slave to master)	
	Internal I/O Area (work bits)	4,800 (300 words):CIO 120000 to CIO 149915 (words CIO 1200 to CIO 1499) 37,504 (2,344 words):CIO 380000 to CIO 614315 (words CIO 3800 to CIO 6143) These bits in CIO Area are used as work bits in programming to control program execution. They cannot be used for external I/O.	
Work Area		8,192 bits (512 words): W00000 to W51115 (words W000 to W511) Control programs only. (I/O from external I/O terminals is not possible.) **Note:** When using work bits in programming, use bits in Work Area first before using bits from other areas.	
Holding Area		8,192 bits (512 words): H00000 to H51115 (words H000 to H511) Holding bits are used to control execution of program, and maintain their ON/OFF status when PLC is turned OFF or operating mode is changed. In CPU Ver.3.0 and higher, Words H512 to H1535 exist, but are internally allocated as Function Block Holding Area and cannot be used.	
Auxiliary Area		Read only: 7,168 bits (448 words): A00000 to A44715 (words A000 to A447) Read/write: 8,192 bits (512 words): A44800 to A95915 (words A448 to A959) Auxiliary bits are allocated specific functions.	
Temporary Area		16 bits (TR00 to TR15) Temporary bits are used to store ON/OFF execution conditions at program branches.	
Timer Area		4,096: T0000 to T4095 (used for timers only)	
Counter Area		4,096: C0000 to C4095 (used for counters only)	
DM Area		32 kWords: D00000 to D32767 Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in DM Area maintain their status when PLC is turned OFF or operating mode is changed. Internal Special I/O Unit DM Area: D20000 to D29599 (100 words × 96 Units). Used to set parameters for Special I/O Units. CPU Bus Unit DM Area: D30000 to D31599 (100 words × 16 Units). Used to set parameters for CPU Bus Units.	
EM Area		32 kWords per bank, 7 banks max.: E0_00000 to E6_32767 max. (Not supported by CJ1M CPU Units.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in EM Area maintain their status when PLC is turned OFF or operating mode is changed. The EM Area is divided into banks, and addresses can be set by either of following methods. Changing current bank using EMBC(281) instruction and setting addresses for current bank. Setting bank numbers and addresses directly. EM data can be stored in files by specifying number of first bank. (EM file memory)	
Index Registers		IR0 to IR15. Store PLC memory addresses for indirect addressing. Index registers can be used independently in each task. One register is 32 bits (2 words). Index registers can be specified as shared or independent for each task.	
Task Flag Area		32 (TK0000 to TK0031). Task Flags are read-only flags that are ON when corresponding cyclic task is executable and OFF when corresponding task is not executable or in standby status.	
Trace Memory		4,000 words (trace data: 31 bits, 6 words)	
File Memory		Memory Cards: OMRON Memory Cards with 15-MB, 30-MB, or 64-MB capacities can be used. (MS-DOS format). EM file memory: Part of EM Area can be converted to file memory (MS-DOS format).	

Function Specifications

Item	Specification	
Constant cycle time	1 to 32,000 ms (Unit: 1 ms) **Note:** With the CJ1G/H-CPU□□H, using the Parallel Processing Mode will create a constant cycle time for program execution.	
Cycle time monitoring	Possible (Unit stops operating if cycle is too long): 1 to 40,000 ms (Unit: 10 ms) **Note:** When the Parallel Processing Mode is used for the CJ1G/H-CPU□□H, the program execution cycle is monitored. Also, a fatal error will occur in the CPU Unit if the peripheral servicing time exceeds 2 s.	
I/O refreshing	Cyclic refreshing, immediate refreshing, refreshing by IORF(097).	
Special refreshing for CPU Bus Units	Data links for Control Link Units, remote I/O communications for DeviceNet Units, and other special data for CPU Bus Units is refreshed at the following times. During I/O refresh period or when CPU BUS UNIT I/O REFRESH (DLNK) instruction is executed.	
I/O memory holding when changing operating modes	Depends on ON/OFF status of IOM Hold Bit in Auxiliary Area.	
Load OFF	All outputs on Output Units can be turned OFF when the CPU Unit is RUN, MONITOR, or PROGRAM mode.	
Input time constant setting	Time constants can be set for inputs from CJ-series Basic I/O Units. The time constant can be increased to reduce influence of noise and chattering or it can be decreased to detect shorter pulses on inputs.	
Operating mode setting at power-up	Possible (By default, the CPU Unit will start in RUN mode if a Programming Console is not connected.)	
Built-in flash memory	· Always stores (automatically backs up/restores) the user program and parameter area data (PLC Setup, etc.) · When downloading projects from the CX-Programmer Ver. 5.0 or later, symbol table files (including CX-Programmer symbol names and I/O comments), comment files (CX-Programmer rung comments and annotations), and program index files (CX-Programmer section names, section comments, and program comments) are stored in the flash memory's internal Comment Memory (See note 1).	
Memory Card functions	Automatically reading programs (autoboot) from the Memory Card when the power is turned ON.	Possible
	Program replacement during PLC operation	Possible
	Memory Card storage data	User program: Program file format PLC Setup and other parameters: Data file format I/O memory: Data file format (binary), text format, CSV format CPU Bus Unit data: Special format
	Memory Card read/write method	User program instructions, Programming Devices (including CX-Programmer and Programming Console), Host Link computers, AR Area control bits, easy backup operation
Filing	Memory Card data and EM (Extended Data Memory) Area can be handled as files.	
Debugging	Force-set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed)	
Online editing	One or more program blocks in user programs can be overwritten when CPU Unit is in PROGRAM or MONITOR mode. This function is not available for block programming areas. With the CX-Programmer, more than one program block can be edited at the same time.	
Program protection	Overwrite protection:Set using DIP switch. Copy protection: Password set using CX-Programmer.	
Error check	User-defined errors (i.e., user can define fatal errors and non-fatal errors) The FPD(269) instruction can be used to check execution time and logic of each programming block. Error status can be simulated with the FAL and FALS instructions.	
Error log	Up to 20 errors are stored in error log. Information includes error code, error details, and time error occurred. The system can be set so that user-defined FAL errors are not stored in the error log.	
Serial communications	Built-in peripheral port: Programming Device (e.g., CX-Programmer or Programming Console), Host Links, NT Links Built-in RS-232C port: Programming Device (e.g., CX-Programmer), Host Links, no-protocol communications, NT Links, Serial PLC Links (CJ1M only)	
	Serial Communications Unit (sold separately): Protocol macros, Host Links, NT Links	
Clock	Provided on all models. Accuracy: ± 1.5 min/mo. at 25°C (accuracy varies with the temperature) Note: Used to store time when power is turned ON and when errors occur.	
Power OFF detection time	10 to 25 ms (not fixed)	
Power OFF detection delay time	0 to 10 ms (user-defined, default: 0 ms)	
Memory protection	Held Areas: Holding bits, user program, Data Memory, Extended Data Memory, and status of counter Completion Flags and present values. **Note:** If IOM Hold Bit in Auxiliary Area is turned ON, and PLC Setup is set to maintain IOM Hold Bit status when power to PLC is turned ON, contents of CIO Area, Work Area, part of Auxiliary Area, timer Completion Flag and PVs, Index Registers, and Data Registers will be saved for up to 20 days.	
Sending commands to a Host Link computer	FINS commands can be sent to a computer connected via Host Link System by executing Network Communications Instructions from PLC.	
Remote programming and monitoring	Host Link communications can be used for remote programming and remote monitoring through a Controller Link System or Ethernet network.	
Eight-level communications (See note 2.)	Host Link communications can be used for remote programming and remote monitoring from devices on networks up to eight levels away (Controller Link Network, Ethernet Network, or other network). CPU Ver. 2.0 or higher. Older CPUs support up to three levels.	
Storing comments in CPU Unit	I/O comments can be stored in Memory Cards, EM file memory, or (Ver. 3.0 and higher) in the comment memory (See note 3.) integrated in the CPU.	
Program check	Program checks are performed for items such as no END instruction and instruction errors. CX-Programmer can also be used to check programs.	
Control output signals	RUN output: The internal contacts will turn ON (close) while the CPU Unit is operating (CJ1W-PA205R).	
Battery life	5 years at 25 °C (The battery life depends on the ambient operating temperature; 0.75 years min. for CJ1H/G, 1.5 years min. for CJ1M) (See note 4.)	
Self-diagnostics	CPU errors (watchdog timer), I/O bus errors, memory errors, and battery errors	
Other functions	Storage of number of times power has been interrupted. (Stored in A514.)	

Note: 1. Supported for CPU Unit Ver. 3.0 or later only.

2. Supported for CPU Unit Ver. 2.0 or later only (Three-level communications are supported for Pre-Ver. 2.0 CPU Units.)

3. Supported for CX-Programmer Ver. 5.0 and CPU Unit Ver. 3.0 or later only.

4. Use a Replacement Battery that is within two years of its date of manufacture.

Power Supply Unit Specifications

Power Supply Unit	CJ1W-PA205R	CJ1W-PA202	CJ1W-PD025	CJ1W-PD022
Supply voltage	100 to 240 V AC (wide-range), 50/60 Hz		24 V DC	24 V DC
Operating voltage and frequency ranges	85 to 264 V AC, 47 to 63 Hz		19.2 to 28.8 V DC	21.6 to 26.4 V DC
Power consumption	100 VA max.	50 VA max.	50 W max.	35 W max.
Inrush current (See note 1.)	At 100 to 120 V AC: 15 A/8 ms max. for cold start at room temperature At 200 to 240 V AC: 30 A/8 ms max. for cold start at room temperature	At 100 to 120 V AC: 20 A/8 ms max. for cold start at room temperature At 200 to 240 V AC: 40 A/8 ms max. for cold start at room temperature	At 24 V DC: 30 A/20 ms max. for cold start	At 24 V DC: 30 A/20 ms max. for cold start
Output capacity	5.0 A, 5 V DC (including supply to CPU Unit)	2.8 A, 5 V DC (including supply to CPU Unit)	5.0 A, 5 V DC (including supply to CPU Unit)	2.0 A, 5 V DC (including supply to CPU unit)
	0.8 A, 24 V DC Total: 25 W max.	0.4 A, 24 V DC Total: 14 W max.	0.8 A, 24 V DC Total: 25 W max.	0.4 A 24 V DC. Total 16.6 W max.
Power supply output terminals	None			
RUN output (See note 2.)	Contact configuration: SPST-NO Switching capacity: 250 V AC, 2 A (resistive load) 120 V AC, 0.5 A (inductive load), 24 V DC, 2 A (resistive load) 24 V DC, 2 A (inductive load)	Not provided		Not provided
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See note 3.)		20 MΩ min. (at 500 V DC) between DC external and GR terminals (See note 3.)	No Isolation

Note: 1. The values for inrush current given above for AC power supplies are for a cold start at room temperature. The values given for DC power supplies are for a cold start. The inrush control circuit in AC power supplies uses a thermistor element with a low-temperature current control characteristic. If the ambient temperature is high or the PC is hot-started, the thermistor will not be sufficiently cool, and the inrush currents given in the table may be exceeded by up to twice the given values. The inrush control circuit in DC power supplies uses a capacitor-charging delay circuit. If the PC is hot-started, the capacitor will have not discharged, and the inrush currents given in the table may be exceeded by up to twice the given values. When selecting fuses or breakers for external circuits, allow sufficient margin in shut-off performance.

2. Supported only when mounted to CPU Rack.

3. Disconnect the Power Supply Unit's LG terminal from the GR terminal when testing insulation and dielectric strength. Testing the insulation and dielectric strength with the LG terminal and the GR terminals connected will damage internal circuits in the CPU Unit.

General Specifications

Item	Specifications
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See note 1.) Leakage current: 10 mA max.
	1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See note 1.) Leakage current: 10 mA max.
Noise immunity	2 kV on power supply line (conforming to IEC61000-4-4)
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes (Time coefficient: 8 minutes x coefficient factor 10 = total time 80 min.) (according to IEC 60068-2-6/JIS C0040)
Shock resistance	147 m/s^2, 3 times each in X, Y, and Z directions (Relay Output Unit: 100 m/s^2) (according to IEC 60068-2-27/JIS C0041)
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (with no condensation)
Atmosphere	Must be free from corrosive gases.
Ambient storage temperature	–20 to 75°C (excluding battery)
Grounding	Less than 100 Ω
Enclosure	Mounted in a panel.
Safety measures	Conforms to cULus and EC Directives.

Note: 1. Disconnect the Power Supply Unit's LG terminal from the GR terminal when testing insulation and dielectric strength. Testing the insulation and dielectric strength with the LG terminal and the GR terminals connected will damage internal circuits in the CPU Unit.

Additional CJ1M-CPU21/22/23 Specifications

Data Area Allocations for Built-in I/O

I/O Code			IN0	IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	OUT1	OUT2	OUT3	OUT4	OUT5	OUT6
		Address	CIO 2960										CIO 2961					
		Bit	00	01	02	03	04	05	06	07	08	09	00	01	02	03	04	05
Inputs		General-purpose inputs	General-purpose input 0	General-purpose input 1	General-purpose input 2	General-purpose input 3	General-purpose input 4	General-purpose input 5	General-purpose input 6	General-purpose input 7	General-purpose input 8	General-purpose input 9	---	---	---	---	---	---
		Interrupt inputs	Interrupt input 0	Interrupt input 1	Interrupt input 2	Interrupt input 3	---	---	---	---	---	---	---	---	---	---	---	---
		Quick-response inputs	Quick-response input 0	Quick-response input 1	Quick-response input 2	Quick-response input 3	---	---	---	---	---	---	---	---	---	---	---	---
		High-speed counters	---	---	High-speed counter 1 (phase-Z/ reset)	High-speed counter 0 (phase-Z/ reset)	---	---	High-speed counter 1 (phase-A, increment, or count input)	High-speed counter 1 (phase-B, decrement, or direction input)	High-speed counter 0 (phase-A, increment, or count input)	High-speed counter 0 (phase-B, decrement, or direction input)	---	---	---	---	---	---
Outputs	General-purpose outputs		---	---	---	---	---	---	---	---	---	---	General-purpose output 0	General-purpose output 1	General-purpose output 2	General-purpose output 3	General-purpose output 4	General-purpose output 5
	Pulse outputs	CW/CCW outputs	---	---	---	---	---	---	---	---	---	---	Pulse output 0 (CW)	Pulse output 0 (CCW)	Pulse output 1 (CW)	Pulse output 1 (CCW)	---	---
		Pulse + direction outputs	---	---	---	---	---	---	---	---	---	---	Pulse output 0 (pulse)	Pulse output 1 (pulse)	Pulse output 0 (direction)	Pulse output 1 (direction)	---	---
		Variable duty ratio outputs	---	---	---	---	---	---	---	---	---	---	---	---	---	---	PWM(891) output 0	PWM(891) output 1 (See note.)
Origin search			Origin search 0 (Origin Input Signal)	Origin search 0 (Origin Proximity Input Signal)	Origin search 1 (Origin Input Signal)	Origin search 1 (Origin Proximity Input Signal)	Origin search 0 (Positioning Completed Signal)	Origin search 1 (Positioning Completed Signal)	---	---	---	---	---	---	---	---	Origin search 0 (Error Counter Reset Output)	Origin search 1 (Error Counter Reset Output)

Note: 1. CJ1M-CPU21 CPU Units have one PWM output only and do not have PWM output 1.

Built-in Input Specifications

Interrupt Inputs and Quick-response Inputs

Item		Specification
No. of interrupt inputs/quick-response inputs		4 total
Input interrupts	Direct (Input Interrupt) Mode	Execution of an interrupt task is started at the interrupt input's rising or falling edge. Interrupt numbers 140 to 143 are used (fixed). Response time from meeting input condition to start of interrupt task execution: 93 μs min.
	High-speed Counter Mode	Rising or falling edges of the interrupt are counted using either an incrementing or decrementing counter, and an interrupt task is started when the input count reaches the set value. Interrupt numbers 140 to 143 are used (fixed). I/O response frequency: 1 kHz
Quick-response inputs		Signals that are shorted than the cycle time (30 μs min.) can be read and treated the same as signals that are one for more than one cycle time.

High-speed Counter Inputs

Item		Specification			
Number of high-speed counters		2 (High-speed counters 0 and 1)			
Pulse input mode (Selected in PLC Setup)		Differential phase inputs (phase-A, phase-B, and phase-Z input)	Up/down inputs (up inputs, down inputs, reset inputs)	Pulse + direction inputs (pulse inputs, direction inputs, reset inputs)	Increment inputs (increment inputs, reset inputs)
Response frequency	Line-driver inputs	50 kHz	100 kHz	100 kHz	100 kHz
	24-V DC inputs	30 kHz	60 kHz	60 kHz	60 kHz
Counting mode		Linear mode or Ring mode (Select in the PLC Setup.)			
Count value		Linear mode: 80000000 to 7FFFFFFF hex Ring mode: 00000000 to Ring SV (The Ring SV is set in the PLC Setup and the setting range is 00000001 to FFFFFFFF hex.)			
High-speed counter PV storage locations		High-speed counter 0: A271 (leftmost 4 digits) and A270 (rightmost 4 digits) High-speed counter 1: A273 (leftmost 4 digits) and A272 (rightmost 4 digits) Target value comparison interrupts or range comparison interrupts can be executed based on these PVs. The PVs are refreshed in the overseeing processes at the beginning of each cycle. Use the PRV(881) instruction to read the most recent PVs.			
Control method	Target value comparison	Up to 48 target values and corresponding interrupt task numbers can be registered.			
	Range comparison	Up to 8 ranges can be registered, with an upper limit, lower limit, and interrupt task number for each.			
Counter reset method		Phase-Z + Software reset: Counter is reset when phase-Z input goes ON while Reset Bit is ON. Software reset: Counter is reset when Reset Bit goes ON. Reset Bits: High-speed Counter 0 Reset Bit is A53100, Counter 1 Reset Bit is A53101.			

Built-in Output Specifications

Position Control and Speed Control

Item	Specifications
Output frequency	1 Hz to 100 kHz (1-Hz units from 1 to 100 Hz, 10-Hz units from 100 Hz to 4 kHz, and 100-Hz units from 4 to 100 kHz)
Frequency acceleration and deceleration rates	Set in 1 Hz units for acceleration/deceleration rates from 1 Hz to 2 kHz (every 4 ms). The acceleration and deceleration rates can be set separately only with PLS2(887).
Changing SVs during instruction execution	The target frequency, acceleration/deceleration rate, and target position can be changed. Changes to the target frequency and acceleration/deceleration rate must be made at constant speed.
Pulse output method	CW/CCW inputs or Pulse + direction inputs
Number of output pulses	Relative coordinates: 00000000 to 7FFFFFFF hex (Each direction accelerating or decelerating: 2,147,483,647) Absolute coordinates: 80000000 to 7FFFFFFF hex (–2,147,483,648 to 2,147,483,647)
Instruction used for origin searches and returns	ORIGIN SEARCH (ORG(889)): Origin search and origin return operations according to set parameters
Instructions used for position and speed control	PULSE OUTPUT (PLS2(887): Trapezoidal output control with separate acceleration and deceleration rate SET PULSES (PULS(886)): Setting the number of pulses for pulse output SPEED OUTPUT ((SPED(885): Pulse output without acceleration or deceleration (Number of pulses must be set in advance with PULS(886) for position control.) ACCELERATION CONTROL (ACC(888)): Changes frequency or pulse output with acceleration and deceleration MODE CONTROL (INI(880)): Stopping pulse output
Pulse output PV's storage location	The following Auxiliary Area words contain the pulse output PVs: Pulse output 0: A277 (leftmost 4 digits) and A276 (rightmost 4 digits) Pulse output 1: A279 (leftmost 4 digits) and A278 (rightmost 4 digits) The PVs are refreshed during regular I/O refreshing. PVs can be read to user-specified words with the PRV(881) instruction.

Variable-duty Pulse Outputs (PWM)

Item	Specifications
Duty ratio	0% to 100%, set in 0.1% units (See note.)
Frequency	0.1 Hz to 999.9 Hz, Set in 0.1 Hz units.
Instruction	PULSE WITH VARIABLE DUTY RATIO (PWM(891)): Sets duty ratio and outputs pulses.

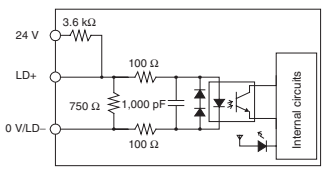
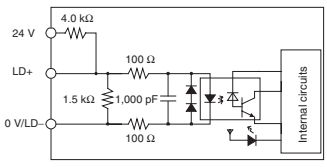
Note: CJ1M CPU Unit Ver. 2.0 or later only. (0% to 100%, set in 1% units for Pre-Ver. 2.0 CPU Units.)

Hardware Specifications

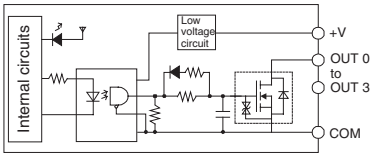
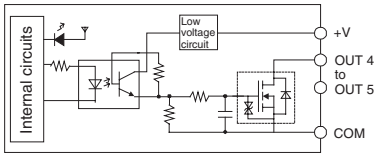
Input Specifications

Item		Specifications			
Number of inputs		10 inputs			
Input method		24-V DC inputs or line driver (wiring changed to select)			
Input voltage specifications		24 V DC		Line driver	
Terminals		IN0 to IN5	IN6 to IN9	IN0 to IN5	IN6 to IN9
Input voltage		20.4 to 26.4 V DC		RS-422A or RS-422 line driver (conforming to AM26LS31), Power supply voltage of 5 V ±5%	
Input impedance		3.6 kΩ	4.0 kΩ	---	---
Input current (typical)		6.2 mA	4.1 mA	13 mA	10 mA
Minimum ON voltage		17.4 V DC/3 mA min.		---	---
Maximum OFF voltage		5.0 V DC/1 mA max.			
Response speed (for general-purpose inputs)	ON response time	Default setting: 8 ms max. (The input time constant can be set to 0 ms, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, or 32 ms in the PLC Setup.)			
	OFF response time	Default setting: 8 ms max. (The input time constant can be set to 0 ms, 0.5 ms, 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, or 32 ms in the PLC Setup.)			

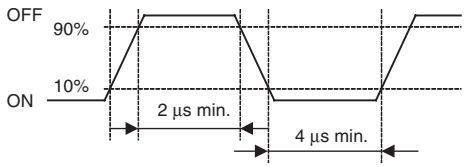
Input Circuit Configuration

Item	Specification	
Input	IN0 to IN5	IN6 to IN9
Circuit configuration		

General-purpose Output Specifications for Transistor Outputs (Sinking)

Item	Specification	
Output	OUT0 to OUT3	OUT4 to OUT5
Rated voltage	5 to 24 V DC	
Allowable voltage range	4.75 to 26.4 V DC	
Max. switching capacity	0.3 A/output; 1.8 A/Unit	
Number of circuits	6 outputs (6 outputs/common)	
Max. inrush current	3.0 A/output, 10 ms max.	
Leakage current	0.1 mA max.	
Residual voltage	0.6 V max.	
ON delay	0.1 ms max.	
OFF delay	0.1 ms max.	
Fuse	None	
External power supply	10.2 to 26.4 V DC 50 mA min.	
Circuit configuration		

Pulse Output Specifications (OUT0 to OUT3)

Item	Specifications
Max. switching capacity	30 mA, 4.75 to 26.4 V DC
Min. switching capacity	7 mA, 4.75 to 26.4 V DC
Max. output frequency	100 kHz
Output waveform	

CJ1G-CPU□□P (Loop-control CPU Units) Specifications

Providing Effective Solutions by Integrating Sequence Control and Loop Control into the Same Basic Functionality of the CJ Series

Overview

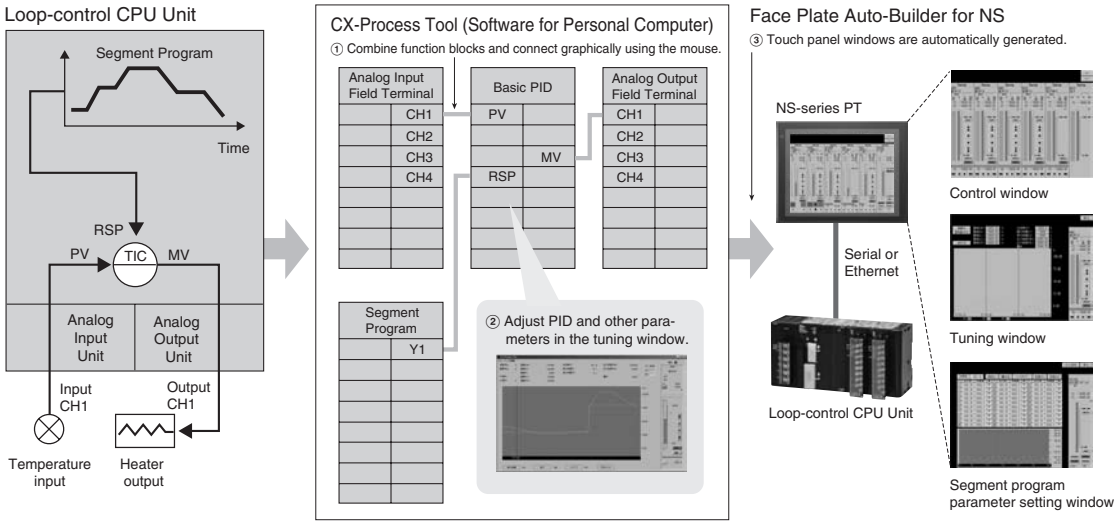
An engine for controlling analog quantities (e.g., temperature, pressure, flowrate) is built into the same CPU Unit as the engine for executing sequence control, delivering high-speed sequence control and high-speed, advanced analog quantity control in a single Unit.

Features

- Program graphically by pasting function blocks for PID control, square root calculations, or other functions in a window and then connect them with the mouse.
- More than 70 types of function blocks are provided, including Bank Selector and Split Converter (for heating and cooling control), supporting a wide array of control methods from basic PID control to cascade control and feed-forward control.
- Function blocks enable a control cycle speed of up to 10 ms. A range of control methods are supported from detailed flowrate control and pressure control to high-speed temperature control.
- The CX-Process Tool can be used to open the tuning window and change parameters while monitoring PVs, SPs, and MVs.
- The Face Plate Auto-builder for NS (order separately) can be used to automatically create touch panel adjustment windows, including control windows, tuning windows, and segment program parameter setting windows, from function block data.

Programming Example

Example: Program Control



Function Specifications

CPU Element (Sequence Control)

Name	I/O bits	Program capacity	DM words	EM words	Model
Loop-control CPU Unit	1,280 bits	60K steps	32K words	32K words × 3 banks E0_00000 to E2_32767	CJ1G-CPU45P
		30K steps		32K words × 1 bank E0_00000 to E0_32767	CJ1G-CPU44P
	960 bits	20K steps			CJ1G-CPU43P
		10K steps			CJ1G-CPU42P

Loop Controller Element (Loop Control)

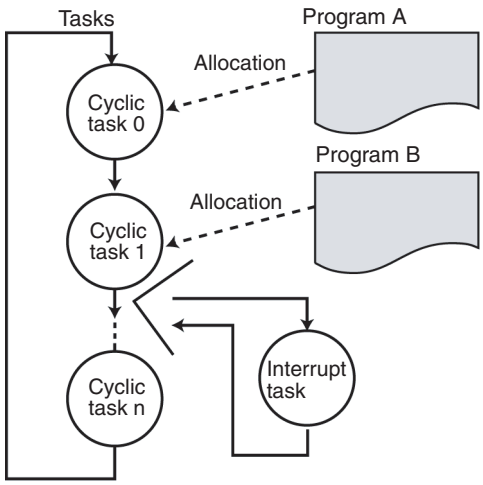
Item		Model	CJ1G-CPU42P	CJ1G-CPU43P	CJ1G-CPU44P	CJ1G-CPU45P
Operation method			Function block method			
Operation cycle			0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) Can be set for each function block.			
Number of function blocks	Analog operations	Control and operation blocks	50 blocks max.	300 blocks max.		
	Sequence control	Step ladder program blocks	20 blocks max. 2,000 commands total	200 blocks max. 4,000 commands total		
	I/O blocks	Field terminal blocks	30 blocks max.		40 blocks max.	
		User link tables	2,400 data items max.			
		Batch allocation	HMI function, allocated 1 EM Area bank			
	System Common block		Single block			
Method for creating and transferring function blocks			Created using CX-Process Tool (order separately) and transferred to Loop Controller.			

Item		Model	CJ1G-CPU42P	CJ1G-CPU43P	CJ1G-CPU44P	CJ1G-CPU45P
Control method	PID control method		PID with 2 degrees of freedom (with autotuning)			
	Control combinations		Any of the following function blocks can be combined: Basic PID control, cascade control, feed-forward control, sample PI control, Smith dead time compensation control, PID control with differential gap, override control, program control, time-proportional control, etc.			
Alarms	PID block internal alarms		4 PV alarms (upper upper-limit, upper limit, lower limit, lower lower-limit) and 1 deviation alarm per PID block.			
	Alarm blocks		High/low alarm blocks, deviation alarm blocks			

Task Programming

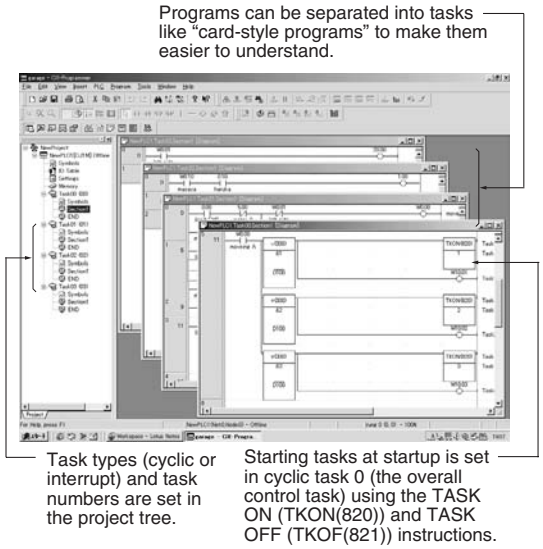
Better Design/Development Efficiency
Structured Programming and Team Program Development Using Tasks

With CJ-series PLCs, programs can be divided into programming units called tasks. There are both cyclic tasks, which are executed each cycle in a specified order, and interrupt tasks, which are executed when an interrupt occurs.



With CJ1-series PLCs, up to 288 tasks can be executed as cyclic tasks.

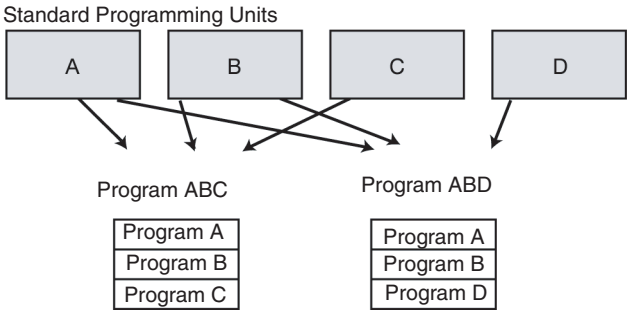
Task Programming Example with CX-Programmer



Advantages

Program Standardization

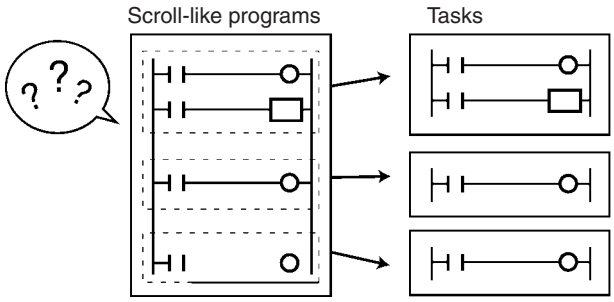
Task programs are created in units divided by functionally by purpose. These functional units can be easily reused when programming new PLCs or systems with the same functionality.



Easier-to-understand Programs

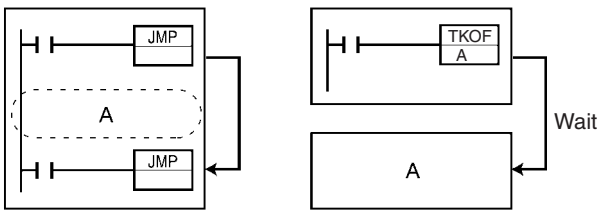
With scroll-like programs, individual functional units are extremely difficult to find just by looking at the program.

Tasks are used to separate a program functionally and make the program much easier to understand.



Shorter Cycle Times

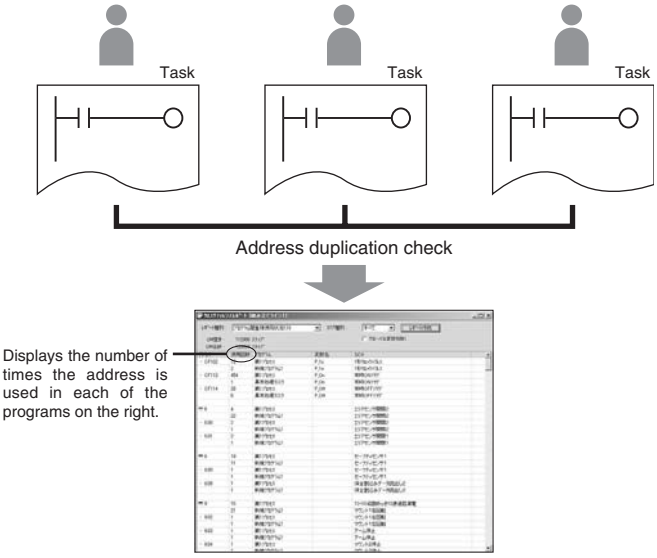
With a scroll-like program, many jump and similar instructions had to be used to avoid executing specific parts of the program. This not only slows down the programs, but makes them more difficult to understand. With task programming, special instructions enable controlling the execution of tasks so that only the require tasks are executed during any particular cycle.



Greater Efficiency in Team Program Development (Unit Ver. 2.0 or Later Only)

Checking Address Duplication between Tasks (CX-Programmer Ver. 4.0 or Higher)

The CX-Programmer automatically executes a cross-reference report that checks whether the same addresses have been used by two or more tasks (programs) created by two or more people.

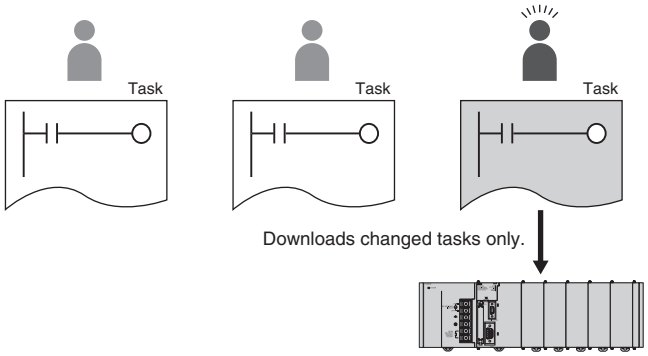


List of duplicated addresses on CX-Programmer

Downloading in Task Units

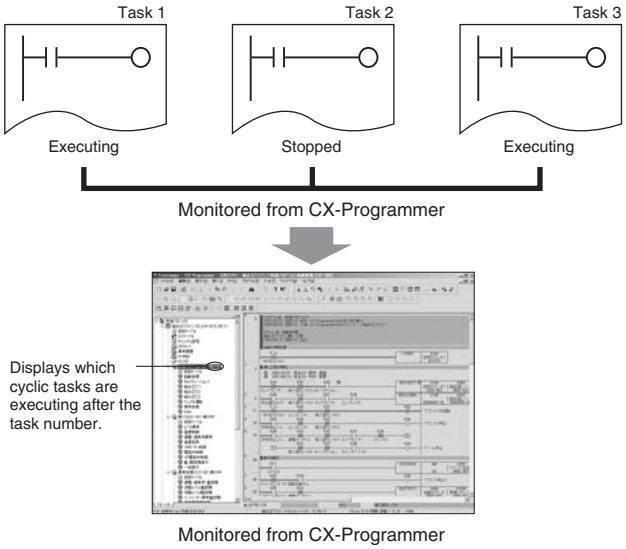
(CX-Programmer Ver. 4.0 or Higher)

When a program has been created by two or more people, each person can use the CX-Programmer to download only the task (program) they have changed.



Monitoring Operating Status for Each Task (CX-Programmer Ver. 4.0 or Higher)

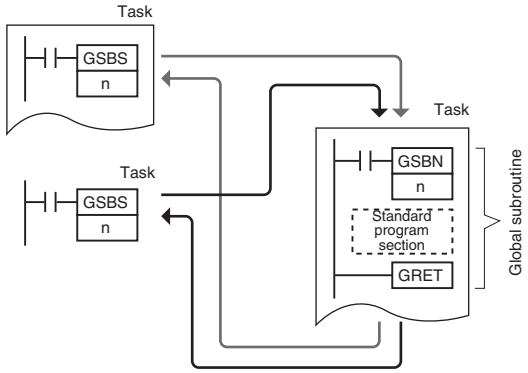
The execution status for each task can be monitored from the CX-Programmer, contributing to improved debugging efficiency.



Task Features

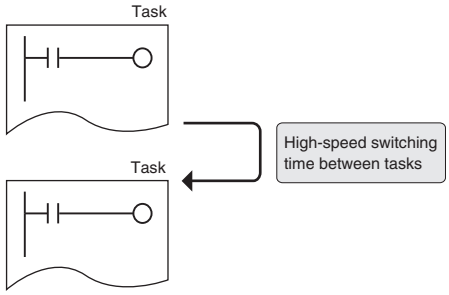
Standardization of Common Processing

Global subroutines are supported that can be called from different tasks. This enables removing standard programming sections from individual tasks for execution as global subroutines, greatly reducing the size of the overall program.



Faster Switching between Tasks

Switching between tasks is faster than ever before to ensure high-speed cycle times even with structured programming.



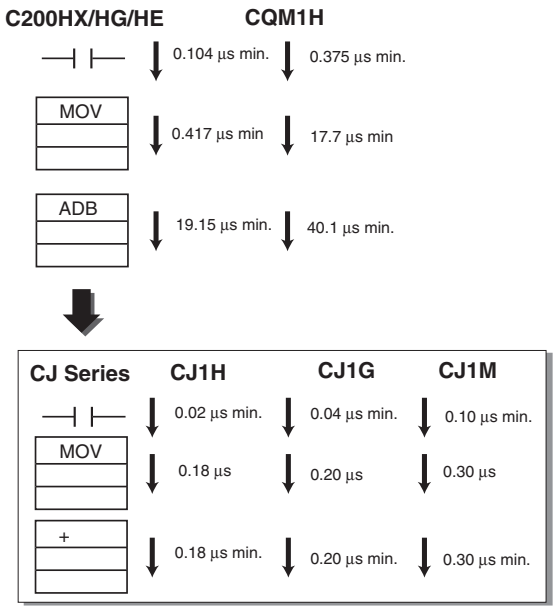
High-speed Processing

Ample Speed for Advanced Machine Interfaces, Communications, and Data Processing

High-speed Instructions and System Bus

Faster Execution Times (from 20 ns) and Faster Processing of Frequently Used Instructions

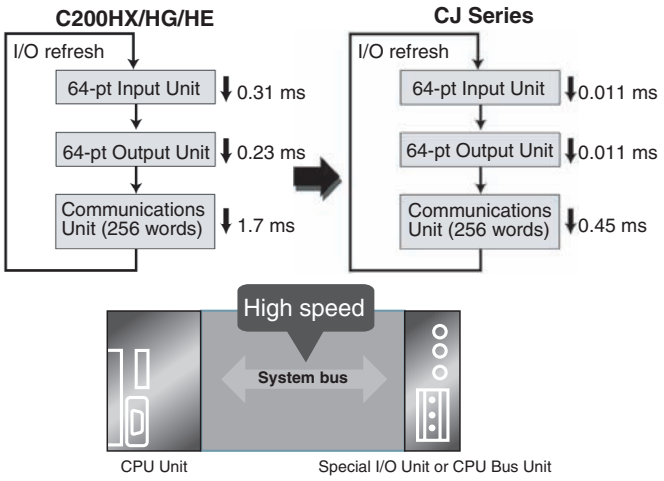
Faster instruction processing includes 0.02 µs for LD and 0.18 µs for MOV. A complete range of instructions (more than 400) is supported, more than 100 of which are frequently used special instructions that can be processed almost as fast as basic instructions, as fast as 0.18 µs for some instructions.



Four Times the Peripheral Servicing and I/O Refresh Speed

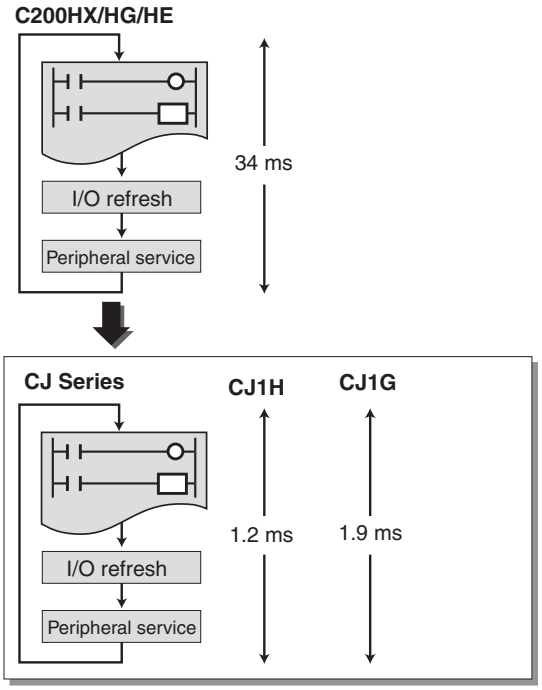
Increased efficiency in data transmission between the CPU Unit and Special I/O Units/CPU Bus Units further improves performance of the entire system.

Refresh time for CJ-series 64-point Input Units:
0.011 ms (16 times faster)
Refresh time for CJ-series 64-point Output Units:
0.011 ms (8 times faster)
Refresh time for 256 words for Communications Unit:
0.45 ms (4 times faster)

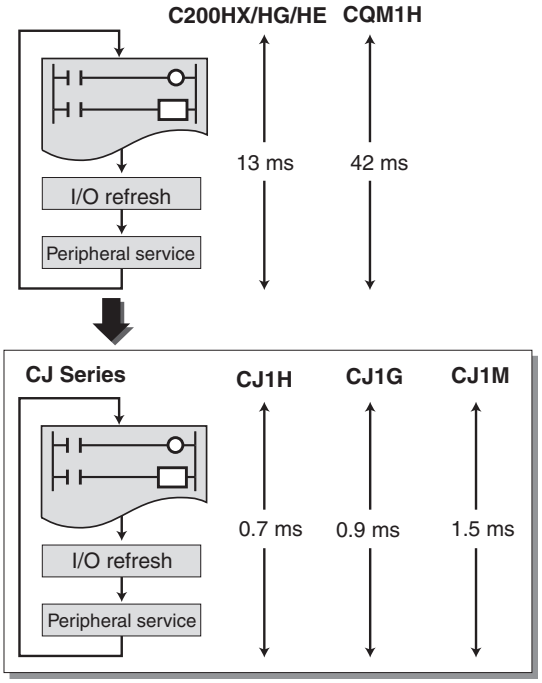


30 Times the Overall Cycle Speed

Example 1: The following example is for 30-Kstep programs (basic instructions: 50%; MOV instructions: 30%; arithmetic operation instructions: 20%).



Example 2: The following example is for 10-Kstep programs (basic instructions: 50%; MOV instructions: 30%; arithmetic operation instructions: 20%).

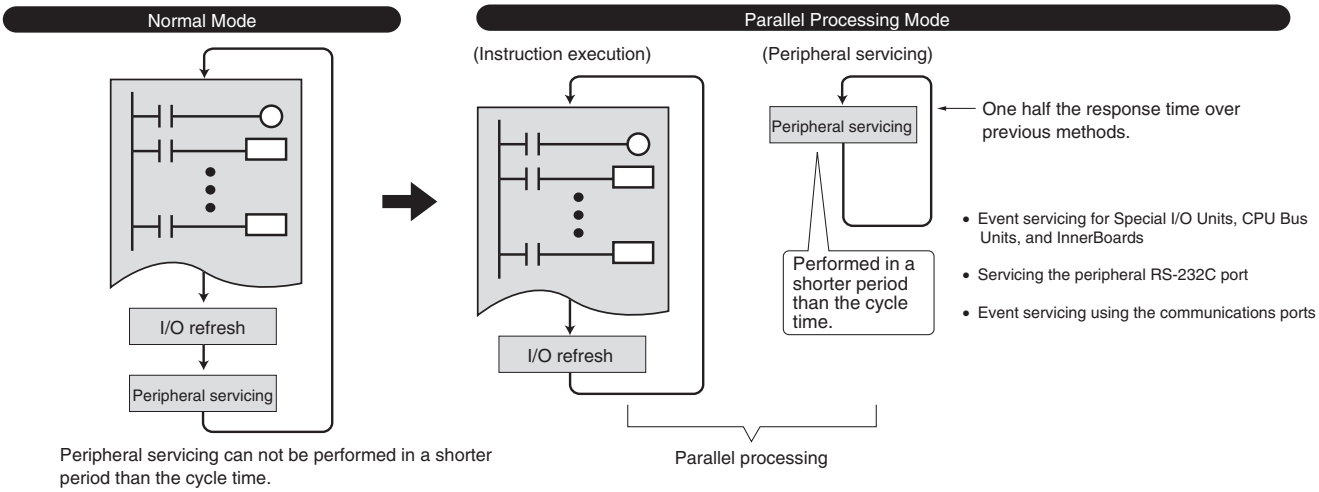


High-speed Exchange with Communications Units and High-speed Data Processing

Response Time for both Instruction Execution and Peripheral Servicing Can Be Emphasized

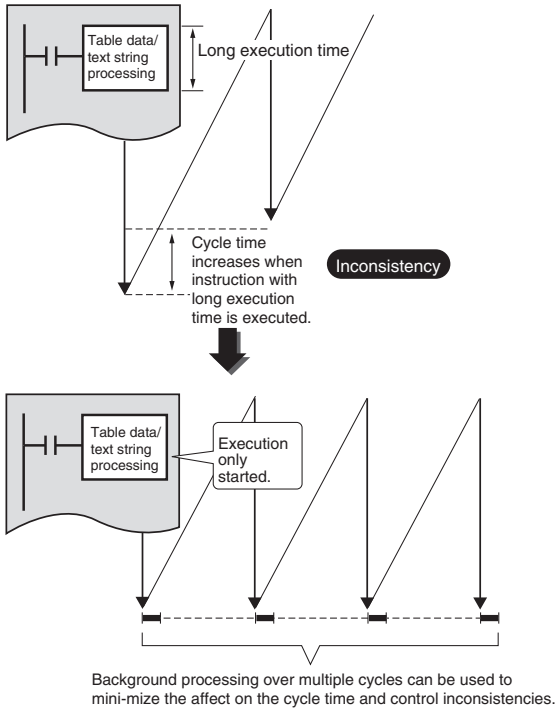
With CJ1G and CJ1H CPU Units, a Parallel Processing Mode can be used to perform program execution and peripheral servicing in parallel. Parallel processing doubles the speed of peripheral serving time over previous PLCs, enabling the following types of application.

- High-volume, high-speed data exchange is possible with a host without the speed being affected by the size of the program in the CPU Unit.
- Data can be exchanged with SCADA software with consistent timing for smooth data updates.
- The cycle time is not affected even if communications are increased or networks added in future system expansions.



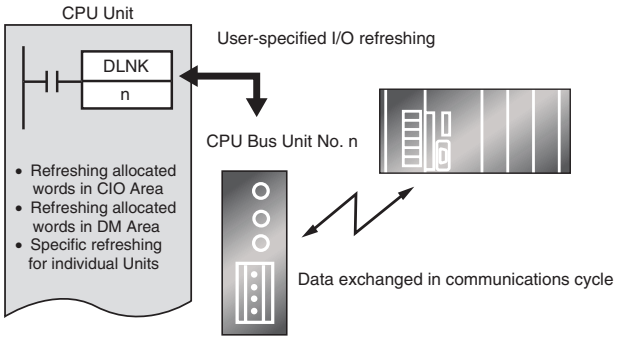
Control Inconsistencies in the Cycle Time for Data Processing

Table data, text string, or other instructions requiring long execution times can be executed over multiple cycles to minimize the affect on the cycle time and maintain more consistent I/O response characteristics.



Better Refresh Performance for Data Links, DeviceNet Remote I/O, and More

I/O refresh processing with CPU Bus Units, which was previously performed only during I/O refreshing after instruction execution, is now possible at any time using the DLNK instruction. The CPU Bus Unit's refresh response performance has been improved by enabling refresh processing specific to CPU Bus Units, such as data links and DeviceNet remote I/O communications, and refreshing of words allocated to the Units in the CIO Area and DM Area any time during instruction execution.



Unit	Refresh function
Controller Link Unit	Data links
DeviceNet Unit	Remote I/O
Serial Communications Unit	Protocol macros
Ethernet Unit	Socket servicing for specific bit manipulations

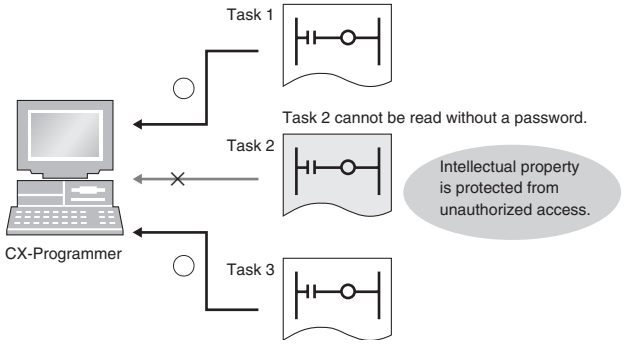
Increased Security

Various Forms of Protection Provide Better Security

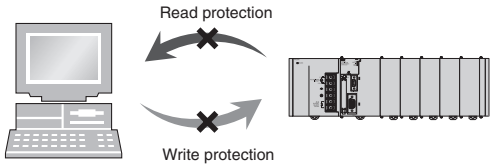
Conceal Intellectual Property Contained in Programs (Unit Ver. 2.0 or Later)

Password Read Protection for Tasks (CX-Programmer Ver. 4.0 or Higher)

Specific tasks (programs) can be set to prohibit reading unless the correct password is input.



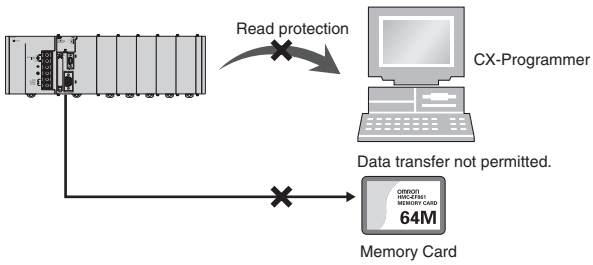
This function enables concealment of intellectual property contained in programs. The overwrite prohibit function also protects programs concealing intellectual property from being carelessly overwritten.



Prevent Leakage of Intellectual Property (Unit Ver. 2.0 or Later)

Prohibit/Allow File Memory Program File Creation (CX-Programmer Ver. 4.0 or Higher)

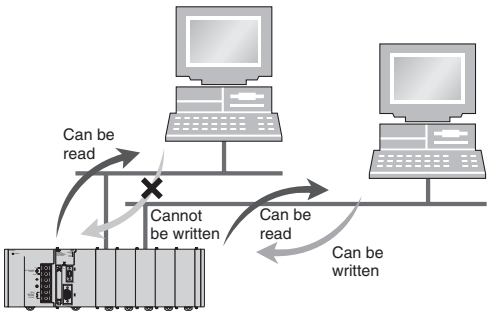
In addition to UM read protection and task read protection, user programs can also be protected from being illegally transferred to a Memory Card. This function enables complete read protection of programs in the PLC and prevents leakage of intellectual property.



Write Protection from Specific Nodes through Networks (Unit Ver. 2.0 or Later)

CPU Unit FINS Write/Protection through Networks (CX-Programmer Ver. 4.0 or Higher)

Specific nodes can be prohibited from writing to other nodes on the network. Data transmissions through the network are monitored, preventing data being carelessly written to the PLC, and preventing problems in the system.



Instruction Features

High-volume Data Processing with One Instruction

The basic data format for specifying instruction operands has been changed from BCD to binary, enabling specification of more data for each instruction.

Example: BLOCK TRANSFER Instruction

Address type	C200HX/HG/HE PLCs	CJ-series PLCs
Direct	0 to 6,655 words	0 to 65,535 words
Indirect for DM Area	DM 0000 to DM 9999	D00000 to D32767

Binary Specifications for Timer/Counter Instructions

Either BCD or binary can be used to specify the set values for timer and counter instructions. Using a binary specification enables specifying longer periods of time and higher count values.

Examples: TIM instruction (BCD): 0 to 999.9 s
TIMX instruction (binary) 0 to 6,553.5 s
CNT instruction (BCD): 0 to 9,999 counts
CNTX instruction (binary): 0 to 65,535 counts

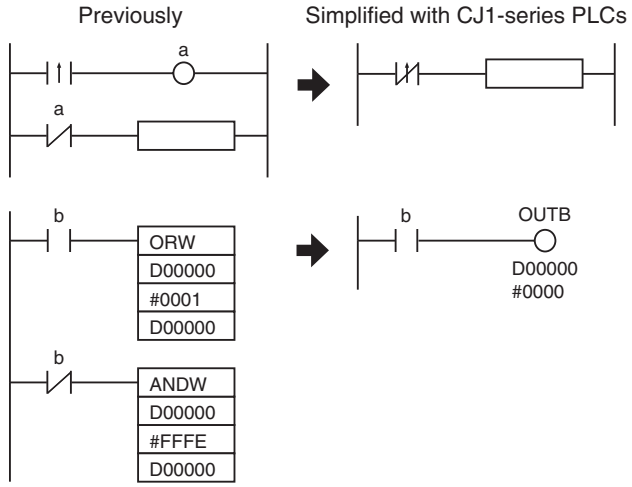
Applicable Instructions:

Binary Timer/Counter Instructions:

BINARY TIMER: TIMX(550)
BINARY COUNTER: CNTX(546)
BINARY HIGH-SPEED TIMER: TIMHX(551)
BINARY ONE-MS TIMER: TMHHX(552)
BINARY ACCUMULATIVE TIMER: TTIMX(555)
BINARY LONG TIMER: TIMLX(553)
BINARY MULTI-OUTPUT TIMER: MTIMX(554)
BINARY REVERSIBLE COUNTER: CNTRX(548)
BINARY RESET TIMER/COUNTER: CNRX(547)

Simplifier Ladder Programming

Programs using many basic instructions can be simplified greatly by using differentiated versions of the LD NOT, AND NOT, and OR NOT instructions, as well as bit access instructions for the DM and EM Areas.

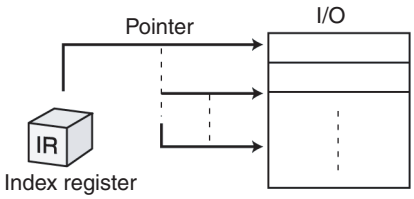


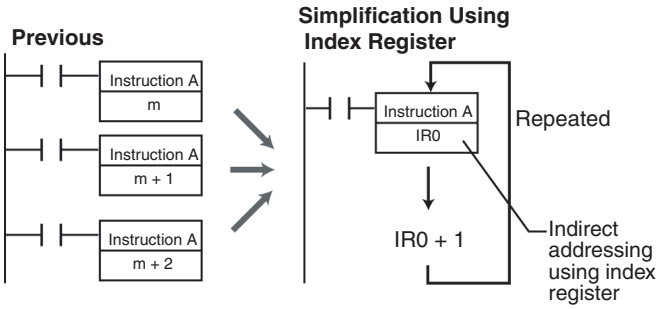
Applicable Instructions:

Bit Access Instructions:
SINGLE BIT OUTPUT (OUTB(534))

Simplify Programs with Index Registers

Index registers can be used as memory pointers to enable easily changing the addresses specified for instructions. Using an index register can often enable one instruction to preform the processing previously performed by many instructions.

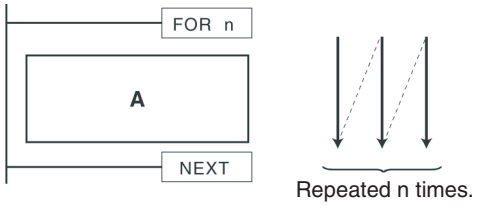




Index Registers: IR00 to IR15

Easily Repeat Processing

Instructions are provided that let you easily repeat sections of the program. Repeat execution can also be ended for a specified condition.



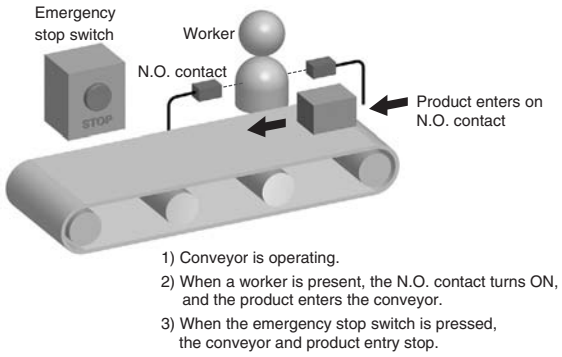
Applicable Instructions:

Loop Control Instructions:
START FOR-NEXT LOOPS (FOR(512))
END FOR-NEXT LOOPS (NEXT(513))
BREAK LOOP (BREAK(514))

Interlock Nesting (Unit Ver. 2.0 or Later Only)

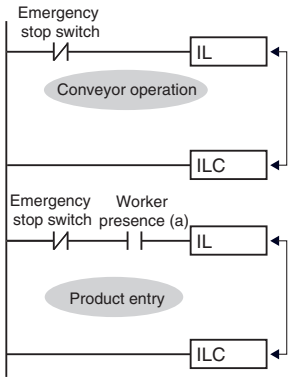
(CX-Programmer Ver 4.0 or Higher)

The previous interlock instructions cannot be nested. In actual applications, however, the entire interlock condition is often combined with partial interlock conditions. Multi-interlock instructions can be nested to better handle real applications.

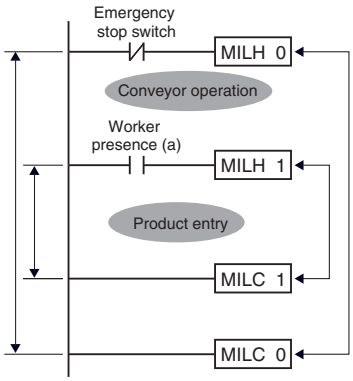


1) Conveyor is operating.
2) When a worker is present, the N.O. contact turns ON, and the product enters the conveyor.
3) When the emergency stop switch is pressed, the conveyor and product entry stop.

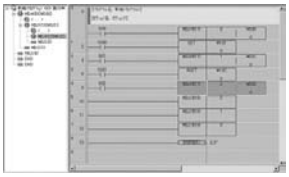
Using Existing IL Instructions



Using Multi-interlock Instructions



● CX-Programmer Screen



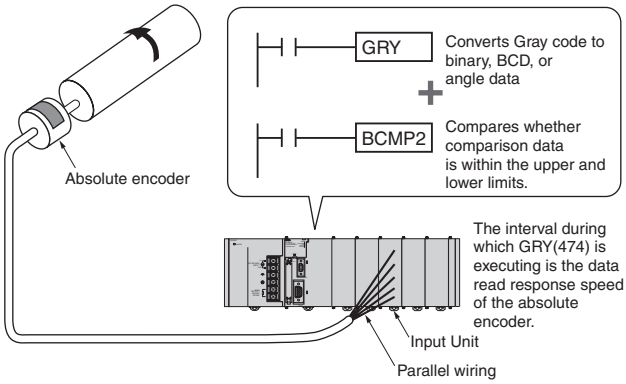
Interlock status is easy to understand using the software.

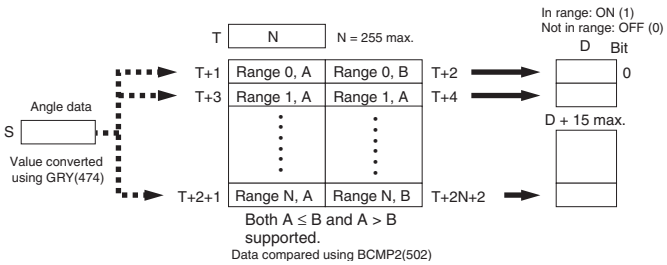
Applicable Instructions:

Sequence Control Instructions**:**
MULTI-INTERLOCK DIFFERENTIATION HOLD (MILH(517))
MULTI-INTERLOCK DIFFERENTIATION RELEASE (MILR(518))
MULTI-INTERLOCK CLEAR (MILC(519))

Easily Program Cam Switch Control (Unit Ver. 2.0 or Later Only)

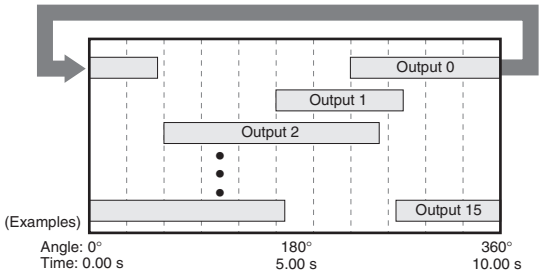
The EXPANDED BLOCK COMPARE (BCMP2(502)) instruction can be used to compare data converted from Gray binary code to binary data, BCD data, or an angle using the GRAY CODE CONVERT (GRY(474)) instruction. It can also compare data in ranges including 0, such as angle data.





If the comparison data (S) is within an of the 256 ranges, BCMP2(502) will turn ON the corresponding output bit in the results. If the upper limit is less than the lower limit, the comparison range will include 0.

Example of Compare Data



Angle Data

Controlling a Machine that Adjusts Timing According to Angles (Cam Switch Control)

Repeatedly Starting a Timer

Controlling Machine Timing Directly (Rotary Timer Control)

Applicable Instructions:

Conversion instructions:

GRAY CODE CONVERT (GRY(474))

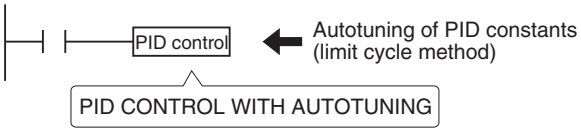
Comparison instructions:

EXPANDED BLOCK COMPARE (BCMP2(502))

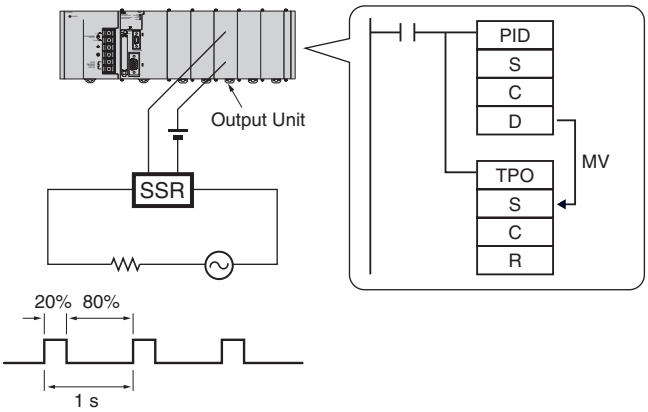
BCMP2(502) is supported by Pre-Ver. 2.0 CJ1M CPU Units or later.

PID Autotuning

PID constants can be automatically tuned for the PID instructions. The limit cycle method is used for tuning, allowing tuning to be completely quickly. This is particularly effective when there are many PID control loops.



PID instructions can be combined with the TIME-PROPORTIONAL OUTPUT (TPO(685)) instruction to enable time-proportional output of a manipulated variable (MV).

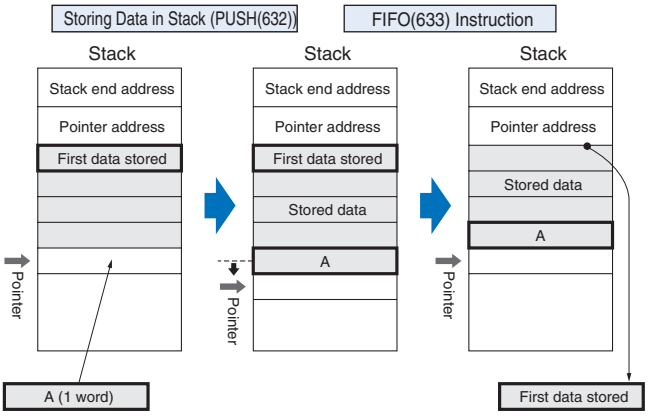


Applicable Instructions:

Control instructions:
PID CONTROL WITH AUTOTUNING (PIDAT(191))
TIME-PROPORTIONAL OUTPUT (TPO(685))

Easily Process Stacks: One-word Records for FIFO Processing

Stacks can be created in the DM Area or other areas for FIFO or other stack processing. The SET STACK (SSET(630)) instruction is used to create a stack.

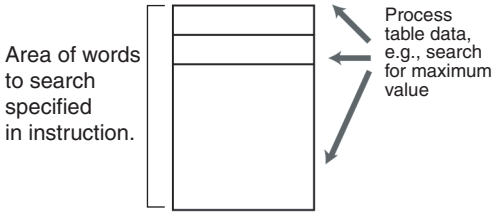


Applicable Instructions:

Stack Instructions:
SET STACK (SSET(630))
PUSH ONTO STACK (PUSH(632))
FIRST IN FIRST OUT (FIFO(633))
LAST IN FIRST OUT (LIFO(634))

Simple Data Searches (Single Words)

Instructions are provided to find the maximum value, minimum value, and search values.

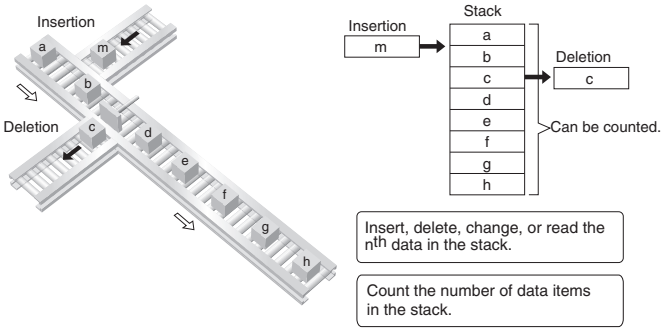


Applicable Instructions:

Search Instructions:
DATA SEARCH (SRCH(181))
FIND MAXIMUM (MAX(182))
FIND MINIMUM (MIN(183))

Real-time Data Management for Conveyors and Other Applications

When workpieces are added and removed during processing, such as with conveyors, the CJ1-series PLCs enable stack data to be inserted or deleted as required to easily manage workpiece data in real-time.



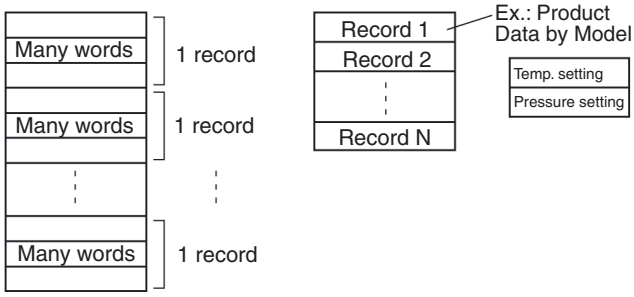
Applicable Instructions:

Table Data Processing Instructions:
SET STACK (SSET(630))
STACK SIZE READ (SNUM(638))
STACK DATA READ (SREAD(639))
STACK DATA OVERWRITE (SWRIT(640))
STACK DATA INSERT (SINS(641))
STACK DATA DELETE (SDEL(642))

Process Data Tables: Multi-word Records

Areas of memory can be defined as tables with the specified record size (words). Index registers can be used with such tables to easily sort records, search for values, or otherwise process the records in the table.

For example, the temperature, pressure, and other settings for each model of a product can be set in separate records and the data handled by record.

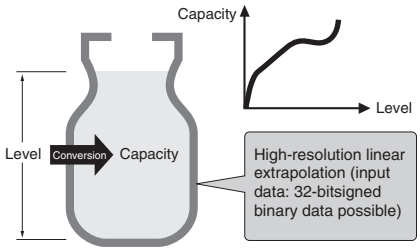


Applicable Instructions:

Table Data Instructions:
DIMENSION RECORD TABLE (DIM(631))
SET RECORD LOCATION (SETR(635))
GET RECORD NUMBER (GETR(636))

High-precision Approximations

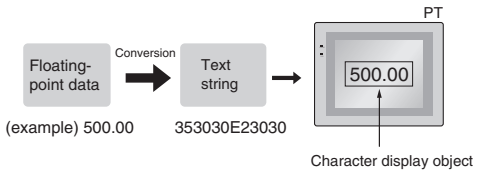
Converting a level meter reading in mm to tank capacity in liters according to the shape of the tank and other difficult linear extrapolations requiring high data resolution can be performed. (Linear data can be handled as 16-bit unsigned binary or BCD data, 16-bit or 32-bit signed binary data, or floating-point decimal data.)



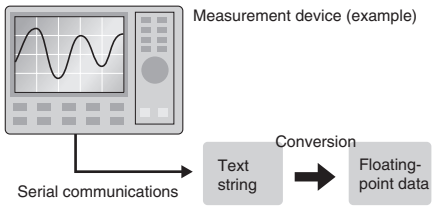
Applicable Instructions:
ARITHMETIC PROCESS (APR(069))

Convert between Floating-point and Text Data

Instructions are provided to easily convert floating-point decimal numbers (real numbers) to text strings (ASCII) for display on PTs. These are display as character display objects on the PT.



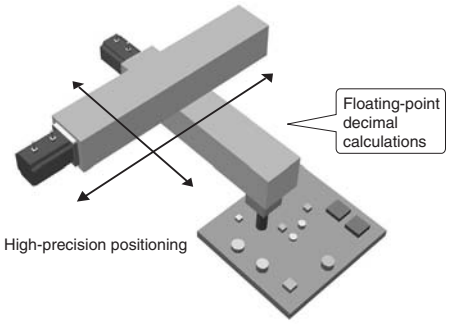
You can also convert ASCII data (text strings) received from measurement devices to floating-point decimal data for use in calculations.



Applicable Instructions:
Floating-point Decimal Math instructions
FLOATING- POINT TO ASCII (FSTR(448))
ASCII TO FLOATING-POINT (FVAL(449))

High-precision Positioning for XY Tables and Other Applications

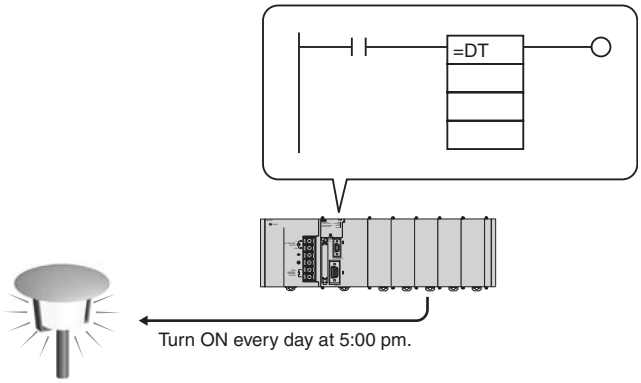
Floating-point decimal and double-precision calculation instruction have been supported. These are essential for position control operations. Now more precise position control is possible than ever before.



Applicable Instructions:
Floating-point Decimal and Double-precision Math instructions

Easily Programmed Calendar Timers (Unit Ver. 2.0 or Later)

Two sets of calendar data can be compared. The calendar data to be compared can be restricted to the year, month, day, hour, minutes, or seconds.



Example: The calendar timer function can be easily set for a specific function to operate every day at 17:00:00 (H:M:S).

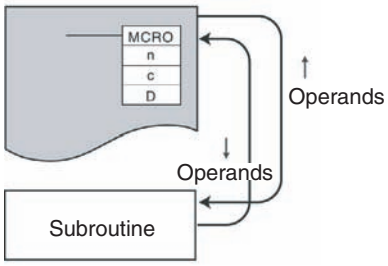
Applicable Instructions:
Comparison instructions

Time comparison:

= DT(341)
<> DT(342)
< DT(343)
<= DT(344)
> DT(345)
>= DT(346)

Simplified Execution of Subroutines with Different Operands

Macro instructions can be used to execute the same subroutine program with different operands from different locations in the programs.

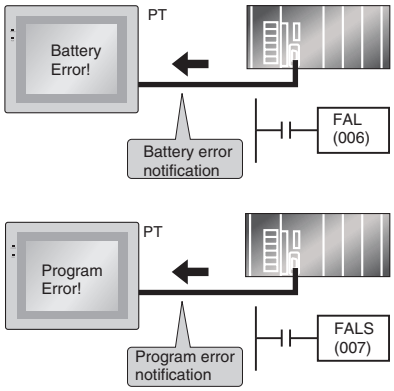


Applicable Instructions:
Subroutine instruction: MACRO (MCRO(099))

Simulate Specific Error Statuses for Debugging

The FAL(006) and FALS(007) instructions can be used to simulate a desired error condition. This can be used, for example, to intentionally create error conditions in the CPU Unit while debugging to check to see if the correct error messages are displayed on a PT.

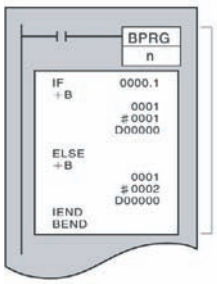
Example



Applicable Instructions:
Diagnostic Instructions
FAILURE ALARM (FAL(006))
SEVERE FAILURE ALARM (FALS(007))

Easily Program Logic Flow Control with Block Programming Sections

A block of mnemonic programming instructions can be executed as a group based on a single execution condition. IF/THEN, WAIT, TIMER WAIT, and other instructions can be used inside the block programming section to easily program logic flow control that is difficult to program with ladder diagrams.

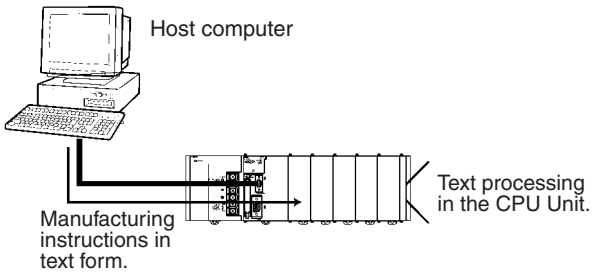


Block programming section

Applicable Instructions:
Block Programming instructions

Easily Handle Text Strings

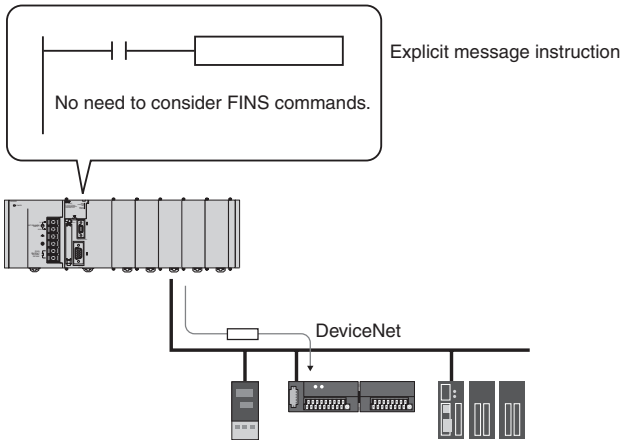
Manufacturing instruction can be obtained from a host computer or other external source, stored in memory, and then manipulated as text strings (ASCII data) as required by the applications. The text strings can be searched, fetched, reordered, or other processed in the CPU Unit of the PLC.



Applicable Instructions:
Text String Processing instructions

Read Maintenance Information Easily through DeviceNet (Unit Ver. 2.0 or Later) NEW!

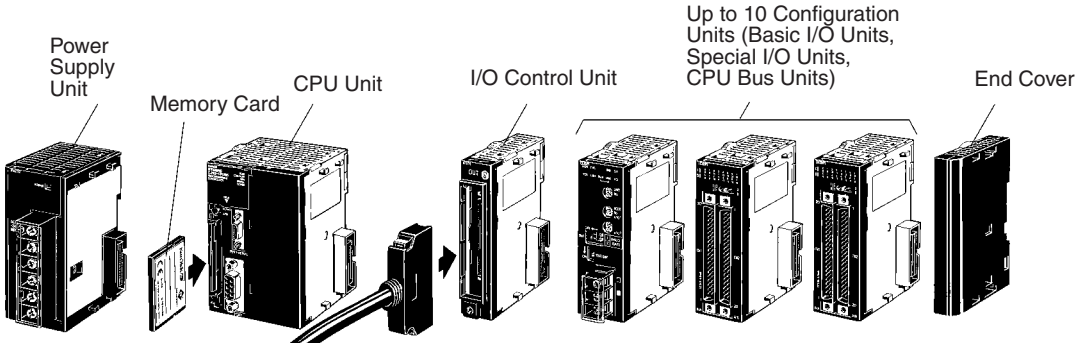
Send user-set explicit messages easily without having to consider FINS commands. Data transmission between PLCs can also be achieved simply using explicit messages.



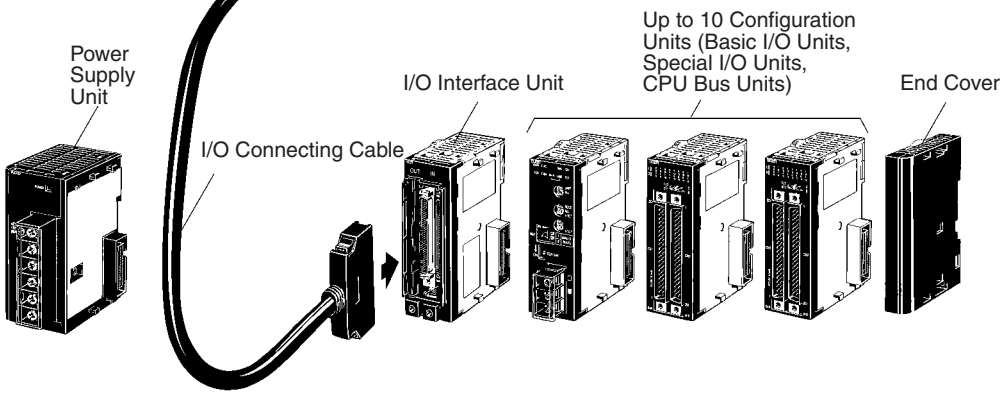
Applicable Instructions:
Network Instructions
EXPLICIT MESSAGE SEND (EXPLT(720))
EXPLICIT GET ATTRIBUTE (EGATR(721))
EXPLICIT SET ATTRIBUTE (ESATR(722))
EXPLICIT WORD READ (ECHRD(723))
EXPLICIT WORD WRITE (ECHWR(724))

Basic System Configuration

CPU Rack



Expansion Rack



CJ-series CPU Rack

A CJ-series CPU Rack consists of a CPU Unit, Power Supply Unit, Basic I/O Units, Special I/O Units, CPU Bus Units, and an End Cover. I/O Control Units are required to connect CJ-series Expansion Racks. Memory Cards are optional.

CJ-series Expansion Racks

CJ-series Expansion Racks can be connected to CJ-series CPU Racks or other CJ-series Expansion Racks.

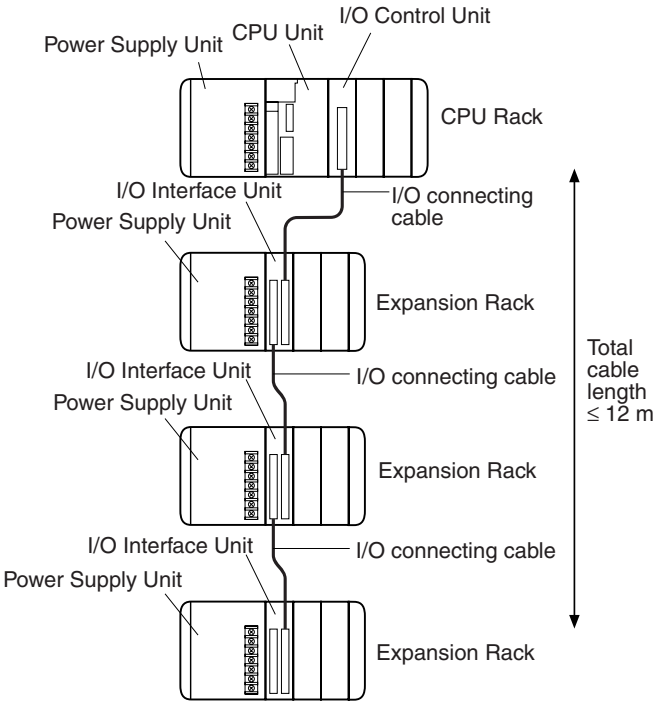
A CJ-series Expansion Rack consists of a Power Supply Unit, an I/O Interface Unit, Basic I/O Units, Special I/O Units, CPU Bus Units, and an End Cover.

Note: Connection of CS-series Expansion Racks is not supported.

Number of Expansion Racks

CPU Unit	No. of Expansion Racks	Max. No. of Units
CJ1H-CPU67H	3	40
CJ1H-CPU66H		
CJ1H-CPU65H		
CJ1G-CPU45H/45P		
CJ1G-CPU44H/44P		
CJ1G-CPU43H/43P	2	30
CJ1G-CPU42H/42P		
CJ1M-CPU23	1	20
CJ1M-CPU13	1	20
CJ1M-CPU13-ETN	1	19
CJ1M-CPU22	none	10
CJ1M-CPU12	none	10
CJ1M-CPU12-ETN	none	9
CJ1M-CPU21	none	10
CJ1M-CPU11	none	10
CJ1M-CPU11-ETN	none	9

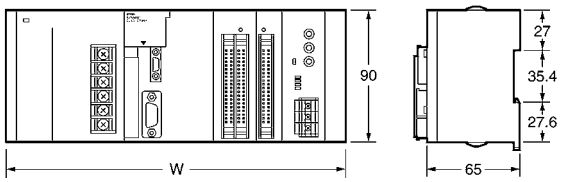
Note:



Dimensions

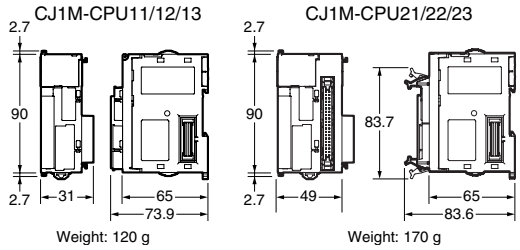
Note: Units are in mm unless specified otherwise.

Product Dimensions



Unit/product	Model number	Width
Power Supply Unit	CJ1W-PA205R	80
	CJ1W-PA202	45
	CJ1W-PD025	60
	CJ1W-PD022	27
CPU Unit	CJ1M-CPU11/12/13	31
	CJ1M-CPU21/22/23	49
	CJ1H-CPU□□H CJ1G-CPU□□H	62
	CJ1G-CPU□□P	69
	CJ1M-CPU1□-ETN	62
End Cover	CJ1W-TER01	14.7

CPU Unit



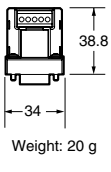
End Plate

(Provided with the CPU Unit.)



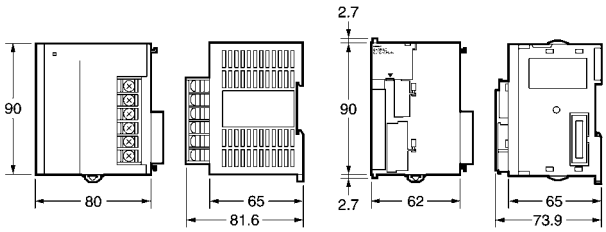
RS-422A Converter

CJ1W-CIF11



Width W (mm) When Used with a CJ1W-PA202 Power Supply Unit (AC, 14 W)

Number of I/O Units with 31-mm width	CJ1M-CPU11/12/13	CJ1M-CPU21/22/23
1	121.7	139.7
2	152.7	170.7
3	183.7	201.7
4	214.7	232.7
5	245.7	263.7
6	276.7	294.7
7	307.7	325.7
8	338.7	356.7
9	369.7	387.7
10	400.7	418.7

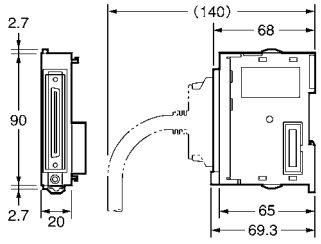


CJ-series Units other than CPU Units and Power Supply Units have a width of either 20 mm or 31 mm, as shown in the tables below.

Units of Width 20 mm

Unit	Model number	Width
I/O Control Unit	CJ1W-IC101	20
32-point Basic I/O Units	CJ1W-ID231/232	
	CJ1W-OD231/232	
CompoBus/S Master Unit	CJ1W-SRM21	

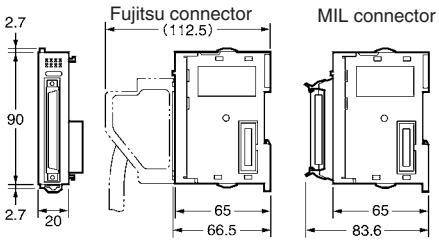
I/O Control Unit



Units of Width 80 mm

Unit	Model number	Width
Motion Control Unit	CJ1W-MCH71	80

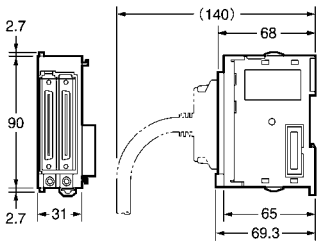
32-point I/O Unit



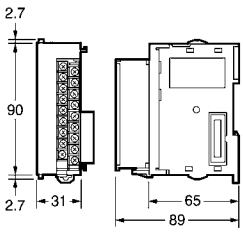
Units of Width 31 mm

Unit	Model number	Width
I/O Interface Unit	CJ1W-II101	31
8/16-point Basic I/O Units	CJ1W-ID201/211 CJ1W-IA111/201 CJ1W-OD201/202/203/204 CJ1W-OD211/212 CJ1W-OC201/211 CJ1W-OA201	
32-point Basic I/O Units	CJ1W-MD231/232/233	
64-point Basic I/O Units	CJ1W-ID261/262 CJ1W-OD261/262/263 CJ1W-MD261/263/563	
Interrupt Input Unit	CJ1W-INT01	
High-Speed Input Unit	CJ1W-IDP01	
Analog I/O Unit	CJ1W-AD□□□ CJ1W-DA□□□ CJ1W-MAD42	
Process Input Units	CJ1W-PDC15 CJ1W-PTS15/16 CJ1W-PTS51/52	
Temperature Input Units	CJ1W-TS561/562	
Temperature Control Units	CJ1W-TC□□□	
Position Control Units	CJ1W-NC113/133	
	CJ1W-NC213/233	
	CJ1W-NC413/433	
High-speed Counter Unit	CJ1W-CT021	
4-channel Counter Unit	CJ1W-CTL41-E	
SSI encoder Unit	CJ1W-CTS21-E	
Controller Link Unit	CJ1W-CLK21	
Serial Communications Unit	CJ1W-SCU21-V1 CJ1W-SCU41-V1	
Ethernet Unit	CJ1W-ETN11/21	
DeviceNet Unit	CJ1W-DRM21	
PROFIBUS-DP Units	CJ1W-PRM21	
	CJ1W-PRT21	
CAN Unit	CJ1W-CORT21	
RFID Sensor Units	CJ1W-V600C11	
	CJ1W-V600C12	
Position Control Unit	CJ1W-NCF71	

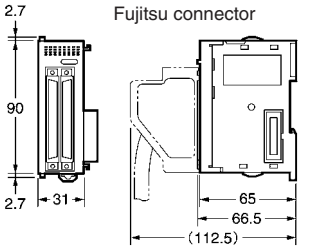
I/O Interface Unit



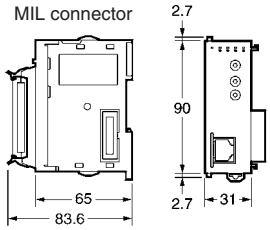
8/16-point Basic I/O Unit and Interrupt Input Unit



64-point Basic I/O Unit



Special I/O Unit /CPU Bus Unit



W, the total width is given by the following formula:

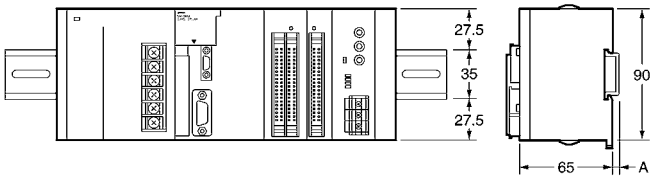
W = 80 (Power Supply Unit) + 62 (CPU Unit) + 20 x n + 31 x m + 14.7 (End Cover) (mm)

where n is the number of Units of width 20 mm and m is the number of Units of width 31mm.

Example:For configurations with 2 32-point Basic I/O Units and 8 Units of width 31 mm:

W = 156.7 + 20 x 2 + 31 x 8 = 444.7 mm

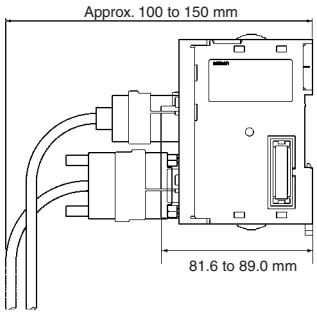
Mounting Dimensions



DIN rail model number	A
PFP-100N2	16 mm
PFP-100N	7.3 mm
FPP-50N	7.3 mm

Mounting Depth

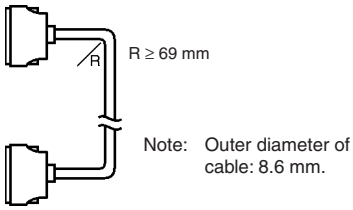
The mounting depth of CJ-series CPU Racks and Expansion Racks is from 81.6 to 89.0 mm depending on the Units that are mounted. Additional depth is required to connect Programming Devices (e.g., CX-Programmer or Programming Console) and Cables. Be sure to allow sufficient mounting depth.



Note: Consider the following points when expanding the configuration:

- The total length of I/O Connecting Cable must not exceed 12 m.
- I/O Connecting Cables require the bending radius indicated below.

CS/CJ-series Connecting Cable



Current Consumption

The amount of current/power that can be supplied to the Units mounted in a Rack is limited by the capacity of the Rack's Power Supply Unit. The system must be designed so that the total current consumption of the Units does not exceed the maximum current for each voltage group and the total power consumption does not exceed the maximum for the Power Supply Unit.

CPU Racks and Expansion Racks

The following table shows the maximum currents and power that can be supplied by Power Supply Units on CPU Racks and Expansion Racks.

Note: 1. When calculating current/power consumption in a CPU Rack, be sure to include the power required by the CPU Unit itself. When expanding the configuration, be sure to include the power required by the I/O Control Unit.

2. When calculating current/power consumption in an Expansion Rack, be sure to include the power required by the I/O Interface Unit itself.

Power Supply Unit	Maximum current consumption			(C) Maximum total power consumption
	(A) 5-V group	(B) 24-V group relay driver power supply	24-V group service power supply	
CJ1W-PA205R	5.0 A	0.8 A	None	25 W
CJ1W-PA202	2.8 A	0.4 A	None	14 W
CJ1W-PD025	5.0 A	0.8 A	None	25 W
CJ1W-PD022	2.0 A	0.4 A	None	19.6 W

Be sure that both conditions 1 and 2 below are met.

Condition 1: Maximum Current Supply

1. Current required at 5 V DC by all Units (A) ≤ Maximum current consumption shown in table
2. Current required at 24 V DC by all Units (B) ≤ Maximum current consumption shown in table

Condition 2: Maximum Total Power Supply
A x 5 V DC + B x 24 V DC + C x 24 V DC £ Maximum total power consumption shown in table (C)

Example Calculations

In this example, the following Units are mounted to a CJ-series CPU Rack with a CJ1W-PA202 Power Supply Unit.

Unit	Model	Quantity	5- V DC	24- V DC
CPU Unit	CJ1G-CPU45H	1	0.910 A	---
I/O Control Unit	CJ1W-IC101	1	0.020 A	---
Input Units	CJ1W-ID211	2	0.080 A	---
	CJ1W-ID231	2	0.090 A	---
Output Units	CJ1W-OC201	2	0.090 A	0.048 A
Special I/O Unit	CJ1W-DA041	1	0.120 A	---
CPU Bus Unit	CJ1W-CLK21	1	0.350 A	---
Current consumption	Calculation		0.910+0.020+0.080×2+0.090x2+ 0.090x2+0.120+0.350	0.048 Ax2
	Result		1.92 A (£5.0 A)	0.096 A (£0.8 A)
Power consumption	Calculation		1.92x5 V=9.60 W	0.096 Ax24 V=2.304 W
	Result		9.60+2.304=11.904 W (£25 W)	

Current Consumption Tables

CPU Units and Expansion Units

Name	Model	Current consumption at 5 V (A)
CPU Units (These values include current consumption for a Programming Console or CX-Programmer.)	CJ1H-CPU67H/66H/65H	0.99 (See note.)
	CJ1G-CPU45P/44P/43P/42P	1.06 (See note.)
	CJ1G-CPU45H/44H/43H/42H	0.91 (See note.)
	CJ1M-CPU11/12/13	0.58 (See note.)
	CJ1M-CPU21/22/23	0.64 (See note.)
	CJ1M-CPU1□-ETN	0.95 (See note.)
Expansion Unit	CJ1W-IC101	0.02
	CJ1W-II101	0.13
End Cover	CJ1W-TER01	Included in CPU Unit or Expansion Unit.

Note: Add 0.15 A per Unit when the NT-AL001-E is connected and 0.04 A when the CJ1W-CIF11 RS-422A Adapter is connected.

CJ-series Basic I/O Units and Interrupt Input Unit

Category	Name	Model	Current consumption at 5 V (A)	Current consumption at 24 V (A)
Basic Input Units	DC Input Units	CJ1W-ID201	0.08	---
		CJ1W-ID211	0.08	
		CJ1W-ID231	0.09	
		CJ1W-ID232	0.09	
		CJ1W-ID261	0.09	
		CJ1W-ID262	0.09	
	AC Input Units	CJ1W-IA111	0.09	
		CJ1W-IA201	0.08	
Basic Output Units	Transistor Output Units	CJ1W-OD201	0.09	
		CJ1W-OD202	0.11	
		CJ1W-OD203	0.10	
		CJ1W-OD204	0.10	
		CJ1W-OD211	0.10	
		CJ1W-OD212	0.10	
		CJ1W-OD231	0.14	
		CJ1W-OD232	0.15	
		CJ1W-OD233	0.14	
		CJ1W-OD261	0.17	
		CJ1W-OD262	0.17	
		CJ1W-OD263	0.17	
	Relay Output Units	CJ1W-OC201	0.09	0.048 (0.006 × No.of ON points)
		CJ1W-OC211	0.11	0.096 (0.006 × No.of ON points)
	Triac Output Unit	CJ1W-OA201	0.22	---
Basic I/O Units	DC Input/ Transistor Output Units	CJ1W-MD231	0.13	
		CJ1W-MD233	0.13	
		CJ1W-MD234	0.13	
		CJ1W-MD261	0.14	
		CJ1W-MD263	0.14	
	TTL I/O Unit	CJ1W-MD563	0.19	
Interrupt Input Unit		CJ1W-INT01	0.08	
High-speed Input Unit		CJ1W-IDP01	0.08	
B7A Interface Units		CJ1W-B7A22	0.07	
		CJ1W-B7A14	0.07	
		CJ1W-B7A04	0.07	
Thermocouple Input Unit		CJ1W-TS561	0.22	
RTD Input Unit		CJ1W-TS562	0.25	

CJ-series Special I/O Units

Name	Model	Current consumption at 5 V (A)	Current consumption at 24 V (A)
Analog Input Units	CJ1W-AD081-V1	0.42	---
	CJ1W-AD041-V1	0.42	
Analog Output Units	CJ1W-DA041	0.12	
	CJ1W-DA021	0.12	
	CJ1W-DA08V/08C	0.14	
Analog I/O Unit	CJ1W-MAD42	0.58	
Process Input Untis	CJ1W-PDC15	0.18	0.09 (external)
	CJ1W-PTS15	0.18	0.06 (external)
	CJ1W-PTS16	0.18	0.07 (external)
	CJ1W-PTS51/52	0.25	---
Temperature Control Units	CJ1W-TC□□□	0.25	
Position Control Units	CJ1W-NC113/133 CJ1W-NC213/233	0.25	
	CJ1W-NC413/433	0.36	
High-speed Counter Unit	CJ1W-CT021	0.28	
Counter Unit	CJ1W-CTL41-E	0.32	
SSI encoder Unit	CJ1W-CTS21-E	0.30	
ID Sensor Units	CJ1W-V600C11	0.26	0.12
	CJ1W-V600C12	0.32	0.24
PROFIBUS-DP Slave Unit	CJ1W-PRT21	0.40	---
CompoBus/S Master Unit	CJ1W-SRM21	0.15	---

CJ-series CPU Bus Units

Name	Model	Current consumption at 5 V (A)
Controller Link Unit	CJ1W-CLK21-V1	0.35
Serial Communications Unit	CJ1W-SCU41	0.38 (See note.)
	CJ1W-SCU21	0.28 (See note.)
Position Control Unit	CJ1W-NCF71	0.36
Motion Control Unit	CJ1W-MCH71	0.60
CAN Unit	CJ1W-CORT21	0.33
Ethernet Unit	CJ1W-ETN11/21	0.38
DeviceNet Unit	CJ1W-DRM21	0.33
PROFIBUS-DP Master Unit	CJ1W-PRM21	0.40

Note: Add 0.15 A per Unit when the NT-AL001-E is connected and 0.04 A when the CJ1W-CIF11 RS-422A Adapter is connected.

Note: This table may contain Units that are no longer in production

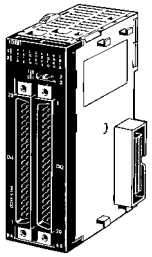
I/O Allocations

I/O Allocations

In CJ-series PLCs, part of the I/O memory is allocated to each Unit. Units are divided into the following 3 groups for allocations.

- Basic I/O Units
- Special I/O Units
- CPU Bus Units

Basic I/O Units



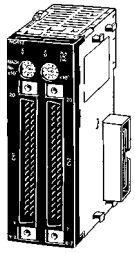
Basic I/O Units

Allocations

CIO Area:
CIO 0000 to CIO 0079 (See note.)
(Memory is allocated in word units based on mounting position in the Racks.)

Note: The Rack's first word setting can be changed from the default setting (CIO 0000) to any word from CIO 0000 to CIO 9999. The first word setting can be changed only with a Programming Device other than a Programming Console.

Special I/O Units



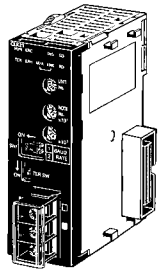
Special I/O Units

Allocations

Special I/O Unit Area:
CIO 2000 to CIO 2959 (See note.)
(Each Unit is allocated ten words based on its unit number.)

Note: A maximum of 40 Units can actually be mounted to a PLC because that is the maximum number of slots possible.

CJ1 CPU Bus Units



CJ1 CPU Bus Units

Allocations

CPU Bus Unit Area:
CIO 1500 to CIO 1899
(Each Unit is allocated 25 words based on its unit number.)

Allocations to Basic I/O Unit Groups

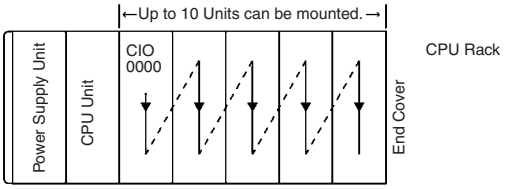
Allocated words in the CIO Area: CIO 0000 to CIO 0079

Basic I/O Units can be mounted to the CPU Rack and Expansion Racks.

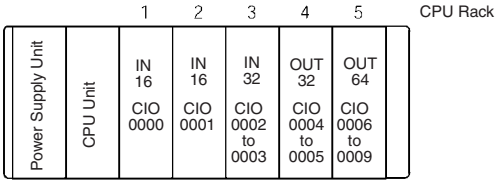
Allocation Methods

1. CPU Rack

Basic I/O Units on the CPU Rack are allocated words left to right (i.e., from the Unit nearest the CPU Unit) starting from CIO 0000. Units are allocated as many words as required in word units. Words can be reserved using the CX-Programmer.



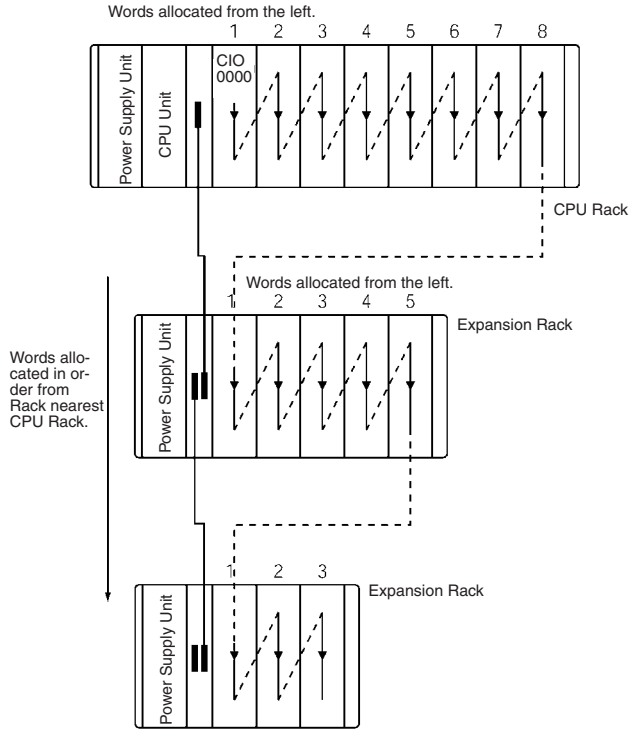
Example Words allocated from the left.



Note: Units with between 1 and 16 I/O points are allocated 1 word (16 bits) and Units with between 17 and 32 I/O points are allocated 2 words (32 bits). For example, 8-point Relay Units are allocated 1 word, with bits 00 to 07 actually allocated to the I/O points.

2. Allocations to Expansion Racks

I/O allocation to Basic I/O Units continues from the CPU Rack to the Expansion Racks. Words are allocated from left to right and each Unit is allocated as many words as it requires in word units, just like Units in the CPU Rack. A Rack's first word setting can be changed set to any word from CIO 0000 to CIO 9999 using a Programming Device.



Allocations to Special I/O Units

Each of these Units is allocated ten words in the Special I/O Unit Area (CIO 2000 to CIO 2959).

Special /O Units can be mounted to the CPU Rack and Expansion Racks.

Each Unit is allocated 10 words in the Special I/O Unit Area according to its unit number, as shown in the following table.

Unit number	Words allocated
0	CIO 2000 to CIO 2009
1	CIO 2010 to CIO 2019
2	CIO 2020 to CIO 2029
⋮	⋮
15	CIO 2150 to CIO 2159
⋮	⋮
95	CIO 2950 to CIO 2959

Note: Special I/O Units are ignored during I/O allocation to Basic I/O Units. Slots containing Special I/O Units are treated as empty slots.

Allocations to CPU Bus Units

Each CPU Bus Unit is allocated 25 words in the CPU Bus Unit Area (CIO 1500 to CIO 1899).

CPU Bus Units can be mounted to the CPU Rack or Expansion Racks.

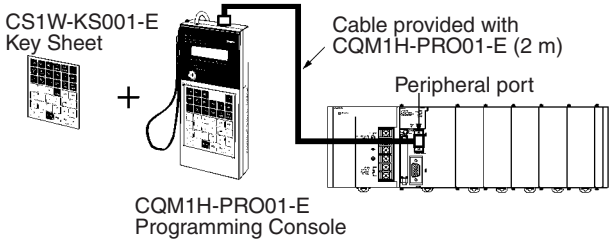
Each Unit is allocated 25 words in the CPU Bus Unit Area according to its unit number, as shown in the following table.

Unit number	Words allocated
0	CIO 1500 to CIO 1524
1	CIO 1525 to CIO 1549
2	CIO 1550 to CIO 1574
⋮	⋮
15	CIO 1875 to CIO 1899

Note: CPU Bus Units are ignored during I/O allocation to Basic I/O Units. The same unit numbers can be used for Special I/O Units and CPU Bus Units.

Programming Consoles

CQM1H-PRO01-E



Model	Cable	Cable length
CQM1H-PRO01-E	Not required.	---

Windows-based Programming Software: CX-One

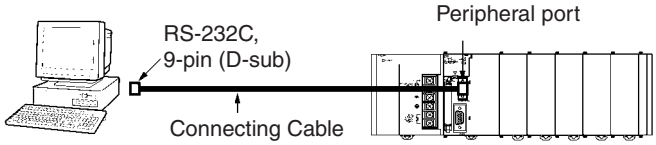
Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.

Name	Model	Specifications
CX-One	CX-ONE-AL□□C-E[*1]	Windows 2000 / XP

[*1] □□ = Number of licences; 01, 03, 10

Note: CX-One includes the PLC programming tool CX-Programmer, previously released as a separate package. CX-Programmer Version 2.04 or higher is required to program CJ-series PLCs.

Connecting to the Peripheral Port

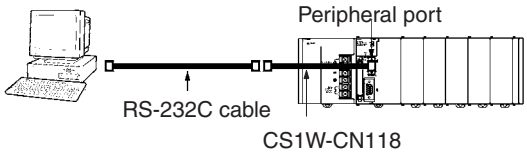


Peripheral Port Connecting Cables

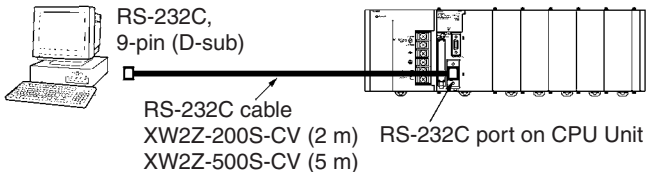
Cable	Length	Computer connector
CS1W-CN226	2.0 m	D-sub, 9-pin, male
CS1W-CN626	6.0 m	

The following cables can be used for an RS-232C connection from the computer to the peripheral port.

Mode	Connecting cables		Length	Computer connector
Peripheral bus or Host Link	XW2Z-200S-CV or XW2Z-500S-CV	CS1W-CN118	2 or 5 m + 0.1 m	D-sub, 9-pin, male
Host Link	XW2Z-200S-V or XW2Z-500S-V			



Connecting to the RS-232C Port



RS-232C Port Connecting Cables

Mode	Cable	Length	Computer connector
Peripheral Bus or Host Link	XW2Z-200S-CV	2.0 m	D-sub, 9-pin
	XW2Z-500S-CV	5.0 m	

Note: Cables with model numbers ending in “CV” are anti-static.

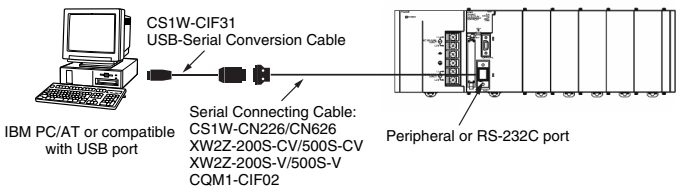
The following cables can be used for an RS-232C connection from the computer to an RS-232C port. (Unlike “CV” models, however, they do not support Peripheral Bus and do not use anti-static connectors.)

Mode	Cable	Length	Computer connector
Host Link	XW2Z-200S-V	2.0 m	D-sub, 9-pin
	XW2Z-500S-V	5.0 m	

The following serial communications modes can be used to connect a computer with the CX-Programmer to a CJ-series PLC.

Mode	Features
Peripheral Bus	The faster mode, peripheral bus is generally used for CX-Programmer connections. Only 1:1 connections are possible. The baud rate is automatically detected with the CJ1.
Host Link	A standard protocol for host computers. Slower than peripheral bus, but allows modem or optical adapter connections, or long-distance or 1:N connections via RS-422A/485.

Using a USB-Serial Conversion Cable to Connect to a Peripheral or RS-232C Port



General Specifications of USB-Serial Conversion Cable

USB interface standard		Conforms to USB Specification 1.1.
DTE speed		115.2 Kbits/s
Connectors	On computer	USB (A plug connector, male)
	On PLC	RS-232C (D-sub, 9-pin, female)
Power supply		Bus power (supplied from upstream, 5 V DC)
Current consumption		35 mA
Operating environment	Ambient temperature	0 to 55 °C
	Ambient humidity	10% to 90% (with no condensation)
	Ambient atmosphere	No corrosive gases
Weight		50 g

OS with Drivers for USB-Serial Conversion Cable

Windows 98, ME, 2000, or XP

Applicable Software

CX-One is the integrated software for programming and configuration of all Omron control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.

It includes the functionality of previously released individual software tools like CX-Programmer, CX-Designer, CX-Simulator, CX-Protocol, and network configuration tools.

Peripheral Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number			Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	CS1W-CN226		0.5 m + 2.0 m	USB (A plug connector)
			CS1W-CN626		0.5 m + 6.0 m	
		CS1W-CIF31	XW2Z-200S-CV/ XW2Z-500S-CV	CS1W-CN118	0.5 m + (2.0 m or 5.0 m) + 0.1 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V/ XW2Z-500S-V		0.5 m + (2.0 m or 5.0 m) + 0.1 m	

RS-232C Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number		Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	XW2Z-200S-CV	0.5 m + 2.0 m	USB (A plug connector)
			XW2Z-500S-CV	0.5 m + 5.0 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V (See note.)	0.5 m + 2.0 m	
			XW2Z-500S-V (See note.)	0.5 m + 5.0 m	

Connection in Tool Bus Mode is not possible. The connector does not have ESD measures.

CJ1 Unit Descriptions

Table of Units

Unit		Classification	Model	Page
I/O Units	Input Units	Basic I/O Unit	CJ1W-ID□□□/IA□□□	182
	Output Units		CJ1W-OD□□□/ OC□□□/OA□□□	182
	I/O Units		CJ1W-MD□□□	183
Interrupt Input Unit		Basic I/O Unit	CJ1W-INT01	194
High-speed Input Units		Basic I/O Unit	CJ1W-IDP01	195
Temperature Input Units		Basic I/O Unit	CJ1W-TS561/TS562	196
Analog I/O Units	Input Units	Special I/O Unit	CJ1W-AD□□□	198
	Output Units		CJ1W-DA□□□	199
	I/O Unit		CJ1W-MAD42	201
Process Input Units		Special I/O Unit	CJ1W-PTS□□/PDC11	202
Temperature Control Units		Special I/O Unit	CJ1W-TC□□□	205
Position Control Units		Special I/O Unit	CJ1W-NC□□□	207
Motion Control Unit			CJ1W-MCH71 - MECHATROLINK-II	208
Position Control Unit			CJ1W-NCF71 - MECHATROLINK-II	210
High-speed Counter Unit		Special I/O Unit	CJ1W-CT021	213
Counter Unit		Special I/O Unit	CJ1W-CTL41E	214
SSI Input Unit		Special I/O Unit	CJ1W-CTS21-E	215
ID Sensor Units		Special I/O Unit	CJ1W-V600C1□	222
Serial Communications Units		CPU Bus Unit	CJ1W-SCU□1	219
RS-232C/RS-422A Adapter Units		---	NT-AL001	221
Communications Networks				224
Ethernet Units		CPU Bus Unit	CJ1W-ETN21	228
Controller Link Boards/ Units	Controller Link Units	CPU Bus Unit	CJ1W-CLK21-V1	230
	Controller Link Boards	Personal computer board (for PCI bus)	3G8F7-CLK21-EV1	
	Repeater Units	Wired/Optical	CS1W-RPT0□	231
DeviceNet Units	DeviceNet Units	CPU Bus Unit	CJ1W-DRM21	233
CAN Unit	User-specified CAN protocols	CPU Bus Unit	CJ1W-CORT21	235
PROFIBUS-DP Units	PROFIBUS-DP Master	CPU Bus Unit	CJ1W-PRM21	236
	PROFIBUS-DP Slave	Special I/O Unit	CJ1W-PRT21	237
CompoBus/S Units	Master Unit	Special I/O Unit	CJ1W-SRM21	238

I/O Terminal Blocks

Most I/O units that use a 18-point removable terminal block are available in two variations:

- Conventional M3 Screw type connection
- Screwless clamp connection



This type requires wiring to be terminated by fork- or ring terminals



This type can be used with standard or solid wire up to 1.5 mm², with or without ferrules.This option is designated by the suffix (SL).

CJ1W-ID/-IA/-OC/-OD/-OA/-MD

Basic I/O Units

I/O Units



Input Unit (8/16 points)
CJ1W-ID201/211
CJ1W-IA□□□
Output Units (8/16 points)
CJ1W-OD20□/21□
CJ1W-OA201



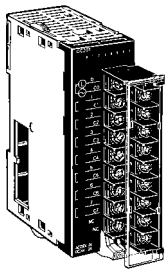
Input Units (32 points)
CJ1W-ID23□
Output Units (32 points)CJ1W-OD23□



I/O Units (32 points)
CJ1W-MD23□



Input Units (64 points)
CJ1W-ID26□
Output Units (64 points)
CJ1W-OD26□



Relay Contact Output Units (8 independent contacts)
CJ1W-OC201
Relay Contact Output Units (16 points)
CJ1W-OC211

DC Input Units

Classification	Inputs	Input Specifications	Connections	Model
Basic I/O Unit	8 pts	24 V DC, 10 mA	Removable terminal block	CJ1W-ID201
	16 pts	24 V DC, 7 mA	Removable terminal block	CJ1W-ID211(SL)
	32 pts	24 V DC, 4.1 mA	Fujitsu-compatible connector	CJ1W-ID231
	32 pts	24 V DC, 4.1 mA	MIL connector	CJ1W-ID232
	64 pts	24 V DC, 4.1 mA	Fujitsu-compatible connector	CJ1W-ID261
	64 pts	24 V DC, 4.1 mA	MIL connector	CJ1W-ID262

AC Input Units

Classification	Inputs	Input Specifications	Connections	Model
Basic I/O Unit	16 pts	100 to 120 V AC, 7 mA (100 V, 50 Hz)	Removable terminal block	CJ1W-IA111
	8 pts	200 to 240 V AC, 9 mA (200 V, 50 Hz)		CJ1W-IA201

Relay Contact Output Units

Classification	Outputs	Maximum switching capacity	Connections	Model
Basic I/O Unit	8 pts (independent contacts)	2 A 250 V AC per contact, max. 8A per common	Removable terminal block	CJ1W-OC201(SL)
	16 pts			CJ1W-OC211(SL)

Transistor Output Units

Classification	Outputs	Maximum switching capacity	Connections	Model
Basic I/O Unit	8 pts	12 to 24 V DC, 2 A/pt, 8 A/Unit sinking	Removable terminal block	CJ1W-OD201
		24 V DC, 2 A/pt, 8 A/Unit, sourcing, load short protection, disconnection detection, alarm		CJ1W-OD202
		12 to 24 V DC, 0.5 A/pt, 4 A/Unit, sinking	Removable terminal block	CJ1W-OD203
		24 V DC, 0.5 A/pt, 4 A/Unit, sourcing, load short protection, disconnection detection, alarm	Removable terminal block	CJ1W-OD204
	16 pts	12 to 24 V DC, 0.5 A/pt, 5 A/Unit sinking	Removable terminal block	CJ1W-OD211(SL)
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, load short protection, alarm		CJ1W-OD212(SL)
	32 pts	12 to 24 V DC, 0.5 A/pt, 4 A/Unit, sinking	Fujitsu-compatible connector	CJ1W-OD231
		24 V DC, 0.5 A/pt, 4 A/Unit, sourcing, load short protection, alarm	MIL connector	CJ1W-OD232
		12 to 24 V DC, 0.5 A/pt, 4 A/Unit, sinking		CJ1W-OD233
	64 pts	12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sinking	Fujitsu-compatible connector	CJ1W-OD261
		12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sourcing	MIL connector	CJ1W-OD262
		12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sinking	MIL connector	CJ1W-OD263
	8 pts	250 V AC, 0.6 A/pt. 2.4 A/Unit, 50/60 Hz	Removable terminal block	CJ1W-OA201

Note: Units with a suffix "(SL)" are available with screwless terminal blocks as well as M3 screw terminals.

DC Input/Transistor Output Units

Classification	Inputs/ Outputs	Input voltage	Input current (typical)	Max. output switching capacity	Connections	Model
Basic I/O Unit	16 inputs/ 16 outputs	24 V DC	7 mA	12 to 24 V DC, 0.5 A/pt. 2.0 A/Unit, sinking outputs	Fujitsu-compatible connector	CJ1W-MD231
					MIL connector	CJ1W-MD233
				12 to 24 V DC inputs, 24 V DC outputs, 0.5 A/pt, 2 A/Unit, sourcing, load short circuit protection, alarm	MIL connector	CJ1W-MD232
	32 inputs/ 32 outputs		4.1 mA	12 to 24 V DC, 0.3 A/pt. 3.2 A/Unit, sinking outputs	Fujitsu-compatible connector	CJ1W-MD261
					MIL connector	CJ1W-MD263

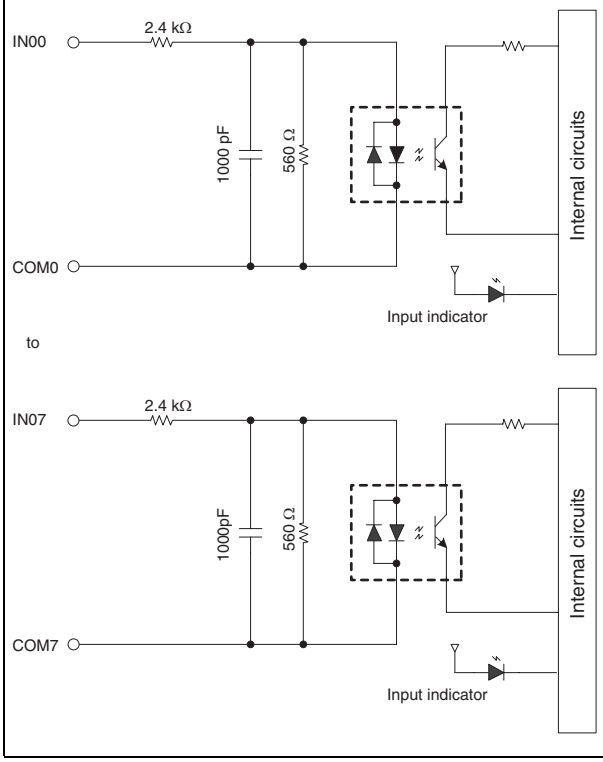
TTL I/O Units

Classification	Inputs/ Outputs	Input voltage	Input current (typical)	Max. output switching capacity	Connections	Model
Basic I/O Unit	32 inputs/ 32 outputs	5 V DC	3.5 mA	5 V DC, 35 mA/pt. 1.12 A/Unit	MIL connector	CJ1W-MD563

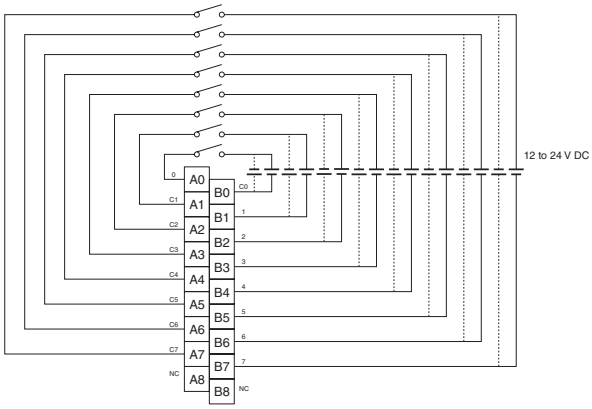
Circuit Configuration and Terminal Arrangement

CJ1W-ID201

Circuit configuration

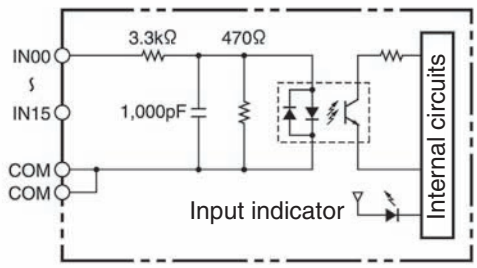


Terminal arrangement

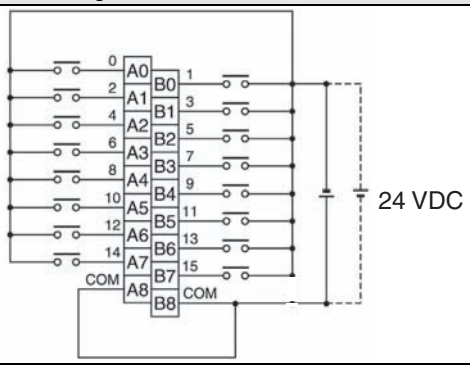


CJ1W-ID211(SL)

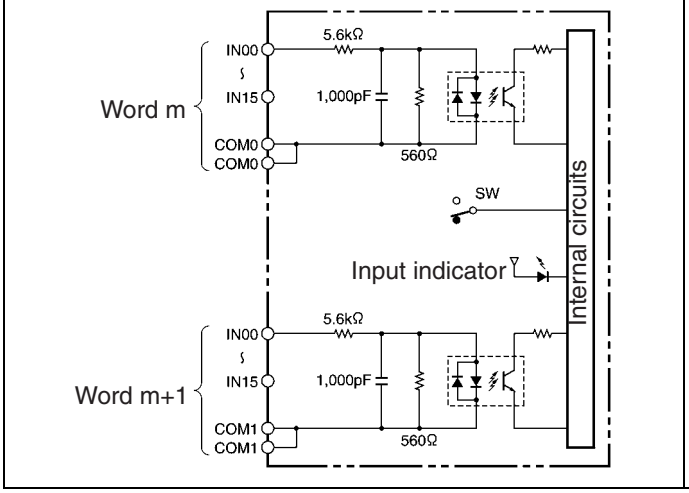
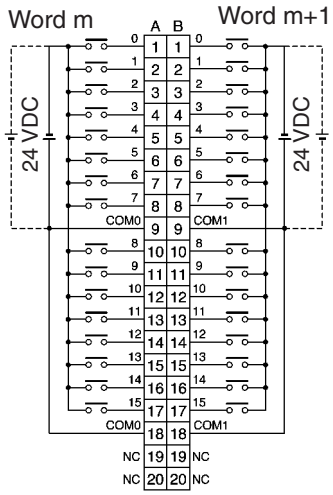
Circuit configuration



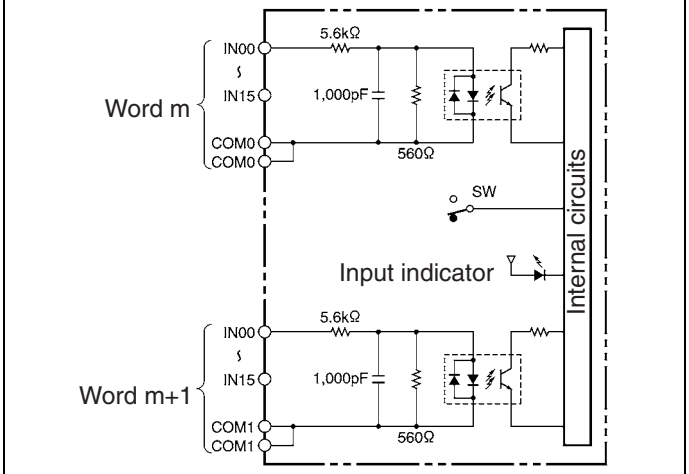
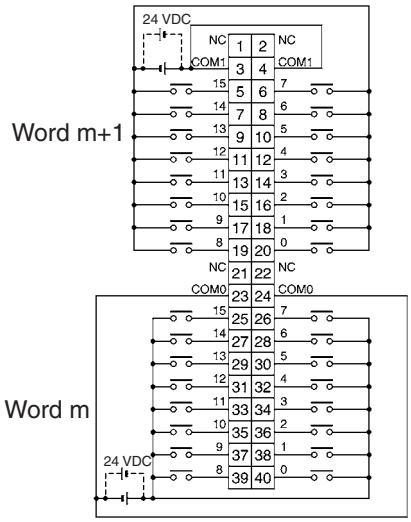
Terminal arrangement



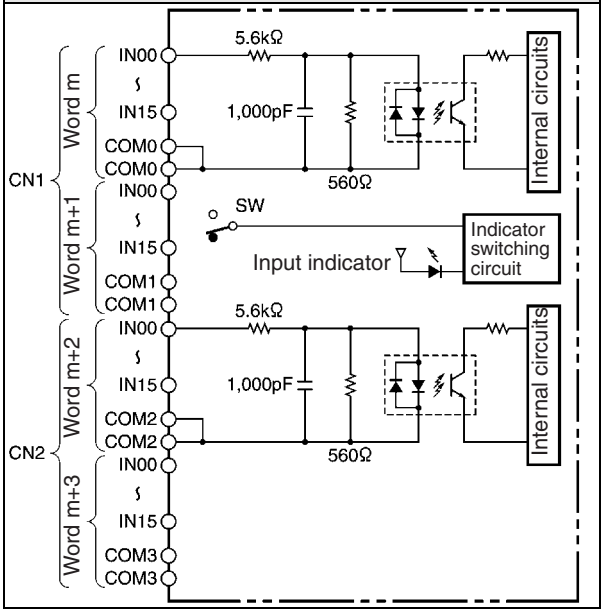
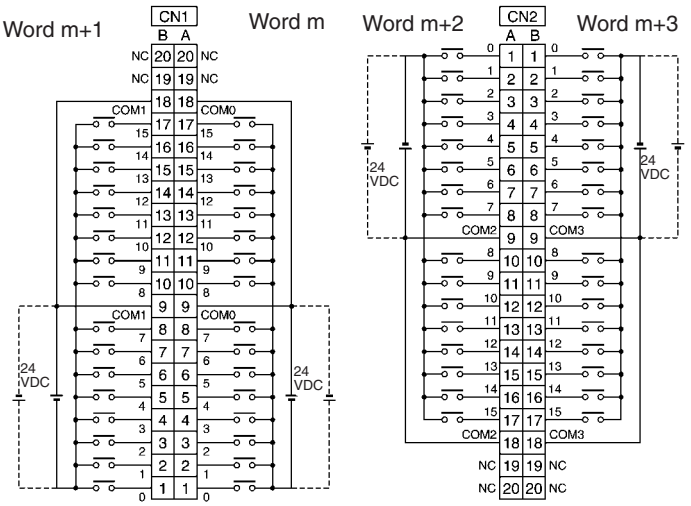
CJ1W-ID231

Circuit configuration	Terminal arrangement
	

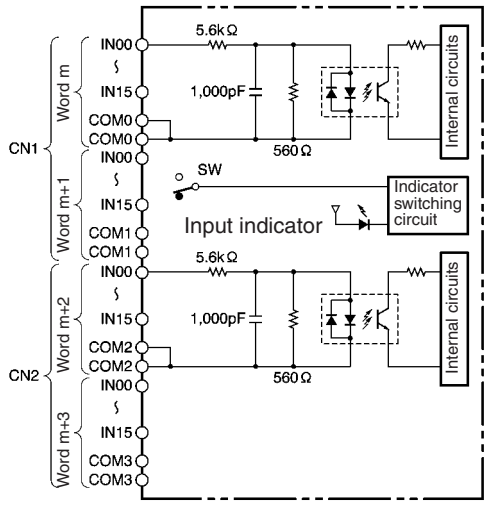
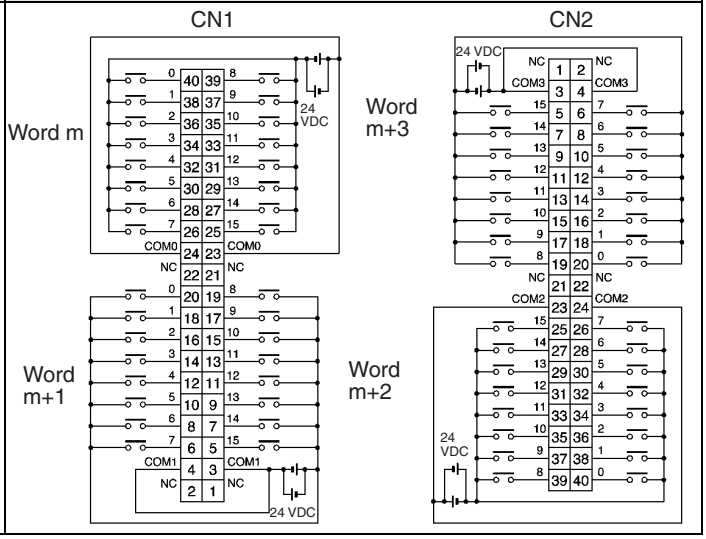
CJ1W-ID232

Circuit configuration	Terminal arrangement
	

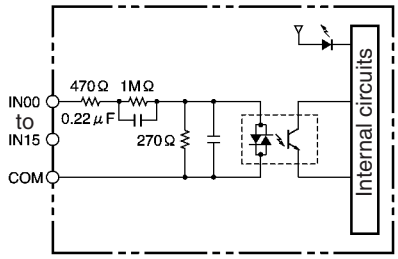
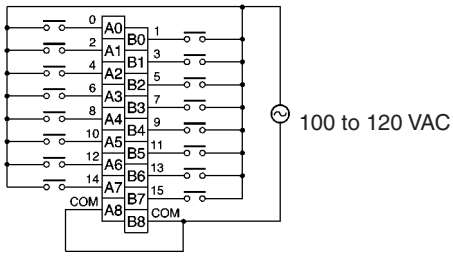
CJ1W-ID261

Circuit configuration	Terminal arrangement
	

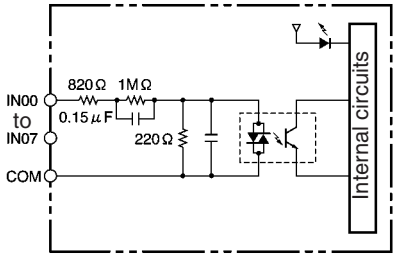
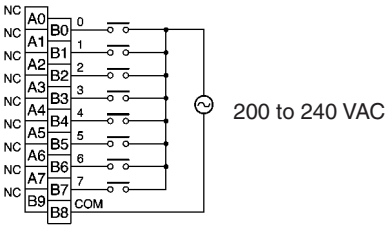
CJ1W-ID262

Circuit configuration	Terminal arrangement
	

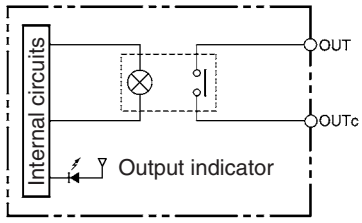
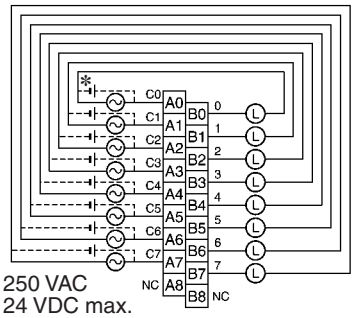
CJ1W-IA111

Circuit configuration	Terminal arrangement
	

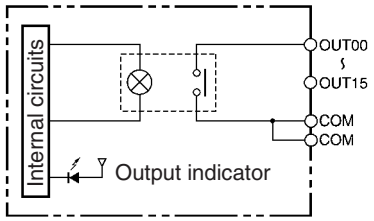
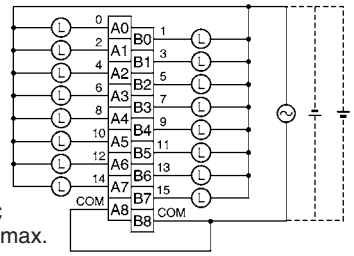
CJ1W-IA201

Circuit configuration	Terminal arrangement
	

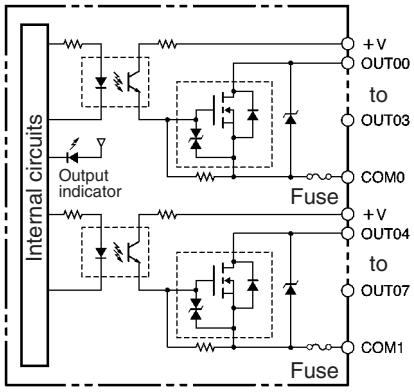
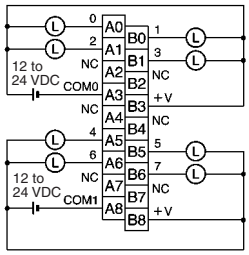
CJ1W-OC201(SL)

Circuit configuration	Terminal arrangement
	

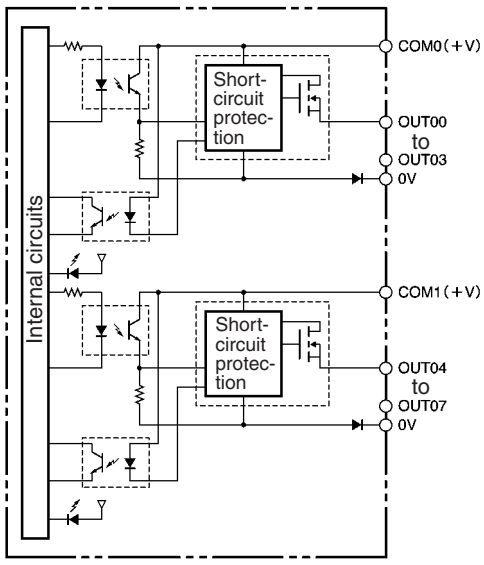
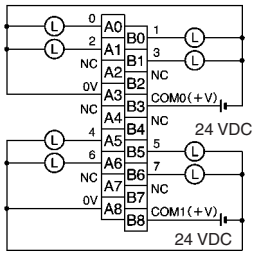
CJ1W-OC211(SL)

Circuit configuration	Terminal arrangement
	

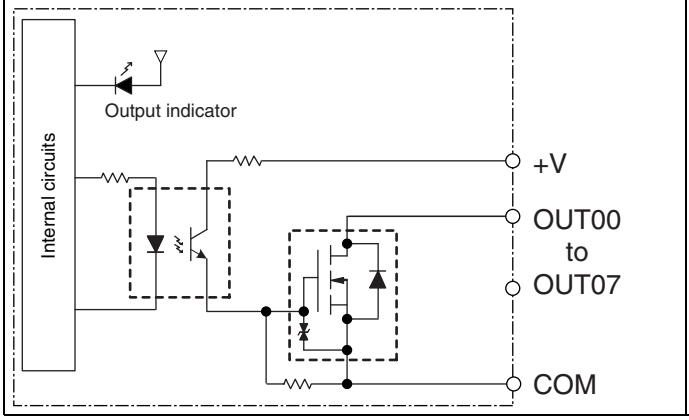
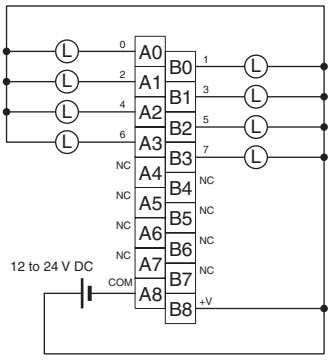
CJ1W-OD201

Circuit configuration	Terminal arrangement
	

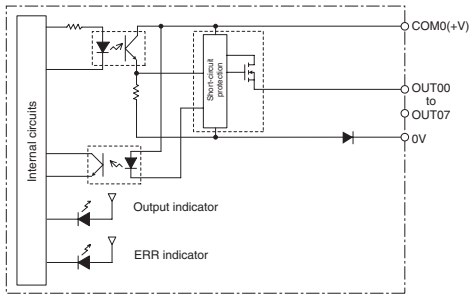
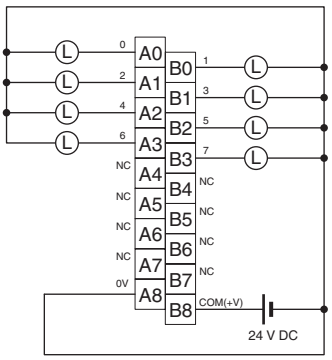
CJ1W-OD202

Circuit configuration	Terminal arrangement
	

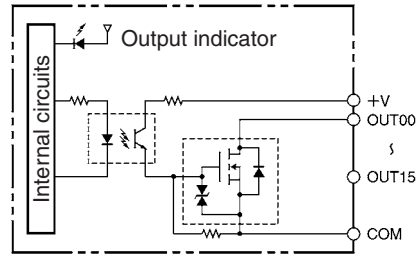
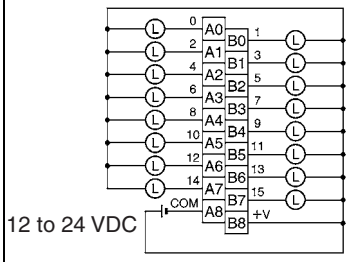
CJ1W-OD203

Circuit configuration	Terminal arrangement
	

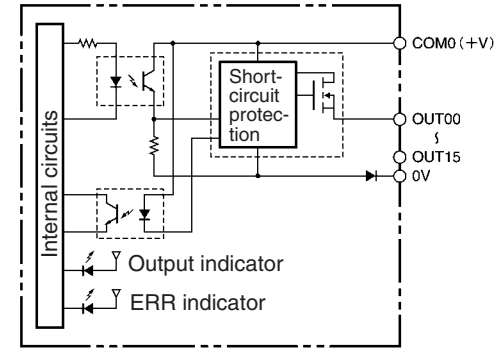
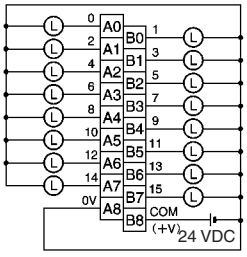
CJ1W-OD204

Circuit configuration	Terminal arrangement
	

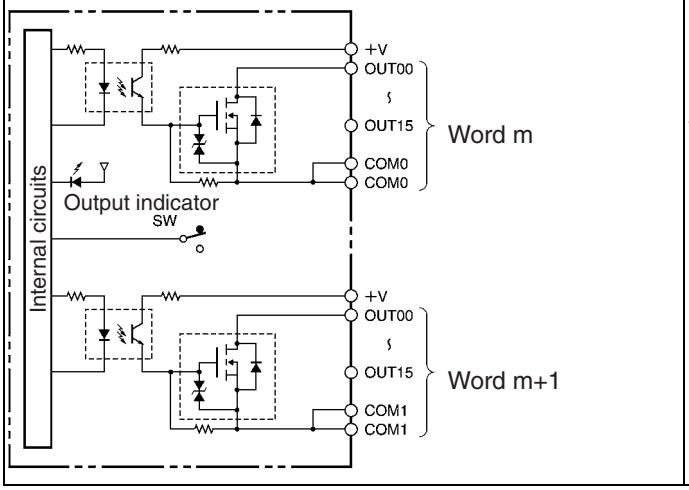
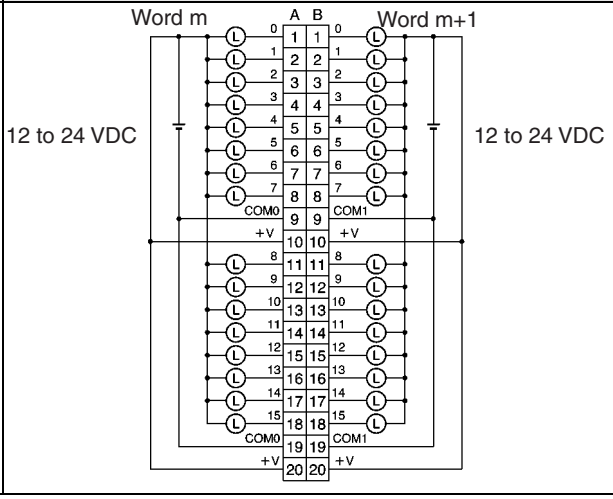
CJ1W-OD211(SL)

Circuit configuration	Terminal arrangement
	

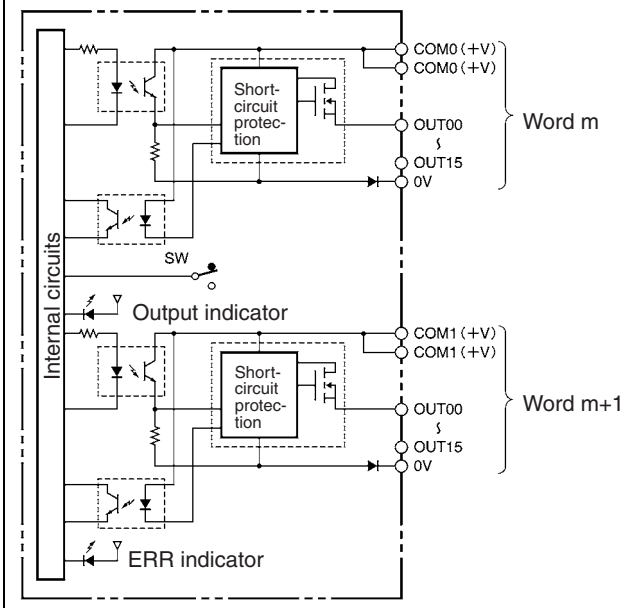
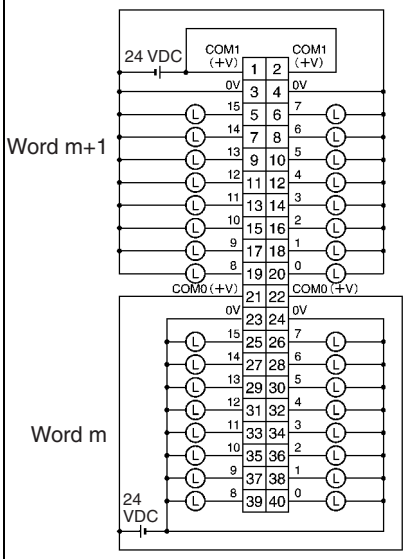
CJ1W-OD212(SL)

Circuit configuration	Terminal arrangement
	

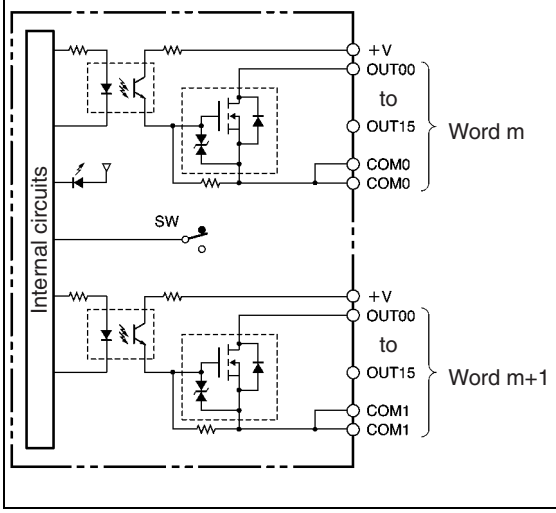
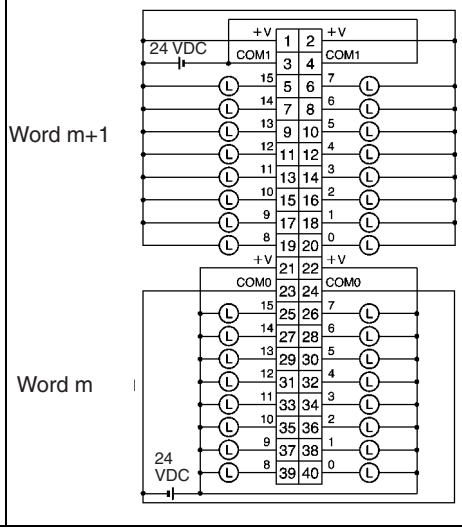
CJ1W-OD231

Circuit configuration	Terminal arrangement
	

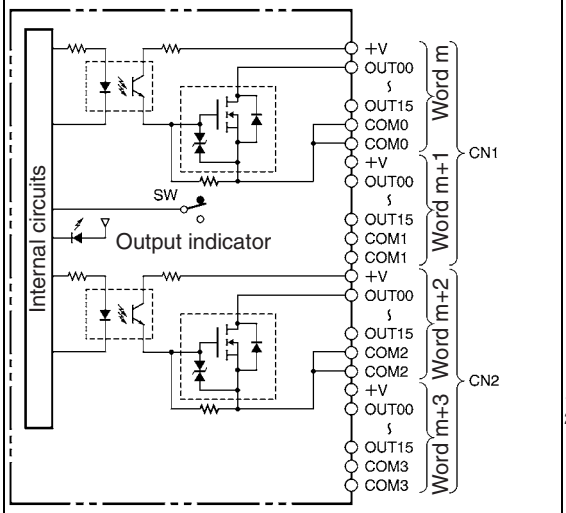
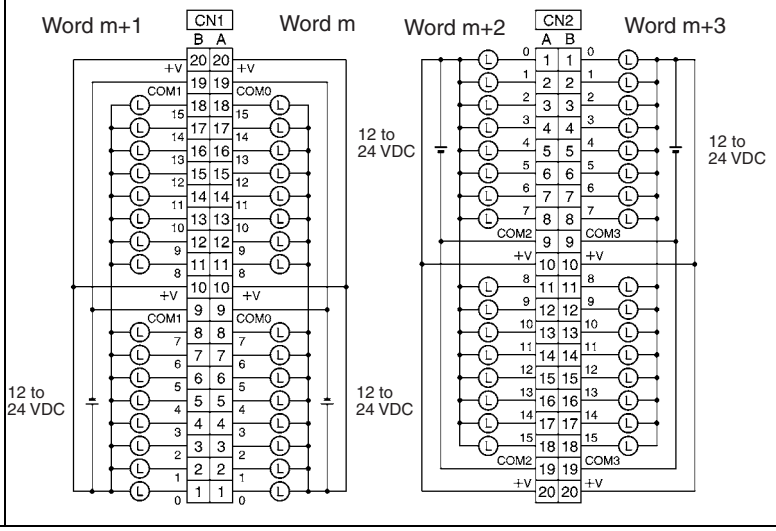
CJ1W-OD232

Circuit configuration	Terminal arrangement
	

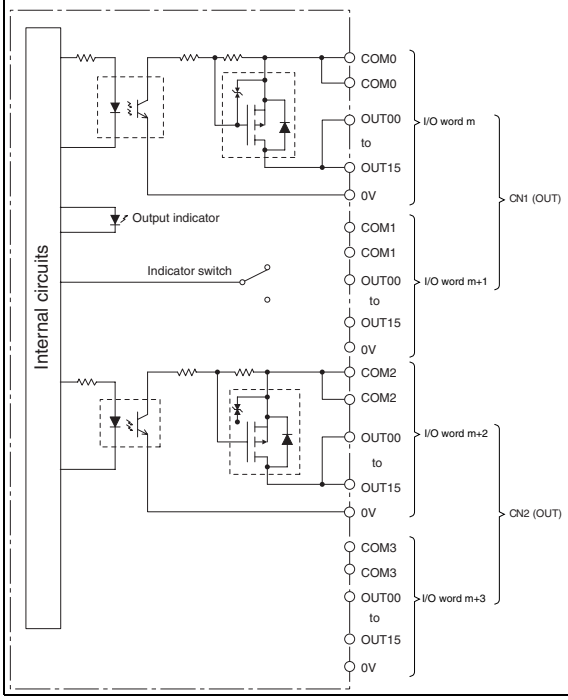
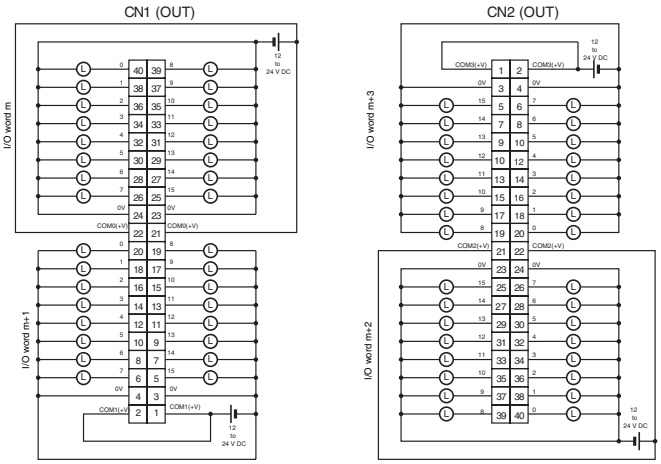
CJ1W-OD233

Circuit configuration	Terminal arrangement
	

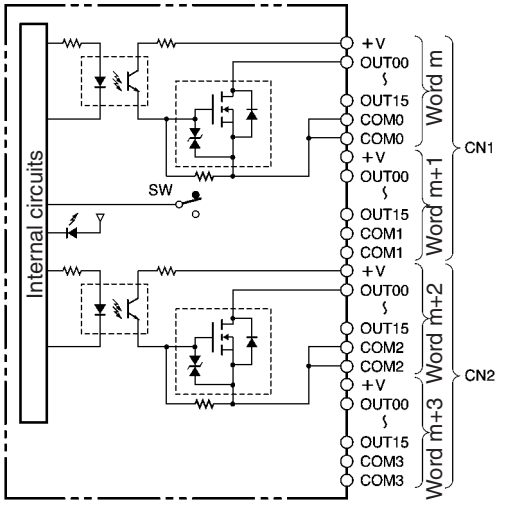
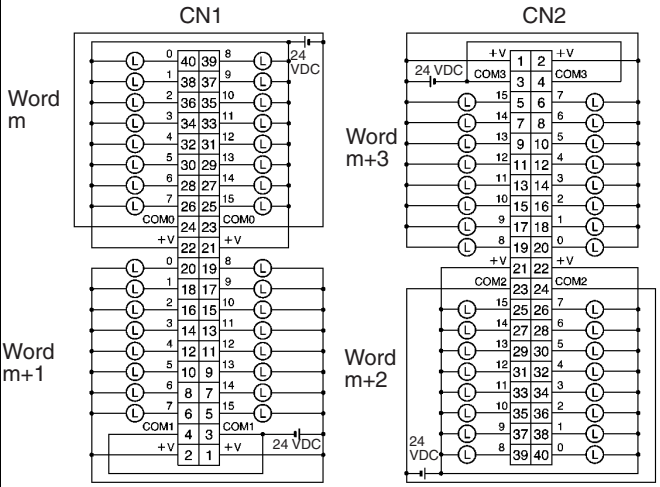
CJ1W-OD261

Circuit configuration	Terminal arrangement
	

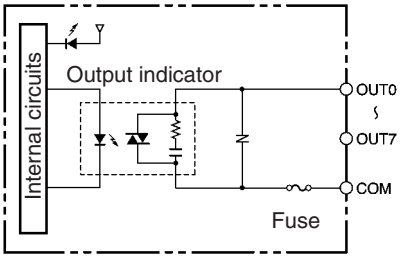
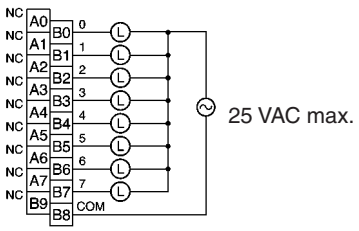
CJ1W-OD262

Circuit configuration	Terminal arrangement
	

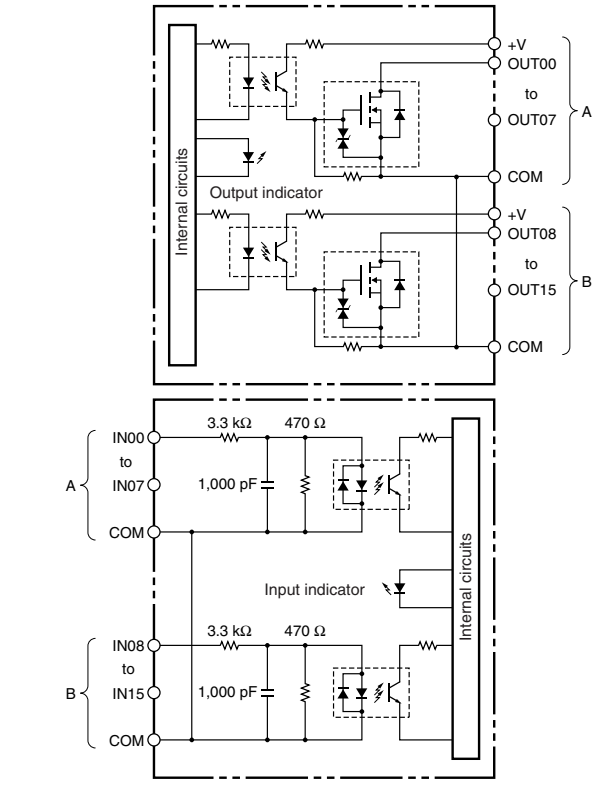
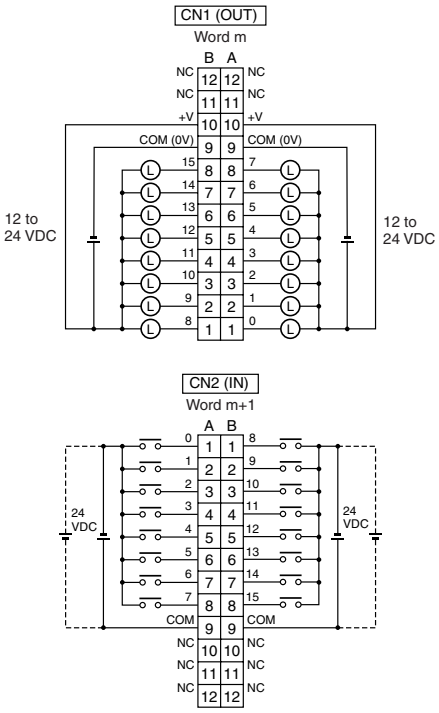
CJ1W-OD263

Circuit configuration	Terminal arrangement
	

CJ1W-OA201

Circuit configuration	Terminal arrangement
	

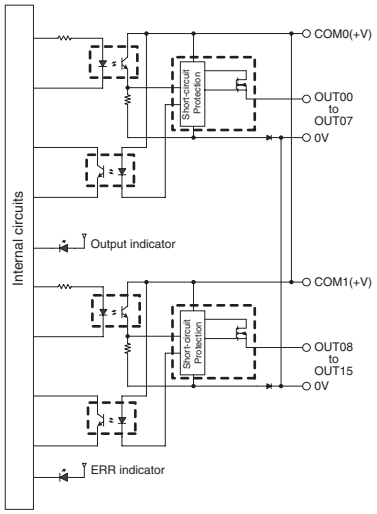
CJ1W-MD231

Circuit configuration	Terminal arrangement
	

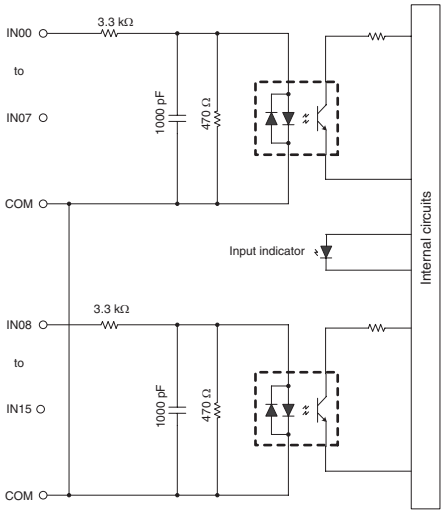
CJ1W-MD232

Circuit configuration	Terminal arrangement

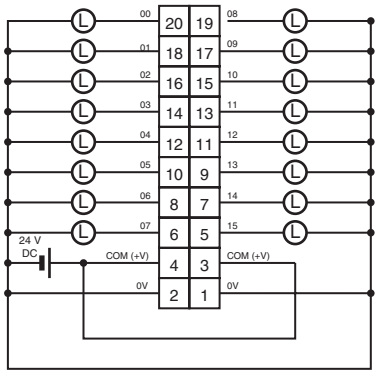
CN1(OUT)



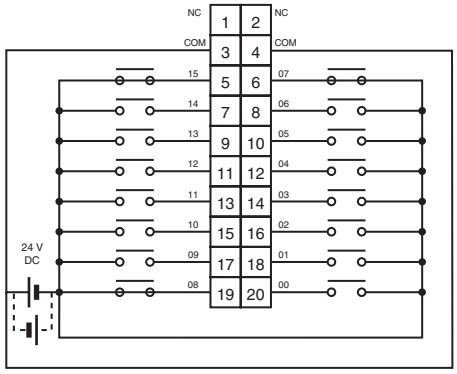
CN2(IN)



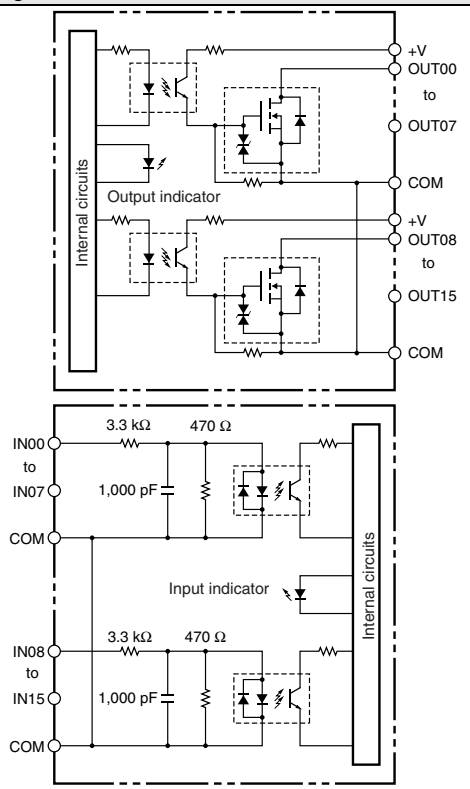
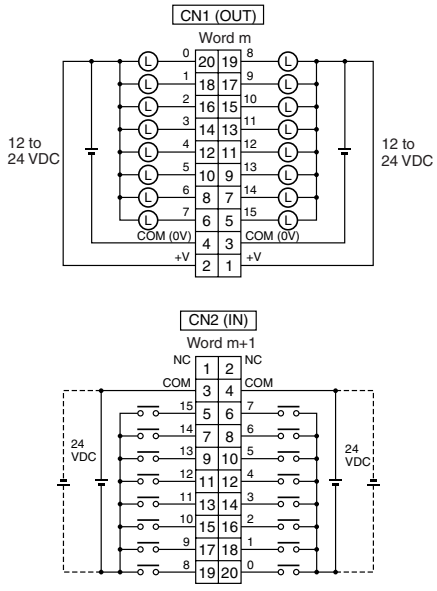
CN1 (Outputs)
I/O word "m"



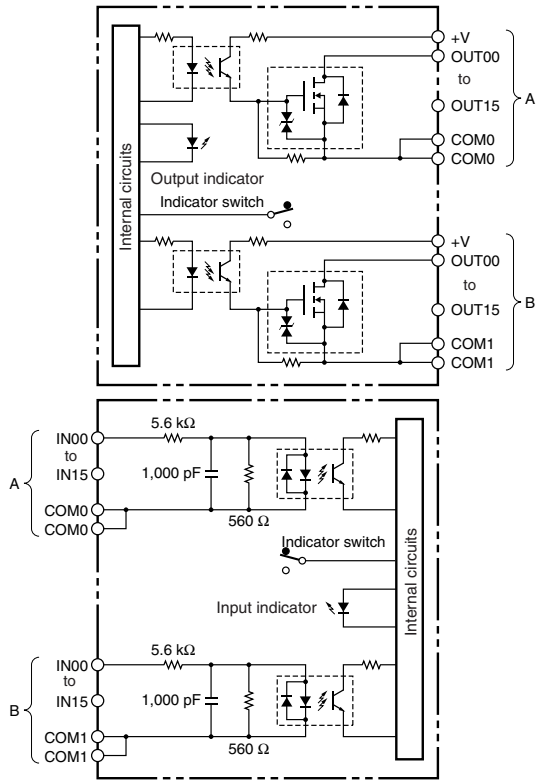
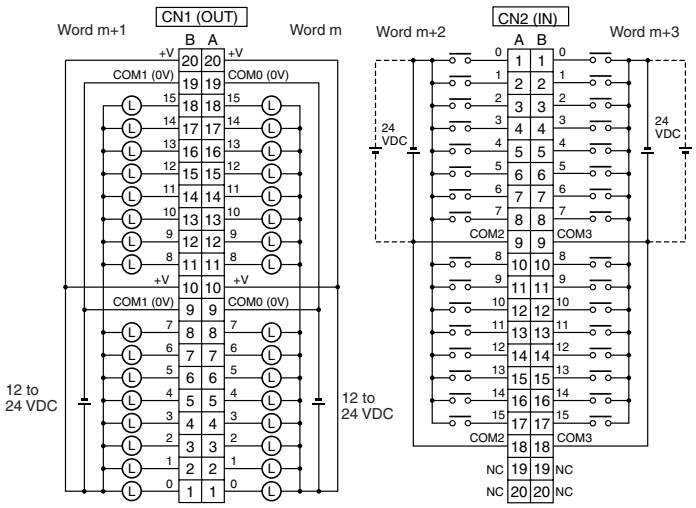
CN2 (Inputs)
I/O word "m+1"



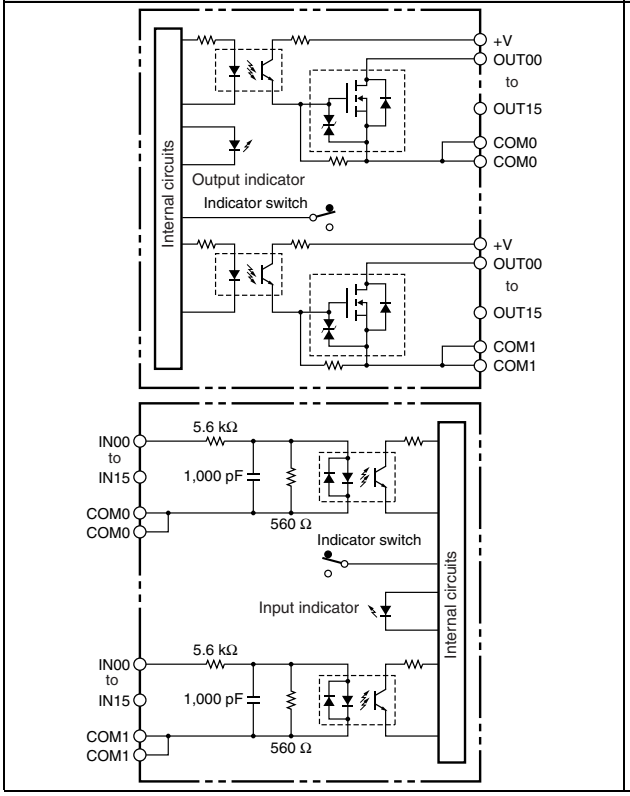
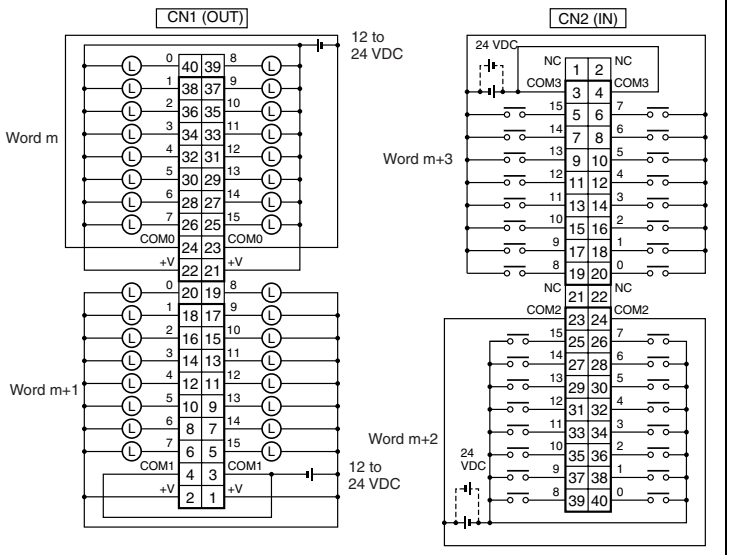
CJ1W-MD233

Circuit configuration	Terminal arrangement
	

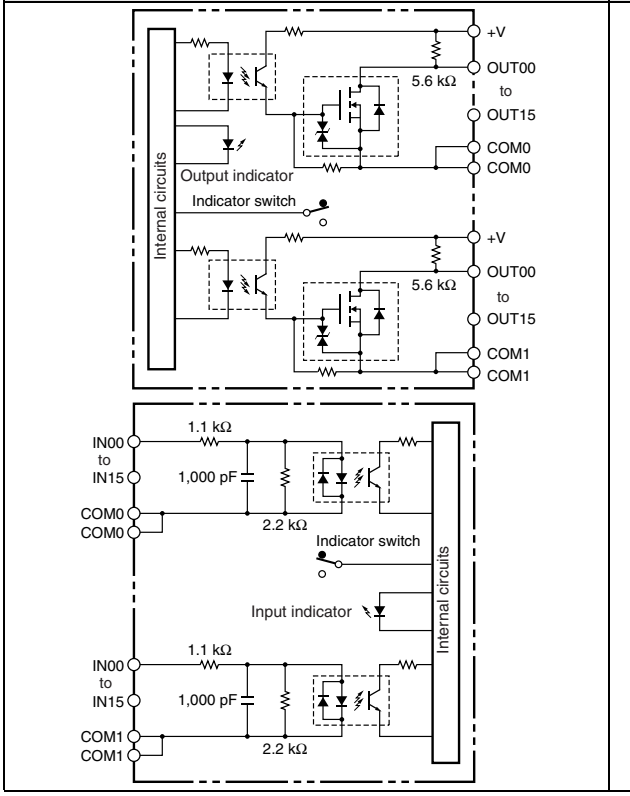
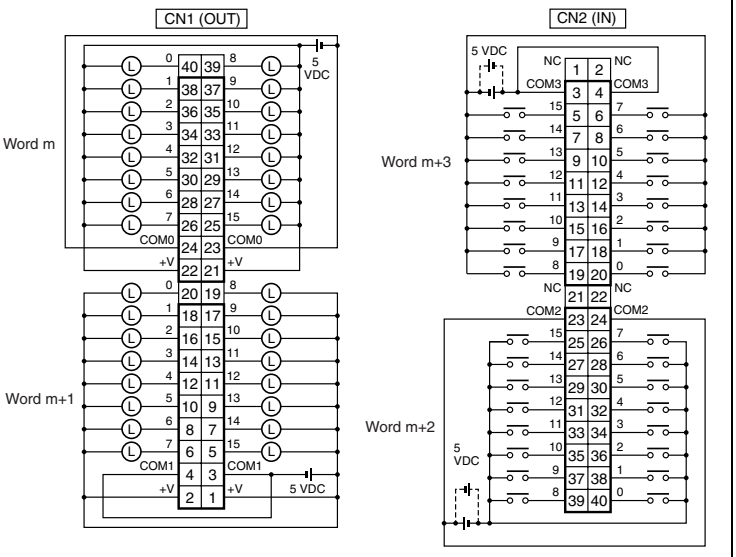
CJ1W-MD261

Circuit configuration	Terminal arrangement
	

CJ1W-MD263

Circuit configuration	Terminal arrangement
	

CJ1W-MD563

Circuit configuration	Terminal arrangement
	

CJ1W-INT01

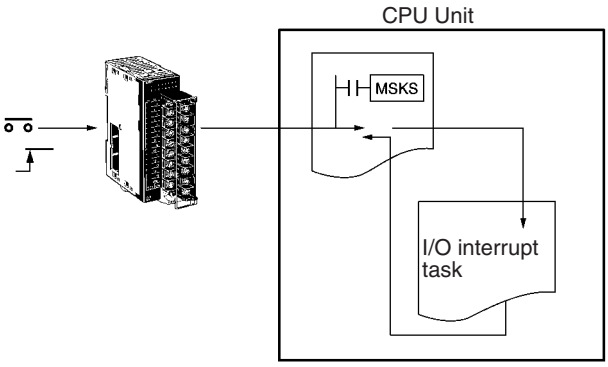
Interrupt Input Unit



High-speed Response for Interrupt Task Execution: 0.37 ms OFF to ON and 0.82 ms ON to OFF

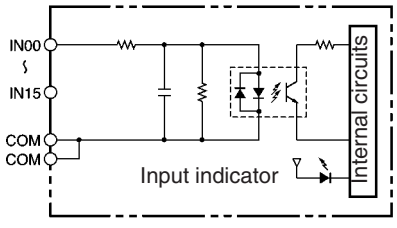
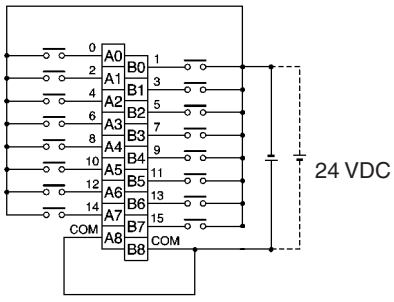
- An input to the Interrupt Input Unit immediately interrupts CPU Unit processing to suspend execution of cyclic tasks (i.e., the normal programming) and execute an I/O interrupt task.

System Configuration



Specifications

Input voltage	Inputs	Input signal pulse width	No. of mountable Units	Mounting location	External connections
24 V DC	16 inputs	ON: 0.05 ms min. OFF: 0.5 ms min.	2 max.	Any of the leftmost 5 slots (CJ1M: 3 slots) next to the CPU Unit on the CPU Rack.	Removable terminal block

Circuit configuration	Terminal connections
	

CJ1W-IDP01

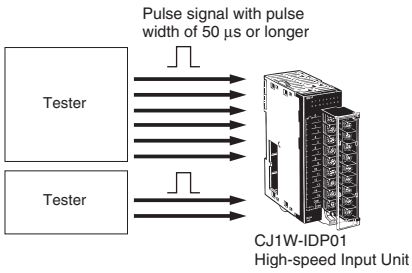
High-speed Input Unit



Latches input pulses as short as 50 µs.

- Reads pulses that are too fast for normal I/O, such as is often requried for signal exchange with inspection devices.
- Reads pulse widths (ON time) as short as 0.05 ms.
- Inputs stored in the internal circuits are cleared in I/O refresh period.

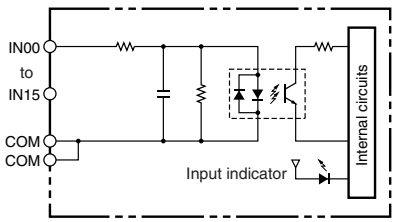
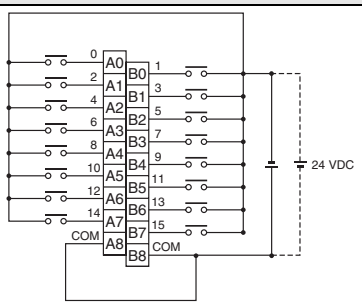
System Configuration



Specifications

Input voltage	Inputs	Input signal pulse width	No. of mountable Units	Mounting location	External connections
24 V DC	16 inputs	ON: 0.05 ms min. OFF: 0.5 ms min.	No restrictions beyond normal limits for CPU Unit	No restrictions	Removable terminal block

Circuit Configuration and Terminal Connections

Circuit configuration	Terminal connections
	

CJ1W-TS561/-TS562

Temperature Input Units

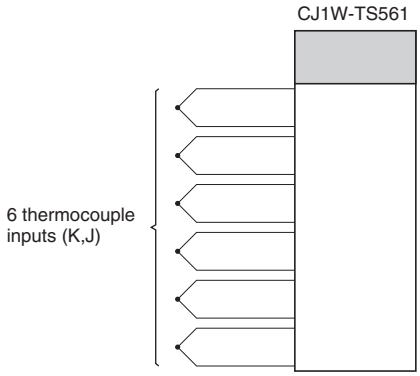


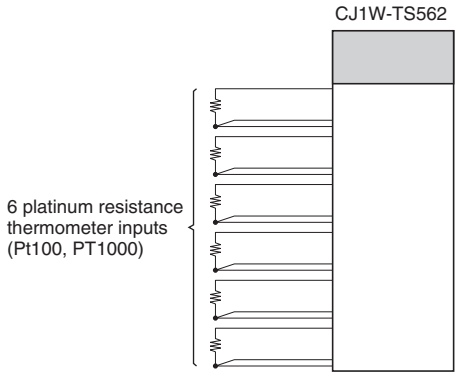
Connect up to 6 temperature sensors per Unit.

These Basic I/O units allow up to 6 temperature sensors to be connected.

- Input types (TS561: thermocouple J/K, TS562 : Pt100/Pt1000) can be selected per channel.
- The unit presents the temperature data in the basic I/O area of the PLC occupying from 3 to 6 CIO words.
- Cold junction compensation (TS561) is provided internally.
- Adjustable filtering allows mains frequencies (50/60 Hz) to be suppressed.
- Broken wire (TC/RTD)and short-circuit alarms (RTD) are provided as error code in the PLC, and by LED indication.
- The unit does not provide galvanic isolation between the input signals.

System Configuration





Terminal arrangement

CJ1W-TS561(SL)

Input 2 (–)	B1	A1	Input 1 (–)
Input 2 (+)	B2	A2	Input 1 (+)
NC	B3	A3	NC
NC	B4	A4	NC
Input 4 (–)	B5	A5	Input 3 (–)
Input 4 (+)	B6	A6	Input 3 (+)
Input 6 (–)	B7	A7	Input 5 (–)
Input 6 (+)	B8	A8	Input 5 (+)
NC	B9	A9	NC

CJ1W-TS562(SL)

Input 2 B'	B1	A1	Input 1 B'
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
Input 4 B'	B4	A4	Input 3 B'
Input 4 B	B5	A5	Input 3 B
Input 4 A	B6	A6	Input 3 A
Input 6 B'	B7	A7	Input 5 B'
Input 6 B	B8	A8	Input 5 B
Input 6 A	B9	A9	Input 5 A

Specifications

Item	Classification: Basic I/O Unit	
	CJ1W-TS561 (SL)	**CJ1W-TS562 (SL)**
Inputs	6 points	
Input Type	Thermocouple types J or K (IEC 60584)	3-wire RTD types Pt100 or Pt1000 (IEC 60751)
Measurement Range	Type J: -100.0 to +850.0 °C, Type K:-200.0 to 1300.0 °C	Pt100/Pt1000: -200.0 to +650.0 °C
Input Assignment	by DIP-switch, any combination of input types is possible	
Output Data	16-bit signed integer, resolution 0.1 °C	
Conversion time	40 ms to 400 ms per active input (depending on filter setting OFF / 50 Hz / 60 Hz / 10 Hz)	
Accuracy	+/- 0.5% of PV or +/- 0.7 °C, whichever is larger, +/- 1 digit max.	+/- 0.5% of PV or +/- 0.8 °C, whichever is larger, +/- 1 digit max.
Cold Junction accuracy	+/- 2.0 °C	n.a.
Sensor connection	terminal block, screw type or screwless clamp (model code + (SL))	

CJ1W-AD□□□(SL)

Analog Input Units



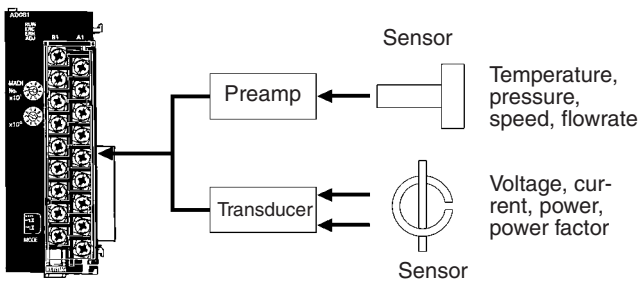
Convert Analog Signals to Binary Data

- Wire burnout detection
- Peak-hold function
- Mean function
- Offset gain setting
- Range selection per intput
- 1/8000 resolution
- 2 ms conversion time for 8 channels

Function

Convert input signals such as 1 to 5 V or 4 to 20 mA to binary values between 0000 and 1F40 Hex and store the results in the allocated words each cycle. The ladder diagram can be used to transfer the data to the DM Area or the SCALING instructions (e.g., SCL(194)) can be used to scale the data to the desired range.

System Configuration



Terminal Arrangement

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (–)	B2	A2	Input 1 (–)
Input 4 (+)	B3	A3	Input 3 (+)
Input 4 (–)	B4	A4	Input 3 (–)
AG	B5	A5	AG
Input 6 (+)	B6	A6	Input 5 (+)
Input 6 (–)	B7	A7	Input 5 (–)
Input 8 (+)	B8	A8	Input 7 (+)
Input 8 (–)	B9	A9	Input 7 (–)

Specifications

Item			Classification: Special I/O Unit	
			CJ1W-AD081-V1(SL)	CH1W-AD041-V1(SL)
Inputs			8 pts	4 pts
Signal range	Voltages	1 to 5 V	Yes	
		0 to 10 V	Yes	
		0 to 5 V	Yes	
		–10 to 10 V	Yes	
	Currents	4 to 20 mA	Yes	
Signal range settings			8 settings (one for each point)	4 settings (one for each point)
Resolution			1/4000 (default) or 1/8000 (selectable)	
Conversion speed			1 ms/point (default), or 250 μs/point (selectable)	
Overall accuracy (at 23 °C)			Voltage: ±0.2% Current: ±0.4%	
Overall accuracy (0 to 55 °C)			Voltage: ±0.4% Current: ±0.6%	
Connections			Terminal block	
Features	Wire burnout detection		Yes	
	Peak-hold function		Yes	
	Averaging		Yes	
Unit No.			0 to 95	

CJ1W-DA□□□(SL)

Analog Output Units



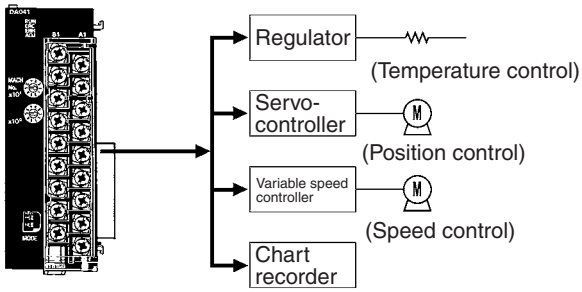
Convert Binary Data to Analog Signals

- Output hold
- Offset gain adjustment
- Range selection per output
- 1 ms conversion time per channel
- 1/8000 resolution

Function

Binary data between 0000 to 0FA0 Hex in the allocated words can be convert to analog signals such as 1 to 5 V or 4 to 20 mA for output. All that is required in the ladder diagram is to place the data in the allocated words.

System Configuration



Terminal Arrangement

CJ1W-DA08V/DA08C(SL)

Output 2 (+)	B1	A1	Output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Output 4 (+)	B3	A3	Output 3 (+)
Output 4 (–)	B4	A4	Output 3 (–)
Output 6 (+)	B5	A5	Output 5 (+)
Output 6 (–)	B6	A6	Output 5 (–)
Output 8 (+)	B7	A7	Output 7 (+)
Output 8 (–)	B8	A8	Output 7 (–)
0 V	B9	A9	24 V

CJ1W-DA041(SL)

Voltage output 2 (+)	B1	A1	Voltage output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Current output 2 (+)	B3	A3	Current output 1 (+)
Voltage output 4 (+)	B4	A4	Voltage output 3 (+)
Output 4 (–)	B5	A5	Output 3 (–)
Current output 4 (+)	B6	A6	Current output 3 (+)
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
0 V	B9	A9	24 V

CJ1W-DA021(SL)

Voltage output 2 (+)	B1	A1	Voltage output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Current output 2 (+)	B3	A3	Current output 1 (+)
N.C.	B4	A4	N.C.
N.C.	B5	A5	N.C.
N.C.	B6	A6	N.C.
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
0 V	B9	A9	24 V

Specifications

Item			Classification: Special I/O Unit			
			CJ1W-DA08V(SL)	CJ1W-DA08C(SL)	CJ1W-DA041(SL)	CJ1W-DA021(SL)
Outputs			8 points	8 points	4 points	2 points
Signal range	Voltages	1 to 5 V	Yes	No	Yes	Yes
		0 to 10 V	Yes	No	Yes	Yes
		0 to 5 V	Yes	No	Yes	Yes
		–10 to 10 V	Yes	No	Yes	Yes
	Currents	4 to 20 mA	No	Yes		
Maximum load current (for voltage outputs):			2,4 mA	n.a.	12 mA	
Maximum load resistance (current outputs):			n.a.	350 Ω	600 Ω	
Signal range settings			8 settings (one for each point)	8 settings (one for each point)	4 settings (one for each point)	2 settings (one for each point)
Resolution			1/4000 (default) or 1/8000 (selectable)	1/4000 (default) or 1/8000 (selectable)	1/4000	
Conversion speed			1.0 ms/point (default) or 250 µs/point (selectable)	1.0 ms/point (default) or 250 µs/point (selectable)	1.0 ms/pt max.	
Overall accuracy (at 23 °C)			Voltage: ±0.3% Current: ±0.5%			
Overall accuracy (0 to 55 °C)			Voltage: ±0.5% Current: ±0.8%			
Connections			Terminal block			
Unit No.			0 to 95			
External power supply			24 V DC +10%/–15%, 140 mA max.	24 V DC +10%/–15%, 170 mA max.	24 V DC +10%/–15%, 200 mA max.	24 V DC +10%/–15%, 140 mA max.

CJ1W-MAD42(SL)

Analog I/O Unit



Handles 4 Analog Inputs and 2 Analog Outputs

- Conversion time: 3 ms for all 6 channels combined
- Resolution: 1/8000

Analog Inputs

- Wire burnout detection
- Peak hold function
- Mean function
- Offset gain setting

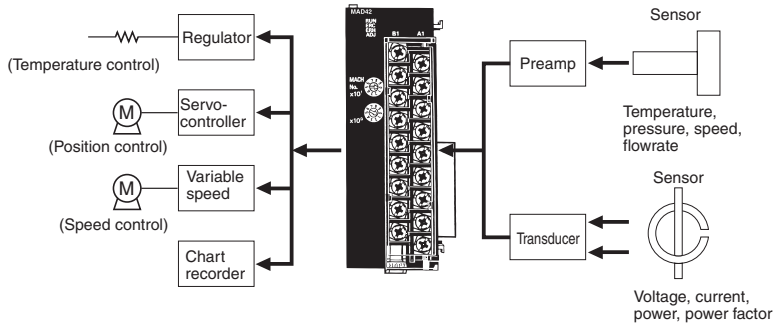
Analog Outputs

- Output hold
- Offset gain adjustment

Other Features

- Scaling function

System Configuration



Terminal Arrangement

Voltage output 2 (+)	B1	A1	Voltage output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Current output 2 (+)	B3	A3	Current output 1 (+)
N.C.	B4	A4	N.C.
Input 2 (+)	B5	A5	Input 1 (+)
Input 2 (–)	B6	A6	Input 1 (–)
AG	B7	A7	AG
Input 4 (+)	B8	A8	Input 3 (+)
Input 4 (–)	B9	A9	Input 3 (–)

Specifications

Item			Classification: Special I/O Unit	
			Inputs	Outputs
Inputs/outputs			4 pts	2 pts
Signal range	Voltages	1 to 5 V	Yes	
		0 to 10 V	Yes	
		0 to 5 V	Yes	
		–10 to 10 V	Yes	
	Currents	4 to 20 mA	Yes	
Input impedance			Voltage inputs 1 MΩ, Current inputs 250 Ω	---
Maximum load current (for voltage outputs)				2.4 mA
Maximum load resistance (current outputs)				600 Ω
Signal range settings			4 settings (one for each point)	2 settings (one for each point)
Resolution			1/4000 (default), 1/8000 (selectable)	
Conversion speed			1.0 ms/point (default) or 500 μs/point (selectable)	
Overall accuracy (at 23 °C)			Voltage: ±0.2% Current: ±0.2%	Voltage: ±0.3% Current: ±0.3%
Overall accuracy (0 to 55 °C)			Voltage: ±0.5% Current: ±0.6%	
Connections			Terminal block	
Functions		Wire burnout	Yes	---
		Peak hold	Yes	---
		Mean	Yes	---
		Output hold	---	Yes
		Scaling	Yes	
Unit No.			0 to 95	

CJ1W-PTS5□

Process Input Units



Directly Input Four Temperature Sensors

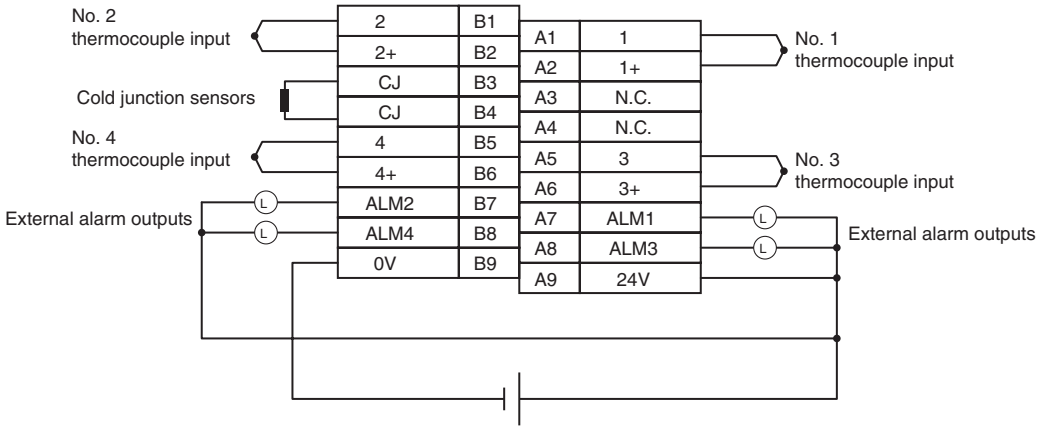
- Up to four temperature sensor inputs can be directly connected to a single Unit (input signal/ range shared by the four inputs)
- Models with isolation between channels prevent unwanted current paths between Temperature Sensor inputs.
- Measurement value alarm with hysteresis/ON delay (two inputs per channel, one of which can be set as a DO output from the Unit).
- High-resolution, high-speed 2 channel input models provide configurable alarms and maintenance functions

Function

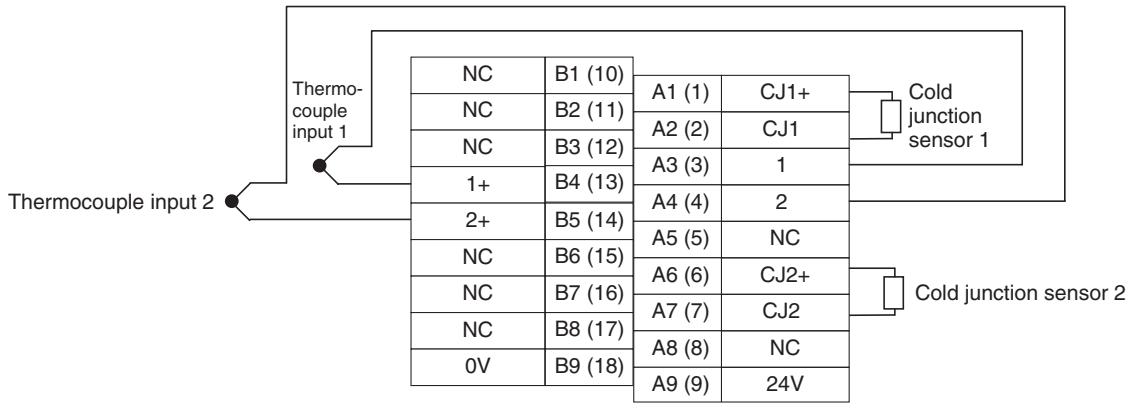
Converts the measured value of DC voltage/current signals, thermocouple or platinum-resistance thermometer inputs (up to 4 points) into binary or BCD code, and stores in the allocated memory area every cycle. The ladder program can be used to transfer the data to a specified words in data memory for use.

Terminal arrangements

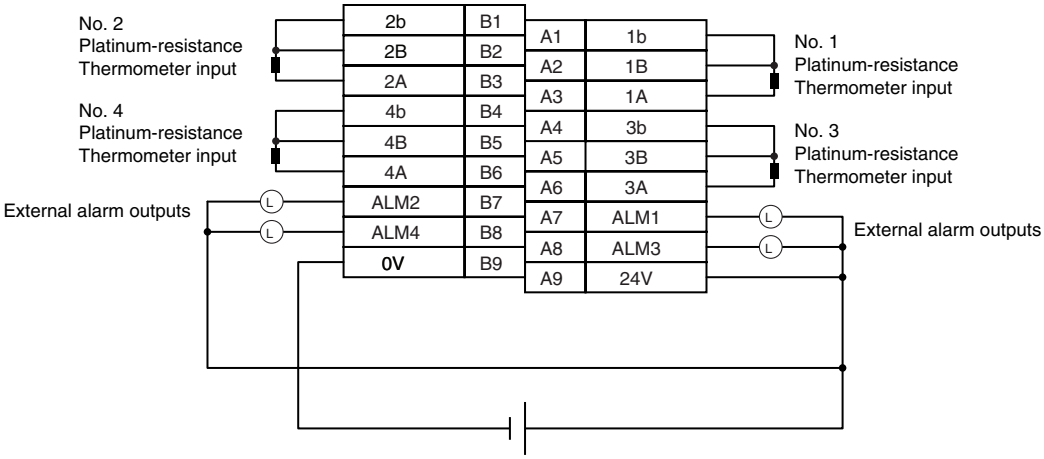
CJ1W-PTS51



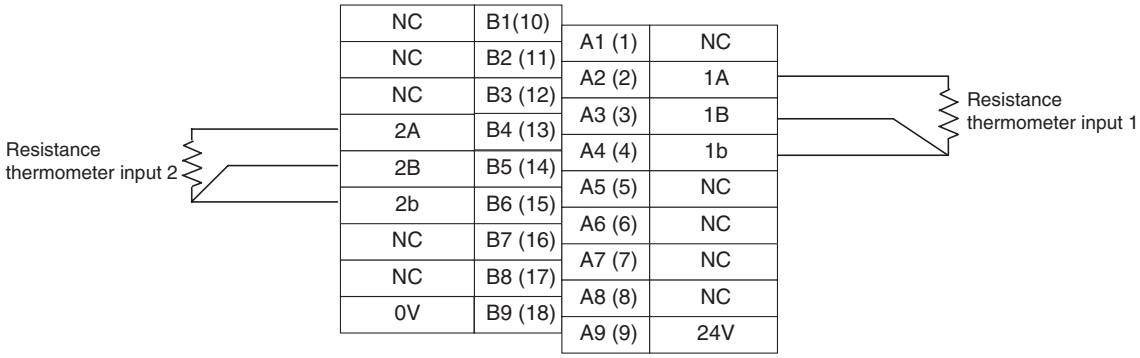
CJ1W-PTS15



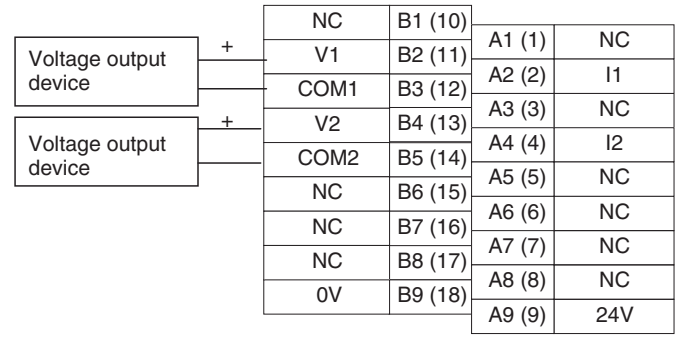
CJ1W-PTS52

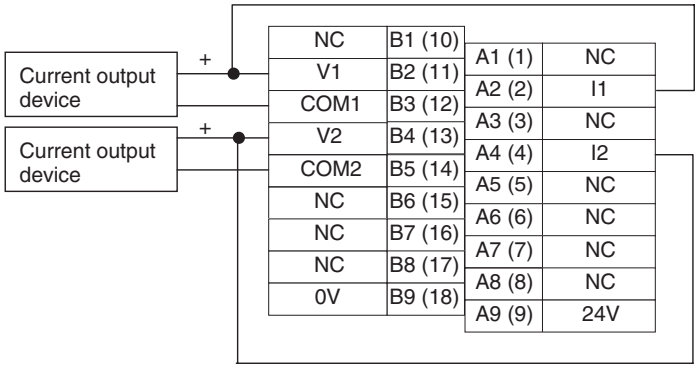


CJ1W-PTS16



CJ1W-PDC15





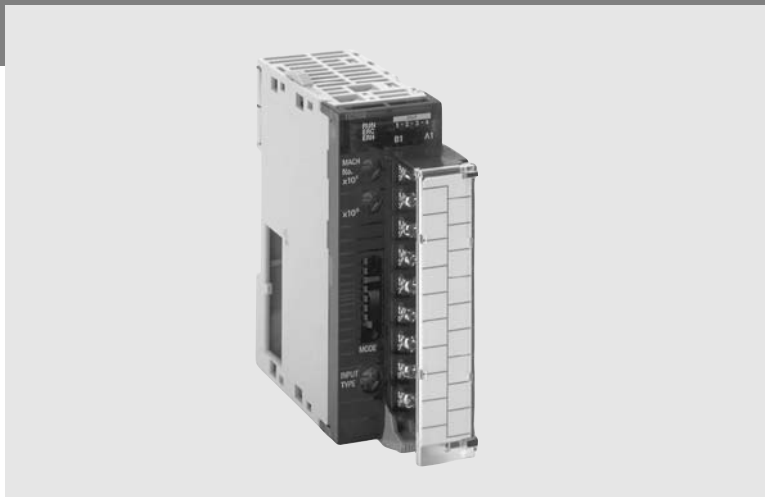
Specifications

Item	Specification				
	CJ1W-PDC15	CJ1W-PTS15	CJ1W-PTS16	CJ1W-PTS51	CJ1W-PTS52
Inputs	2 inputs			4 inputs	
Input signals	4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, -1.25 to 1.25 V, User-defined	Thermocouple B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, -100 to 100 mV	Pt50, Pt100 JPt100, Ni508.4	Thermocouple B, J, K, L, R, S, T	Pt100, JPt100
Input signal ranges	Selectable per input			Same for all 4 inputs	
A/D conversion output data	16-bit binary data, user-adjustable zero/span			Temperature data in binary or BCD (16 bit)	
Conversion speed	10 ms / 2 inputs			250 ms / 4 inputs	
Overall accuracy	± 0.05% at 25 °C	± 0.05% at 25 °C *1 Cold junction compensation error ±1°C, at 20 ±10°C	± 0.05 % or ± 0.1 °C, whichever is larger (at 25 °C)	± 0.3 % of PV or ± 1 °C, whichever is larger, ± 1 digit max.*1	± 0.3 % of PV or ± 0.8 °C, whichever is larger, ± 1 digit max.
Connections	Terminal block				
Unit classification	CJ1-series Special I/O Unit				
Unit No.	0 to 95				

*1 Accuracy of the measured value depends on thermocouple type and actual temperature. Consult Operation Manual W368-E1 for details.

CJ1W-TC□□

Temperature Control Units



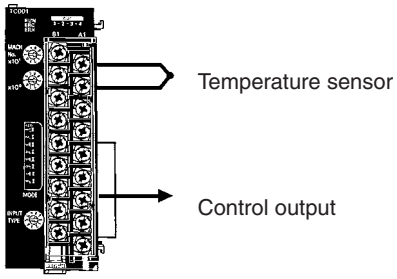
One Unit Functions as Four Temperature Controllers

- Supports 2-loop or 4-loop PID control or ON/OFF control.
- The PID constants for PID control can be set using auto-tuning (AT).
- Select either forward (cooling) operation or reverse (heating) operation.
- Input directly from temperature sensors. (Thermocouples: R, S, K, J, T, B, or L; or platinum resistance thermometers: JPt100 or Pt100.)
- Open collector output
- Sampling period: 500 ms
- RUN/STOP control.
- Two internal alarms per loop.
- With 2-loop models, a current transformer can be connected to each loop to detect heater burnout.

Function

Perform PID control (two degrees of freedom) or ON/OFF control based on inputs from thermocouples or platinum resistance thermometers to control open collector output. Four-loop models and two-loop models (with heater burnout detection function) are available. Words allocated to the Unit in memory can be manipulated from the ladder diagram to start/stop operation, set the target value, read the process value, or perform other operations.

System Configuration



Terminal Wiring Examples

Thermocouple Temperature Control Units

CJ1W-TC001 (4 loops, NPN outputs)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
Input 4 –	B5	A5	Input 3 –
Input 4 +	B6	A6	Input 3 +
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V COM (–)	B9	A9	24 V

CJ1W-TC002 (4 loops, PNP outputs)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
Input 4 –	B5	A5	Input 3 –
Input 4 +	B6	A6	Input 3 +
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V	B9	A9	24 V COM (+)

CJ1W-TC003 (2 loops, NPN outputs, HB alarm)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V COM (–)	B9	A9	24 V

CJ1W-TC004 (2 loops, PNP outputs, HB alarm)

Input 2 –	B1	A1	Input 1 –
Input 2 +	B2	A2	Input 1 +
Cold-junction comp.	B3	A3	N.C.
Cold-junction comp.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V	B9	A9	24 V COM (+)

Note: Do not connect any wiring to the N. C. terminals.

Platinum Resistance Thermometer Temperature Control Units

CJ1W-TC101 (4 loops, NPN outputs)

Input 2 B’	B1	A1	Input 1 B’
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
Input 4 B’	B4	A4	Input 3 B’
Input 4 B	B5	A5	Input 3 B
Input 4 A	B6	A6	Input 3 A
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V COM (–)	B9	A9	24 V

CJ1W-TC102 (4 loops, PNP outputs)

Input 2 B’	B1	A1	Input 1 B’
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
Input 4 B’	B4	A4	Input 3 B’
Input 4 B	B5	A5	Input 3 B
Input 4 A	B6	A6	Input 3 A
Output 2	B7	A7	Output 1
Output 4	B8	A8	Output 3
0 V COM (–)	B9	A9	24 V COM (+)

CJ1W-TC103 (2 loops, NPN outputs, HB alarm)

Input 2 B’	B1	A1	Input 1 B’
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
N.C.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V COM (–)	B9	A9	24 V

CJ1W-TC104 (2 loops, PNP outputs, HB alarm)

Input 2 B’	B1	A1	Input 1 B’
Input 2 B	B2	A2	Input 1 B
Input 2 A	B3	A3	Input 1 A
N.C.	B4	A4	N.C.
CT input 2	B5	A5	CT input 1
CT input 2	B6	A6	CT input 1
Output 2	B7	A7	Output 1
HB output 2	B8	A8	HB output 1
0 V	B9	A9	24 V COM (+)

Note: Do not connect any wiring to the N. C. terminals.

Specifications

Classification	Temperature sensor inputs	Number of loops	Control outputs	Unit numbers	Model
Special I/O Unit	Thermocouples (R, S, K, J, T, B, or L)	4 loops	Open collector NPN output (pulse)	0 to 94	CJ1W-TC001
			Open collector PNP output (pulse)		CJ1W-TC002
		2 loops (with heater burnout detection function)	Open collector NPN output (pulse)		CJ1W-TC003
			Open collector PNP output (pulse)		CJ1W-TC004
	Platinum resistance thermometers (JPt100 or Pt100)	4 loops	Open collector NPN output (pulse)		CJ1W-TC101
			Open collector PNP output (pulse)		CJ1W-TC102
		2 loops (with heater burnout detection function)	Open collector NPN output (pulse)		CJ1W-TC103
			Open collector PNP output (pulse)		CJ1W-TC104

CJ1W-NC□□

Position Control Units



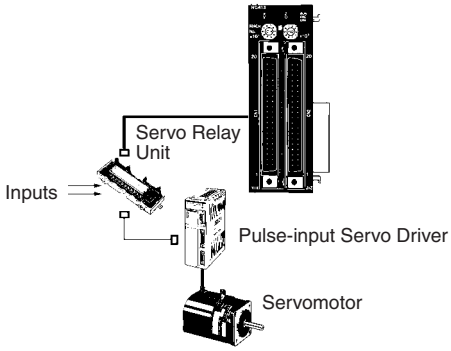
High-speed, High-precision Positioning with 1, 2, or 4 Axes

- Simple positioning systems can be created by directly specifying operation from the CPU Unit when required.
- Positioning data is saved in internal flash memory, eliminating the need to maintain a backup battery.
- Use Windows-based Support Software (CX-Position) to easily create positioning data and store data and parameters in files.
- S-curve acceleration/deceleration, forced starting, and other features also supported.
  - Position, speed and acceleration settings can be changed during operation
  - Speed and acceleration can be modified during Jog operation
  - Parameters and data are easily backed up to a memory card in the CPU unit

Function

These Position Control Units support open-loop control with pulse-train outputs. Position using automatic trapezoid or S-curve acceleration and deceleration. Models available with 1, 2, or 4 axes. Use in combination with servomotors or stepping motors what accept pulse-train inputs.

System Configuration

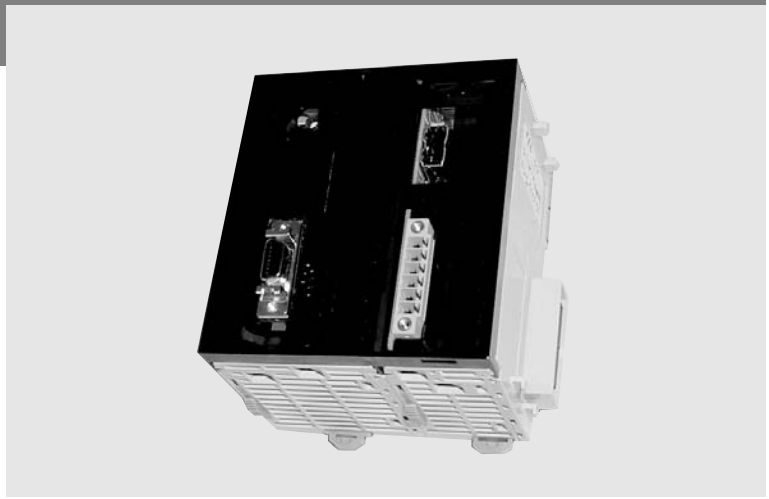


Specifications

Model	CJ1W-NC113 CJ1W-NC133	CJ1W-NC213 CJ1W-NC233	CJ1W-NC413 CJ1W-NC433
Unit name	Position Control Unit		
Classification	Special I/O Unit		
Unit numbers	0 to 95		0 to 94
Control method	Open-loop control by pulse train output		
Control output interface	CJ1W-NC□13: Open-collector output CJ1W-NC□33: Line-driver output		
Controlled axes	1	2	4
Operating modes	Direct operation or memory operation		
Data format	Binary (hexadecimal)		
Affect on scan time for end refresh	0.29 to 0.41 ms max./unit		
Affect on scan time for IOWR/IORD	0.6 to 0.7 ms max./instructions		
Startup time	2 ms max. (Refer to operation manual for conditions.)		
Position data	–1,073,741,823 to +1,073,741,823 pulses		
No. of positions	100 per axis		
Speed data	1 to 500 kpps (in 1-pps units)		
No. of speeds	100 per axis		
Acceleration/ deceleration times	0 t 250 s (time to max. speed)		
Acceleration/ deceleration curves	Trapezoidal or S-curve		
Saving data in CPU	Flash memory		
Windows-based Support Software	CX-Position (WS02-NCTC1-E)		
Ambient operating temperature	0 to 55 °C		0 to 50 °C
External power supply	24 V DC ±10%, 5 V DC ±5% (line driver only)		24 V DC ±5%, 5 V DC ±5% (line driver only)

CJ1W-MCH71 - MECHATROLINK-II

Motion Control Unit



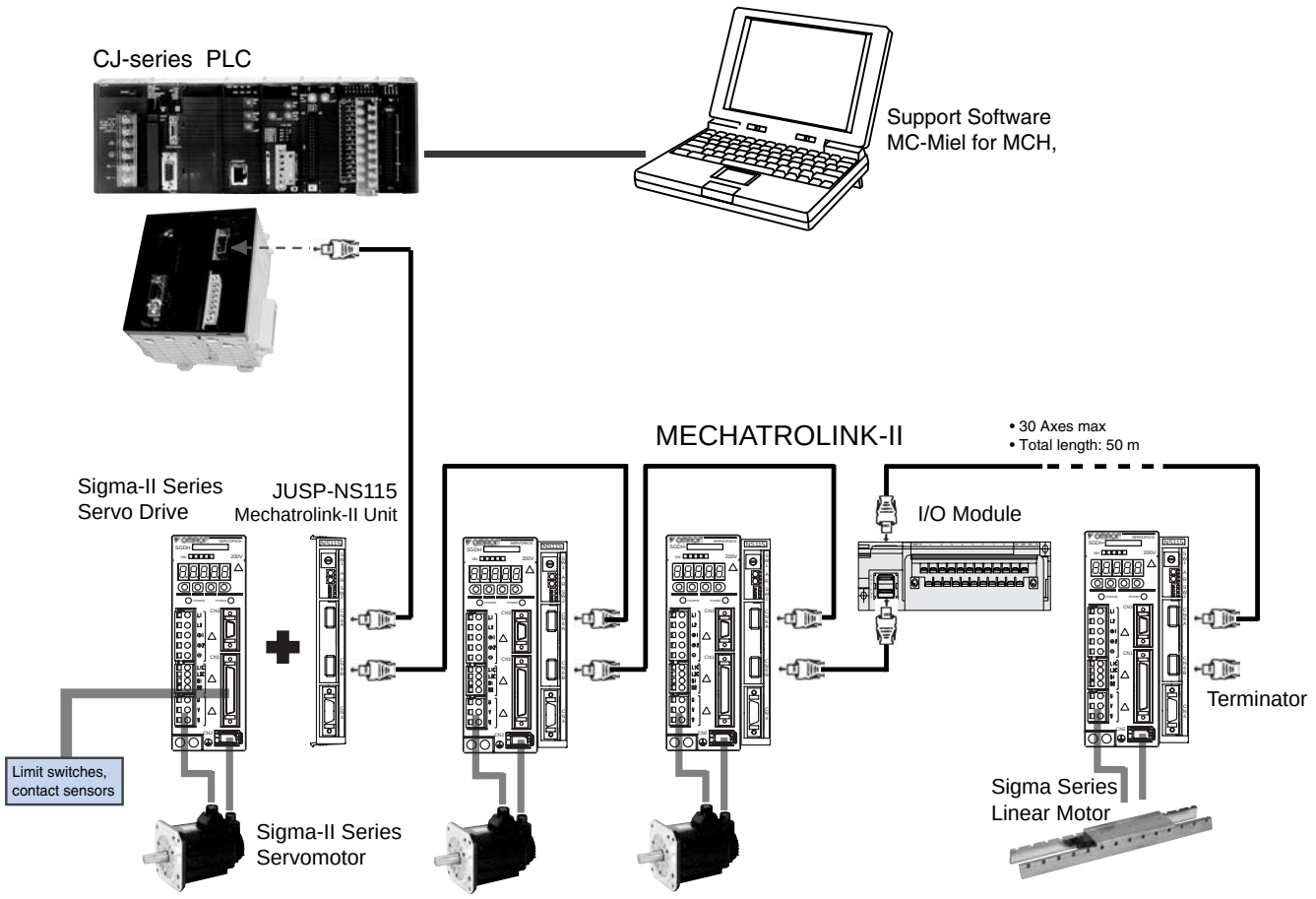
Multi-axes Motion Control over high-speed MECHATROLINK-II

- Up to 30 axes controlled with minimum wiring
- High-speed bus MECHATROLINK-II is specially designed for Motion Control
- Supports Position, speed and Torque control
- Electronic CAM profiles and axes synchronization
- Hardware registration input for every axis
- Program control commands, like Multi-task programming and branching commands, and various arithmetic operations for maximum program efficiency
- Access to the complete system from one point

Function

Multi-axes control is made easy by freely combining control axes. Up to 32 axes can be used, including 30 physical axes and two virtual axes, and each axis can be set individually. Position Control, synchronized control (electronic gear, electronic Cam, follow-up), speed control, and torque control are all supported, enabling a wide range of applications. By using the high-speed servo communications MECHATROLINK-II, motion programs, system parameters, system data, and servo drive parameters can be set and read from the software tool.

System Configuration



Specifications

Motion Control Unit

Model		CJ1W-MCH71
Classification		CJ-series CPU Bus unit
Applicable PLCs		CJ-series V. 2.0 or later
Control Method		MECHATROLINK-II (Position, Speed and Torque control)
Controlled devices		Sigma-II series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface and various I/O Units.
Programming language		BASIC type motion control language
Controlled axes		32 max, including 30 physical or virtual axes and 2 virtual axes
Operating modes		RUN Mode, CPU Mode, Tool Mode/System (depending on Tool)
Automatic/Manual Mode		Automatic Mode: Mode for executing programs in the Unit Manual Mode: Mode for executing commands from the CPU Unit (via allocated words)
Minimum setting unit		1, 0.1, 0.01, 0.001, 0.0001 (Unit: mm, inch, degree, pulse)
Maximum command value		–2,147,483,648 to 2,147,483,647 pulses (32 bits with sign); infinite axis feed mode supported. Example: 16,384 pulses/rev after multiplication, a minimum setting unit of 0.001 mm and 1 mm/rev would result in –1,310,720,000 to 1,310,719,999 command units.
Control functions by command from CPU Unit	Servo lock/unlock	Locks and unlocks the servo driver.
	Jogging	Executes continuous feeding for each axis independently at the speed system parameter times the override.
	Origin search	Determines the machine origin in the direction set in the system parameters. Can be executed with an absolute encoder.
	Absolute origin setting	Sets the origin for when an absolute encoder is used. (Offset value: 32 bits [pulses] with sign)
	Machine lock	Stops the output of move commands to axes.
	Single block	Executes motion programs one block at a time.
Control functions by motion program	Positioning (PTP)	Executes positioning independently for each axis at a specified speed or the speed system parameter. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/Unit)
	Linear interpolation	Executes linear interpolation for up to eight axes at a time at the specified interpolation feed speed. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/system)
	Circular interpolation	Executes circular interpolation for two axes in either clockwise or counterclockwise at the specified interpolation feed speed. Helical circular interpolation is also possible with single-axis linear interpolation added. (Simultaneous specification: Two or three axes/block, Simultaneous execution: Up to 16 blocks/system)
	Other functions	Origin searches, interrupt feeding, timed positioning, traverse positioning, independent electronic CAM, synchronized electronic CAM, link operation, electronic gear, follow-up synchronization, speed reference, torque reference
Acceleration/deceleration curve, acceleration/deceleration time		Trapezoidal or S-curve, 60,000 ms max. (S-curve: Constant 30,000 ms max.)
External I/O		One port for MECHATROLINK-II Servo communications, one deceleration stop input, two general inputs, two general outputs
Feed rate		Rapid, interpolation feed rate: 1 to 2,147,483,647 (command units/min)
Override		0.00% to 327.67% (setting unit: 0.01%; Can be set for each axis or task.)
Motion programs	Number of tasks, number of programs	Up to 8 tasks and 256 programs/Unit (8 parallel branches per task max.)
	Program numbers	0000 to 0499 for main program; 0500 to 0999 for subroutine
	Program capacity	In motion program conversion, 8,000 blocks/Unit max. (2 Mbytes); number of blocks: 800
	Data capacity	Position data: 10,240 points/Unit; Cam data: 32 max.; 16,000 points/Unit
	Subroutine nesting	Five levels max.
	Start	Programs in other tasks can be started from a program.
	Deceleration stop	Decelerates to a stop regardless of the block.
	Block stop	Decelerates to a stop after the block being executed is ended.
	Single block	Executes the program one block at a time.
Data exchange with CPU Unit	Words allocated to Unit in CIO Area	Uses one unit number (25 words). Used for Unit and tasks: 11 to 25 words (depending on the number of tasks)
	Words allocated to Unit in DM Area	Uses one unit number (100 words). Used for Unit and tasks: 32 to 74 words (depending on the number of tasks)
	Any area (bits)	Axes: 0 to 64 words (depending on the maximum axis number used)
	Any area (data)	Axes: 0 to 128 words (depending on the maximum axis number used)
	Any area (data)	General I/O: 0 to 1,280 words (depending on the settings)
Saving programs and data		Memory Card backup (in CPU Unit, 100,000 times max.)
Self-diagnostic functions		Watchdog, RAM check, etc.
Error detection functions		Deceleration stop inputs, unit number errors, CPU errors, software limit errors, etc.
Error log function		Read by IORD instruction from CPU Unit.
Support Software		Microsoft Windows 2000 or NT 4.0 (Processor: Pentium, 100 MHz min., with at least 64 MB of memory)
External power supply voltage		24 V DC (21.6 to 26.4 V DC)
Internal current consumption		0.6 A or less for 5 V DC
Weight (not including connectors)		300 g max.

Note: 1. Take the following factors into account when mounting Motion Control Units under a single CPU Unit:

- The maximum number of CPU Bus Units that can be allocated words in the CPU Unit

- The capacity of the Power Supply Unit on each CPU Rack or Expansion I/O Rack and the current consumption of the Units mounted on the Rack (For details, refer to the Operation Manual for the CPU Unit.)

2. The required power supply must be provided by the user.

3. A Memory Card must be used to add system software functions to the CPU Unit in order to use IOWR and IORD.

CJ1W-NCF71 - MECHATROLINK-II

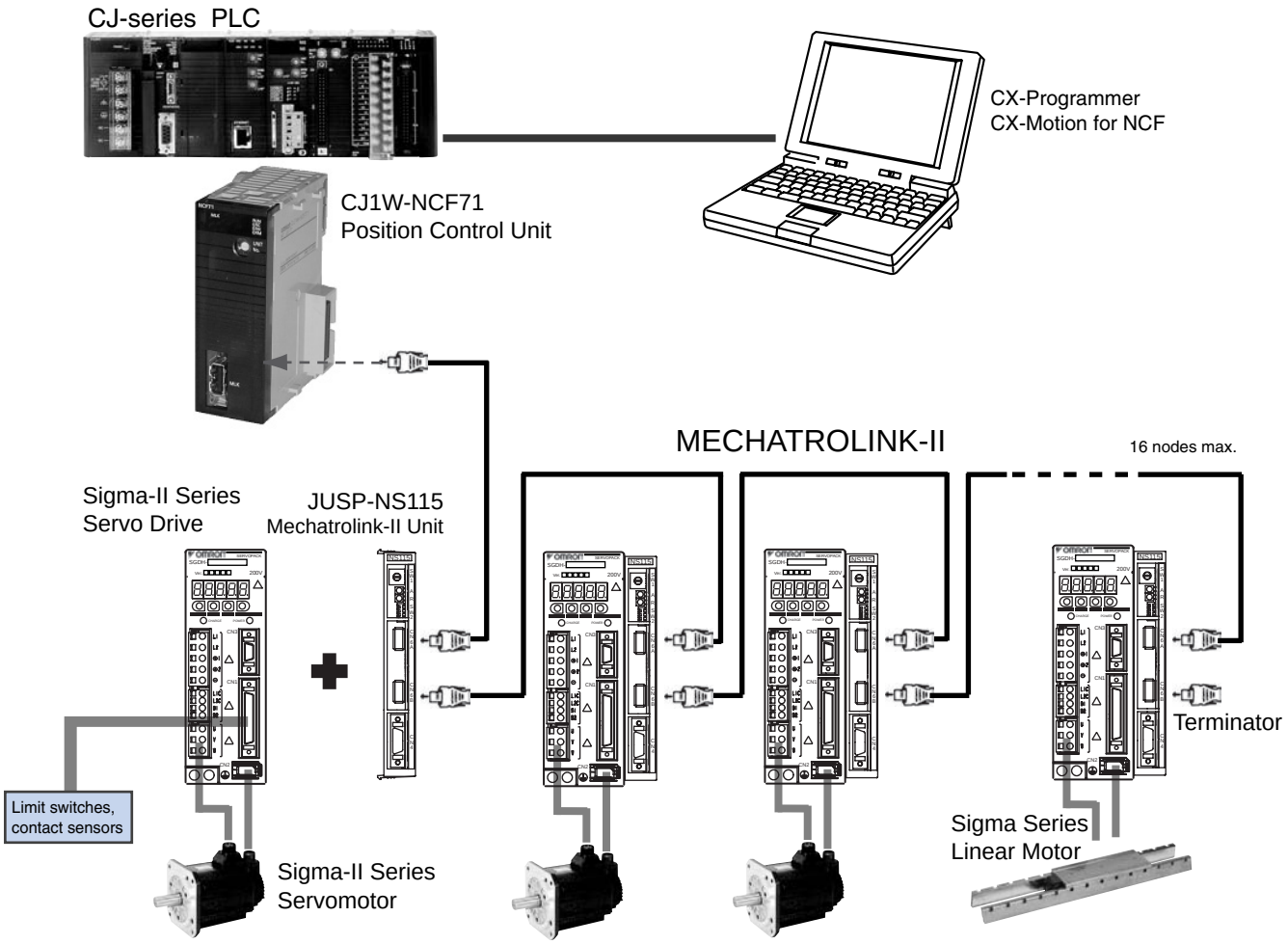
Position Control Unit



Multi-axes Position Controller over high-speed MECHATROLINK-II

- Up to 16 axes controlled with minimum wiring. Only one cable between devices is needed.
- High-speed bus MECHATROLINK-II is specially designed for Motion Control
- Supports Position, speed and Torque control
- Positioning can be done by direct Ladder commands.
- Access to Servo Drives parameters can be done through PLC operation
- Access to the complete system from one point. Network setup, Servo Drives configuring and monitoring, and PLC Programming.

System Configuration



Specifications

Position Control Unit

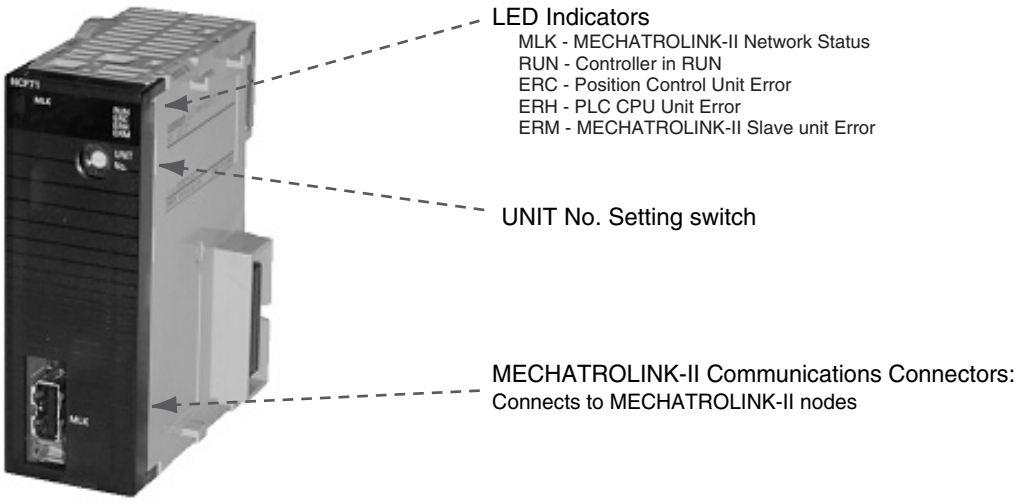
Model		CJ1W-NCF71
Classification		CJ-series CPU Bus unit
Applicable PLCs		CJ-series
Possible unit number settings		0 to F
Control Method		MECHATROLINK-II (Position, Speed and Torque control)
Controlled devices		Sigma-II series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface
Controlled axes		16 maximum
I/O allocations	Common Operating Memory Area	Words allocated in CPU Bus Unit Area: 25 words (15 output words, 10 input words)
	Axis Operating Memory Area	Allocated in one of the following areas (user-specified): CIO, Work, Auxiliary, Holding, DM, or EM Area. Number of words allocated: 50 words (25 output words, 25 input words) × Highest axis No. used
Control units	Position command unit	Command unit: Depends on the Electronic Gear Setting in the Servo Parameters. Default setting: Pulses
	Speed command unit for position control	Command units/s
	Acceleration/deceleration speeds for position control	10,000 command units/s^2
	Speed command unit for speed control	0.001% of the motor's maximum speed
	Torque command unit for torque control	0.001% of the motor's maximum torque
Control command range	Position command range	-2,147,483,648 to 2,147,483,647 (command units)
	Speed command range for position control	0 to 2,147,483,647 (command units/s)
	Acceleration/deceleration speeds for position control	1 to 65,535 (10,000 command units/s^2)
	Speed command range for speed control	-199.999% to 199.999% The upper limit is restricted by the maximum speed of the Servomotor.
	Torque command range for torque control	-199.999% to 199.999% The upper limit is restricted by the maximum torque of the Servomotor.
Control functions	Servo lock/unlock	Locks and unlocks the Servo Driver.
	Position control	Positions to an absolute position or relative position according to the specified target position and target speed specified from the ladder program.
	Origin determination	• Origin search: Establishes the origin using the specified search method. • Present position preset: Changes the present position to a specified position to establish the origin. • Origin return: Returns the axis from any position to the established origin. • Absolute encoder origin: Establishes the origin using a Servomotor that has an absolute encoder, without having to use an origin search.
	Jogging	Outputs a fixed speed in the CW or CCW direction.
	Interrupt feeding	Performs positioning by moving the axis a fixed amount when an external interrupt input is received while the axis is moving.
	Speed control	Performs speed control by sending a command to the Servo Driver speed loop.
	Torque control	Performs torque control by sending a command to the Servo Driver current loop.
	Stop functions	• Deceleration stop: Decelerates the moving axis to a stop. • Emergency stop: Positions the moving axis for the number of pulses remaining in the deviation counter and then stops the axis.
Auxiliary functions	Acceleration/deceleration curves	Sets either a trapezoidal (linear) curve, an exponential curve, or an S-curve (moving average).
	Torque limit	Restricts the torque upper limit during position control.
	Override	Multiplies the axis command speed by a specified ratio. Override: 0.01% to 327.67%
	Servo parameter transfer	Reads and writes the Servo Driver parameters from the ladder program in the CPU Unit.
	Monitoring function	Monitors the control status of the Servo Driver's command coordinate positions, feedback position, current speed, torque, etc.
	Software limits	Limits software operation for controlling positioning.
	Backlash compensation	Compensates for the amount of play in the mechanical system according to a set value.
External I/O	Position Control Unit	One MECHATROLINK-II interface port
	Servo Driver I/O	CW/CCW limit inputs, origin proximity inputs, external interrupt inputs 1 to 3 (can be used as external origin inputs)
Self-diagnostic functions		Watchdog, flash memory check, memory corruption check
Error detection functions		Overtravel, Servo Driver alarm detection, CPU error, MECHATROLINK communications error, Unit setting error
Internal current consumption		360 mA or less for 5 VDC
Weight		95 g

JUSP-NS115 - Mechatrolink-II Interface Unit

Item		Details
Type		JUSP-NS115
Applicable Servo Drive		SGDH-□□□E models (Version 38 or later)
Installation Method		Mounted on the SGDH Servo Drive side: CN10.
Basic Specifications	Power Supply Method	Supplied from the Servo Drive control power supply.
	Power Consumption	2 W
MECHATROLINK -II Communications	Baud Rate / Transmission Cycle	10 MHz / 500 ms or more. MECHATROLINK-II communications
Command Format	Operation Specification	Positioning using MECHATROLINK-I/II communications.
	Reference Input	MECHATROLINK-I/II communications Commands: Motion commands (position, speed), Interpolation commands, Parameter read/write, Monitor output
Position Control Functions	Acceleration/Deceleration Method	Linear first/second-step, asymmetric, exponential, S-curve
	Fully Closed Control	Position control with fully closed feedback is possible.
Fully Closed System Specifications	Fully Closed Encoder Pulse Output	5 V differential line-driver output (complies with EIA Standard RS-422A)
	Fully Closed Encoder Pulse Signal	90° Phase difference 2-phase differential pulse (phase A, phase B)
	Maximum Receivable Frequency for Servo Drive	1 Mpps
	Power Supply for Fully Closed Encoder	To be prepared by customer.
Input Signals	Signal Allocation Changes Possible	Forward/reverse run prohibited, Zero point return deceleration LS External latch signals 1, 2, 3 Forward/reverse torque control
Internal Functions	Position Data Latch Function	Position data latching is possible using phase C, and external signals 1, 2, 3
	Protection	Parameters damage, Parameter setting errors, Communications errors, WDT errors, Fully closed encoder detecting disconnection
	LED Indicators	A: Alarm, R: MECHATROLINK-I/II Communicating

Nomenclature

CJ1W-NCF71 - Position Control Unit



CJ1W-CT021

High-speed Counter Unit



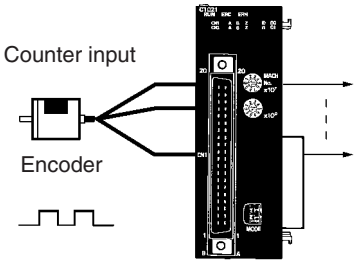
High-speed, flexible control with a wide array of features

- Input frequencies to 500 kHz.
- 32-bit counting range.
- Variable digital noise filter provided.
- 5-/12-/24-V line driver inputs
- Supports simple, ring, and linear counting modes.
- Supports two external control inputs, and a total of 16 functions can be set: open gate, close gate, preset, reset, capture, stop/capture/reset combinations, reset enable, and more.
- One Unit supports two external outputs and 30 internal outputs with counter value zone comparisons, target comparisons, delays, holds, programmable outputs, and hysteresis settings.
- Pulse rate measurement function and data logging.
- Counter outputs and external control inputs can be used to trigger interrupt tasks in the CPU Unit.

Function

The High-speed Counter Unit counts pulse signal inputs that are too fast to be detected by normal Input Units. The Unit can be programmed to produce outputs according to counter values for specified conditions, and many other functions are supported.

System Configuration



Specifications

Unit name	High-speed Counter Unit			
Classification	Special I/O Unit			
Unit numbers	0 to 92			
Countable inputs	2 channels			
Counter modes	Simple counter	Linear or ring counter		
Input types	Differential phase inputs (x1)	Differential phase inputs (x1, x2, x4)	Up/Down pulse inputs	Pulse and direction inputs
Countable frequencies	50 kHz	10, 50, or 500 kHz		
Counter values	8000 0000 to 7FFF FFFF (–2,147,483,648 to 2,147,483,647)	Liner counter: 8000 0000 to 7FFF FFFF (–2,147,483,648 to 2,147,483,647) Ring counter: 0000 0000 to FFFF FFFF (0 to 4,294,967,295)		
Counter inputs				
Input signals	Phases A, B, and Z			
Input voltage (selected via connector)	24 V DC	5 V DC (for ch1 only)	12 V DC (for ch2 only)	Line driver
External inputs	Number of inputs: 2			
Input voltage	24 V DC			
External outputs	Number of outputs: 2 (switchable between NPN and PNP)			
External power supply	10.2 to 26.4 V DC			
Max. switching capacity	46 mA at 10.2 V to 100 mA at 26.4 V			
Response time	0.1 ms max.			
Leakage current	0.1 mA max.			
Residual voltage	1.5 V max.			
Control methods	Simple counter: Forced ON/OFF, Linear counter: Forced ON/OFF, zone comparison, and target comparison			

CJ1W-CTL41-E

4-Channel Counter Unit

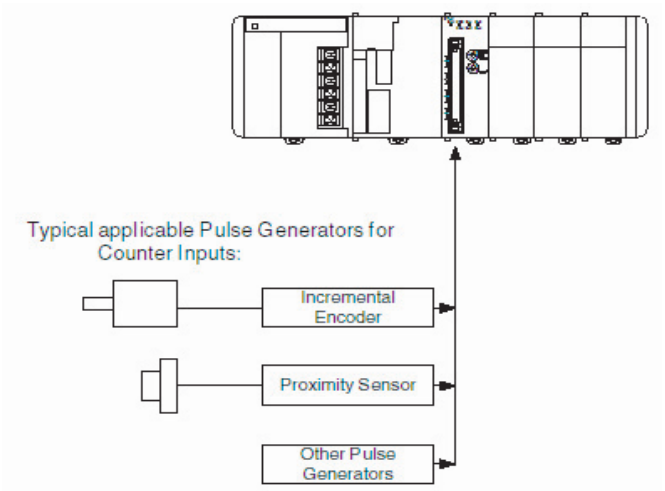


- 4 independent counter channels for encoder or pulse train inputs
- 4 Counter channels with 32-bit counter value
- Linear or circular counter mode selectable per channel.
- Max. input pulse frequency 100 kHz, or 400 k counts/second in quadrature mode
- 32 comparison values (8 per channel) can be used to trigger interrupts to the PLC CPU
- Counter channel settings can be reconfigured on-the-fly
- Input level: line driver
  (24 V inputs through dedicated terminal block).
- Easy connection (line driver or 24V) by using XW2G-40G7-E screwless terminal block)

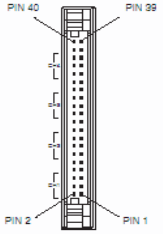
Function

This Unit offers an economical way to acquire position information from up to four encoders, or to count fast pulse trains up to 100 kHz. Dynamically adjustable counter comparison values offers flexibility in triggering interrupts to the PLC with sub-millisecond response.

System Configuration



Terminal arrangement



	Pin No.	Signal	Pin No.	Signal
Channel 4	40	Not Connected	39	Not Connected
	38		37	
	36	Z-	35	Z+
	34	B-	33	B+
	32	A-	31	A+
Channel 3	30	Not Connected	29	Not Connected
	28		27	
	26	Z-	25	Z+
	24	B-	23	B+
	22	A-	21	A+
Channel 2	20	Not Connected	19	Not Connected
	18		17	
	16	Z-	15	Z+
	14	B-	13	B+
	12	A-	11	A+
Channel 1	10	Not Connected	9	Not Connected
	8		7	
	6	Z-	5	Z+
	4	B-	3	B+
	2	A-	1	A+

Specifications

Item	Classification: Special I/O Unit
	CJ1W-CTL41-E
Unit numbers	0 to 92
Counter Inputs	2 Channels
Counter Modes	Linear, Circular
Counter Values	8000 0000 to 7FFF FFFF (–2,147,483,648 to 2,147,483,647)
Comparison values	8 values or 4 ranges per channel
Input Types	Differential Phase Inputs (1x, 2x, 4x) Pulse Up/Down Inputs Pulse + Direction Inputs
Input Voltage	RS422 Line Driver compatible level 24V via XW2G-40G7-E terminal block
Max. input Frequency	100 kHz (A and B signals)

CJ1W-CTS21-E

SSI Encoder Input Unit



2 independently configurable inputs for SSI-compatible sensors

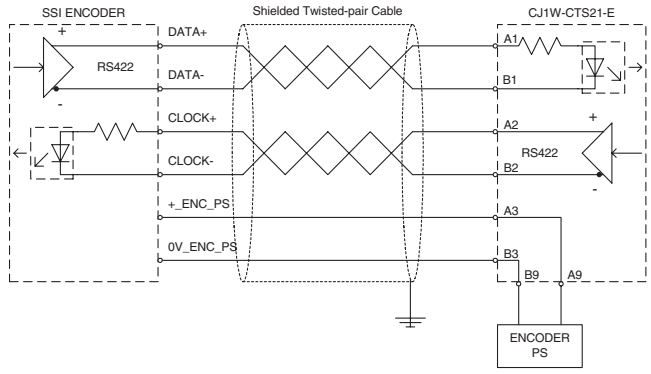
- SSI (synchronous serial interface) is a standard communication protocol mainly used for absolute encoders or distance measurement systems.
- It provides more flexibility, easier connection and reduced wiring compared to parallel connection of absolute encoders.

Function

The Units sets up and maintains data communication with up to two SSI slave devices.
Extensive setting options allow matching the coding, baud rate or data length of any SSI device.

SSI Communication

Item	Specification
CLK lines	Non-isolated differential line driver, RS422 compliant
DATA lines	Electrically isolated differential line receiver, RS422 compliant
Number of data-bits	9 to 31 (default: 24)
Value coding	Gray / Binary / Tannenbaum / Raw (default: Gray)
Clock frequency	100 kHz to 1.5 MHz
Monoflop time	10 µs to 99.990 µs (default: 40 µs)
Sample rate	About 2,500 Samples/sec with 2 encoders connected (with default settings



Terminal arrangement

Item	Description Row B	Terminal no.		Description Row A
SSI DATA CH1	DATA1-	B1		
			A1	DATA1+
SSI Clock CH1	CLOCK1-	B2		
			A2	CLOCK1+
SSI Power Supply OUT CH1	0V_ENC_PS	B3		
			A3	+_ENC_PS
	N.C.	B4		
			A4	N.C.
SSI DATA CH2	DATA2-	B5		
			A5	DATA2+
SSI Clock CH2	CLOCK2-	B6		
			A6	CLOCK2+
SSI Power Supply OUT CH2	0V_ENC_PS	B7		
			A7	+_ENC_PS
	N.C.	B8		
			A8	N.C.
Encoder Power Supply Input	0V_ENC_PS	B9		
			A9	+_ENC_PS

Specifications

Item	Classification: Special I/O Unit
	CJ1W-CTS21-E
Unit numbers	0 to 94
SSI Inputs	2 Channels
SSI Configuration options (per channel)	Baud Rate, Value coding (see above) Resolution (9-31 bits) Leading/trailing bits (0-31 bits) Encoder Status bits (0-8 bits) Parity (Odd, Even, None) Monoflop time

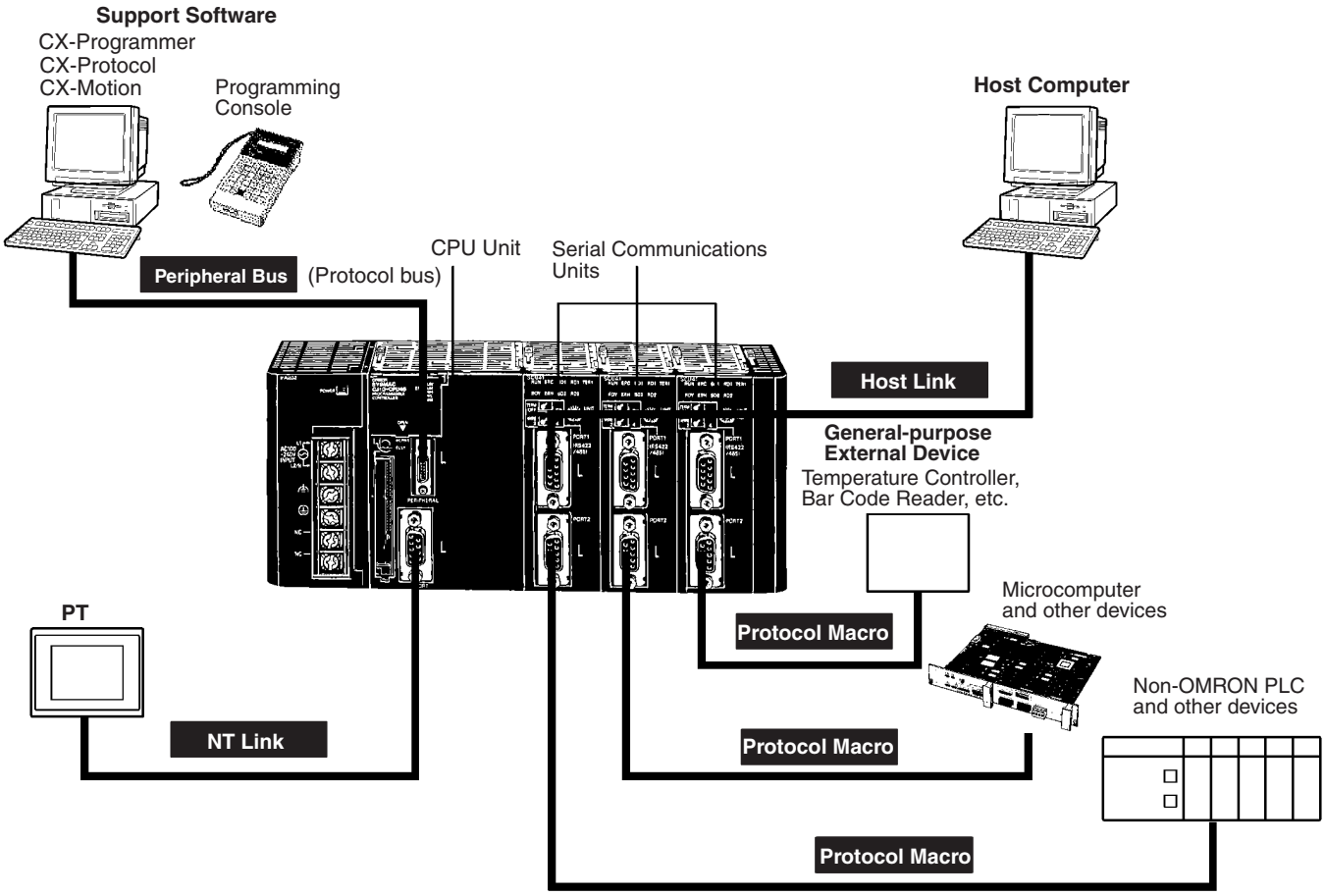
Serial Communications

Serial Communications Connections

Unit	Model	Ports	Serial communications mode							
			Protocol macros	Host Link	NT Links	No-protocol	Serial PLC Link	Peripheral bus	Programming Console bus	Serial Gateway (See note 1.)
			General-purpose external devices	Host computers	OMRON PTs	General-purpose external devices	CJ1M	Programming Devices	Programming Console	CompoWay/F-compatible models
CPU Units	All models	Port 1: Peripheral	No	Yes	Yes	No	No	Yes	Yes	No
		Port 2: RS-232C				Yes	Yes (CJ1M only)		No	Yes
Serial Communications Units	CJ1W-SCU41-V1	Port 1: RS-422/485	Yes	Yes	Yes	Yes (See note 1.)	No	No	No	Yes (See note 2.)
		Port 2: RS-232C								
	CJ1W-SCU21-V1	Port 1: RS-232C	Yes	Yes	Yes	Yes (see note 1.)	No	No	No	Yes (See note 2.)
		Port 2: RS-232C								

Note: 1. CPU Unit Ver. 3.0 and Serial Communications Unit Ver. 1.2 or later only.
2. Gateway to Host Link FINS is also possible.

Example Serial Communications Configuration



Protocol Macros

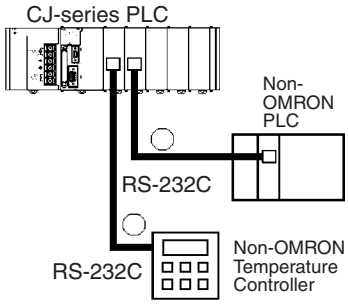
Easily Create Protocols for Data Exchange with External Devices Using One Instruction

Function

Data transfer protocol for serial communications vary with the manufacture and with devices. Differences in protocols can make communications between devices by different manufactories very difficult, even when electrical standards are the same.

OMRON's protocol macros solve this problem by enabling easy creation of protocol macros designed to match the protocol of a connected device. Protocol macros will let you communicate with essentially any device with an RS-232C, RS-422, or RS-485 port without having to write a special communications program.

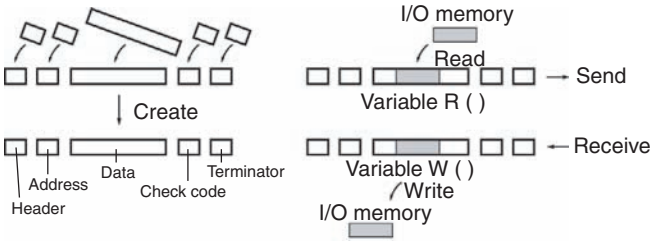
PLCs with Protocol Macros



The Two Main Functions of Protocol Macros

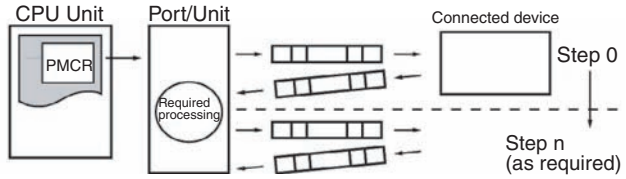
1. Creating Communications Frames

The communications frames can be easily created according to the specifications required by the connected device. Data from I/O memory in the CPU Unit can be easily included as part of a communications frame to read from or write to I/O memory.



2. Creating Frame Send/Receive Procedures

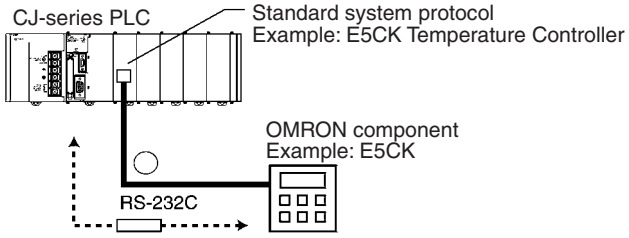
The required processing, including sending and receiving communications frames, can be performed one step at a time according to the results of the previous step, and then CX-Protocol an be used to trace send and receive data.



Types of Protocol

Standard System Protocols

Data transfers with OMRON components can be easily performed using standard system protocols. There is no need to develop you own protocols in this case.

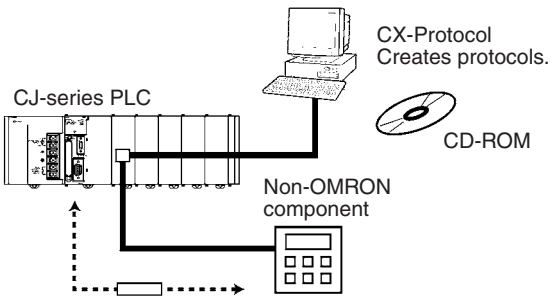


Component		Model
CompoWay/F-compatible components		OMRON CompoWay/F slave components
Digital Controllers and Temperature Controllers	Small Digital Controller with Communications (53 x 53 mm)	E5CK
	Temperature Controllers with Digital Indications (Thermac J with communications) (96 x 96 mm or 48 x 96 mm)	E5□J-A2H0
	Digital Controllers with Communications (96 x 96 mm)	ES100□
	High-density Temperature Controller with communications (8 control points)	E5ZE
Intelligent Signal Processors		K3T□
Bar Code Readers	Laser Scanner type	V500
	CCD type	V520
Laser Micrometer		3Z4L
Visual Inspection Systems	High speed, high precision, low cost	F200
	High-precision inspection/positioning	F300
	Character inspection software/positioning software	F350
ID Controllers	Electromagnetic coupling (for short distances)	V600
	Microwave (for short distances)	V620
Hayes Modem AT Command		---
C-series PLCs (See note.)		PLC with Host Link (C mode) protocol
CS/CJ-series PLCs (See note.) CVM1/CV-series PLCs (See note.)		PLC with Host Link (FINS) protocol
Mitsubishi PLCs (Sequencer CPU Modules) (See note.)		PLC with Computer Link (A-compatible, 1C frame, model 1) slave functions.

Note: Serial Communications Unit Ver. 1.2 or later only.

User-created Protocols

Data transfers with non-OMRON components can be easily created just by defining parameters using the CX-Protocol Windows tool.

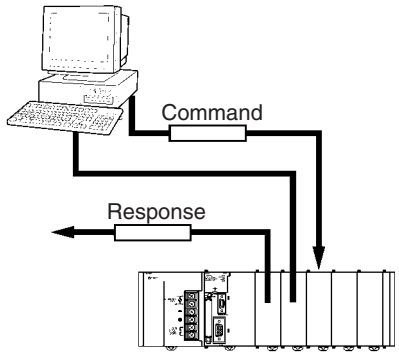


Other Protocols

Host Links

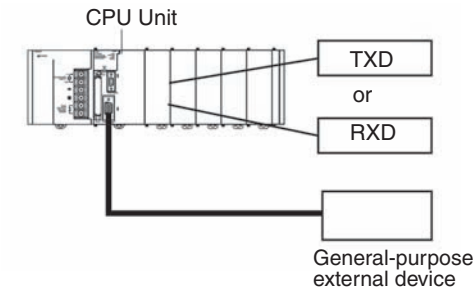
Host Link (C-mode) commands or FINS commands placed within host link headers and terminators can be sent to a host computer to read/write I/O memory, read/control the operating mode, and perform other operations for the PLC.

Unsolicited messages can also be sent from the PLC to the host computer by sending FINS commands from the ladder program using the SEND(090), RECV(098), and CMND(490) instructions.



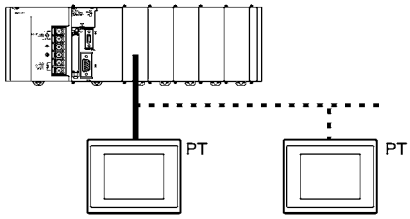
Custom Protocols

I/O instructions for communications ports (TXD/TXDU, RXD/RXDU) can be used for simple data transfers (custom protocols), such as to input data from bar code readers or output data to a printer. Start/end codes can be specified, and RS, CS, and other control signals can be handled.



1:N NT Links with High-speed Links

The PLC can be connected to a Programmable Terminal (PT) via RS-232C or RS422A/485 ports, and I/O memory in the PLC can be allocated to various PT functions, including status control areas, status notifications areas, touch switches, lamps, memory tables, and other objects.



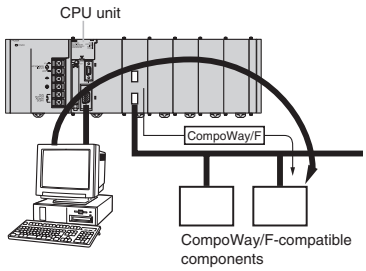
Note: Either one or up to eight PTs can be connected to a PLC in 1:N NT Links.

High-speed NT Links that are three times faster are possible with the NS Series and version 2 of the NT631 and NT31 Series. This speed is particularly important when connecting to more than one PT.

Serial Gateway Function *NEW*

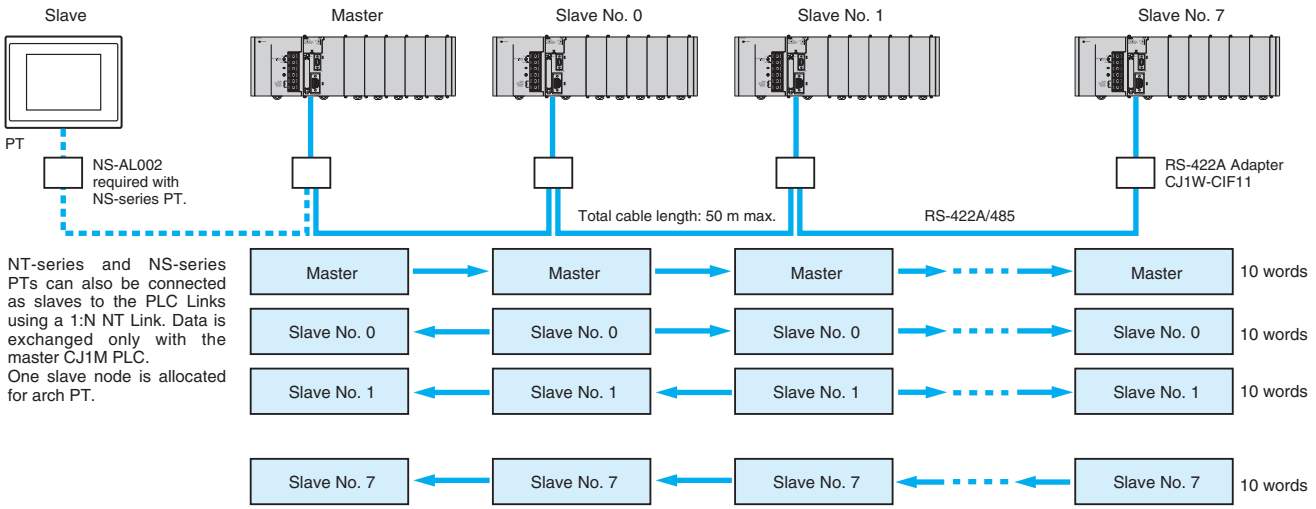
(CPU Unit Ver. 3.0 or later, Serial Communications Unit Ver. 1.2 or later only)

When a FINS command containing a CompoWay/F command is received via network or serial communications, the command is automatically converted to a protocol suitable for the message and forwarded using serial communications. This enables access to CompoWay/F-compatible components from a personal computer, PT, or PLC via a network.



Serial PLC Links (CJ1M CPU Unit's Built-in RS-232C Port)

Allows many applications to be easily achieved, such as exclusive control between PCB loaders and unloaders and temperature information and time management between conveyor ovens. Up to 9 CJ1M CPU Units can be connected, with up to 10 words of data between them managed by the built-in RS-232C port. The RS-232C can be converted to RS-422A simply by using a CJ1W-CIF11 RS-422A Conversion Adapter.



CS1W-SCU□1-V1

Serial Communication Unit



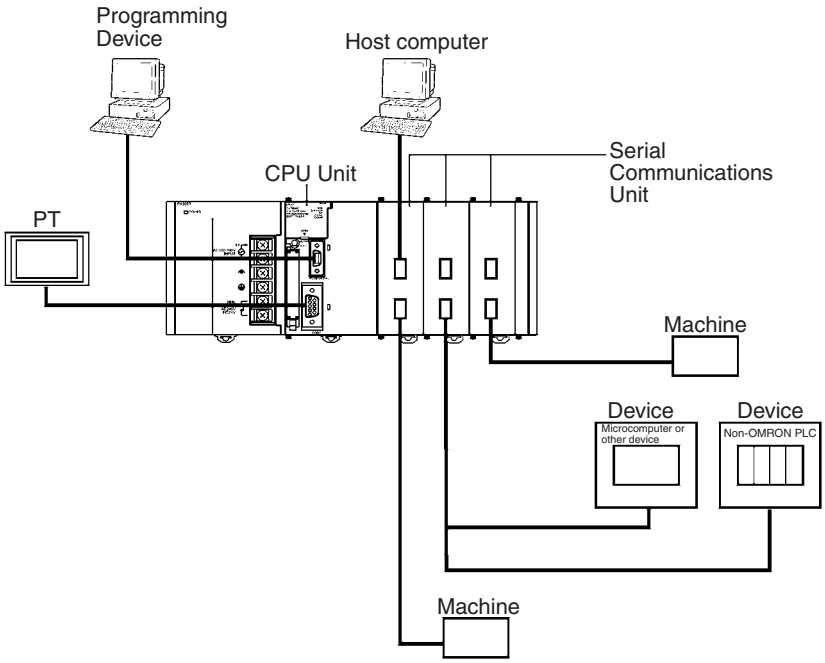
Support Protocol Macros, Host Link Communications, and 1:N NT Links

- Mount up to 16 Units (including all other CPU Bus Units) on CPU or Expansion Racks. Ideal for systems that required many serial ports.

Function

The SCU21 and SCU41 CPU Bus Unit can be used to increase the number of serial ports (RS-232C or RS-422A/485) two at a time. The SCU21 provides two RS232C ports, the SCU41 has one RS232C port and one RS422/RS485 port. Specify Serial Gateway, Protocol Macros, Host Link Communications, or 1:N NT Links separately for each port. With the CJ Series, you can easily provide the right number of serial ports for your system.

System Configuration

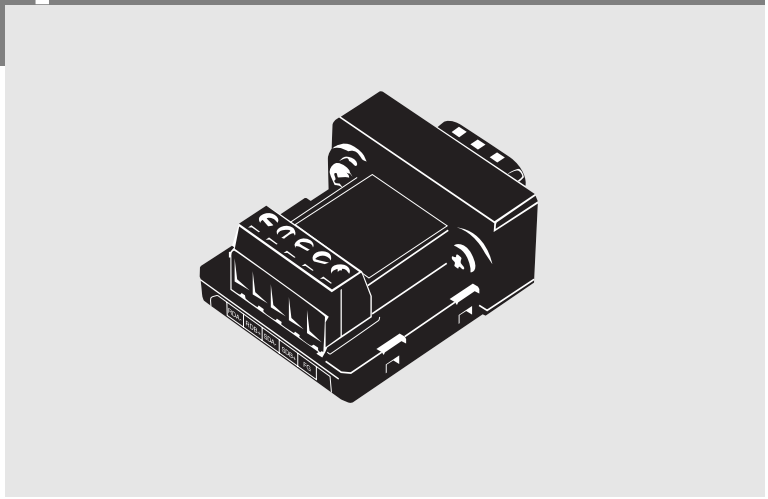


Specifications

Unit	Classification	Serial communications modes	Serial	Unit numbers	Model
Serial Communications Unit	CPU Bus Unit	Protocol Macro, Host Link, 1:N NT Link, Serial Gateway, or non-protocol communications	RS-232C x 1 RS-422A/485 x 1	0 to F	CJ1W-SCU41-V1
			RS232C x 2		CJ1W-SCU21-V1

CJ1W-CIF11

RS-422A Adapter



Converts RS-232C to RS-422A/RS-485

- Use to convert RS-232C to RS-422A/RS-485.
- Simply connect this Adapter to the built-in RS-232C port or an RS-232C connector on a Serial Communications Unit (D-sub, 9-pin) to convert to RS-422A/RS-485).

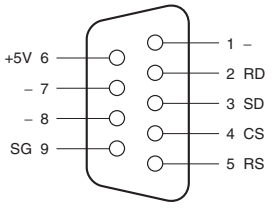
Specifications

Item	Specifications	
Dimensions	18.2 × 34.0 × 38.8 mm (W × H × D)	
Weight	20 g max.	
Rated power supply voltage	+5 V	Supplied from pin 6 on the RS-232C connector.
Current consumption	40 mA max.	
Isolation	No isolation	
Transmission distance	50 m	

Interface

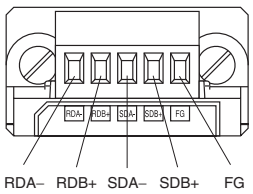
RS-232C Connector

RS-232C Port Connector Pin Arrangement



Pin	Signal
1	NC
2	RD
3	SD
4	CS
5	RS
6	+5V
7, 8	NC
9	SG
Hood	FG

RS-422A/485 Terminal Block



Signal
RDA–
RDB+
SDA–
SDB
FG

NT-AL001

RS-232C/RS-422A Adapter Unit



- Long-distance transmissions are possible through an RS-422A interface. By converting from RS-232C to RS-422A and then back to RS-232C, a transmission distance of up to 500 m can be achieved.
- No power supply is required. If the 5-V terminal (150 mA max.) is connected from the RS-232C device, a separate power supply is not required to drive the Adapter Unit.
- Duct wiring can be used. The removable terminal block enables wiring not possible with D-sub connectors. (The RS-232C interface is 9-pin D-sub.)

Function

The NT-AL001 is used to connect a PT or other device with an RS-232C terminal to a device with an RS-422A terminal, or an RS422A multi-drop network..

Communications Specifications

General Specifications

Item	Specification
Rated power supply voltage	+5 V ±10% (Use pin 6 on the RS-232C connector.)
Rated current consumption	150 mA max.
Rush current	0.8 A max.
Weight	200 g max.

RS-422A Interface

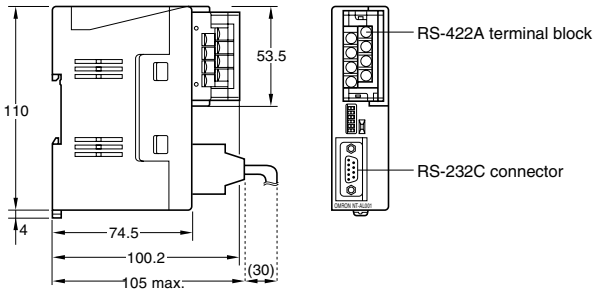
Item	Specification
Baud rate	64 Kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminal block	8 terminals, M3.0; detachable

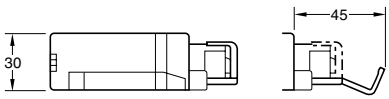
RS-232C Interface

Item	Specification
Baud rate	64 Kbps max.
Transmission distance	2 m max.
Connector	9-pin, D-sub connector (female)

Dimensions

Note: Units are in mm unless specified otherwise.

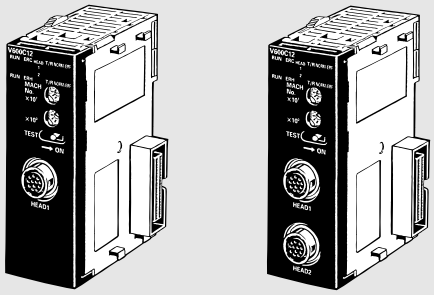




With RS-422A terminal block cover closed: 30 × 114 × 100.2 mm (W × D × H)
With RS-422A terminal block cover open: 30 × 114 × 119.5 mm (W × D × H)

CJ1W-V600C1□

RFID Sensor Units



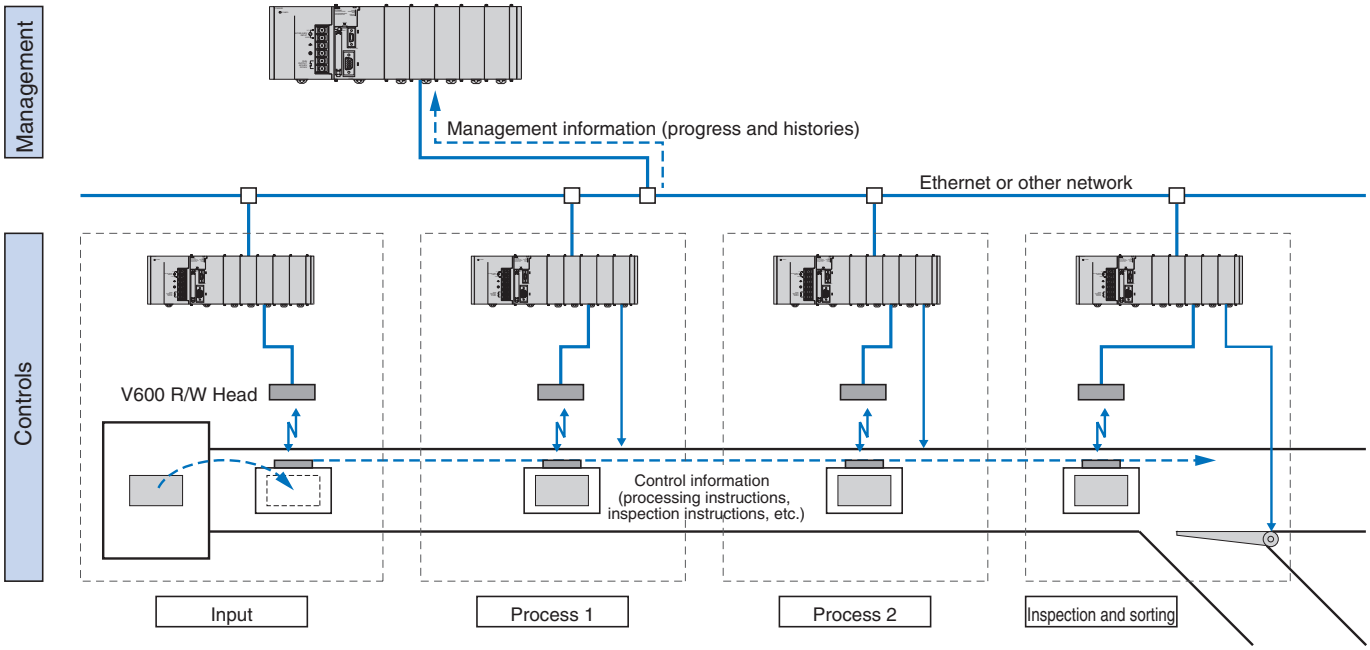
Process RFID tag data directly in the control system.

- Models available to connect to either one R/W Head or two R/W Heads.
- High-speed data communications with the CPU Unit (160 bytes/scan).
- Efficient programming with control bits and data located in different interface areas.
- Common operating methods for both Single-head and Double-head Units to effectively apply programming resources through modularization.
- Status confirmation function without CPU Unit program for faster system setup.
- Power supply error flags and processing provide debugging information (communications TAT and error codes) for easier maintenance.

Function

The ID Sensor Unit interfaces to the V600-series RFID System's Amplifiers and Read/Write Heads and is used together with V600 Data Carriers.

System Configuration



Combine Products and Information

Data Carriers attached to the products being manufactured are used to handle the flow of control and management information on the production line. They can also be used to automatically collect and manage quality information.

Autonomous Control

The information required for production is provided from the product itself, enabling the creation of an autonomous control system that does not need to rely on a host.

Modularization of Control Processes

The required information is available when it is required, enabling simple separation of control processes into autonomous modules.

Specifications

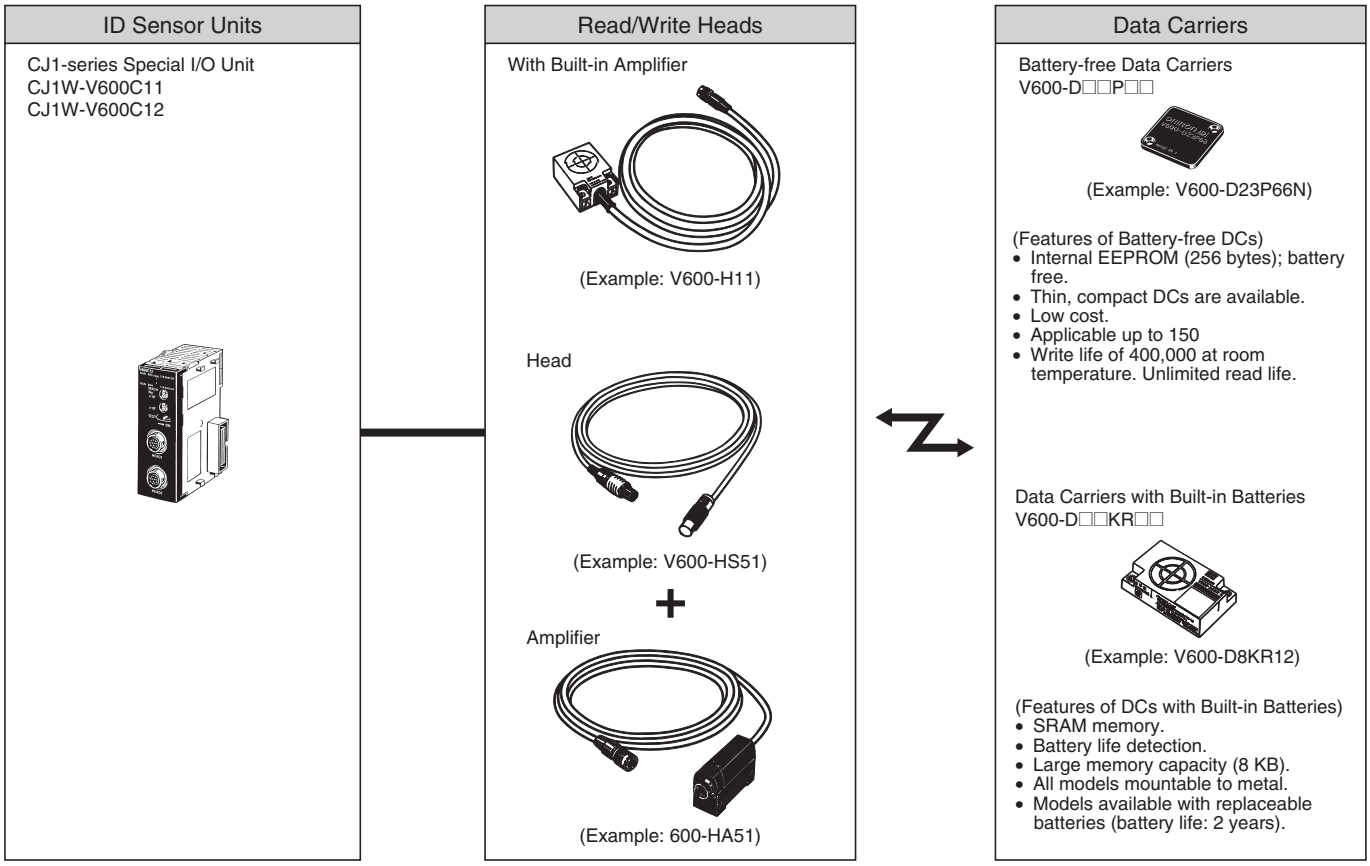
Item	CJ1W-V600C11	CJ1W-V600C12
Data transfer speed	160 bytes/scan (between CPU Unit and ID Sensor Unit)	
Applicable RFID system	V600 Series	
Number of connectable R/W Heads	1	2
Commands (The number of bytes that can be specified is given in brackets.)	Read/Write [1 to 2,048] Data Fill (Clear) [1 to 2,048 or through end address] Copy (for Double-head Units only) [1 to 2,048] Calculation Write [1 to 4] Bit Set/Bit Clear [1 to 4] Masked Bit Write [2] Memory Check [2] No. of Writes Control [2]	
Communications processing time (See note.)	See table below	
Maintenance features	Communications test, processing results monitor data (communications TAT and error codes)	
Error detection	CPU errors, communications errors with Data Carriers, R/W Head power supply check	

Command	Data Carriers with built-in batteries	Battery-free Data Carriers in time priority mode
Read	1.8 × N + 48.4 ms	1.8 × N + 79.0 ms
Write with verify	4.2 × N + 86.5 ms	7.1 × N + 180.4 ms
Write without verify	2.2 × N + 72.8 ms	4.3 × N + 132 ms

N = The number of bytes being read or written.

Note: Add the data transfer time to the communications processing time for the command processing time

System Configuration



Note: Refer to the *Auto-Identification Components Group Catalog* (Cat. No. Q132) for details on the V600 Series.

Communications Networks

Overview

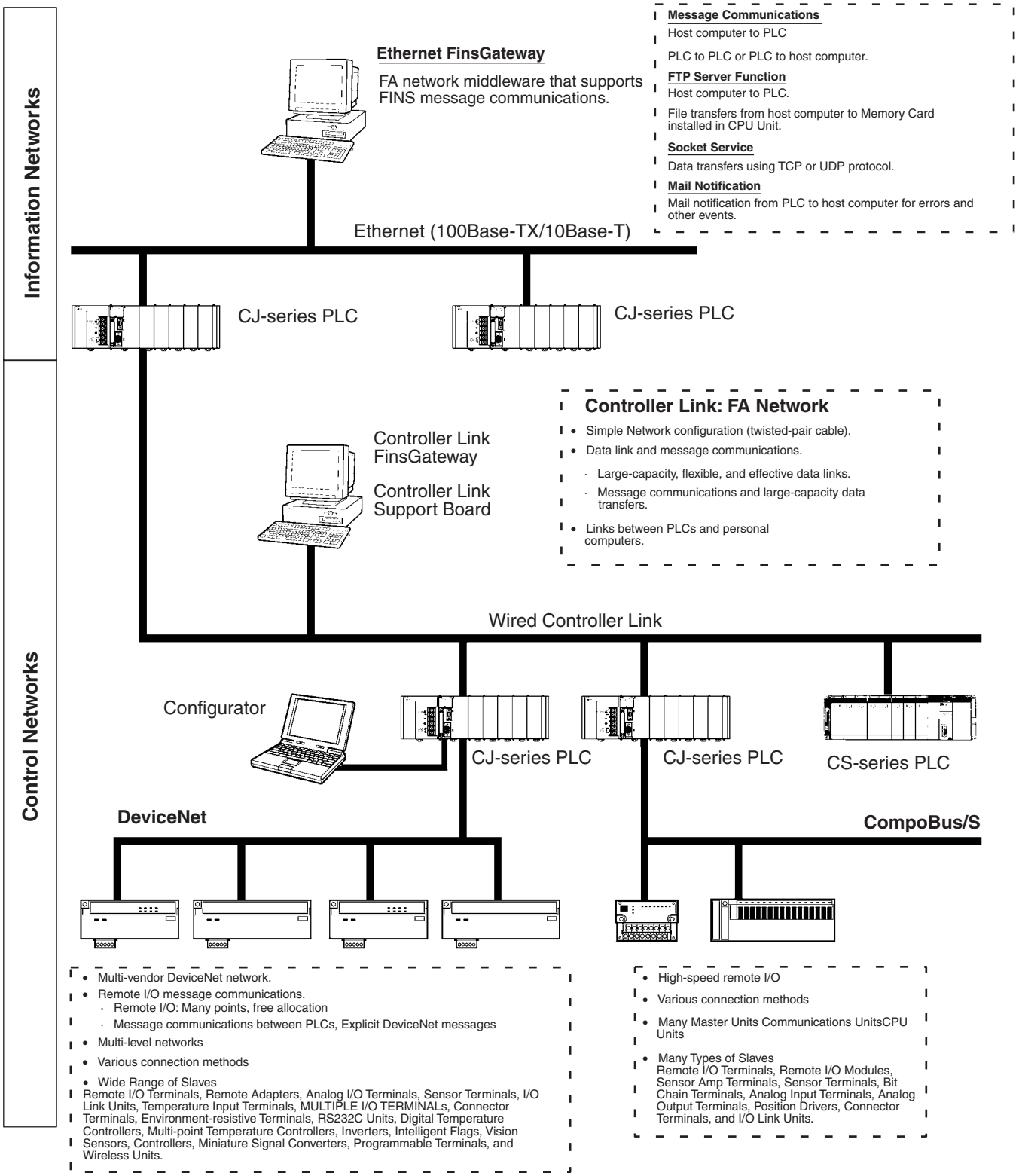
Level	Network	Functions	Communications	Unit/Board
Information networks	Ethernet	Host computer to PLC	FINS messages	Ethernet Unit
		PLC to PLC		
		Host computer to CPU Unit memory card	FTP server	
		UNIX computer or other socket service to PLC	Socket services	
	Controller Link	Computers connected directly to network and PLC	FINS messages	Controller Link Support Board and Unit
			Data links (offsets and automatic setting)	
Control networks	Controller Link	PLC to PLC	FINS messages	Controller Link Unit
			Data links (offsets and automatic setting)	
	DeviceNet		FINS messages on open network	DeviceNet Unit and Configurator
	DeviceNet	PLC to components (slaves)	HIgh-capacity remote I/O on open network (fixed or user allocations)	DeviceNet Unit and Configurator
	CompoBus/S		High-speed remote I/O (fixed allocation) on OMRON network.	CompoBus/S Master Unit
	PROFIBUS-DP		HIgh-capacity remote I/O on open network (fixed or user allocations)	PROFIBUS-DP Unit and Configurator

Specifications

Network	Ethernet	Controller Link	PROFIBUS-DP	DeviceNet	CompoBus/S
Messages	Yes	Yes	Limited (DPV1 devices)	Yes	---
Data links	---	Yes	Manually configurable	---	---
Remote I/O	---	---	Yes	Yes	Yes
Maximum speed	10/100 Mbps	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	12 Mbps, Comm. cycle from 1 ms.	500 Kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	750 Kbps (See note 1.) Comm cycle: Approx. 1 ms (128 inputs and 128 outputs)
Total distance	---	Twisted-pair cable: 1 km (at 500 bps) Optical cable: 20 km	1200 m up to 93.75 kbps, 100 m at 12 Mpbs, extension by optical links i possible	500 m (at 125 kbps)	Trunk line: 500 m (For the long-distance communications mode) (Total wiring length is 200 m when using the 4-conductor VCTF cable or special flat cable.) Communications cycle: 6 ms max.
Maximum nodes	---	32/62	126	63	32
Communications media	---	Special twisted-pair cable or optical cable	PROFIBUS cable	DeviceNet cable	2-conductor VCTF cable 4-conductor VCTF cable Special flat cable (Different cables cannot be used together.)
Network data link capacity	---	32,000 or 62,000 words	---	---	---
Remote I/O capacity	---	---	7000 words (112000 points), Configurator always required	32,000 pts (with Configurator) 2,048 pts (without Configurator)	256 pts
Supporting PLCs	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE, CQM1H	CJ Series, CS Series, C200 HX/HG/HE, C200HS, CQM1H, CPM1A/2A	CJ Series, CS Series, CVM1, CV Series, C200HX/HG/HE, C200HS, CQM1/CQM1H (with I/O Link), CPM1A/2A (I/O Link)	CJ Series, CS Series, C200HX/HG/HE, C200HS, CQM1/CQM1H, CPM2C-S1□0c(-DRT), CPM1A/2A (with I/O Link), CPM2C (with I/O Link)

Note: 1. For the baud rate of 500 kbps.
2. For the baud rate of 125 kbps.
3. For the high-speed communications mode (trunk length: 100 m) (30 m max. when using 4-conductor VCTF cable or special flat cable)

Communications Networks

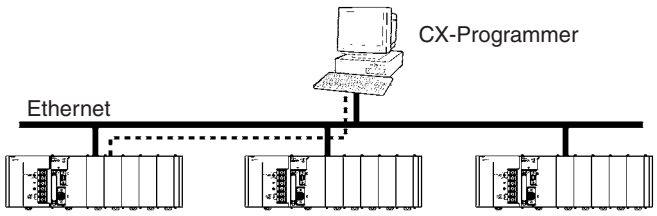


Ethernet: Information Network

Use an Ethernet Network to organically link production management with the production site using various communications services.

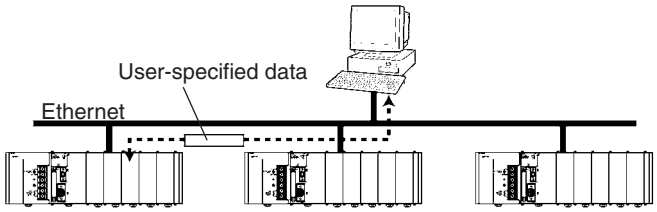
Remote Programming and Monitoring

CX-Programmer running on a computer connected to the Ethernet Network can be used to program and monitoring all the PLCs connected to the Ethernet Network.



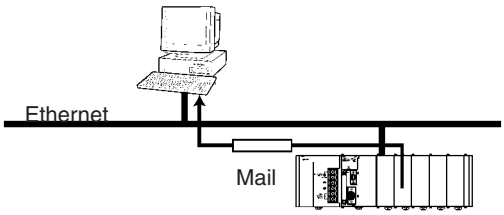
Socket Service

Transfer data using either UDP or TCP protocol.



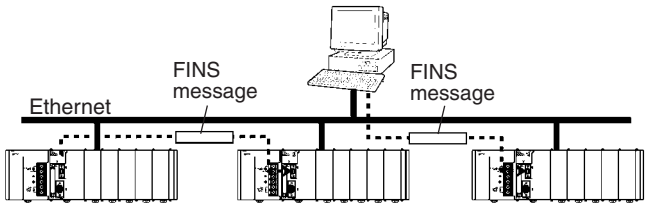
Mail Service

Send electronic mail from the PLC to a host computer when a flag turns ON, when an error occurs, or at scheduled times.



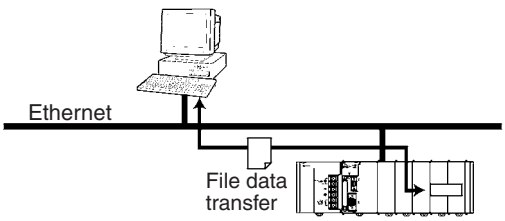
FINS Message Service

Send FINS message between PLCs or between PLCs and host computers. The Ethernet FinsGateway can be used to handle messages from applications without having to program FINS commands directly.



FTP Service

Use the FTP to transfer files between Memory Cards in the CPU Unit and computer memory.



Controller Link: Control Network

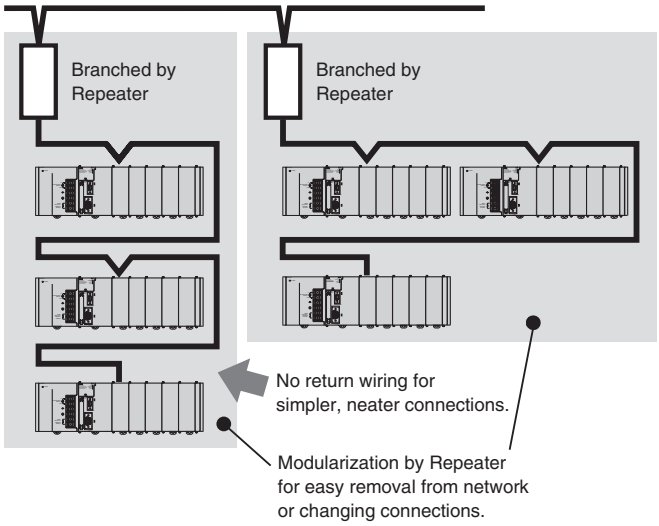
Controller Link can easily connect PLCs at the factory site in a fully functional FA network.

Easy Network Construction with Twisted-pair Cables

Repeater Units Enable T-branch Wiring, Extension, Expansion, or Optical Sections in Networks

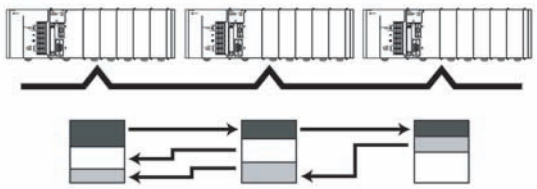
More Flexibility in Wiring for Layout, Construction, and Expansion Using T-branches

Repeater Units can be used for branching, making complicated wiring paths unnecessary. This method reduces wiring labor, and modularization of equipment into Repeater Units.



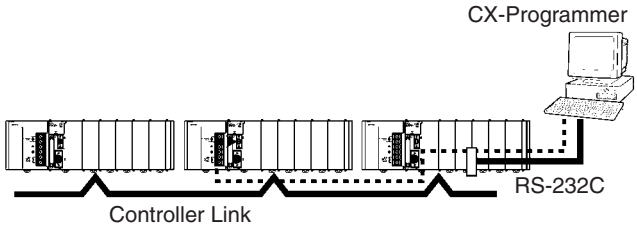
Data Links

Efficient, large-capacity data links can be flexibly created between PLCs and between PLCs and host computers. The Controller Link FinsGateway can be used to handle data links from applications without having to program FINS commands directly.



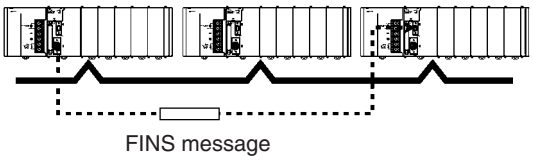
Remote Programming and Monitoring

CX-Programmer connected via RS-232C can be used to program and monitor PLCs on the Controller Link Network.



FINS Message Communications

Large volumes of data can be transferred between PLCs and host computers whenever necessary. The Controller LInk FinsGateway can be used to handle messages from applications without having to program FINS commands directly.

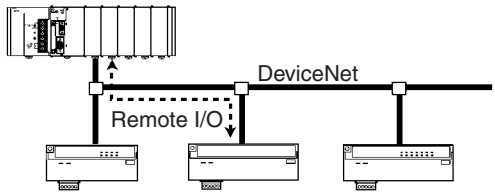


DeviceNet: Component Network

Create a multi-vendor network for multibit communications for lower-level PLCs that need to handle both control signals and data.

Remote I/O Communications

Large-capacity remote I/O can be freely allocated according to application needs.

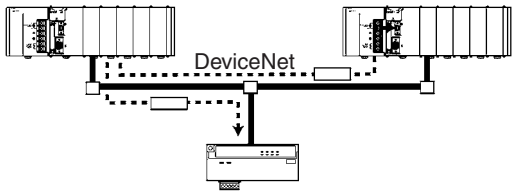


Select from a Wide Range of Slaves (Connection Possible to Data-intensive Devices)

Connect contact I/O, analog I/O, temperature inputs, sensor (photoelectric or proximity) inputs, and small PLCs (e.g., CQM1).

Message Communications

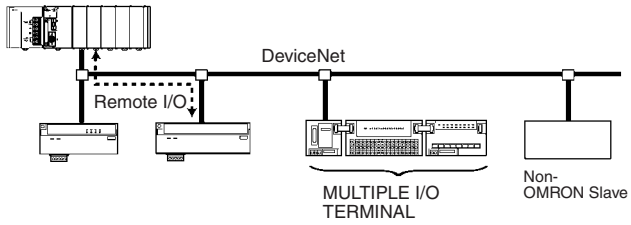
Send FINS messages between OMRON PLCs and Explicit message between OMRON PLCs and devices from other makers.



Use MULTIPLE I/O TERMINALs as DeviceNet Slaves

I/O can be expanded through one-step connections. Special I/O and explicit messages are also supported.

Connect to DeviceNet Products from Other Manufacturers

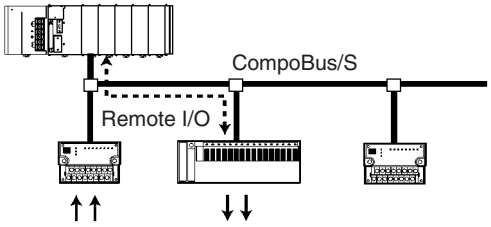


CompoBus/S: High-speed ON/OFF Bus

Construct a high-speed remote I/O system under the PLC to reduce wiring for sensors and actuators inside machines.

High-speed Remote Communications at 1 ms or Less

In the High-speed Communication Mode, you can link up to 32 slaves (up to 128 input and 128 output points) with a high-speed communications cycle of 1 ms or less (0.5 ms with up to 16 slaves, 64 input and 64 output points).



High-speed and Long-distance Communications Modes

A switch enables switching between the previous High-speed and a new Long-distance Communications Mode.

- High-speed Mode: 100-m communications distance at 750 Kbits/s (with 2-conductor VCTF cable)
- Long-distance Mode: 500-m communications distance at 93.75 kbits/s (with 2-conductor VCTF cable)

Reduced Wiring with Special Cables

Connect with special Flat Cables or VCTF Cables.

A Slave for Essential Any Application

Contact I/O, Contact I/O Modules, Photoelectric/Proximity Sensor Input Slaves are provided along with Analog Input and Analog Output Slaves.

No-restriction Branching in Long-distance Communications Mode

With special Flat Cables or 4-conductor VCTF Cables, you can branch and wire in any required structure for up to a total distance of 200 m.

CJ1W-ETN21

Ethernet Unit

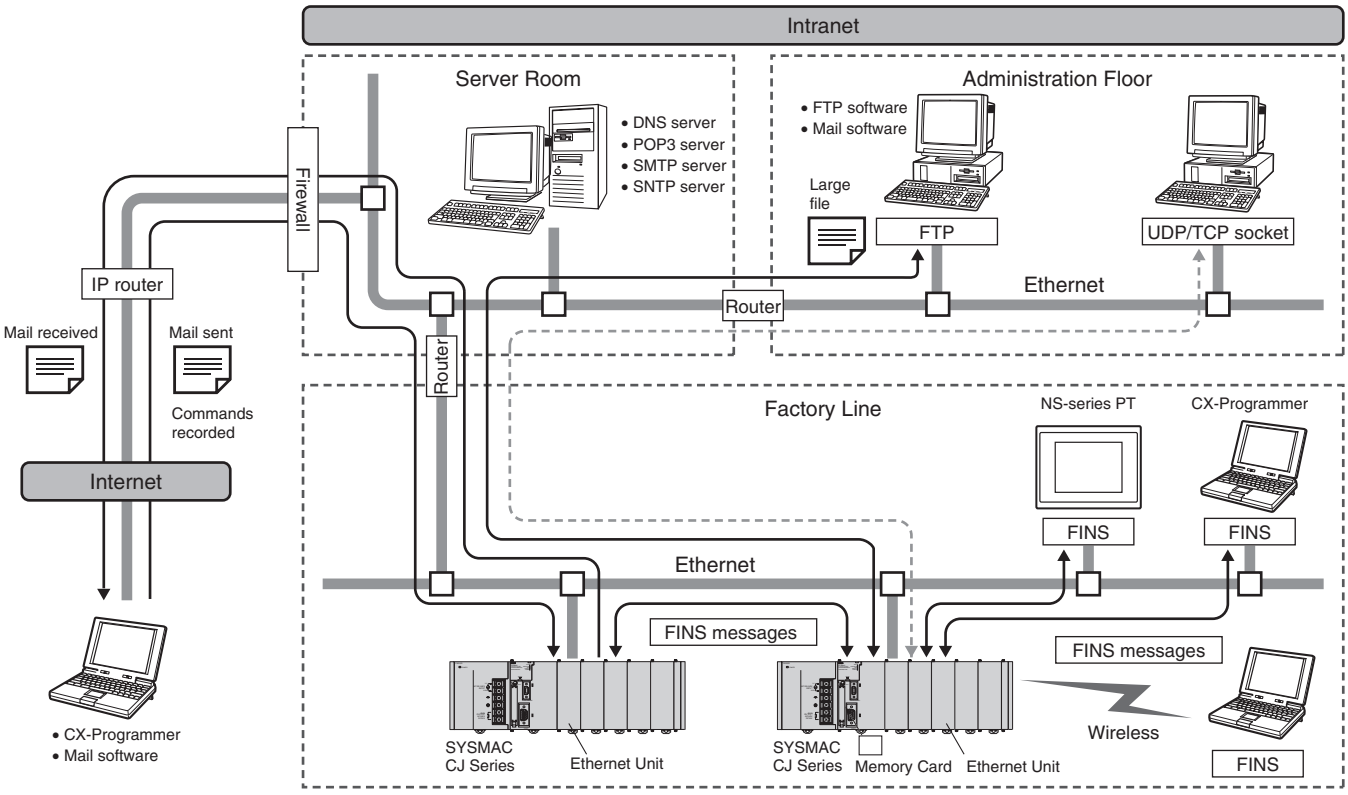


Enables fast data transfer within Factory Automation systems, and easily links FA systems to plant management systems

- Use the standard Ethernet protocools, TCP/IP and UDP/IP, and OMRON's standard FINS message communications.
- FINS routing provides seamless communication with Controller Link, DeviceNet and other networks.
- Access data files in PLC memory or on Compact-Flash cards using the Unit's FTP server function.
- Freely configurable communications using socket services
- Send e-mails automatically upon preset conditions, including embedded data in the e-mail body, or with data file attachments.
- Receive e-mails (POP3), including commands to the PLC, with password protection.
- Automatic correction of the PLC clock using SNTP function.
- DNS Client function allows server access by host name.
- Set communications parameters with CX-One's setup menus or the HTML setup pages.

Function

Achieve a wide range of communications from PLCs connected to an Ethernet network: Transfer data with TCP/IP or UDP/IP socket services, executed OMRON's standard FINS commands, transfer files with FTP, or send mail with SMTP. Select the communications services that are required and flexibly connect PLCs on an information level Ethernet network.



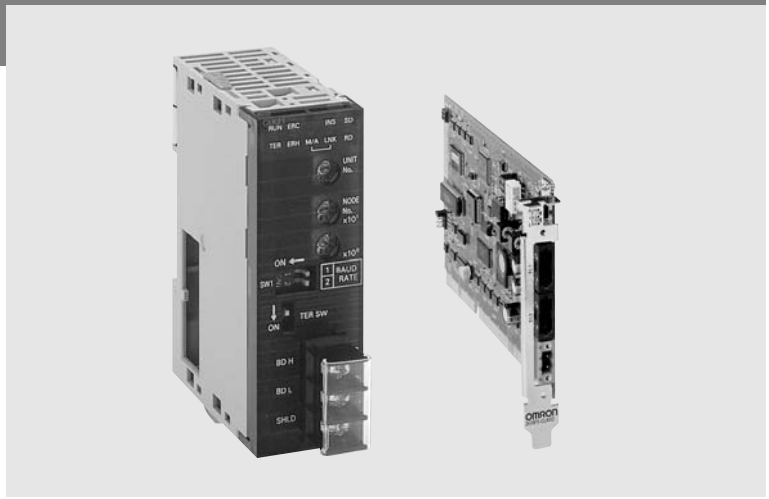
Specifications

Classification	Communications services	Unit numbers	Connector	Model
CPU Bus Unit	FINS communications service (TCP/IP, UDP/IP), FTP server functions, socket services, mail transmission service, mail receive, automatically adjusted PLC built-in clock (remote command receive), server/host name specification.	0 to F (4 Units max.)	100Base-TX (10Base-T)	CJ1W-ETN21

CJ1W-CLK21-V1

Controller Link Units

Simpler Controller Link Wiring, Startup, and Construction Provides Larger-capacity Data Links, Greater Flexibility in Area Control, and Supports Multiple Sub-networks



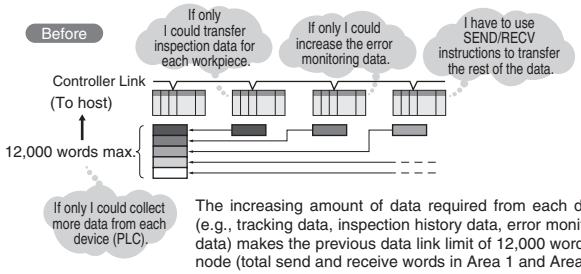
Function

The data link capacity is 20,000 words per node. Allocate both Data Link Area 1 and Area 2 in the same area. Connect up to 8 Units under a single CPU Unit. (Unit Ver. 1.2 only)

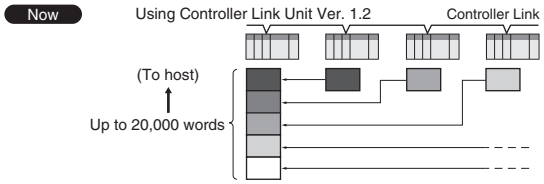
Using Wired Controller Link Units together with Repeater Units allows network configurations for essentially any application, including T-branching, long-distance applications, applications with up to 62 nodes, or applications with optical sections in a wired network. Models are also available that enable changes in configurations and automatic 1:N communications while data links are active.

Huge increase in amount of data that can be collected from devices.

Number of data link send/receive words (total of Area 1 and Area 2) for a single Controller Link Unit increased from 12,000 to 20,000 words.

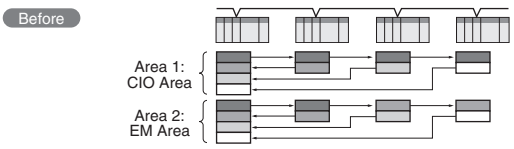


The increasing amount of data required from each device (e.g., tracking data, inspection history data, error monitoring data) makes the previous data link limit of 12,000 words per node (total send and receive words in Area 1 and Area 2 for manually set data links) insufficient for many applications.

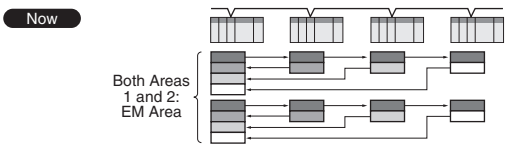


New CS/CJ-series Controller Link Units (Wired/Optical Ring) can handle up to 20,000 send/receive data link words (total of Area 1 and Area 2) for a single node. This enables more data to be collected from each device.

The same Memory Area can be used for the Data Link Areas. For example, Data Link Areas 1 and 2 can be both allocated and managed in EM Bank 0.



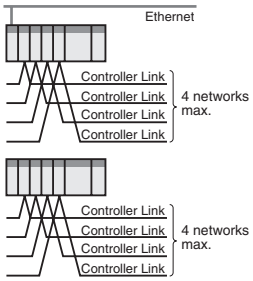
Area 1 and Area 2 had to be allocated in separate Memory Areas for user-set data links. Therefore, allocating all data links in the EM Area was not possible.



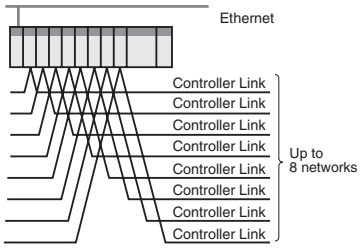
New CS/CJ-series Controller Link Units (Wired/Optical Ring Units) enable both Areas 1 and 2 to be allocated in the same Memory Area when using user-set data links. Provided addresses do not overlap, the same Memory Area can be used, making area control easier.

Control up to 8 Controller Link sub-networks as a group from the host network.

Previous Units supported connection of up to four Controller Link Units to a single CPU Unit. Creating a gateway to the host network to control the Controller Links as a group of sub-networks required dividing the Units between two PLCs with a maximum of four networks for a single PLC.



New CS/CJ-series Controller Link Units (Wired/Optical Ring) enable connection of up to 8 Controller Link Units for each CPU Unit. This enables easy centralized control of a group of Controller Link sub-networks from the one PLC.

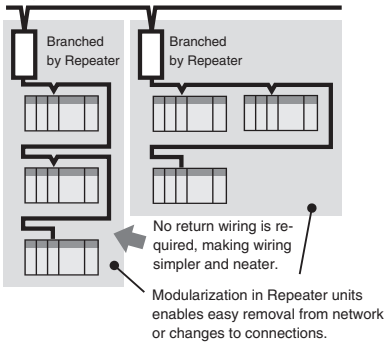


System Configuration

Use Repeater Units for T-branch Wiring, Extension, Expansion, and Optical Sections

T-branching Enables More Flexible Wiring Solutions for Layout, Building, and Expansion of Networks

Repeaters can be used for branching, so long lines are not required. As a result, wiring labor is reduced, and modularization is achieved in Repeater units.



Wired Types Support Long-distance Extension

The total extended length that was previously 500 m at 2 Mbps can be extended to up to 1.5 km by using two Repeater Units.

Connect up to 64 Nodes Using Wired Types

Networks can be constructed with up to 62 nodes when Controller Link Units/Support Boards with -V1 suffix are combined with Repeater Units.

Wiring with Optical Cables Increases Noise Immunity

Using two Repeater Units for optical ring enables wiring with optical cables in parts of the network subject to noise.

Simpler, More Flexible Data Links

Change Data Link Tables While Data Links Are Active

- When data link tables are changed due to additional nodes or other networking changes, data link tables can be transferred without stopping any data link communications.
- Flexible system configurations can be changed by combining node expansion using Repeater Units.

Specifications

Unit/Board	Classification	Compatible PLC	Media	Model	Connections
Controller Link Units	CPU Bus Unit	CJ Series	Wired	CJ1W-CLK21-V1	Can be mounted to previous Controller Link Units/ Support Boards.
Controller Link Support Boards	Personal computer board (for PCI bus)	---		3G8F7-CLK21-EV1	
Controller Link Repeater Units	---	Not mounted to PLC	Twisted-pair cable	CS1W-RPT01	Unit mounted independently using either DIN Track or screws.
			Optical ring (H-PCF cable)	CS1W-RPT02	
			Optical ring (GI cable)	CS1W-RPT03	

Main Specifications Related to Version Upgrade for Unit Ver. 1.2

Item		Unit Ver. 1.2 or later	Pre-Ver. 1.2
Number of data link words		Number of send/receive words per Unit Total of Area 1 and Area 2: 20,000 words max.	Number of send/receive words per Unit Total of Area 1 and Area 2: 12,000 words max.
		Number of send words per Unit Total of Area 1 and Area 2: 1,000 words max.	
Data Link Area allocations	User-set allocations	Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area	
		Both Area 1 and Area 2 can be allocated in the same area (provided there is no address duplication).	Both Area 1 and Area 2 cannot be allocated in the same area.
	Automatically set equal allocations	Area 1: CIO Area (including data link words), Area 2: DM Area and EM Area	
	Automatically set 1:N allocations	Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area	
Maximum number of Controller Link Units connected to a single CPU Unit		8 Units max.	4 Units max.

Note: CX-Programmer Ver. 5.0 or higher is required to set a data link area with a maximum number of send and receive words of 20,000 words per Controller Unit, or to allocate the same area for Area 1 and Area 2.

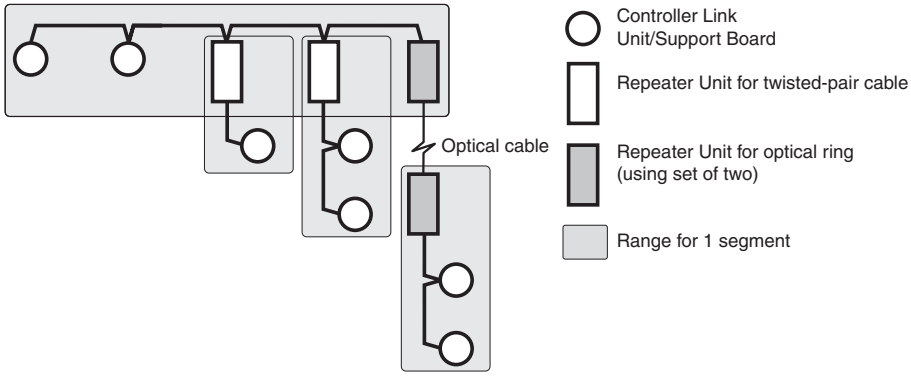
Specifications for Networks Using Repeaters

Item	Segment (See note 1.)	Total network
Transmission path configuration	Multi-drop	Tree (using Repeaters to connect each segment)
Baud rate/maximum transmission distance (See note 2.)	2 Mbps: 500 m 1 Mbps: 800 m 500 kbps: 1 km	2 Mbps: 1.5 km 1 Mbps: 2.4 km 500 kbps: 3.0 km
Maximum number of nodes	Controller Link Unit + Repeater Unit Total number of nodes: 32	Controller Link Unit: 62 nodes (using a Controller Link Unit that supports 62 nodes)
Maximum number of Repeater levels (See note 3.)	---	2 levels

Note: 1. Specifications for each segment are the same as for Wired Controller Link networks.

2. Maximum transmission distance: Total wired cable length between the two nodes separated by the longest total wired cable length.

3. Maximum number of Repeater levels: Maximum number of Repeaters in a path linking any two nodes. For optical ring types, one set of two Units comprises one level.



CJ1W-DRM21

DeviceNet Unit



Multivendor, Multibit Network

- Control of up to 32,000 points (2,000 words) per master.
- Remote I/O communications can be allocated in any area using DM settings.
- 16 DeviceNet Units can be mounted for each CPU Unit (3 max. for fixed allocations).
- When using the Configurator (see note), remote I/O can be allocated in an order independent of node address.

Note: The Configurator is allocating a node-address if connected to DeviceNet using a DeviceNet communication card. It is not doing this if connected through the serial communications interface of the CPU.

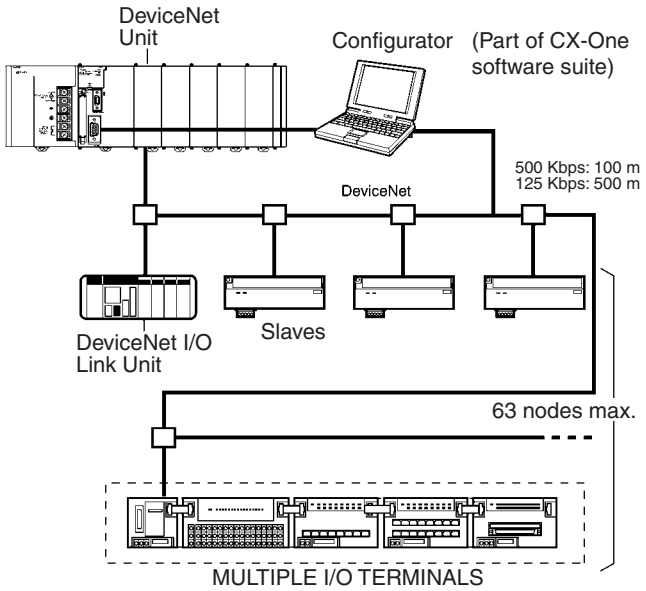
- DeviceNet Units can be used as a master and a slave, and this functionality can be used simultaneously.
- DeviceNet Units allow DeviceNet networks to be treated exactly like Controller Link, Ethernet, or other networks for message communications or remote programming and monitoring by CX-Programmer.

Function

OMRON supports the DeviceNet open field network, a multivendor network for machine/line control and information. The following types of communications are possible.

1. Remote I/O communications for automatic data transfers between the CPU Unit and Slaves (with no programming in the CPU Unit).
2. Explicit message communications. This can be programmed from the CPU unit (IOWR and CMND instructions) and read from/write to other DeviceNet units.
3. With explict message communication FINS commands can be send to other devices that support FINS messaging.

System Configuration



Specifications

DeviceNet Unit

Classification	Types of communications	Specifications	Unit numbers	Model
CPU Bus Unit	Remote I/O communications master (fixed or user-set allocations) Remote I/O communications slave (fixed or user-set allocations) Message communications	Up to 16 Units can be mounted when a Configurator is used.	0 to F (Configurator required to mount 16 Units.)	CJ1W-DRM21

DeviceNet Configurator

Name	Model number	Specifications
DeviceNet Configurator	WS02-CFDC1-E	Software only (Windows 95, 98, NT 4.0, or 2000)
	3G8E2-DRM21-EV1	PC card with software (Windows 95 or 98)

For all two products, refer to page 449 for more info.

CJ1W-CORT21

CAN Unit



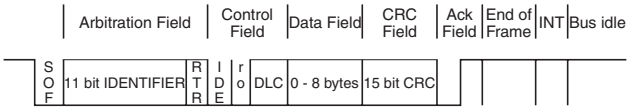
Sending and Receiving 11- or 29-bit CAN messages

The CAN communication protocol is widely used in all kinds of aplications. Benefits are its high reliabilty, low price and ease of implementation. But for two CAN devices to understand eachother they must speak the same protocol (language). Many implementers of CAN comunication have made their own protocol. The User Defined CAN Unit has the possibility to adapt to any protocol by configuration. This makes it possible to add a PLC and all its opennes, features and extensions to what was once a proprietary solution.

Function

The Unit can send and receive 11- or 29-bit CAN messages. The identifier, datalength and data of the CAN message and the way the CAN message is send (On time, trigger or change) are set buy FINS commands

11-bit identifier CAN frame



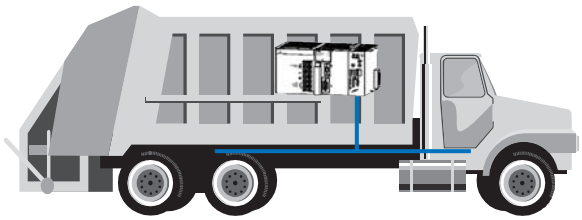
ISO/OSI Reference Model

CAN communication describes only layers 1 and 2, the Physical and the Datalink Layer. Layer 7, the Application Layer is normally described in protocol standards like CANopen and DeviceNet.

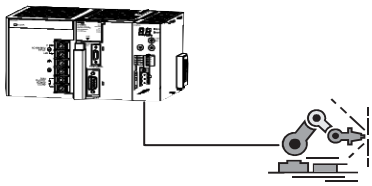
Layer 7	**Application Layer**
Layer 3-6	
Layer 2	**Data Link Layer**
	Logical Link Control: LLC Acceptance filtering, overload notification, recovery management Medium Access Control: MAC Data encapsulation and decapsulation frame coding, stuffing medium access management error detection error signalling acknowledgement serialization, deserialization
Layer 1	**Physical Layer**
	bit encoding / decoding bit timing synchronization

Applications

Monitoring of diesel-engines and drivetrains in trucks and bus



Robot Control



Specifications

Item	Classification: Special CPU Unit
	CJ1W-CORT21
Unit number	0 to 15
CAN communication	Any baud rate can be set Transmit and receive 11- or 29-bit CAN messages Transmit messages on time, trigger, or data change
Configuration	Status and control words provide straightforward operation. All configuration data can can be changed on-line by FINS commands. Up to 640 identifiers can be configured for message filtering. Up to 640 different identifiers can be configured for transmission.

CJ1W-PRM21

PROFIBUS-DP Master unit

- PROFIBUS-DP master class one with support of DP-V1 data types.
- 7 kWord I/O
- Simple configuration through FDT/DTM based configurator
- Special CPU unit
- Handles data independent of the CPU unit, thus reducing CPU load



Function

The CJ1W-PRM21 is a PROFIBUS-DP Master Class1 device (DPM1).

It exchanges I/O data and communication/status information with the CPU of the PLC and I/O data and diagnistics information with PROFIBUS-DP slave stations on the PROFIBUS network.

The CJ1W-PRM21 can be configured via any communication interface of the PLC system. Since the configuration software uses FINS communication, configuration data and diagnostic information can be routed over Controller Link, Ethernet or serial networks through up to 8 layers.

Specifications

Model			Remarks
CJ1W-PRM21	Main function	Basic PROFIBUS-DP master Class 1 functions plus: DPV1 data types support	
	Unit No.	0-15	Special CPU unit
	Maximum number of units mountable per PLC	16	Maximum depends on PLC CPU-type
	Configurator	CX-PROFIBUS, FTD/DTM based configurator	Incorporates a Generic DTM to use with GSD-file based slaves
	Supported baud rate(s)	All baud rates as specified by the standard EN50170 Volume 2, the PROFIBUS extensions to EN50170, as well as the standard IEC61158: 9.6 kBit/s, 19.2 kBit/s, 45.45 kBit/s. 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s, 12 MBit/s	The baud rate value to be used must be selected through the Configurator.
	Selectable PROFIBUS address	0-125	Set through the configurator
	Maximum number of PROFIBUS slaves	125	
	Maximum number of I/O points	7168 words	
	Maximum number of I/O points per PROFIBUS slave	244 bytes In / 244 bytes Out	
	Control and status ares size	25 words	
	Supported Global_Control services	- Sync - Unsync - Freeze - Unfreeze - Clear	Through Control Area
	Supported Master-Slave communication services	- Data_Exchange - Slave_Diag - Set_PRM - Chk_Cfg - Global_Control	
	Power consumption	400 mA at 5 V	
	Dimensions	90 x 65 x 31 mm	
	Weight	100 gr	
	Ambient temperature	Operating: 0 °C to 50 °C	

CJ1W-PRT21

PROFIBUS-DP slave unit



PROFIBUS-DP I/O link unit

- Data link to any PLC data area
- Simple configuration using max. data input 100 words and max. data output of 100 words. Max. total exchanged data 180 words.
- CJ1 special I/O unit
- Status information overview in host PLC, plus extensive diagnostics via PROFIBUS

Specifications

Installation	**Host PLC System**	CJ1
	Maximum number of Units per PLC system	40
	Current consumption	400 mA (maximum) at 5V DC from PLC power supply
	Weight	90 g (typical)
Environment	**Storage temperature**	-20°C to +70°C
	Operating temperature	0°C to +55°C
	Operating humidity	10 to 90% (non-condensing)
	Conformance to EMC- and environmental standards	EN50081-2 EN61131-2
User Interface	**Switch settings**	Special I/O Machine number (00-95) by 2 rotary switch PROFIBUS-DP node address (00-99) by 2 rotary switches
	LED Indicators	Unit status: RUN (green LED), ERC (red LED) Network status: COMM (green LED), BF (red LED) CPU status: ERH (red LED)
PLC Interface	**No. of CIO words allocated**	PLC → Unit: 1 word control data Unit → PLC: 1 word status data
	No. of DM words allocated	Unit → PLC: 8 words of Unit setup information
	Amount of I/O data per Unit	Fixed: 2 words CIO area (one in, one out) for Unit status + control bits. 2 words status information from the host PLC, containing operation status and error code (read from location A400). This information will be sent to the PROFIBUS master: - as extended diagnostics, only at a change of data content. - optionally, attached to the I/O data, each PROFIBUS cycle. Variable: 2 user-defined areas for PROFIBUS I/O data, with the following restrictions: - Up to 100 words input in one PLC area (CIO, H, D, EM). - Up to 100 words output in one PLC area (CIO, H, D, EM). - Inputs+outputs must be 180 words or less

CJ1W-SRM21

CompoBus/S Master Unit



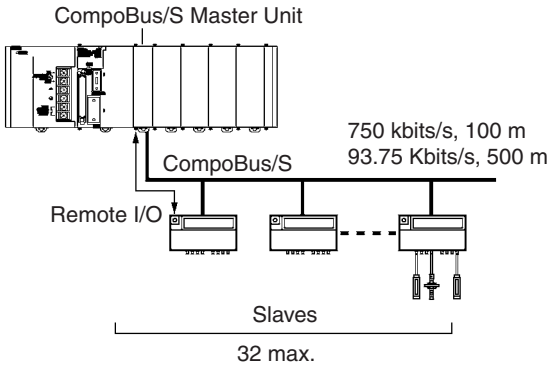
CompoBus/S is a high-speed I/O bus

- Up to 256 I/O points per Master.
- Up to 32 Slaves per Master.
- Communications cycle time: 0.5 ms (at 750 kbps).
- Communications distance: Up to 500 m (at 93.75 kbps).
- Free wiring with any branching method for up to 200 m (in long-distance communications mode).

Function

A high-speed ON/OFF bus that automatically transfers remote I/O status to the CPU Unit without any programming in the CPU Unit. High-speed remote I/O is supported by a communications cycle time of 1 ms maximum for 256 I/O points.

System Configuration



Specifications

Master

I/O points	256 (128 inputs and 128 outputs) or 128 (64 inputs and 64 outputs) (Switch-selectable)
Allocated words	For 256 I/O: 20 words (8 for inputs, 8 for outputs, 4 for status) For 128 I/O: 10 words (4 for inputs, 4 for outputs, 2 for status)
No. of mountable Master Units	40
Node address	8 addresses per node
No. of connectable Slaves	32
Status information	Communications Error Flags, Participation Flags

Note: Uses Special I/O Unit Area (in CIO Area).

Communiccations

<table>
<tr><td colspan="2">Communications method</td><td>Special CompoBus/S protocol</td></tr>
<tr><td colspan="2">Coding</td><td>Manchester</td></tr>
<tr><td colspan="2">Connections</td><td>Multidrop, T-branch (requires termination)</td></tr>
<tr><td colspan="2">Baud rate</td><td>High-speed mode: 750 kbps
Long-distance mode: 93.75 kbps. Set via DIP switch. (Set via DM Area, Default: 750 kbps)</td></tr>
<tr><td rowspan="4">Communications cycle time</td><td rowspan="2">High-speed mode</td><td>0.5 ms (with 8 input and 8 output Slaves)</td></tr>
<tr><td>0.8 ms (with 16 input and 16 output Slaves)</td></tr>
<tr><td rowspan="2">Long-distance mode</td><td>4.0 ms (with 8 input and 8 output Slaves)</td></tr>
<tr><td>6.0 ms (with 16 input and 16 output Slaves)</td></tr>
<tr><td colspan="2">Media</td><td>2-conductor cable (VCTF 0.75 x 2), 4-conductor cable (VCTF 0.75 x 4), or Special Flat Cable</td></tr>
<tr><td colspan="2">Maximum communications distance</td><td>With 2-conductor Cable
<table>
<tr><th>Mode</th><th>Main</th><th>Branch</th><th>Total branch</th></tr>
<tr><td>High-speed</td><td>100 m</td><td>3 m</td><td>50 m</td></tr>
<tr><td>Long-distance</td><td>500 m</td><td>6 m</td><td>120 m</td></tr>
</table>
With 2-conductor or Special Flat Cable
<table>
<tr><th>Mode</th><th>Main</th><th>Branch</th><th>Total branch</th></tr>
<tr><td>High-speed
(See note 1.)</td><td>30 m</td><td>3 m</td><td>30 m</td></tr>
<tr><td>Long-distance
(See note 2.)</td><td colspan="3">Any up to 200 m total</td></tr>
</table></td></tr>
<tr><td colspan="2">Max. No. of nodes</td><td>32</td></tr>
<tr><td colspan="2">Error control checks</td><td>Manchester code, frame length, and parity checks</td></tr>
</table>

Note: 1. For 16 Slaves or fewer: Main: 100 m, Total branch: 50 m.

2. No restrictions on branching method or individual line lengths. Connect terminating resistance to Slave farthest from Master.

Performance

CompoBus/S Master Unit

Name	Classification	Communications function	Specifications	Unit numbers	Model number
CompoBus/S Master Unit	Special I/O Unit	Remote I/O communications	Mountable Units: 40	0 to 94 (when 2 unit numbers are allocated to each Master) 0 to 95 (when 1 unit number is allocated to each Master)	CJ1W-SRM21

Ordering Information

International Standards

The standards indicated in the „Standards“ column are those current for UL, CSA, cULus, cUL, NK, and Lloyd standards and EC Directives as of the end of September 2004. The standards are abbreviated as follows: U: UL, U1: UL Class 1 Division 2 Products for Hazardous Locations, C: CSA, UC: cULus, UC1: cULus Class 1 Division 2 Products for Hazardous Locations, CU: cUL, N: NK, L: Lloyd, and CE: EC Directives. Ask you OMRON representative for the conditions under which the standards were met.

Basic Configuration Units

Name		Specifications					Model	Standards
CPU Units	CJ1 CPU Units	I/O bits	Program capacity	Data memory capacity	LD instruction execution time	Built-in Functions	---	---
		2,560 (3 Expansion Racks)	250 kSteps	448 kWords (DM: 32 kWords, EM: 32 kWords x 13 banks)	0.02 μs	None	CJ1W-CPU67H	UC1, CE, N, L
			120 kSteps	256 kWords (DM: 32 kWords, EM: 32 kWords × 7 banks)			CJ1H-CPU66H	
			60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords × 3 bank)			CJ1H-CPU65H	
		1,280 (3 Expansion Racks)			0.04 μs		CJ1G-CPU45H	
			30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords × 1 banks)			CJ1G-CPU44H	
		960 (2 Expansion Racks)	20 kSteps				CJ1G-CPU43H	
			10 kSteps				CJ1G-CPU42H	
	CJ1G Loop Control CPU Units	1,280 (3 Expansion Racks)	60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords x 3 bank)	0.04 μs	Loop Control Engine (300 blocks)	CJ1G-CPU45P	UC1, CE
			30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords x 1 banks)			CJ1G-CPU44P	
		960 (2 Expansion Racks)	20 kSteps				CJ1G-CPU43P	
			10 kSteps			Loop Control Engine (50 blocks)	CJ1G-CPU42P	
	CJ1M CPU Units	640 (1 Expansion Rack)	20 kSteps	32 kWords (DM only, no EM)	0.1 μs	10 inputs and 6 outputs, with fast pulse- and interrupt functions. (See note 1.)	CJ1M-CPU23	UC1, CE, N, L
		320 (no expansion)	10 kSteps				CJ1M-CPU22	
		160	5 kSteps				CJ1M-CPU21	
		640 (1 Expansion Rack)	20 kSteps			None	CJ1M-CPU13	
		320 (no expansion)	10 kSteps				CJ1M-CPU12	
		160	5 kSteps				CJ1M-CPU11	
	CJ1M Ethernet CPUs	640 (1 Expansion Rack)	20 kSteps	32 kWords (DM only, no EM)	0.1 μs	100 Base-TX Ethernet port	CJ1M-CPU13-ETN	
		320 (no expansion)	10 kSteps				CJ1M-CPU12-ETN	
		160	5 kSteps				CJ1M-CPU11-ETN	
Power Supply Units		100 to 240 V AC (with RUN output), Output capacity: 5 A, 5 V DC					CJ1W-PA205R	UC1, CE, N, L
		100 to 240 V AC, Output capacity: 2.8 A, 5 V DC					CJ1W-PA202	
		24 V DC, Output capacity: 5 A, 5 V DC					CJ1W-PD025	
		24 V DC, Output capacity: 2 A, 5 V DC					CJ1W-PD022	
RS-422A Adapter		Converts RS-233C to RS-422A/RS-485					CJ1W-CIF11	
I/O Control Unit		Mount 1 Unit on the CPU Rack when connecting an Expansion Rack.					CJ1W-IC101	UC1, CE, N, L
I/O Interface Unit		1 required on each Expansion Rack.					CJ1W-II101	
I/O Connecting Cable		For connecting Expansion Racks to the CPU Rack or another Expansion Rack.		Cable length: 0.3 m			CS1W-CN313	L, CE
				Cable length: 0.7 m			CS1W-CN713	
				Cable length: 2 m			CS1W-CN223	
				Cable length: 3 m			CS1W-CN323	
				Cable length: 5 m			CS1W-CN523	
				Cable length: 10 m			CS1W-CN133	
				Cable length: 12 m			CS1W-CN133-B2	
Memory Cards (See note 2.)		Flash memory, 30 MB					HMC-EF372	L, CE
		Flash memory, 64 MB					HMC-EF672	
		Memory Card Adapter (for computer PCMCIA slot)					HMC-AP001	CE

Note: 1. The connector for built-in I/O is not included. Purchase one of the connectors in the following table separately.

2. TheHMC-EF372, and HMC-EF672 Memory Cards cannot be used with the following products.
The following CPU Units with lot numbers of 020108 or earlier (manufactured 8 January 2002 or earlier): CS1G-CPU□□H, CS1H-CPU□□H, CJ1G-CPU□□H, and CJ1H-CPU□□H
NS7-series PTs with lot numbers of 0852 or earlier (manufactured 8 May 2002 or earlier)

Name	Specifications		Model
Applicable Connector	MIL Flat Cable Connectors (Pressure-fitted Connectors)		XG4M-4030-T
Terminal Blocks	General-purpose type (M3 screw terminals,40-pin)		XW2D-40G6
	Special Connecting Cables	Cable length: 1 m	XW2Z-100K
		Cable length: 1.5 m	XW2Z-150K
		Cable length: 2 m	XW2Z-200K
		Cable length: 3 m	XW2Z-300K
		Cable length: 5 m	XW2Z-500K
Servo Relay Units (See note.)	Servo Relay Unit for 1 axis		XW2B-20J6-8A
	Servo Relay Unit for 2 axes		XW2B-40J6-9A
	SMARTSTEP Cable for CJ1M CPU Unit, cable length: 1 m		XW2Z-100J-A26
	W-series Servo Cable for CJ1M CPU Unit, cable length: 1 m		XW2Z-100J-A27

Note: Refer to the catalogs or user manuals for the Servo Drivers.

Programming Devices

Name	Specifications		Model	Standards
Programming Consoles	An English Keyboard Sheet (CS1W-KS001-E) is required. (Connects on peripheral port on CPU Unit only.)		CQM1H-PRO01-E	U, C, CE
				U, C, N, CE
Programming Console Key Sheet	For CQM1H-PRO01-E, CQM1-PRO01-E, and C200H-PRO27-E.		CS1W-KS001-E	CE
Programming Console Connecting Cables	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)		CS1W-CN114	
	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)		CS1W-CN624	
Programming Device Connecting Cables (for peripheral port)	Connects DOS computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect RS-232C cable to peripheral port)		CS1W-CN118	CE
	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	Used for Peripheral Bus or Host Link.	CS1W-CN226	
	Connects DOS computers, D-Sub 9-pin (Length: 6.0 m)		CS1W-CN626	
Programming Device Connecting Cables (for RS-232C port)	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	Used for Peripheral Bus or Host Link. Anti-static connectors	XW2Z-200S-CV	---
	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-CV	
	Connects DOS computers, D-Sub 9-pin (Length: 2.0 m)	Used for Host Link only. Peripheral Bus not supported.	XW2Z-200S-V	
	Connects DOS computers, D-Sub 9-pin (Length: 5.0 m)		XW2Z-500S-V	
USB-serial conversion cable	USB-toRS-232C conversion cable (0.5 m) and driver CD-ROM (WIN98, ME, 2000, XP), USB version 1.1, USB plug: A-type, male. RS-232C plus: 9-pin D-sub, male		CS1W-CIF31	CE
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.		CX-ONE-AL□□C-E*1	---

*1 □□ = Number of licences; 01, 03, 10

Optional Products, Maintenance Products and DIN rail

Name	Specifications	Model	Standards
Battery Set	For CJ1G and CJ1H CPU Units (Use batteries within two years of manufacture.)	CPM2A-BAT01	L, CE
	For CJ1M CPU Units (Use batteries within two years of manufacture.)	CJ1M-BAT01	CE
End Cover	Mounted to the right-hand side of CJ-series CPU Racks or Expansion Racks. One End Cover is provided as a standard accessory with each CPU Unit and I/O Interface Unit.	CJ1W-TER01	UC1
DIN rail	Length: 0.5 m; Height: 7.3 mm	PFP-50N	---
	Length: 1 m; Height: 7.3 mm	PFP-100N	
	Length: 1 m; Height: 16 mm	PFP-100N2	
End Plate	There are 2 stoppers provided with CPU Units and I/O Interface Units as standard accessories to secure the Units on the DIN rail.	PFP-M	

Basic I/O Units

Name	Specifications	Connection type	Model	Standards
DC Input Units	12 to 24 V DC, 10 mA, 8 inputs	terminal block	CJ1W-ID201	UC1, CE, N, L
	24 V DC, 7 mA, 16 inputs	terminal block	CJ1W-ID211(SL)	
	24 V DC, 4.1 mA, 32 inputs	one 40-pin Fujitsu connector	CJ1W-ID231	
	24 V DC, 4.1 mA, 32 inputs	one 40-pin MIL connector	CJ1W-ID232	
	24 V DC, 4.1 mA, 64 inputs	two 40-pin Fujitsu connectors	CJ1W-ID261	
	24 V DC, 4.1 mA, 64 inputs	two 40-pin MIL connectors	CJ1W-ID262	
AC Input Units	100 to 120 V AC, 7 mA (100 V, 50 Hz), 16 inputs	terminal block	CJ1W-IA111	
	200 to 240 V AC, 10 mA (200 V, 50 Hz), 8 inputs	terminal block	CJ1W-IA201	
Interrupt Input Unit	24 V DC, 7 mA, 16 inputs	terminal block	CJ1W-INT01	
High-speed Input Unit	24 V DC, 7 mA, 16 inputs	terminal block	CJ1W-IDP01	
Relay Output Units	250 V AC/24 V DC, 2 A, independent contacts	8 outputs max.	CJ1W-OC201(SL)	UC1, CE, N, L
	250 V AC/24 V DC, 2 A, independent contacts	16 outputs max.	CJ1W-OC211(SL)	
Transistor Output Units	12 to 24 V DC, 2 A, 8 outputs, sinking	terminal block	CJ1W-OD201	
	24 V DC, 2 A, 8 outputs, sourcing, load short-circuit protection, alarm	terminal block	CJ1W-OD202	
	12 to 24 V DC, 0.5 A, 8 outputs, sinking	terminal block	CJ1W-OD203	
	24 V DC, 0.5 A, 8 outputs, sourcing, load short-circuit protection, alarm	terminal block	CJ1W-OD204	
	12 to 24 V DC, 0.5 A, 16 outputs, sinking	terminal block	CJ1W-OD211(SL)	
	24 V DC, 0.5 A, 16 outputs, sourcing, load short-circuit protection, disconnection detection, alarm	terminal block	CJ1W-OD212(SL)	
	12 to 24 V DC, 0.5 A, 32 outputs, sinking	one 40-pin Fujitsu connector	CJ1W-OD231	
	24 V DC, 0.5 A, 32 outputs, sourcing, load short-circuit protection, alarm	one 40-pin MIL connector	CJ1W-OD232	
	12 to 24 V DC, 0.5 A, 32 outputs, sinking	one 40-pin MIL connector	CJ1W-OD233	
	12 to 24 V DC, 0.3 A, 64 outputs, sinking	two 40-pin Fujitsu connectors	CJ1W-OD261	
	12 to 24 V DC, 0.3 A, 64 outputs, sourcing	two 40-pin MIL connectors	CJ1W-OD262	
	12 to 24 V DC, 0.3 A, 64 outputs, sinking	two 40-pin MIL connectors	CJ1W-OD263	
Triac Output Unit	250 V AC, 0.6 A, 8 outputs	terminal block	CJ1W-OA201	
DC Input/Transistor Output Units	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs	two 24-pin Fujitsu connectors	CJ1W-MD231	UC1, CE, N
	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sourcing, load short circuit protection, alarm	two 20-pin MIL connectors	CJ1W-MD232	
	16 inputs, 24 V DC, 7 mA 16 outputs, 12 to 24 V DC, 0.5 A, sinking outputs	two 20-pin MIL connectors	CJ1W-MD233	
	32 inputs, 24 V DC, 4.1 mA 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs	two 40-pin Fujitsu connectors	CJ1W-MD261	
	32 inputs, 24 V DC, 4.1 mA 32 outputs, 12 to 24 V DC, 0.3 A, sinking outputs	two 40-pin MIL connectors	CJ1W-MD263	
TTL I/O Unit	32 inputs, 5 V DC, 35 mA 32 outputs, 5 V DC, 35 mA/pt. 1.12 A/Unit	two 40-pin MIL connectors	CJ1W-MD563	
Temperature Input Units	6 thermocouples, J-type/K-type, no isolation between channels	terminal block	CJ1W-TS561(SL)	UC1, CE, L
	6 RTDs, Pt1000, no isolation between channels	terminal block	CJ1W-TS562(SL)	

Note: 1. Units with terminal blocks are generally available with screw connection, or with screwless clamp connection. For M3 screw connection, omit the "(SL)" from the model code.

2. Units with MIL/Fujitsu connectors are not provided with a plug counterpart. Either purchase the matching connector from the list below, or use OMRON XW2Z or G79 cables to connect I/O terminal blocks to the Unit (see „Wiring Systems“, page 384).

Connectors for I/O Units

Applicable Units	Name	Connection	Model	Remarks	Standards
I/O Units with terminal blocks	18-point screwless terminal block	Screwless Clamp/ card edge	CJ-WM01-18P-5	Replacement terminal blocks for I/O Units, pack of 5 pcs.	---
I/O Units with Fujitsu connectors	40-pin Connector	Soldered	C500-CE404	Connector: FCN-361J040-AU Connector Cover: FCN-360C040-J2	---
		Crimped	C500-CE405	Housing: FCN-363J040 Contactor: FCN-363J-AU Connector Cover: FCN-360C040-J2	
		Pressure welded	C500-CE403	FCN-367J040-AU/F	
	24-pin Connector	Soldered	C500-CE241	Connector: FCN-361J024-AU Connector Cover: FCN-360C024-J2	---
		Crimped	C500-CE242	Housing: FCN-363J024 Contactor: FCN-363J-AU Connector Cover: FCN-360C024-J2	
		Pressure welded	C500-CE243	FCN-367J024-AU/F	
I/O Units with MIL connectors*	40-pin Connector	Pressure welded	XG4M-4030-T	FRC5-A040-3TOS	
	20-pin Connector		XG4M-2030-T	FRC5-A020-3TOS	

Note: * Connectors according to MIL-C-83503 , also compatible with commercially available connectors according to DIN 41651 or IEC 60603-1 specifications

Special I/O Units

Name	Specifications	Model	Standards
Analog Input Units	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/8000, Conversion speed: 0.25 ms/point	CJ1W-AD081-V1(SL)	UC1, CE, N, L
	4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/8000, Conversion speed: 0.25 ms/point	CJ1W-AD041-V1(SL)	UC1, CE, N, L
Analog Output Units	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V) Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000, 250 μs/point)	CJ1W-DA08V(SL)	UC1, CE, N, L
	8 outputs (4 to 20 mA) Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000, 250 μs/point)	CJ1W-DA08C(SL)	UC1, CE, N, L
	4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000, Conversion speed: 1 ms/point max.	CJ1W-DA041(SL)	UC1, CE, N, L
	2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4000, Conversion speed: 1 ms/point max.	CJ1W-DA021(SL)	UC1, CE, N, L
Analog I/O Unit	4 inputs, 2 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4000, Conversion speed: 1 ms/point max. (Settable to 1/8000, 250 μs/point)	CJ1W-MAD42(SL)	UC1, CE, N, L
Process Input Units	2 isolated DC inputs, 16-bit resolution, conversion speed 10 ms/2 pts	CJ1W-PDC15	UC1, CE
	2 isolated thermocouple inputs, 16-bit resolution, conversion speed 10 ms/2pts	CJ1W-PTS15	
	2 isolated Pt100 inputs, 16-bit resolution, conversion speed 10 ms/2pts	CJ1W-PTS16	
	4 isolated inputs, thermocouple type R, S, K, J, T, L, B. Conversion speed 250 ms/4 pts	CJ1W-PTS51	
	4 isolated Pt100 inputs (JIS, IEC). Conversion speed 250 ms/4 pts	CJ1W-PTS52	
Temperature Control Units	4 loops, thermocouple input, NPN output	CJ1W-TC001	UC1, CE, N, L
	4 loops, thermocouple input, PNP output	CJ1W-TC002	
	2 loops, thermocouple input, NPN output, heater burnout detection function	CJ1W-TC003	
	2 loops, thermocouple input, PNP output, heater burnout detection function	CJ1W-TC004	
	4 loops, platinum resistance thermometer input, NPN output	CJ1W-TC101	
	4 loops, platinum resistance thermometer input, PNP output	CJ1W-TC102	
	2 loops, platinum resistance thermometer input, NPN output, heater burnout detection function	CJ1W-TC103	
	2 loops, platinum resistance thermometer input, PNP output, heater burnout detection function	CJ1W-TC104	
High-speed Counter Unit	2 inputs, max. input frequency: 500 kpps	CJ1W-CT021	UC1, CE, N, L
4-Channel Counter Unit	4 inputs, max. input frequency: 100 kpps	CJ1W-CTL41-E	UC1, CE, L
	Screwless Terminal Block for CJ1W-CTL41-E	XW2G-40G7-E	CE
2-SSI Encoder Input Unit	2 Synchronous Serial Interface channels	CJ1W-CTS21-E	CE, L
PROFIBUS-DP I/O Link Unit	Exchanges up to 180 words in any memory area with a PROFIBUS-DP Master Unit	CJ1W-PRT21	UC1, CE
CompoBus/S Master Unit	CompoBus/S remote I/O, 256 points max.	CJ1W-SRM21	UC1, CE, N, L
Position Control Units	Pulse train, open collector output, 1 axis	CJ1W-NC113	UC1, CE
	Pulse train, open collector output, 2 axes	CJ1W-NC213	
	Pulse train, open collector output, 4 axes (See note 1.)	CJ1W-NC413	
	Pulse train, line driver output, 1 axis	CJ1W-NC133	
	Pulse train, line driver output, 2 axes	CJ1W-NC233	
	Pulse train, line driver output, 4 axes (See note 1.)	CJ1W-NC433	
	Spacer Unit (See note 1.)	CJ1W-SP001	
Servo Relay Units (See note 2.)	For 1-Axis Position Control Unit (without communications support) (CS1W-NC113/133, CJ1W-CN113/133, C200HW-NC113, C200H-NC112)	XW2B-20J6-1B	
	For 2- or 4-Axis Position Control Unit (without communications support) (CS1W-NC213/233/413/433, CJ1W-CN213/233/413/433, C200HW-NC213/413, C500-NC213/211, C200H-NC211)	XW2B-40J6-2B	
	For 2- or 4-Axis Position Control Unit (with communications support) (CS1W-NC213/233/413/433, CJ1W-CN213/233/413/433, C200HW-NC213/413)	XW2B-40J6-4A	
Position Control Unit Cables (See note 2.)	Connects CJ1W-NC113 to W Series, Cable length: 0.5 m	XW2Z-050J-A14	
	Connects CJ1W-NC113 to W Series, Cable length: 1 m	XW2Z-100J-A14	
	Connects CJ1W-NC213/413 to W Series, Cable length: 0.5 m	XW2Z-050J-A15	
	Connects CJ1W-NC213/413 to W Series, Cable length: 1 m	XW2Z-100J-A15	
	Connects CJ1W-NC113 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A16	
	Connects CJ1W-NC113 to SmartStep, Cable length: 1 m	XW2Z-100J-A16	
	Connects CJ1W-NC213/413 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A17	
	Connects CJ1W-NC213/413 to SmartStep, Cable length: 1 m	XW2Z-100J-A17	
	Connects CJ1W-NC133 to W Series, Cable length: 0.5 m	XW2Z-050J-A18	
	Connects CJ1W-NC133 to W Series, Cable length: 1 m	XW2Z-100J-A18	
	Connects CJ1W-NC233/433 to W Series, Cable length: 0.5 m	XW2Z-050J-A19	
	Connects CJ1W-NC233/433 to W Series, Cable length: 1 m	XW2Z-100J-A19	
	Connects CJ1W-NC133 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A20	
	Connects CJ1W-NC133 to SmartStep, Cable length: 1 m	XW2Z-100J-A20	
	Connects CJ1W-NC233/433 to SmartStep, Cable length: 0.5 m	XW2Z-050J-A21	
	Connects CJ1W-NC233/433 to SmartStep, Cable length: 1 m	XW2Z-100J-A21	
ID Sensor Unit (See note 3.)	For V600 Series, 1 R/W Head	CJ1W-V600C11	---
	For V600 Series, 2 R/W Heads	CJ1W-V600C12	

1. The ambient operating temperature for 4-Axis Position Control Units is 0 to 50 °C; mount a Spacer Unit to the Position Control Unit in case the ambient temperature may reach 55 °C. The allowable voltage fluctuation on the external 24- V DC power supply is 22.8 to 25.2 V DC (24 V ±5%).
2. Two Servo Relay Units and two cables for the Position Control Unit are required for a 4-Axis Position Control Unit.
3. Refer to the *Auto-Identification Components Group Catalog* (Cat. No. Q132) for details on the V600 Series RFID System

CPU Bus Units

Name	Specifications	Model	Standards
Controller Link Units	Wired (Shielded twisted-pair cable)	CJ1W-CLK21-V1	UC, CE, N, L
Controller Link Relay Terminal	Wired Set of 5 Terminals	CJ1W-TB101	---
Controller Link Support Board	Twisted pair, PCI bus, with Support Software	3G8F7-CLK21-EV1	CE
Controller Link Repeater Units	Twisted-pair cable	CS1W-RPT01	UC1, CE
	Optical Ring (H-PCF cable)	CS1W-RPT02	
	Optical Ring (GI cable)	CS1W-RPT03	
Serial Communications Units	1 RS-232C port and 1 RS-422/485 port	CJ1W-SCU41-V1	UC, CE, N, L
	2 RS-232C ports	CJ1W-SCU21-V1	
Ethernet Unit	100Base-Tx	CJ1W-ETN21	UC, CE, N, L
DeviceNet Unit	Functions as master and/or slave; allows control of 32,000 points max. per master	CJ1W-DRM21	
CAN Unit	Freely configurable reception and transmission of CAN messages	CJ1W-CORT21	UC1, CE
PROFIBUS-DP Master Unit	Controls up to 7000 words of remote I/O data over PROFIBUS-DP	CJ1W-PRM21	UC, CE
CX-PROFIBUS, PROFIBUS-DP Configurator	Software only (Windows 2000, XP)	CX-Profi-V1	---
Motion Control Unit	Real axes: 30, Virual Axes: 2, Communication by Mechatrolink-II	CJ1W-MCH71	CE
Position Control Unit	Mechatrolink-II connection to max. 16 axes	CJ1W-NCF71	UC1, CE

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P04E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

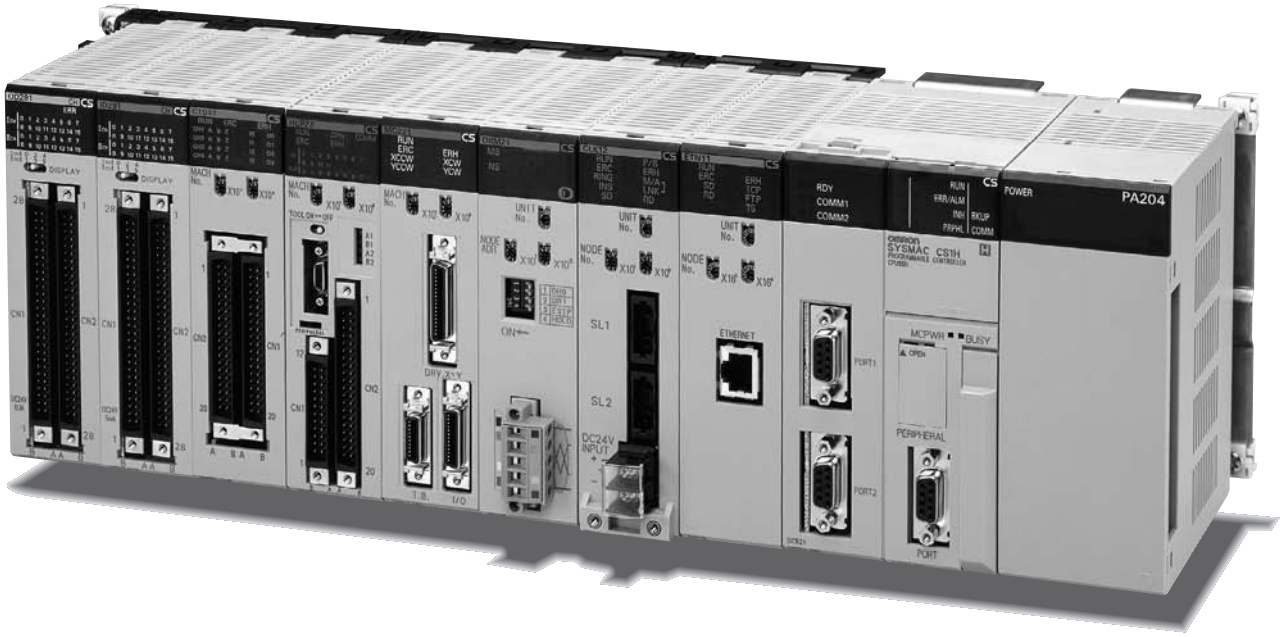
Rack PLCs

CS1 Series		
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Rack PLC series

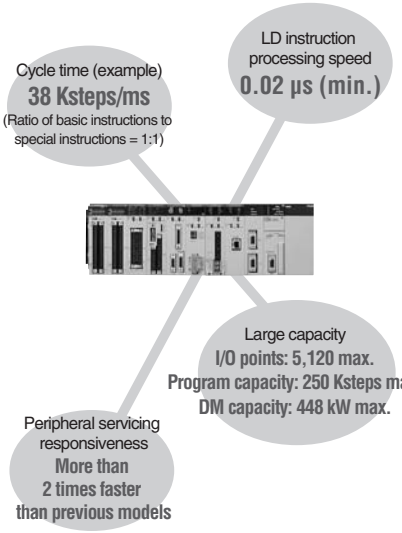
CS1

The evolution of the SYSMAC CS1 is accelerating advances in the production site.



1 Ultimate Performance

Further improvements to instruction execution efficiency, the core of overall PLC performance, enable the highest speeds in the industry. This allows the optimization of processing time and accuracy.



2 Instructions That Fit the Application

These PLCs have a variety of special instructions that allow their operation to suit the application. High-precision control can be achieved without complex programs.

- High-precision Positioning
  Double-precision floating-point instructions
- Automatic Adjustment of PID Constants
  PID instructions with autotuning
- Program Simplification
  Set and reset instructions for DM/EM Area bits

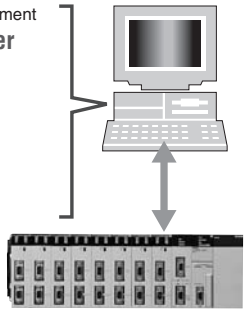


- Error Generation for Debugging
  Failure diagnosis instructions
- High-resolution Approximation
  APR instruction
- Workpiece Information Control for Conveyor Systems
  Table data processing instructions for stacks

3 Integrated Development Environment and Middleware

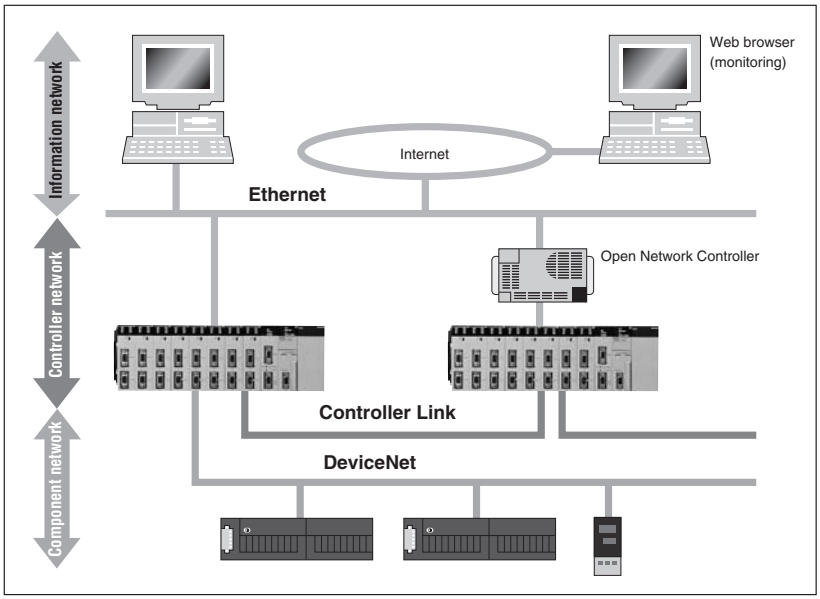
CX-One includes powerful software packages for program development, simulation, and communications. Develop more efficient value-added systems in the time allowed.

- Program development
  CX-Programmer
- Simulation
  CX-Simulator
- Communications middleware
  CX-Server



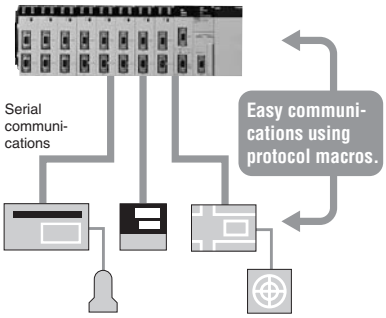
4 Seamless Networking

The CS1 supports message communications across three network levels, from information networks down to component networks, allowing greater on-site information management. Remote monitoring of installations is also possible using Web functions via the Internet.



5 Easier Connection to Peripheral Devices

Up to 35 peripheral devices can be connected to a CS1 PLC via serial communications. Data can be exchanged with peripheral devices easily using the protocol macro function, eliminating the need for time-consuming communications programs.



6 Inheritance and Maintenance

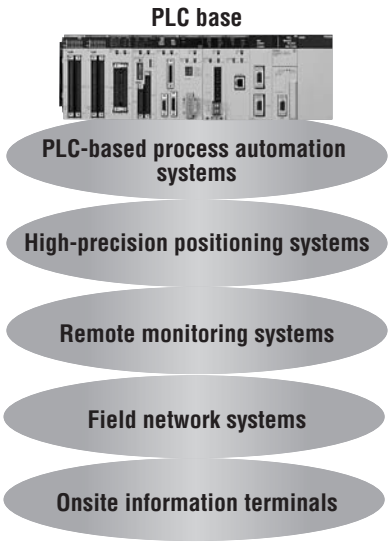
Today´s CS1 PLCs have complete upward compatibility with existing CS1 systems. Facilities performance can be upgraded simply by replacing the CPU Unit (see note). Also, features such as battery-free operation ensure greater convenience for maintenance and operation.



Note: When replacing a CPU Unit with a different model, always test the system to confirm that it has not been adversely affected.

7 PLC-based System Expansion

A variety of system expansions based on CS1 PLCs, such as PLC-based process automation systems, high-precision positioning systems, and remote monitoring systems are possible.



Use the improved SYSMAC CS1 PLCs to scale advanced systems to the optimum size.

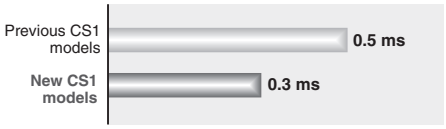
1

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

Faster Instruction Execution and Faster Overall Performance

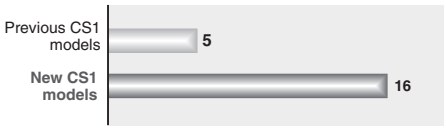
In addition to further improvements to the instruction execution engine, which is the core of overall PLC performance, the high-speed RISC chip has been upgraded to **realize the fastest instruction execution performance in the industry**. Also, the new models have a mode where instruction execution and peripheral processing are processed in parallel, enabling balanced improvements in overall speed.

● Common Processing: 1.6 Times Faster



The figures above are for high-speed, general-purpose PLCs with interchangeable boards.

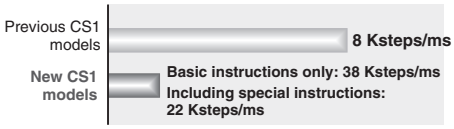
● PCMIX Value: 3 Times Higher



The PCMIX is the average number of instructions that can be executed in 1 μs and expresses the over execution performance of the ladder program. This unit was conceived to allow comparing the performance of PLCs from different manufacturers using a common metric.

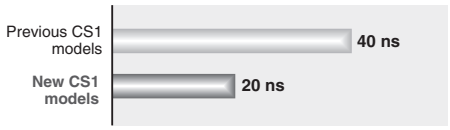
● Cycle Time: 2.5 to 4.8 Times Shorter

(Cycle time for 128 inputs and 128 outputs)



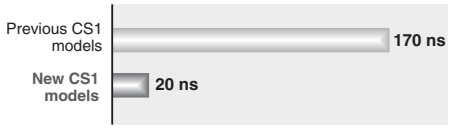
With normal I/O refresh, 1-ms pulses are not lost even for large-capacity (e.g., 30-Kstep) programs. This allows use in applications requiring a high working accuracy, such as molding equipment.

● LD Instruction Processing Speed: 2 Times Faster



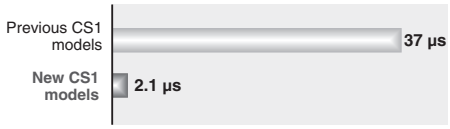
The development of a special LSI to execute instructions and use of a high-speed RISC chip enable high-speed processing at the CPU.

● OUT Instruction Processing Speed: 8 Times Faster



Programs consisting mainly of basic instructions are processed at ultrahigh speed.

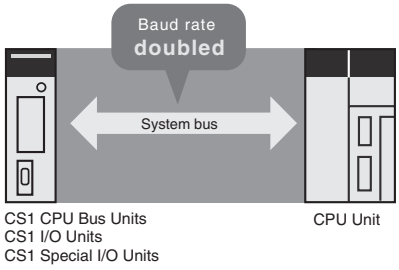
● Subroutine Processing Speed: 17.6 Times Faster



Cycle time overhead due to program structuring is minimized.

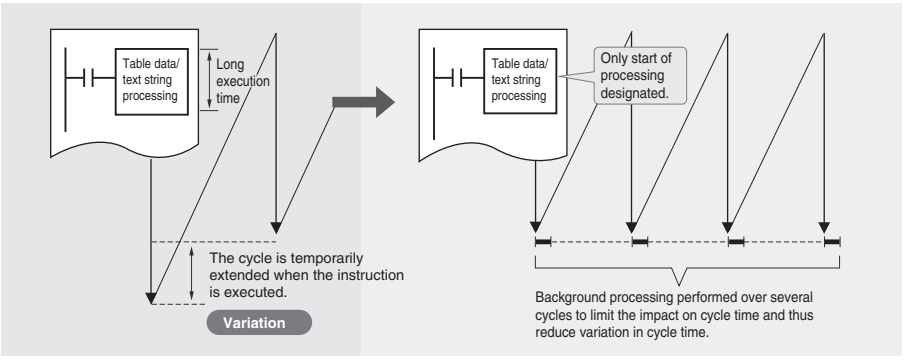
System Bus Baud Rate Doubled

The data transfer rate between the CPU Unit and certain Units has been doubled to further improve total system performance.



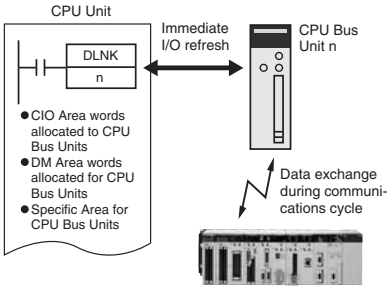
Reduced Variation in Cycle Time During Data Processing

Instructions that require long execution time, such as table data processing instructions and text string processing instructions, are processed over multiple cycles to minimize variations in cycle time and maintain stable I/O response.



Improved Refresh Performance for Data Links, Remote I/O Communications, and Protocol Macros

In the past, I/O refresh processing with the CPU Bus Unit only occurred during I/O refresh after instructions were executed.



Unit name	Refresh function
Controller Link Unit	Data links
DeviceNet Unit	Remote I/O
Serial Communications Unit	Protocol macros
Ethernet Unit	Socket service based on manipulation of specific bits.

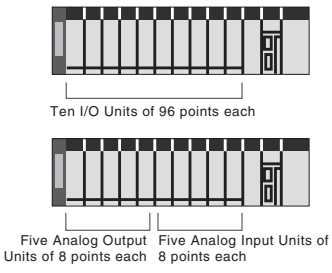
With the new CS1, however, I/O can be refreshed immediately by using the DLNK instruction. Immediate refreshing for processes peculiar to the CPU Bus Unit, such as for data links and DeviceNet remote I/O communications, and for allocated CIO Area/DM Area words when instructions are executed, means greater refresh responsiveness for CPU Bus Units.

Large Capacity CPU Units for Greater Component Control Power

The CS1 CPU Units boast amazing capacity with up to 5,120 I/O points, 250 Ksteps of programming, 448 Kwords of data memory (including expanded data memory) and 4,096 timers/counters each. With a large programming capacity, CS1 PLCs are not only ideal for large-scale systems but easily handle value-added applications and other advanced data processing.

Control Up to 960 Points with Units Mounted to the CPU Rack

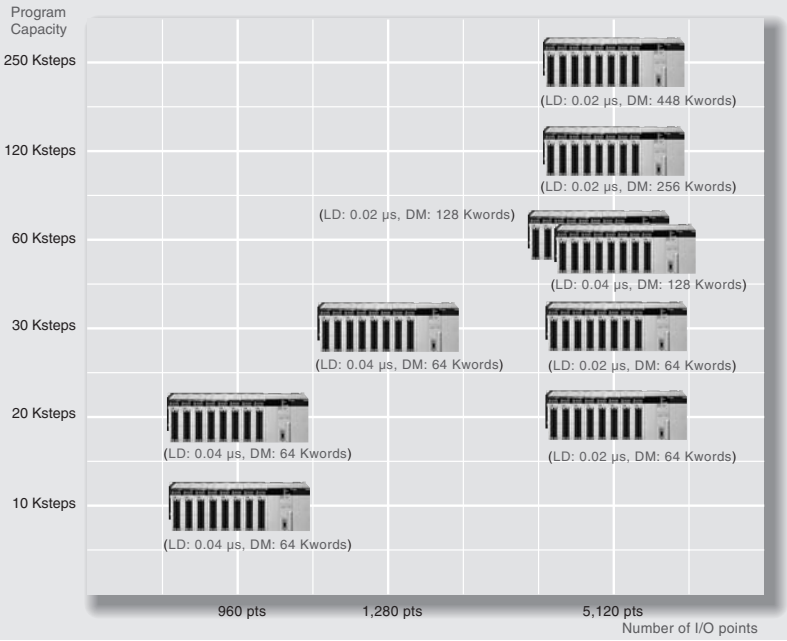
The CS1 provides a high level of space efficiency. As many as 960 I/O points can be controlled by simply mounting ten Basic I/O Units, with 96 I/O points each, to the CPU Rack. Alternatively, as many as 80 analog I/O points can be used by mounting five Analog Input Units and five Analog Output Units.



Wide Lineup Makes It Easy to Build the Optimum System

A total of nine CPU Unit models provide for a wide range of applications, from small-scale systems to large. The lineup also includes Memory Cards, Serial Communications Boards, and a wide selection of Special I/O Units that can be used with any CPU Units to flexibly build the system that meets the requirements.

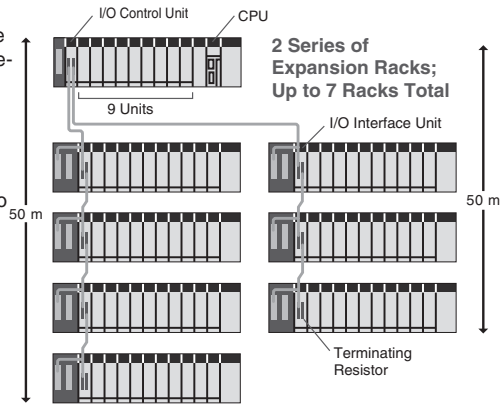
Product lineup (Example: LD instruction processing speed, DM capacity)



Two Series of Expansion Racks Up to 50 m Long for Long-distance Expansion with Up to 72 Units and 7 Racks

With an expansion capacity of up to 80 Units and 7 Racks over a distance of 12 meters, the CS1 can meet large-scale control needs. Alternatively, an I/O Control Unit and I/O Interface Units can be used to connect two series of CS1 Long-distance Expansion Racks extending up to 50 m each and containing a total of up to 72 Units and 7 Racks. CS1 Basic I/O Units, CS1 Special I/O Units, and CS1 CPU Bus Units can be mounted anywhere on the Racks and programmed without being concerned about special remote programming requirements.

Note: C200H Units cannot be mounted on the Long-distance Expansion Racks.



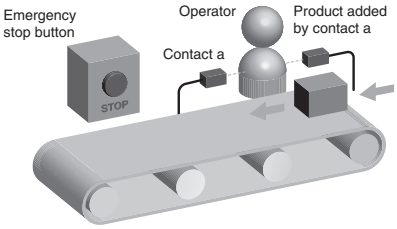
Equipped with functions demanded by the production site to suit a variety of applications

2

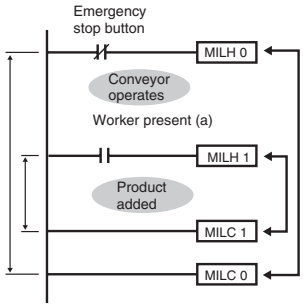
The evolution of the SYSMAC CS1 is accelerating advances in the production site.

Nested Interlocks (for CPU Unit Ver. 2.0 or Later)

Although strictly speaking the present interlock instructions do not allow nesting, applications can be created to include combination of complete and partial interlock conditions that achieve nested interlocks.



(1) Conveyor operates
(2) Contact "a" turns ON when operator is present and products are supplied.
(3) When the emergency stop button is pressed, the conveyor and product addition both stop.



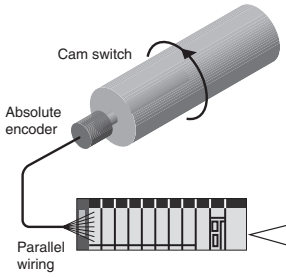
CX-Programmer Screen

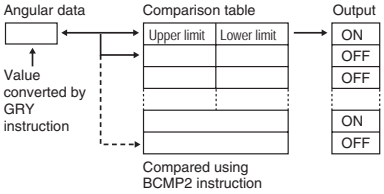


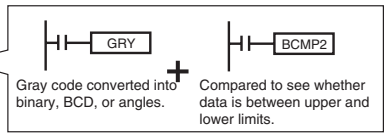
Support Software clearly shows the interlock status.

Easy Cam Switch Control with Ladder Instructions

(for CPU Unit Ver. 2.0 or Later)



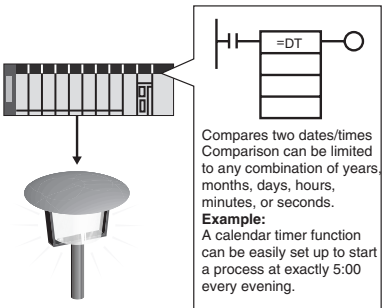




The time interval for execution by the GRY instruction is determined by the response speed for reading data from the absolute encoder.

Easy Calendar Timer Function

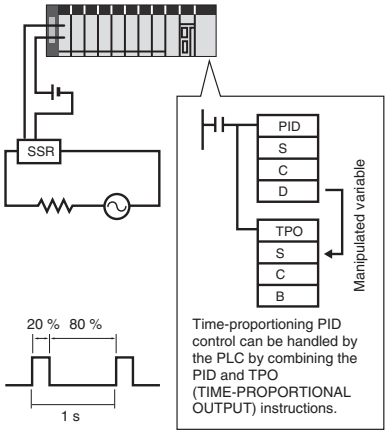
(for CPU Unit Ver. 2.0 or Later)



Compares two dates/times Comparison can be limited to any combination of years, months, days, hours, minutes, or seconds.
Example:
A calendar timer function can be easily set up to start a process at exactly 5:00 every evening.

TIME-PROPORTIONAL OUTPUT (TPO) Instruction

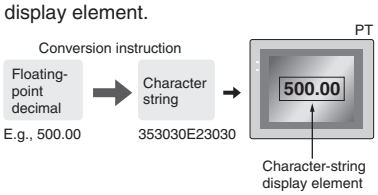
(for CPU Unit Ver. 2.0 or Later)



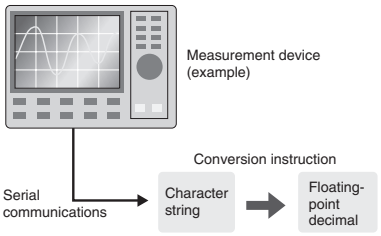
Time-proportioning PID control can be handled by the PLC by combining the PID and TPO (TIME-PROPORTIONAL OUTPUT) instructions.

Convert Between Floating-point Decimal and Character Strings

The new CS1 can convert floating-point decimal (real numbers) to character strings (ASCII) for display on a PT (operator interface). The data can be displayed on the PT as a character-string display element.

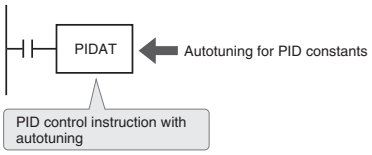


The new CS1 can convert ASCII character strings read from measurement devices by serial communications to floating-point decimal data for use in data processing.



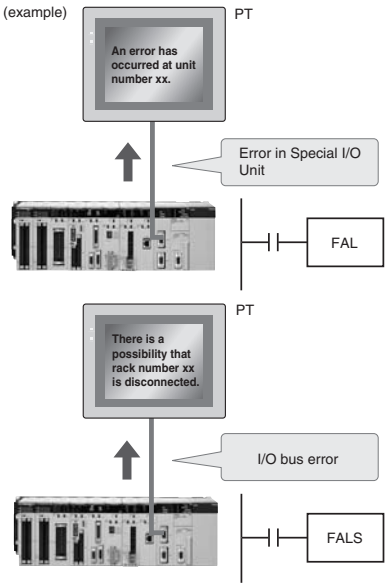
PID Autotuning

The new CS1 can autotune PID constants with a PID control instruction. The limit cycle method is used for autotuning, so the tuning is completed quickly. This is particularly effective for multiple-loop PID control.



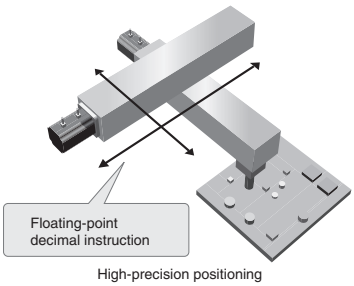
Error Status Generation for Debugging

A specified error status can be simulated by executing the diagnostic instructions (FAL/FALS). With the new CS1, debugging is simple for applications that display messages on a PT or other display device based on the error status of the CPU Unit.



Highly Accurate Positioning with XY Tables

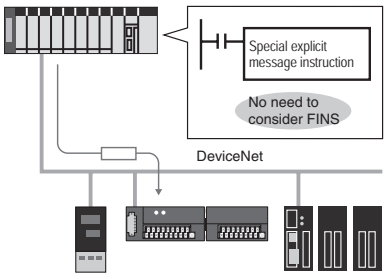
The new CS1 has many double-precision processing instructions for floating-point decimal operations, enabling positioning with greater accuracy.



Easy Reading of Maintenance Data via DeviceNet

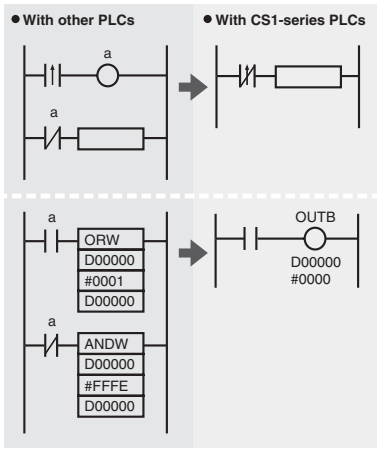
(for CPU Unit Ver. 2.0 or Later)

The addition of special explicit message instructions makes it easy to send explicit messages without having to consider FINS commands. Transferring data among PLCs with explicit messages is also simplified.



Simpler Ladder Programs

Ladder programs that use a lot of basic instructions can be simplified using differentiation instructions LD NOT, AND NOT, and OR NOT, and instructions that access bits in the DM and EM Areas.



Binary Set Values for Timer/Counter Instructions

The SV for a timer or counter instruction can be specified using either BCD or binary. Using binary SV enables longer timers and higher-value counters.

Examples: Timer/Counter Instructions
TIM (BCD): 0 to 999.0 s
TIMX(550) (binary) 0 to 6553.5 s
CNT (BCD): 0 to 999 counts
CNTX(546) (binary) 0 to 65,535 counts

Applicable Timer/Counter Instructions
TIMER: TIMX(550)
COUNTER: CNTX(546)
HIGH-SPEED TIMER: TIMHX(551)
ONE-MS TIMER: TMHHX(552)
ACCUMULATIVE TIMER: TTIMX(555)
LONG TIMER: TIMLX(553)
MULTI-OUTPUT TIMER: MTIMX(554)
REVERSIBLE COUNTER: CNTRX(548)
RESET TIMER/COUNTER: CNRX(547)

Easier and more efficient design, development and maintenance with Windows-based software and middleware

3

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

Improved Support Software in an Integrated Windows-based Development Environment

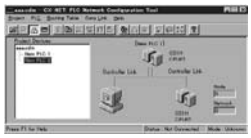
The CX-One software suite provides tools for more efficient design and development using the CX-Programmer for programming and network configuration, and CX-Simulator for operation simulation.

CX-Programmer

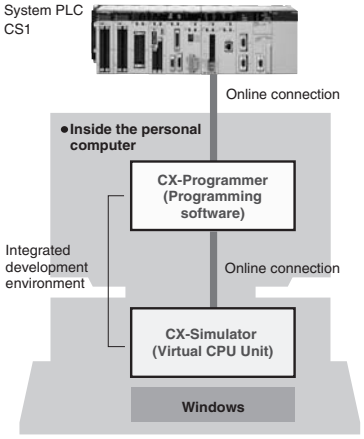


CX-Simulator





CX-Integrator Network Configuration Tool



CX-Programmer

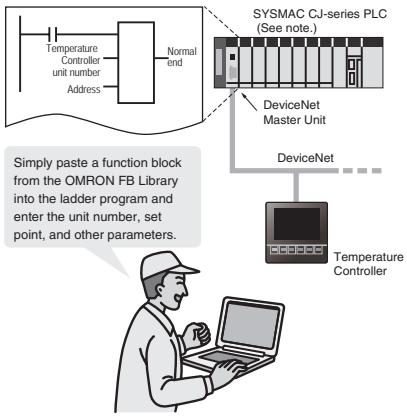
OMRON FB Library *NEW*

(Unit Ver. 3.0 or later)

The OMRON FB library provides function blocks for setting SPs, reading PVs, and reading/writing RUN/STOP status and other Temperature Controller parameters. The programmer simply pastes function blocks from the OMRON FB Library into the ladder program. The desired functions can be utilized simply by inputting the Temperature Controller unit number and address.

●What is the OMRON FB Library?
The OMRON FB Library is a set of functional objects for ladder programming for OMRON CS/CJ-series PLCs. By incorporating the OMRON function blocks provided by OMRON into a ladder program, the program interface for different control devices is easily completed. This reduces the number of working hours required for program development and, at the same time, improves product quality through standardization.

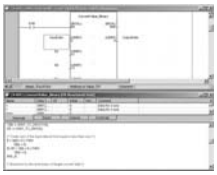
Example: Function Block for Writing Temperature Controller SPs



The Structured Text (ST) Language Enables Trigonometric Functions and other Arithmetic Processes *NEW*

(Unit Ver. 3.0 or later)

In addition to ladder programming, function block logic can be written in ST, which conforms to IEC61131-3. With ST, arithmetic processing is also possible, including processing of absolute values, square roots, logarithms, and trigonometric functions (SIN, COS, and TAN). Processing difficult to achieve in ladder programs becomes easy to write.

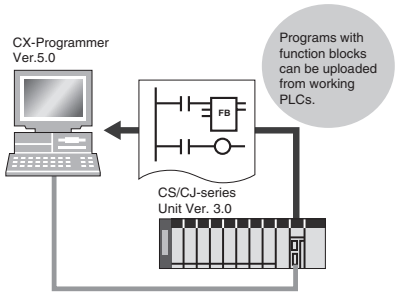


NEW
CX-Programmer Ver. 5.0 or higher is required.

Recovery Possible by Uploading Function Blocks from Working PLC *NEW*

(Unit Ver. 3.0 or later)

Programs with function blocks can be uploaded from CPU Units, just like normal programs, without the need for additional memory, such as a Memory Card.

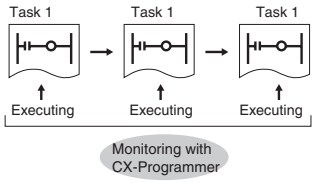


Enhanced Efficiency for Program Development Teams

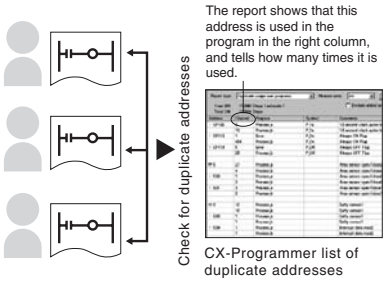
(for CPU Unit Ver. 2.0 or Later)

Multiple programmers will enjoy better efficiency when working on task-based programs, thanks to automatic checking for address duplication among tasks, downloading and uploading in task units, and easy monitoring of task operating status.

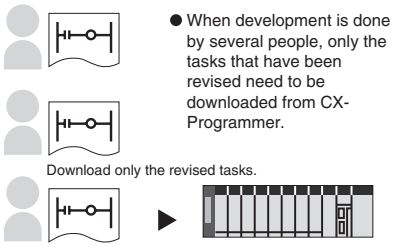
- The execution status of each task can be monitored with CX-Programmer to improve debugging efficiency.



- Checking for address duplication among tasks developed by multiple programmers is automatically executed with the cross reference report of CX-Programmer.



- When development is done by several people, only the tasks that have been revised need to be downloaded from CX-Programmer.



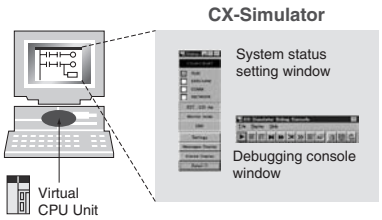
Copy and Paste between Spreadsheets and Symbol Tables

You can use your favorite spreadsheet application to prepare an allocation table with symbol names, addresses, and I/O comments, then copy and paste it into a symbol table, and also do the reverse. This greatly improves programming productivity.

CX-Simulator

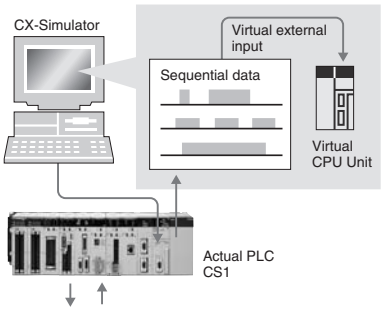
Programs Can Be Executed, Monitored, and Debugged without an Actual PLC

The CX-Simulator Software simulates ladder execution of the new CS1 CPU Unit on a computer. Online functions, such as monitoring of I/O bit status, monitoring of I/O memory present values, forced set/reset, differential monitoring, data tracing, and online editing, can be performed by connecting to the virtual CPU Unit on the computer from the CX-Programmer using the CX-Simulator. This reduces the total lead time to machine or system startup.



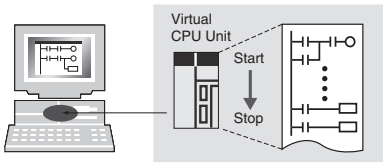
Data Logging On-site and Operation Verification in the Office

Sequential data from I/O memory in the actual PLC can be obtained and saved as a data recreation file (CSV format). On-site PLC ladder execution can be recreated on a computer by inputting this data to the CX-Simulator as virtual external input data.



Comprehensive Debugging Functions Including Ladder Step Execution and Break Points

The new CS1 has comprehensive debugging functions, including ladder step execution (execution by instruction), start point settings, break point setting, I/O break conditions, and scan execution. This enables more detailed debugging without using an actual PLC. Interrupt tasks can be simulated, enabling more realistic debugging.

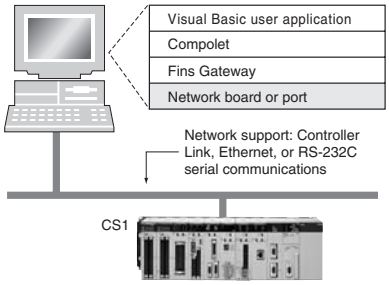


Middleware to Support PLC-centered System Construction

Easy development of user applications for communications with the new CS1.

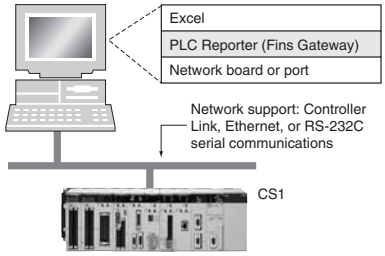
SYSMAC Compolet: Accessing the CS1 with Visual Basic

Use SYSMAC Compolet for communications with OMRON PLCs to greatly reduce development time of user applications for CS1 I/O memory read and write, forced set/reset, and FINS message communications using Visual Basic.



PLC Reporter 32: Add-on Software for Accessing the New CS1 Using Excel

Use PLC Reporter 32 to automatically collect specific CS1 I/O memory data into Excel 97 or Excel 2000 cells without special programming. Basically, a system can be constructed with a computer, PLC Reporter 32, Excel, and a host link cable. The cost of constructing a monitoring system can thus be greatly reduced.



Further improvements to communications functions. Seamless networks increase production site transparency

4

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

The Solution for Communicating across Network Levels

The SYSMAC CS1 enables FINS message communications across a maximum of eight levels (See note) (using CX-Programmer Ver. 4.0 or higher) in comparison with three levels in previous OMRON systems
Expansion up to eight levels lets you build a seamless communications system for sending FINS messages across multiple levels of Ethernet and Controller Link networks.

Note: For CPU Unit Ver. 2.0 or later.

Flexible System Building Based on the DeviceNet

The CS1 Series supports the worldwide multivendor bus standard, DeviceNet. Component connections in a multivendor environment are greatly enhanced by connecting to up to 64 nodes for a wide range of FA applications, and by device profiles and configurator tools that ensure high reliability and easy maintenance. Production systems can be configured even more flexibly by incorporating products such as the MULTIPLE I/O TERMINAL.

A Wide Range of Systems, from Small-scale to Large

OMRON offers a full lineup of reliable PLCs including the "flagship" CS1 Series, and ranging from the small-scale CQM1H to the large-scale CV Series. The CS1 Series meets the needs not only of small-scale to large-scale systems, but of distributed systems as well. This allows the construction of the optimum system for the scale and applications of the production site.

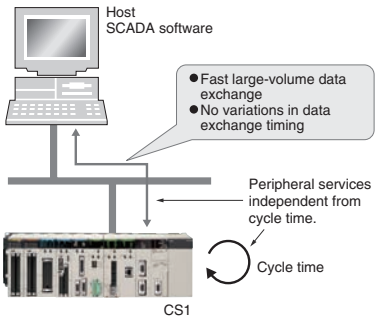
Functions for Better Ethernet Support

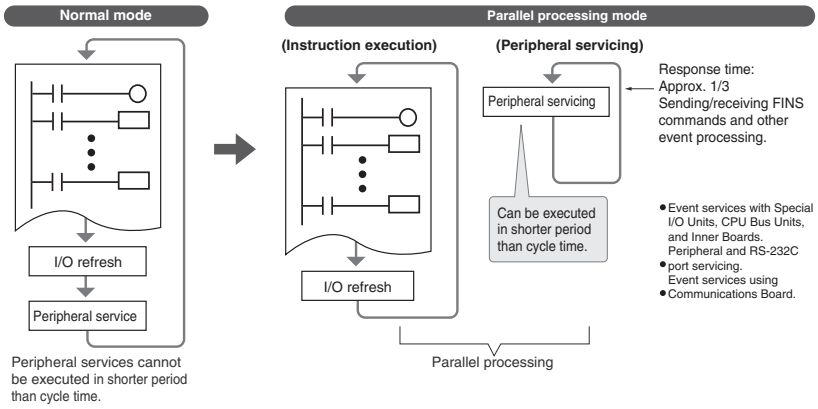
Ethernet is becoming an increasingly important standard for information networks. Up to eight socket interfaces for TCP/IP and UDP/IP are supported, in addition to FINS messages, FTP file transfers, and mail notification, so that production management can now be organically linked with the production site.

High Event Responsiveness and High-speed Instruction Execution

The new CS1 has an operating mode that allows parallel processing for program execution and peripheral services. This has the following benefits.

- Fast exchange with host computers of large amounts of data, without dependence on the program capacity of the new CS1. Smooth refreshing of data exchanged with
- SCADA software without variations in timing. Cycle time not affected if communications traffic or networks increase when expanding
- facilities in the future.



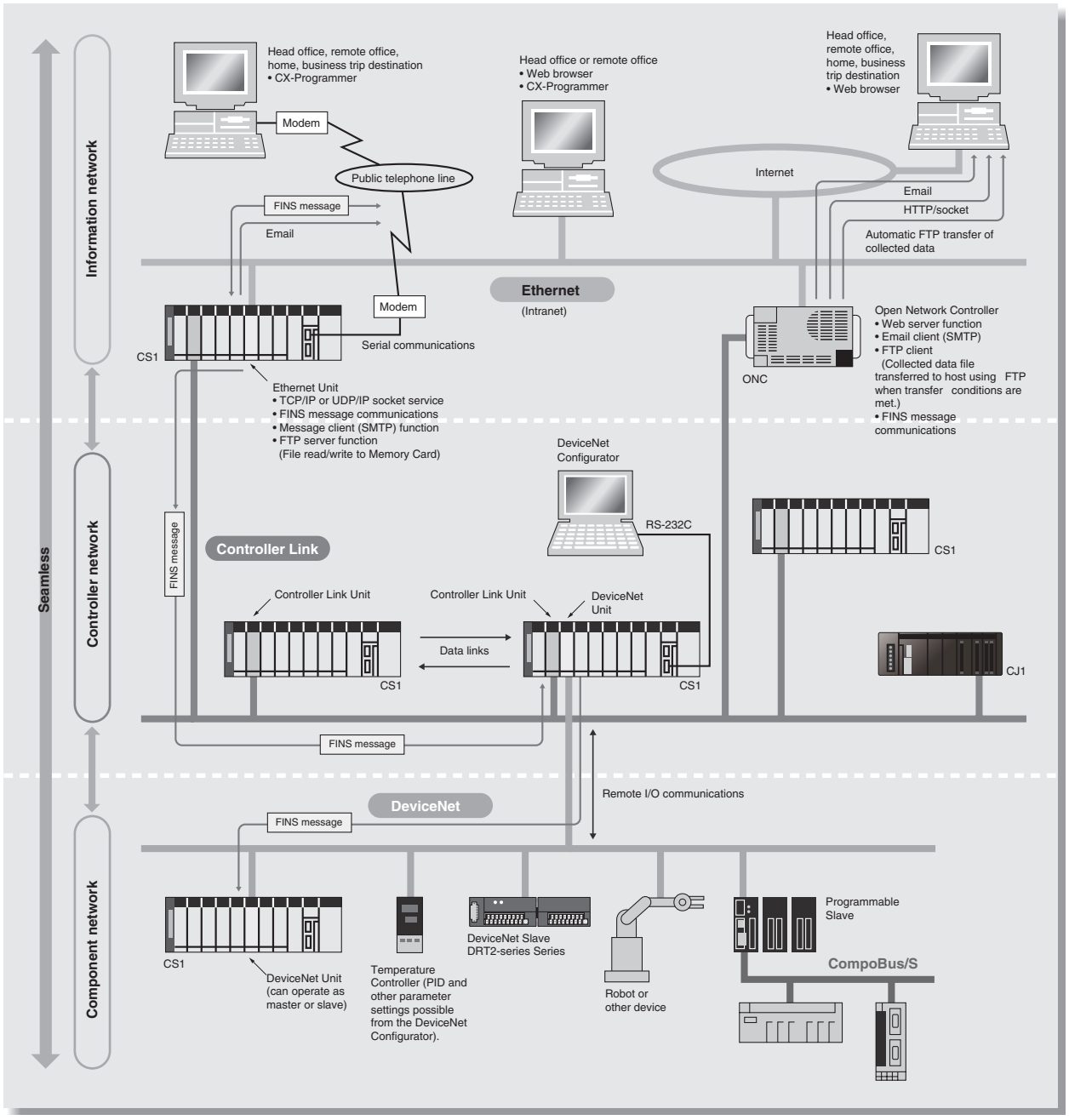


Add a Redundant Optical Ring to Your Controller Link Communications

A redundant network configuration will keep communications flowing over the duplicate ring-shaped path in the event of a broken optical fiber, preventing system malfunction.

Remote Monitoring via the Web

Connecting via an ONC enables remote monitoring from a Web browser with a user-defined Web application (using Web Tool Kit). It is also possible to automatically collect data on a Memory Card mounted to an ONC and automatically transfer data to the host PLC (using Data Collection/Distribution Software).



Construction of systems in multivendor environments simplified with protocol macros.

5

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

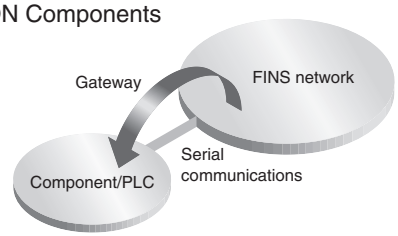
NEW Serial Gateway

(CPU Unit Ver. 3.0 or later)
(Serial Communications Units/Boards with Ver. 1.2 or later)

Truly Seamless Incorporation of OMRON Components and Other Devices into Networks

When the CPU Unit (Ver. 3.0 or later) or Serial Communications Board or Serial Communications Unit (Ver. 1.2 or later) receive a FINS command containing a CompoWay/F command (see note 1) via network or serial communications, the command is automatically converted to a protocol suitable for the message and forwarded using serial communications.

- CompoWay/F (See note 2.)
- Host Link FINS
  (Possible only with Serial Communications Boards or Serial Communications Units Ver. 1.2 or later)

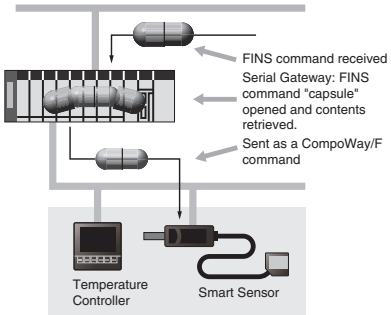


Note 1: FINS
Abbreviation for Factory Interface Network Service. A command system for message services common to OMRON networks. FINS commands can be sent across up to 8 network levels, including serial communications paths using a serial gateway. (Possible only with CS/CJ-series CPU Unit Ver. 2.0 or later.)

Note 2: CompoWay/F
CompoWay/F is an integrated communications protocol used for OMRON general-purpose serial communications. It is used by Temperature Controllers, Digital Panel Meters, Timer/Counters, Smart Sensors, Cam Positioners, Safety Controllers, etc. (as of July 2004).

● Serial Gateway System (Reference)

When CompoWay/F commands are enclosed in FINS commands and sent to Serial Communications Boards or Serial Communications Units (Ver. 1.2) or serial ports on CPU Unit Ver. 3.0, the enclosed CompoWay/F command is retrieved using a Serial Gateway Function and sent as a CompoWay/F command.



More Ports for Even More Serial Device Connections

Protocol macros make it easy to create serial communications protocols (communications frames, error checks, retries, error processing, etc.) to match those of remote communications devices. Multiple ports are provided for this function. Each PLC supports up to 16 Serial Communications Units (32 ports total) and one Serial Communications Board (with 2 ports). This makes it possible to connect up to 34 devices with serial communications at a speed of 38.4 Kbps. Message length has been increased from 256 to 1,000 bytes to give communications more power than ever before.

Windows-based Software Simplifies Serial Device Connections

Protocol macros for Serial Communications Units and Boards can be created using the CX-Protocol, thus enabling message tracing and greatly reducing the time involved in connecting various serial devices.



Enhanced Protocol Macro Functionality *NEW*

(Serial Communications Units/Boards with Ver. 1.2 or later)

- Baud rate increased from 38,400 bps to 57,600 bps for faster communications. Standard system protocol added for
- greater connectability with components and PLCs.
  - •CompoWay/F Master
  - •Host Link Master functions
  - •Mitsubishi Computer Link Master

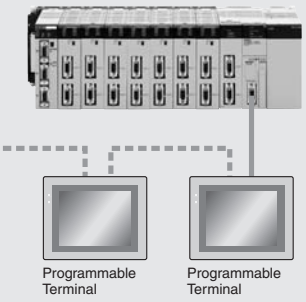
Wide Range of Applicable Protocols Allows for High Value-added Programs

The CS1 Series supports a wide range of serial communications protocols, such as Host Link, no-protocol, NT Link, peripheral bus, and more. These allow for high value-added programs such as MMI, communications, and data processing.

The Fastest Communications in the Industry with High-speed NT Links

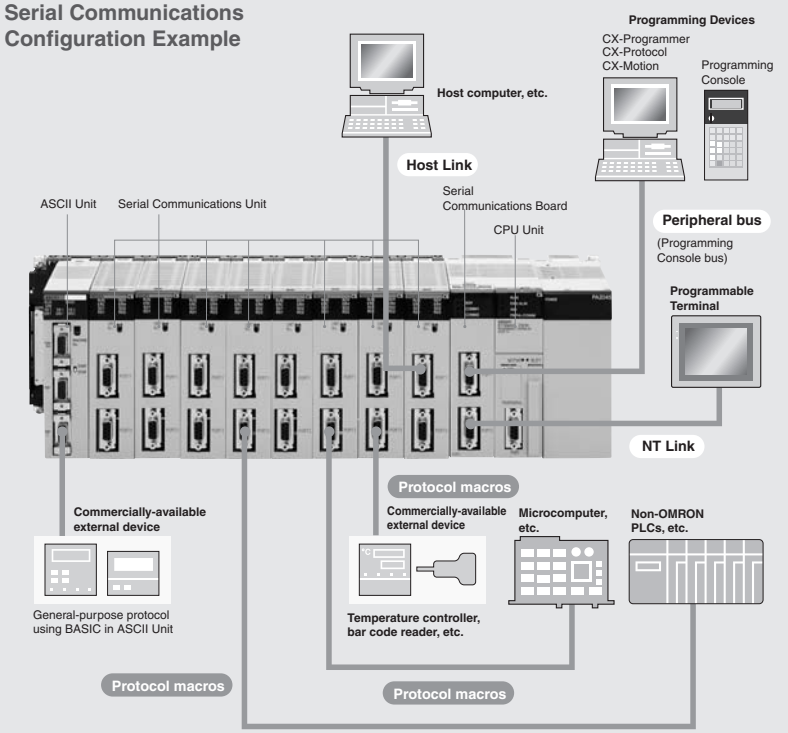
Combine with one of the NS Series Programmable Terminals (NS8, NS10, or NS12) to enable connecting High-speed NT Links. Using NT Link terminology together with a communications speed of 115 Kbps provides high-speed response.

NT Links (1:N Mode)

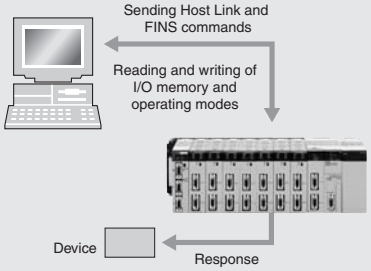


PLC-to-PT connection in NT Link (1:N mode) communications can be either one-to-one or one-to-many.

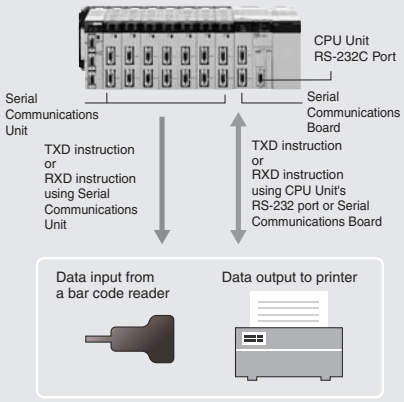
Serial Communications Configuration Example



Host Links



No-protocol



Supports No-protocol Communications *NEW*

(Serial Communications Units/Boards with Ver. 1.2 or later)

- No-protocol communications supported for Serial Communications Units and Serial Communications Boards
- This mode enables components to be connected to multiple communications ports using no-protocol communications.
- Serial port I/O instructions executable using no-protocol communications from Serial Communications Units and Serial Communications Boards (TXDU, RXDU, TXD, and RXD) are supported for CPU Units with Ver. 3.0 or later.

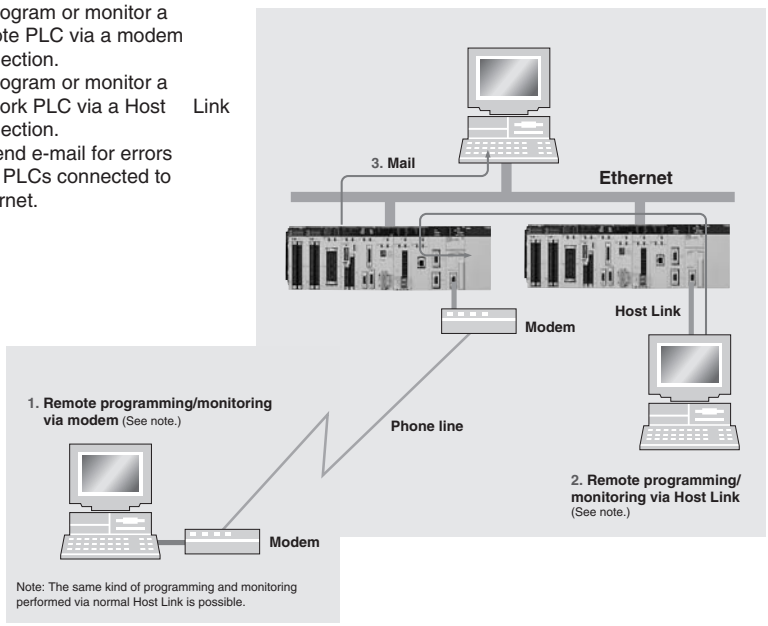
Advanced management and resource inheritance providing powerful support for maintenance and operation

6

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

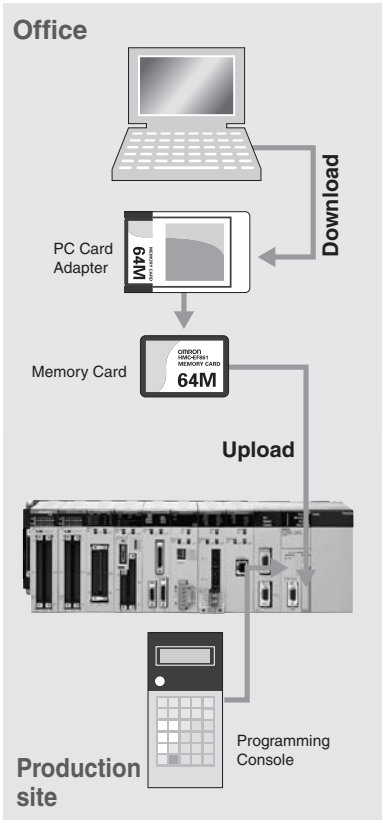
Remote Maintenance

1. Program or monitor a remote PLC via a modem connection.
2. Program or monitor a network PLC via a Host Link connection.
3. Send e-mail for errors from PLCs connected to Ethernet.



Memory Cards for Data File Management

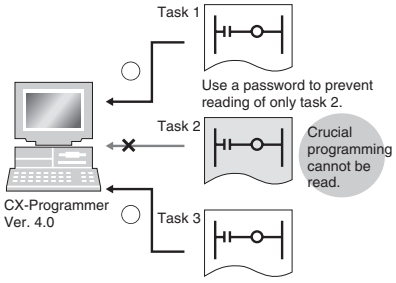
User programs, I/O memory, or system parameters can be converted to Windows-based files and stored in Memory Cards or in EM file memory in the CPU Unit. It is also possible to automatically read the user program and other data from the Memory Card to the CPU Unit at startup, replacing ROM operation. Change programs on-site using only a Memory Card and Programming Console, or use Memory Cards to store symbol tables or I/O comments. Connecting a Programming Device allows monitoring operations with ladder programs with comments. It is also possible to save and read data such as DM data to a Memory Card during operation, and the Memory Cards are ideal for operations such as saving quality data and reading recipes.



Boost Program Security by Keeping Part of It Hidden

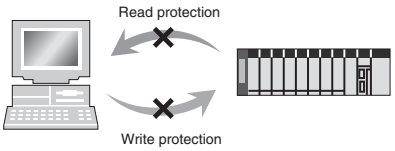
(for CPU Unit Ver. 2.0 or Later)

You can prevent access to special tasks by requiring the user to have a password to read them.



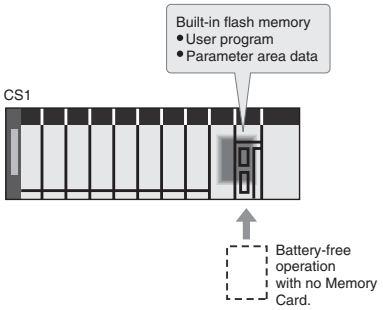
This allows you to hide crucial parts of the program.

By applying write protection, you can also prevent a user from inadvertently writing over the hidden part of the program. This provides additional protection for your program.



Internal Flash Memory-based Battery-free Operation

Flash memory (non-volatile memory) is built into the new CS1's CPU Unit. User programs and system parameters (e.g., PC Setup and data link tables) are automatically saved to this flash memory. This means that the new CS1 can operate without a Memory Card and battery.

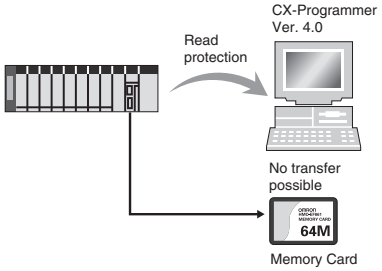


NEW CX-Programmer Ver. 5.0 or higher required.

Prevent Information Leaks from PLCs

(for CPU Unit Ver. 2.0 or Later)

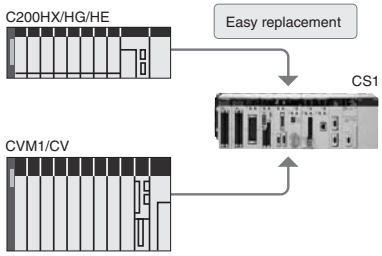
In addition to applying read protection functions to the user program area and tasks, you can also protect against the transfer of user programs to a Memory Card.This prevents leaks of proprietary information by completely protecting against the reading of programs inside the PLC.



Easy Replacement of Existing Models

Programs designed for existing models (C200HX/HG/HE, CVM1, or CV-series PLCs) using the CX-Programmer can be converted for use with the new CS1. The following functions are available to make the conversion to the new CS1 even easier.

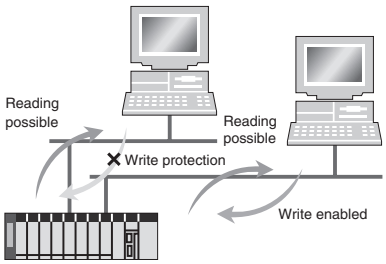
- CV-CS address conversion instruction to convert programs designed for the CVM1/CV that include internal I/O memory addresses.
- C200HX/HG/HE: Region comparison (ZCP and ZCPL) instructions.



Write Protection from a Specific Node over the Network

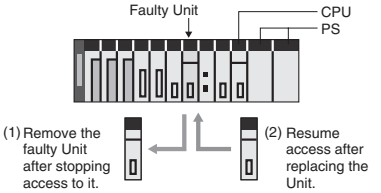
(for CPU Unit Ver. 2.0 or Later)

You can now stop specific nodes from writing over the network.By preventing unintentionally writes to the PLC while monitoring data over the network, you can prevent potential problems.



Replace Malfunctioning Units without Turning OFF the Power (Online Unit Replacement)

When an I/O Unit, a Special I/O Unit, or a CPU Bus Unit is malfunctioning, it is now possible to replace the faulty Unit while the system continues operating.
This is particularly effective for systems that cannot be stopped when a problem has occurred in another part of the system.
(This function requires a CS1D-CPU S CPU Unit, a CS1D-BC082 or CS1D-BI092 Backplane, and a CS1D-PA207R or CS1D-PD024 Power Supply Unit.)



Store All I/O Comments, Symbol Names, Rung Comments, and Other Information in CPU Unit Comment Memory *NEW*

(Unit Ver. 3.0 or later)

When downloading projects, the Memory Card, EM file memory, or comment memory (in the CPU Unit's flash memory) can be selected as the transfer destination for I/O comments, symbol names, rung comments, and other data. This enables data such as I/O comments, symbol names, and rung comments to be stored in the CPU Unit's internal comment memory when a Memory Card or EM file memory are both not available. (PLC models: CS/CJ-series with unit version 3.0 or later only.)

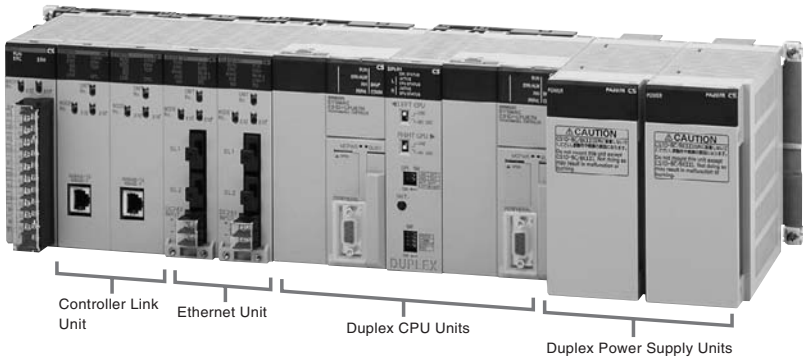
The CS1 Duplex System Boots the Reliability of Facilities and Equipment

7

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

SYSMAC CS1D
Programmable Controllers
Duplex System

Duplex-CPU System



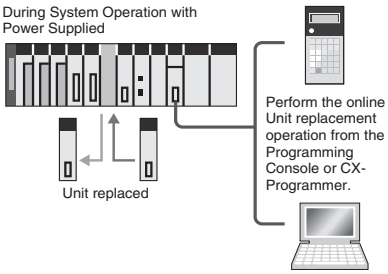
Hot Standby System Adopted for CPU Unit Duplexing

- When a problem occurs in the CPU Unit, the system instantly switches control to the other CPU Unit, enabling continuous operation with minimal effect on the system.
- Because there is no need for special duplex programming, the design process is simple and design steps are reduced.

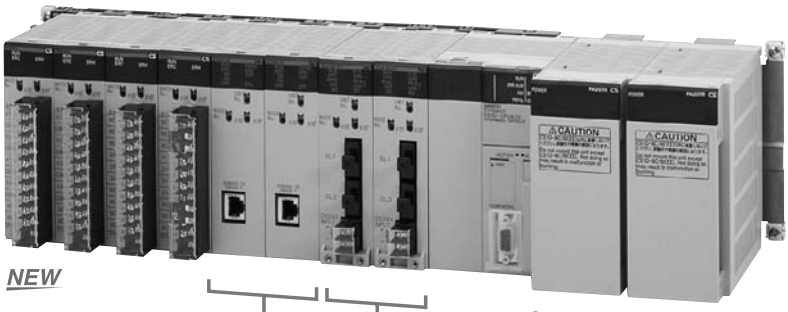
The system can also be configured with only one each of the CPU, Power Supply, and Communications Units. This lets you optimize the system cost by selecting the Units that you need. (The Duplex Unit must be used even when using only one each of the CPU, Power Supply, and Communications Units.)

Online Unit Replacement

With either a Duplex-CPU or Single-CPU CS1D System, Basic I/O Units, Special I/O Units, and CPU Bus Units can be replaced online while the system continues operation.
Although operation will stop for the Unit being replaced, all other Units will continue operation.



Single-CPU System



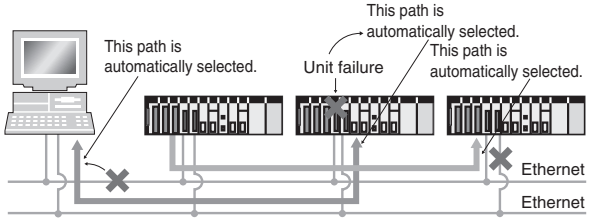
Duplex operation is possible for any or all of the following: CPU Units, Power Supply Units, and Communications Units.

Use duplex operation for the CPU Unit, power supply, or communications depending on system requirements for reliability, costs, and functionality. For example, use duplex operation for all of these for systems that must never go down or use duplex operation for only the power supply (which has a relatively short service life). Just build in the redundancy required by the system.

Increase the Reliability of Information with Duplex Networks

Duplex Ethernet for Greater Information Network Reliability *NEW*

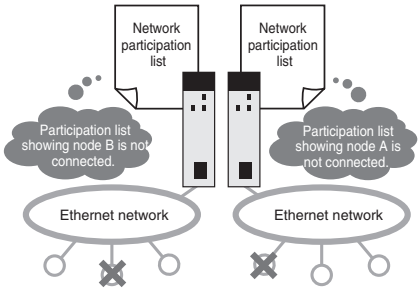
With redundant networks and Communications Units, communications will continue even if a network line is broken or one of the Communications Units fails. The communications path is automatically selected for each communications process (as opposed to switching the entire line), to enable creating a highly reliable network even against a network line broken in more than one location.



The CS1D-ETN21D and CS1D CPU Unit version 1.1 or higher are required for a duplex Ethernet network.

Monitor Connection Status to an Ethernet Network *NEW*

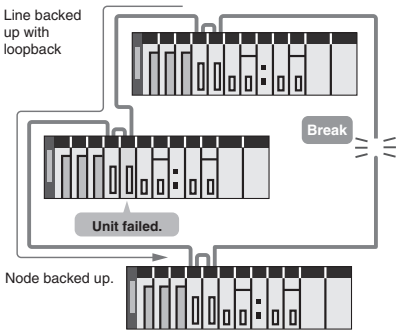
The connection status for each line is stored in the CIO Area words allocated in the CPU Unit. This enables the ladder program or host to quickly detect faulty nodes or lines to make maintenance easier.



Duplex Networks between PLCs with Controller Link

Even if one Unit fails, the other Unit will back it up and continue communications. Even if a line breaks, a loopback will be used to maintain the network.

Either the CS1W-CLK12-V1 or CS1W-CLK52-V1 is required for a Duplex Controller Link network.



Initial and maintenance costs are reduced.

Allows effective use of software assets.

The same support software can be used in systems combining the CS1 and CJ1 Series, and all software programs and data are compatible.Their application and reuse are extremely easy.There is also no need for ladder programs for duplexing. This means that when converting an existing system to a Duplex System, there is almost no need to revise ladder programs.

Complete compatibility among Units.

The CS1D Duplex System is fully compatible with the I/O Units of the entire CS Series. Accordingly, the same Units and materials can be used for restoring the system and conducting maintenance. There is no need to purchase different Units and materials for each system, making the CS1D Duplex System highly economical.
(C200H Units, however, cannot be used with CS1D PLCs. Refer to user documentation for details.)

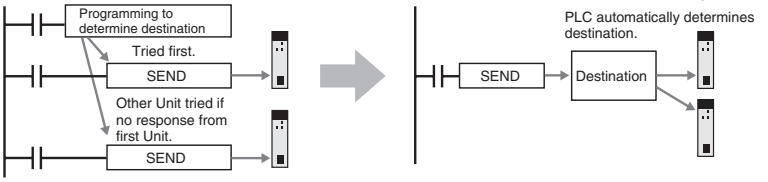
Program without Being Concerned with Duplex Operation

No special programming is required to use duplex communications with the CS1D, making it simple to design programs for duplex systems.

- **The complex programming required in previous applications for duplex communications with Ethernet is eliminated.** *NEW*

Previously it was necessary to program operation for both Ethernet Units.

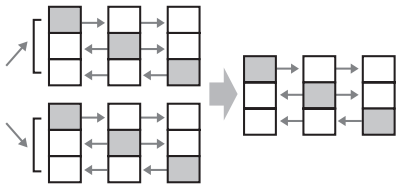
Just program the operation as if for one Ethernet Unit, and the PLC will determine the destination and send the message.



- **Controller Link networks enable allocating data link areas without wasting memory.**

Previously, twice the memory was required to implement data links for two Controller Link Units, and it was necessary to determine which data could be used.

Two sets of the same data link areas were required and programming was required to select the areas.



Just create the data links for one Controller Link Unit to eliminated wasted data memory. The Duplex Controller Link Units share the data links.

8

Machine performance improved with high-speed, high precision, flexible motion control

Position Control Units

Two Types of Outputs and Control of 1, 2, or 4 Axes

Select from 1-axis, 2-axis, and 4-axis models with either open-collector output or line-driver output to suit a number of different applications.

A Variety of Positioning Functions

There are 2 operating modes: direct operation (position, speed, acceleration, and deceleration data specified from the ladder program), which is effective for setting target positions, speeds, and acceleration rates immediately or during operation, and memory operation, where fixed patterns are stored beforehand in the Unit and used for operation. There are also a variety of positioning functions, such as interrupt feeding, which is effective for feeder control, and forced interrupt, which is useful in emergencies.

Advanced Motion Control Units

Easy System Construction

Up to 30 physical axes and two virtual axes, making a total of 32, can be controlled, and the servo interface is handled by high-speed servo communications (MECHATROLINK-II, a registered trademark of Yaskawa Electric Corporation). This makes it possible to control multiple axes with less wiring.

Easy Data Control

High-speed servo communications lets you read programs and parameter settings from CX-Programmer on a PC.

You can also read and track the operating status of parameter settings inside the Servo Driver.

Easy Motion Control

Motion control, including positioning, synchronizing (electronic gears, electronic cams, tracking), speed, and torque control, can all be handled by the CS1.

Eight motion tasks can be used for simultaneous motion program execution.

Motion Control Units

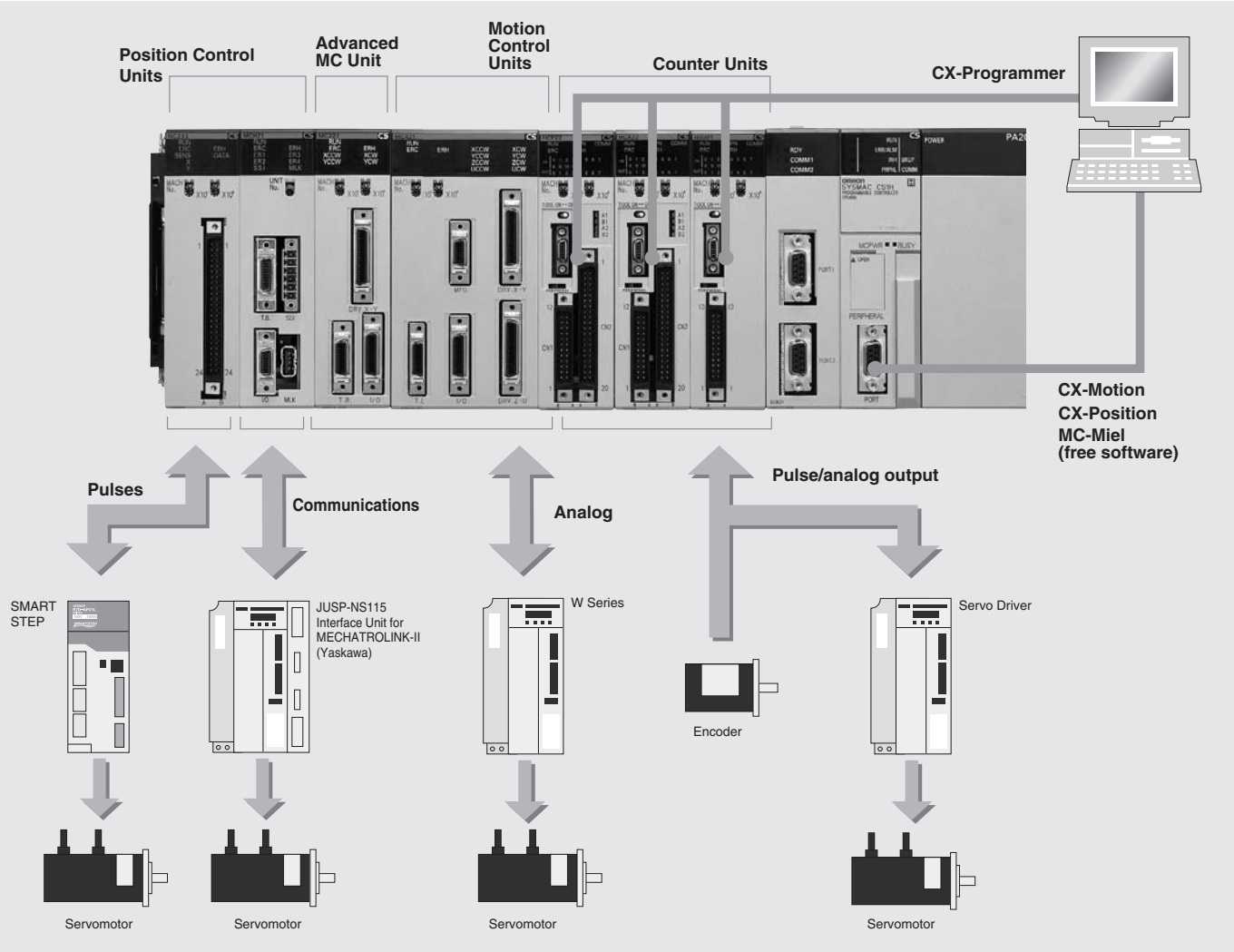
Easy Programming with G Language and Multitasking

The Motion Control Units use G language to ensure easy programming. The Units have a large programming capacity of up to 100 programs and 2,000 program blocks, and allow independent operation of 4 tasks.

High-speed Interlocks

Interrupt programs can be executed from the motion control program using D codes (interrupt codes). Easy, fast interlocks ensure greater production efficiency.

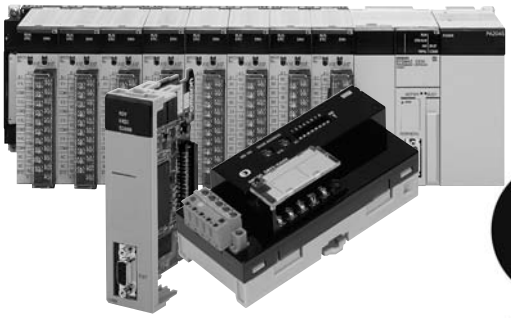
Synchronous control (electronic gears, electronic cams) is also possible.



Smart Process Control
OMRON PLC-based Process Control brings Major Innovations to Process Automation

9

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

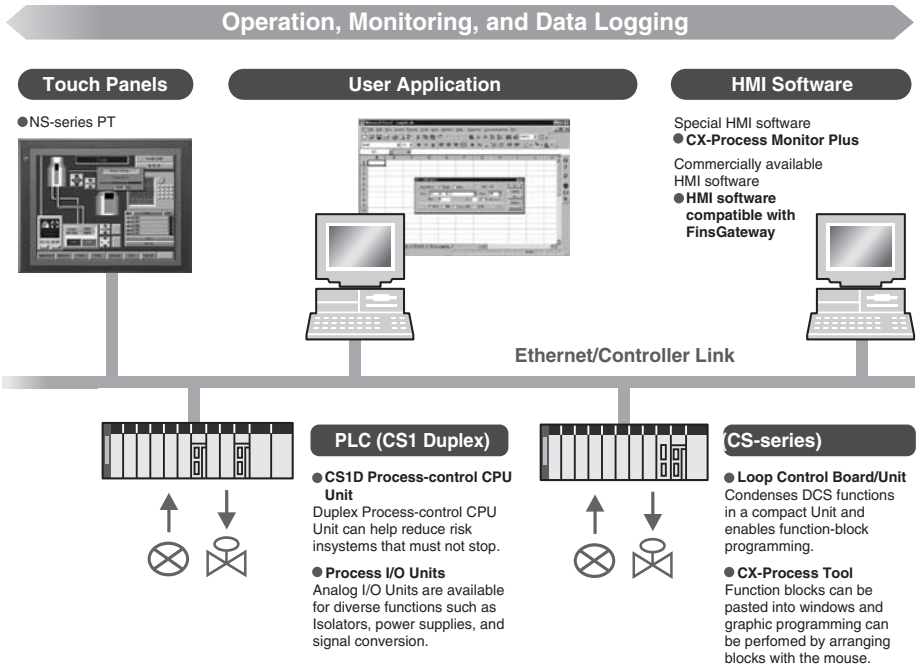


- DCS functionality in a PLC
- Analog Units with signal conversion functions
- A scaleable system configuration

- Function block programming
- Sequence programming using either step ladders or sequence tables
- A direct link to HMI products

- Duplex operation supported
- Complete maintenance functions

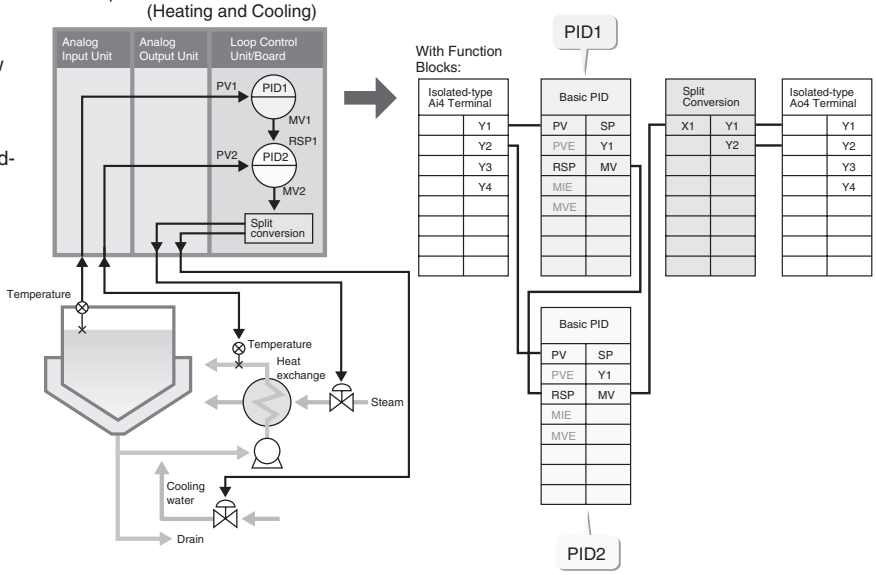
Provides an exceptionally open environment with PLC-based process control to advance standardization and IT integration of the process control system.



Diversified Loop Control is even easier to use. Programming becomes even easier with function-block programming.

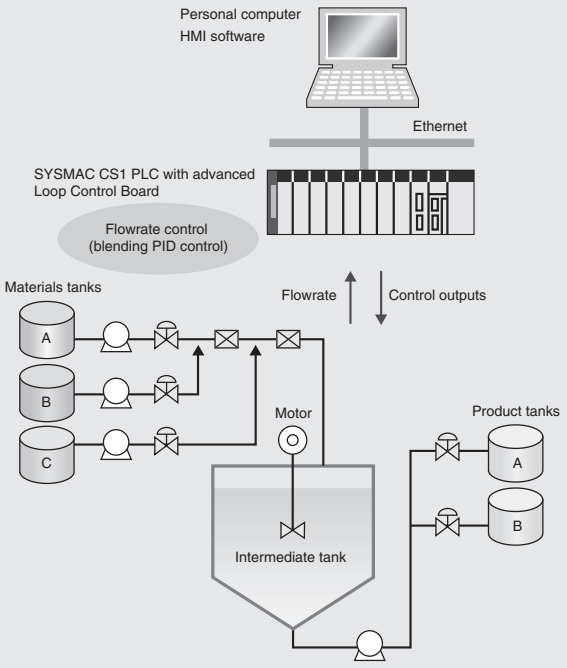
Packed with complete DCS functionality, the LCBs/LCUs are programmed with function blocks designed specifically for process control. Similar to preparing a flow sheet, function blocks are pasted and connections made using a graphic interface. A wide array of control methods, from basic PID control to cascade and feed-forward control, are possible.

●Example: Cascade Control (Heating and Cooling)

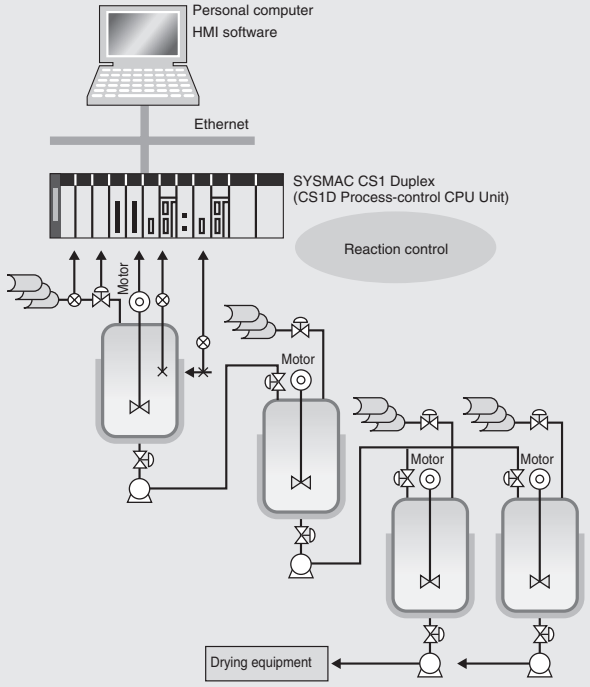


PLC-based Process Control Application Examples

●In-line Blending in a Food Plant



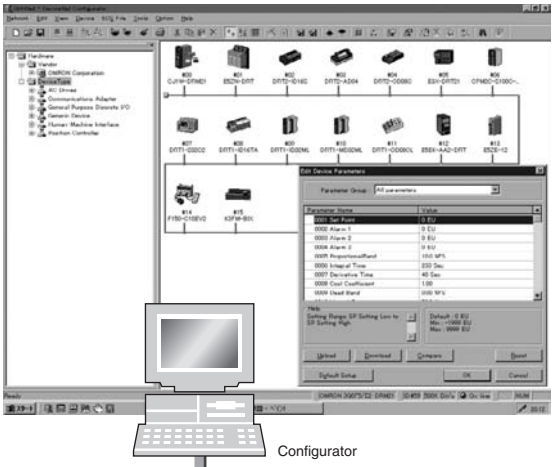
●Batch Control in a Chemical Plant



DeviceNet Creates Many Advantages for Development and Design, for Production and Startup, and for Operation and Maintenance

10

The evolution of the SYSMAC CS1 is accelerating advances in the production site.



Configurator

Ethernet

Programmable Terminal
NT631

DeviceNet Interface Unit
NT-DRT21

SYSMAC CS-series DeviceNet Unit
CS1W-DRM21-V1

DeviceNet Option Unit for OMNUC W Series AC Servo Drivers
R88A-NCW152-DRT

Smart Slave
Environment-resistive Terminals
DRT2-HD16C (-1)
DRT2-ID08C/OD08C (-1)

Smart Slave
Sensor Connector Terminals
DRT2-□D16S (-1)

Smart Slave
Remote I/O Terminals
DRT2-ID16/OD16 (-1)
XWT-ID16/OD16 (-1)
XWT-ID08/OD08 (-1)

Smart Slave
Analog I/O Terminal
DRT2-AD04/DA02
DRT2-AD04H *NEW*

Smart Slave
Transistor Remote I/O Terminals with 3-tier Terminal Block
DRT2-ID16(-1)/
OD16(-1)/
MD16TA(-1)

Smart Slave
Transistor Connector Terminals with MIL Connectors
DRT2-ID32ML(-1)/
OD32ML(-1)/
MD32ML(-1)

Smart Slave
Transistor Screwless Clamp Terminals
Without detection function
DRT2-ID32SL(-1)/
OD32SL(-1)/
MD32SL(-1)
With detection function
DRT2-ID32SLH(-1)/
OD32SLH(-1)/MD32SLH(-1)

Smart Slave
Relay Output Remote I/O Terminal
DRT2-ROS16

DeviceNet Wireless Link
WD30-ME

PCB Terminals (MIL connector)
DRT2-□D32B(-1)/ *NEW*
DRT2-□D32BV(-1)

Temperature Input Terminals
DRT2-TS04T *NEW*
DRT2-TS04P

Advantages in Development and Design

Hardware Advantages

- Many compatible components for more options and easier system construction. No restrictions on Master, enabling
- equipment modularization at the Slaves.

Software Advantages

- Simple software standardization with profile specified for each component.
- Open network construction eliminates the need to consider communications protocols, allowing program development using ladder diagrams only.

Advantages in Production and Startup

Hardware Advantages

- Assembly time shortened by standardization and modularization.
- Number of work hours reduced by less wiring.
- Simple wiring checking process to help prevent wiring mistakes.
- Simple implementation of distributed equipment manufacturing.
- Distributed I/O for more compact control panels and equipment.

Startup Advantages

- Simple re-assembly at delivery site.
- Simple settings and communications work, shortening startup time.
- Establishing communications with components with plug-and-play simplicity.
- Simple identification of faults with complete monitoring tools.

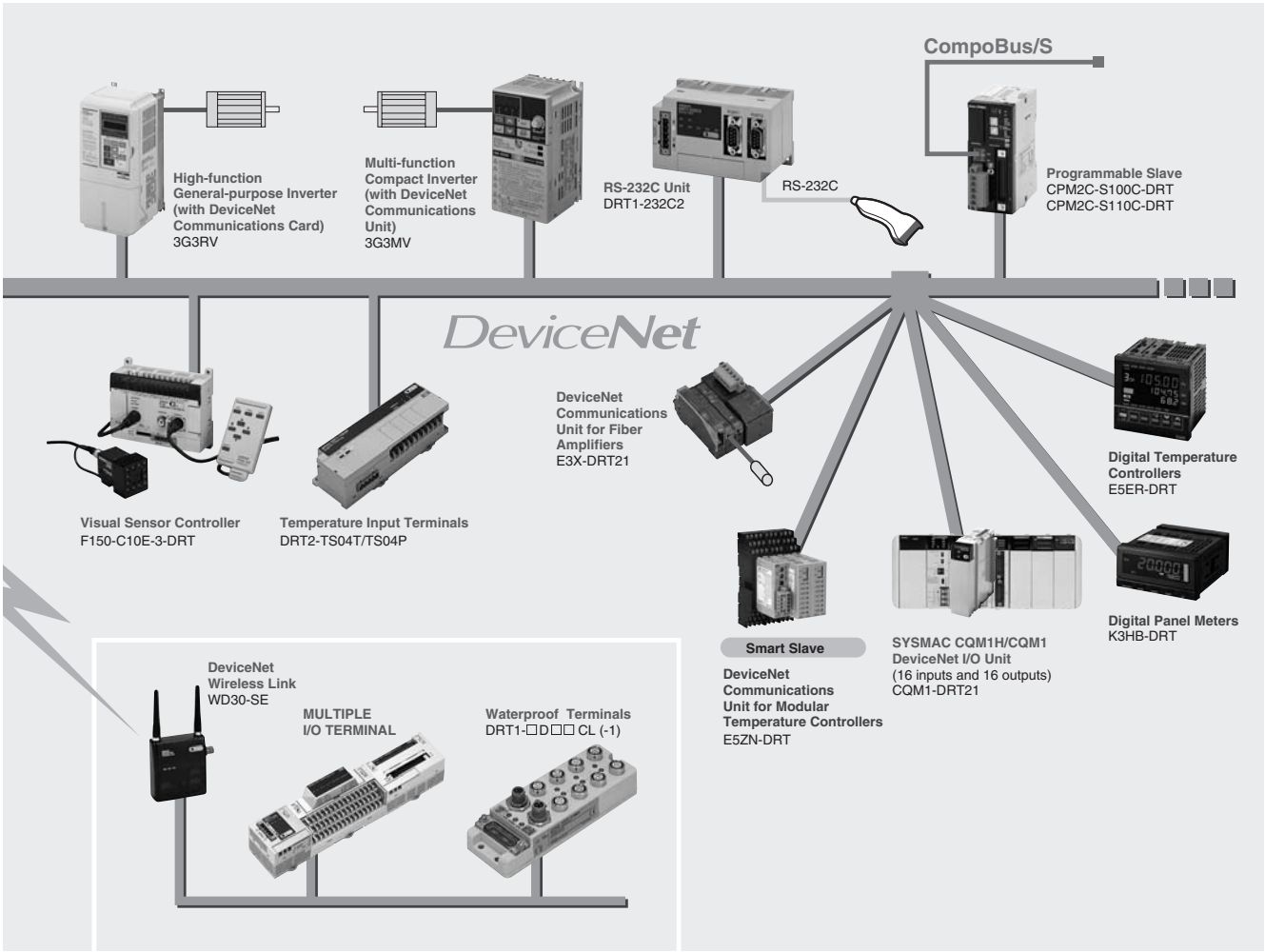
Advantages in Operation and Maintenance

Operation Advantages

- Recipe control quickly improves yields. Preventative maintenance to avoid
- system shutdowns and increase operating rates. Simple layout changes.
- Lines can be constructed for modular
- replacement.

Maintenance Advantages

- Easy identification of fault locations reduces time to restore operation.
- A wide variety of data can be collected from components, aiding preventative maintenance.
- Simple plug-and-play replacement using connectors.
- Online replacement for maintenance without stopping the system.



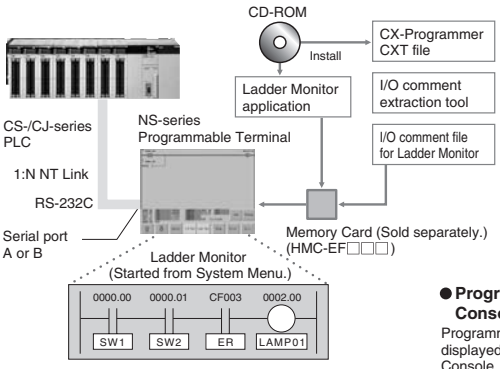
Greater Compatibility with PLCs
Multilingual Globalization for Greater Machine Flexibility

11

The evolution of the SYSMAC CS1 is accelerating advances in the production site.

Ladder Monitor Function

Save the NS-EXT01 Ladder Monitor system program on a Memory Card (the NS-EXT01 is sold separately) and install the Memory Card to enable monitoring of a ladder program (I/O bit status monitor, address/instruction search, multiple I/O bit monitor, etc.) being executed in a CS/CJ-series PLC connected by a serial connection. It is also possible to display I/O comments created with the CX-Programmer.



Note: CS- and CJ-series PLCs connected via a 1:N NT Link to serial port A or B on an NS-series Programmable Terminal can be monitored.

Programming Console Function (Using NS-EXT01-V2 □□□Ladder Monitor)

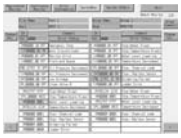
If a Programming Console is selected as the operating mode, a Programming Console is displayed on the Ladder Monitor screen. Operating methods are exactly the same as for a CS-/CJ-series Programming Console. Timer set values can be changed, bit addresses can be added or changed, and many other operations can be performed on-site, all from the screen of the NS-series PT. The functionality of the Ladder Monitor and Programming Console can be used for primary on-site response without a personal computer.



● **Programming Console Function**
Programming Console functionality is displayed when Programming Console is selected as the operating mode.

Switch Box Function

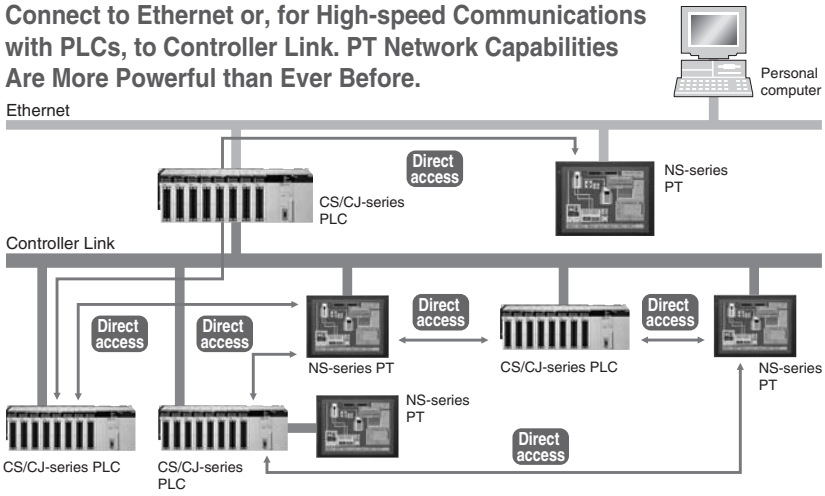
The Switch Box Function has been added to the NS-series Programmable Terminals. The Switch Box Function can be used to monitor the status of each bit in a word or a combination of user-selected bits organized like a ladder program section. The Switch Box Function makes it possible to perform basic troubleshooting on the factory floor even without a computer.



The Switch Box provides the following functions:

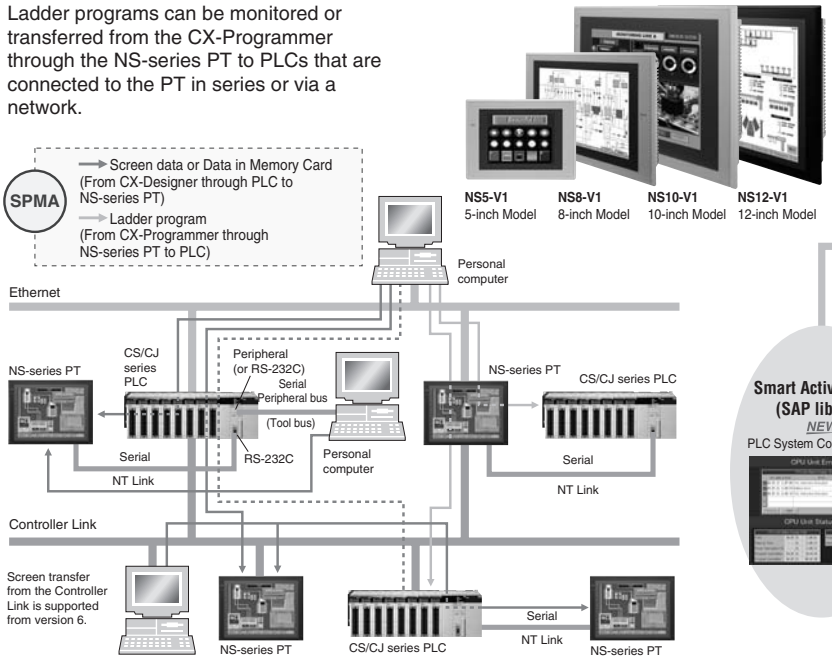
- Switching between Monitoring Contiguous or Noncontiguous Bits and Contiguous Words
  The I/O memory monitor function monitor words or combinations of specified bits. Bit/word comments are imported from the CX-Programmer.
- Register the Words or Bit Combinations To Be Monitored by Group
  Comments can be input for individual groups, e.g., so that the operating conditions of words or bits can be described in text.
- Same User Interface as the Switch Box Utility for Personal Computers
  The same displays can be monitors in the office on a personal computer and onsite at the NS-series PT, making discussions clearer.

Connect to Ethernet or, for High-speed Communications with PLCs, to Controller Link. PT Network Capabilities Are More Powerful than Ever Before.

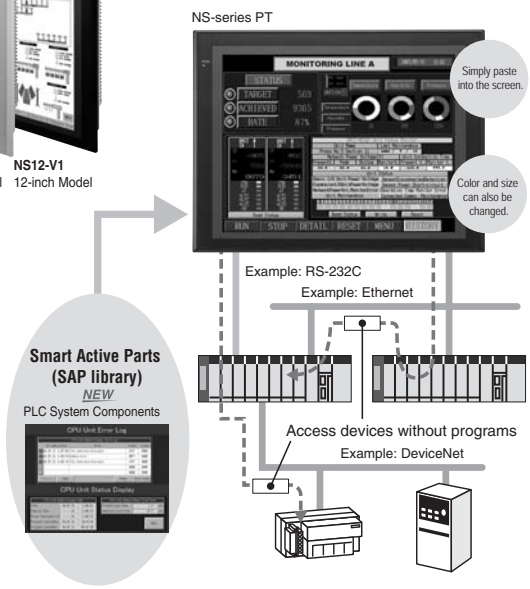


You may want to transfer screens to a PT through the PLC without changing computer connections or transfer a ladder program to the PLC through the PT by using the Ethernet or Controller Link.

Ladder programs can be monitored or transferred from the CX-Programmer through the NS-series PT to PLCs that are connected to the PT in series or via a network.



NS-series PTs provide Smart Active Parts (SAP library) enabling direct access to data in various devices.



Multilingual Version to Develop for Various Demands

- Create Chinese or Korean screens on your Windows system.
- Support multiple languages with the same screen data.
- Create the source language labels and let suppliers handle the other languages.

NS Series: Easily Create Multilingual Screens on Your Windows System

Multi-language Input with Japanese Windows

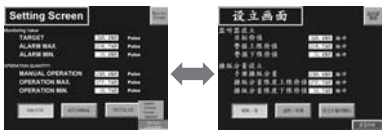
When Windows 2000 or XP is being used, Simplified Chinese, Traditional Chinese, Korean, and other language text can be input in NS-Designer. Select the desired language with Global IME to input a different language. You can also use this program together with RAKURAKU CHUUGOKUGO and RAKURAKU KANKOKUGO (Chinese and Korean input systems) to convert Japanese to Chinese and Korean.



For more information on this software, refer to the following site or send email to the following address.
URL: http://www.omronsoft.co.jp/SP/
E-mail: rakuraku@omuronsoft.co.jp

Label Switching to Select from Multiple Languages

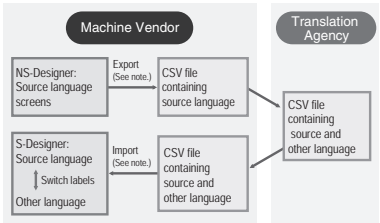
Up to 16 groups of labels (labels 0 to 15) can be registered for functional objects such as buttons, lamps, labels, and alarm settings. (Each label can correspond to a different language, for example, label 0 = Japanese, label 1 = Simplified Chinese, label 2 = Korean, label 3 = English, etc.)
Once all of the labels have been input in each language with the multilingual input function, all of the labels can be switched to a different language at once just by specifying the corresponding label number from the PLC.



Example: The label switch function can be used to switch between English and Simplified Chinese.

Use Screen Import/Export Functions to Separate Translation Work

Property information for labels and other objects in screen data created using the NS-Designer can be exported to CSV files. These files can be edited in Excel and other programs. The screens can be created in the source language and then labels and other text exported to CSV files, which can be sent to translators for conversion to other languages. The translated CSV files can then be imported to automatically input the desired languages into labels.

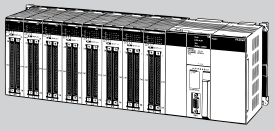


Note: Refer to the operation manual for NS-Designer for information on importing and exporting.

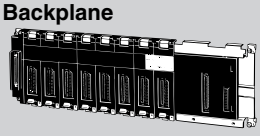
A Complete Lineup of Units for Optimal Control.

SYSMAC CS1

CPU Rack



CPU Backplane



CS1W-BC□□□
(2, 3, 5, 8, or 10 slots)

CS1D-BC□□□
(5 slot duplex CPU, 8 slot single CPU)

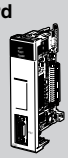
Note: Expansion is not possible for 2-slot Backplanes. These Backplanes are for CS1 Units only. Use a CS1W-BC□□3 Backplane for C200H Units.

Serial Communications Board



CS1W-SCB21
CS1W-SCB41

Loop Control Board



CS1W-LCB01/05

CPU Units



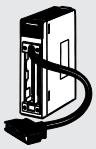
CS1G-CPU□□H
CS1D-CPU□□H/P/S

Power Supply Units



C200HW-PA□□□/-PD□□□
CS1D-PA□□□/-PD□□□

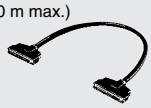
I/O Control Unit



CS1W
-IC102

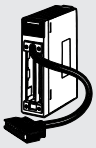
Note: C200H Units cannot be used in long-distance expansion.

Long-distance Expansion Connecting Cable
(50 m max.)



CV500-CN□□2

I/O Interface Unit



CS1W
-II102

Terminating Resistor



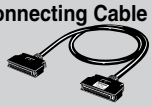
CV500-TER01
(Two provided with CS1W-IC102)

Memory Card



HMC-EF172/372/672

CS1 I/O Connecting Cable



CS1W-CN□□3
(30 cm, 70 cm, 2 m, 3 m, 5 m, 10 m, 12 m)

CS1 Expansion Backplane



CS1W-BI□□□
(3, 5, 8, or 10 slots)

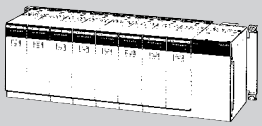
Note: This is for CS1 Units only. Use CS1W-BI□□3 for C200H Units.

Power Supply Units



C200HW-PA□□□/-PD□□□
CS1D-PA□□□/-PD□□□

CS1 Expansion Rack

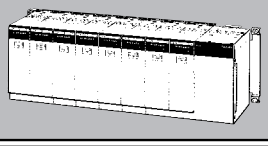


CS1 to C200H I/O Connecting Cable



CS1W-CN□□1
(30 cm, 70 cm, 2 m, 3 m, 5 m, 10 m, 12 m)

C200H Expansion Rack

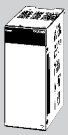


C200HX/HG/HE Expansion I/O Backplane



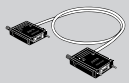
C200HW-BI□□1(-V1)
(3, 5, 8, or 10 slots)

Power Supply Units



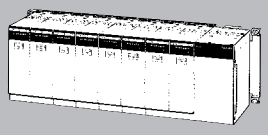
C200HW-PA204/
204S/204R/209R/PD024

C200H I/O Connecting Cable



C200H-CN□□1
(30 cm, 70 cm, 2 m, 5 m, 10 m)

C200H Expansion Rack



CS1 CPU Bus Units

Loop Control Unit



CS1W-LC001

Serial Communications Unit



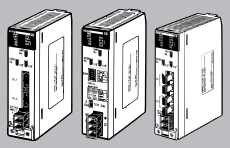
CS1W-SCU21-V1

Ethernet Unit



CS1W-ETN21
CS1D-ETN21D

Controller Link Unit



CS1W-CLK21/12/52-V1

Motion Controller Unit



CS1W-MCH71

DeviceNet Unit



CS1W-DRM21-V1

PROFIBUS-DP Unit



CS1W-PRM21

Basic I/O Units

Note: C200H Basic I/O Units and High-density I/O (Group-2) Units can also be used.

C200H Basic I/O Unit P207



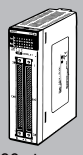
16 pts
Input Unit:
CS1W-ID211



32 pts
Input Unit:
CS1W-ID231



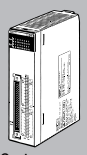
64 pts
Input Unit:
CS1W-ID261



96 pts
Input Unit:
CS1W-ID291



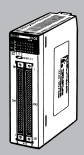
16 pts
Output Unit:
CS1W-OD21□



32 pts
Output Unit:
CS1W-OD23□



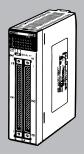
64 pts
Output Unit:
CS1W-OD26□



96 pts
Output Unit:
CS1W-OD29□



32 inputs/32 outputs
I/O Unit:
CS1W-MD26□



48 inputs/48 outputs
I/O Unit:
CS1W-MD29□/561



16 pts
AC Input Unit:
CS1W-IA111/211



8 pts
Triac Output Unit:
CS1W-OA201



16 pts
Triac Output Unit:
CS1W-OA211



8 pts (independent)
Relay Output Unit:
CS1W-OC201



16 pts
Relay Output Unit:
CS1W-OC211



32 inputs/32 outputs
TTL I/O Unit:
CS1W-MD561
(available soon)

Interrupt Input Unit



Interrupt function supported on CPU Rack only. (Two Units mountable on CPU Rack.)

16 pts
CS1W-INT01

Analog Timer Unit



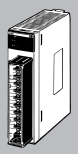
C200H-TM001

High-speed Input Unit



16 pts
CS1W-IDP01

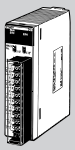
Safety Relay Unit



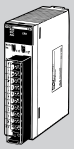
CS1W-SF200

Special I/O Units

CS1 Special I/O Unit



Process I/O Unit
CS1W-P□□□(-V1)



Analog Input Unit
CS1W-AD041-V1
/081-V1



Analog Output Unit
CS1W-DA041/
08V/08C



Analog I/O Unit
CS1W-MAD44



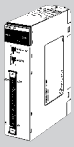
ID Sensor Units*
CS1W-V600C11/
-V600C12



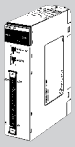
Position Control Unit
CS1W-NC□□□



Motion Control Unit
CS1W-MC221/421



High-speed Counter Unit
CS1W-CT021/041



SSI input unit
CS1W-CTS21

C200H Special I/O Unit



Temperature Sensor Units
C200H-TS□□□



Temperature Control Units
C200H-TC□□□
C200H-TV□□□



PID Control Units
C200H-PID0□



Position Control Units*
C200HW-NC□□□



CAN(open) Unit
C200HW-
CORT21-V1



PROFIBUS-DP Master Unit
C200HW-PRM21



PROFIBUS-DP I/O Link Unit
C200HW-PRT21



High-speed Counter Units*
C200H-CT□□□



2-axis Motion Control Unit*
C200H-MC221



4-axis Motion Control Unit*
C200H-MC402E



ID Sensor Units*
C200H-IDS□□

ASCII Units*
C200H-ASC□□

GP-IB Interface Unit
CS1W-GPI01

DeviceNet I/O Link Unit
C200HW-DRT21

CompoBus/S Master Unit
C200HW-SRM21-V1

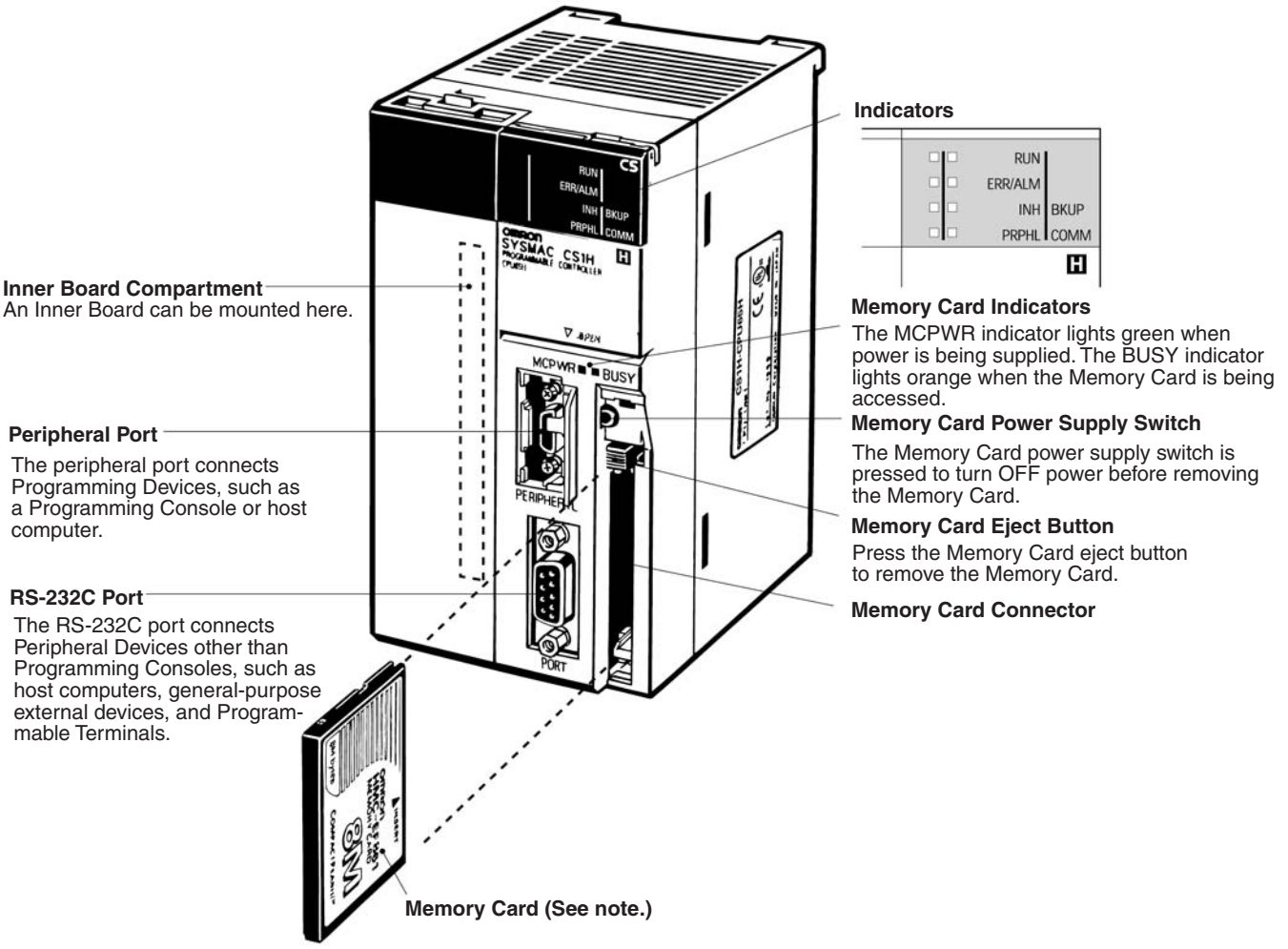
Note: HMC-372/672 Memory Cards cannot be used with CS1G-CPU□□H, CS1H-CPU□□H, CJ1G-CPU□□H, or CJ1H-CPU□□H CPU Units prior to Lot No. 02108 (manufactured prior to January 8, 2002, nor with NS-7-series PTs prior to Lot. No. 0852 (manufactured prior to May 8, 2002). Check lot numbers before ordering.

The following restrictions exist in data transfers with the CPU Unit for bit and DM Area specifications for the C200H Special I/O Units marked with asterisks, as well as in data transfers programmed from these Units. Refer to CS-series PLC Operation manuals for details.

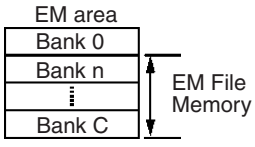
- Converting data for the CPU Unit using bit and DM Area specifications (source/destination area type and addresss designation).
- Exchanging data with the CPU Unit using instructions (PC READ, PC WRITE, etc.) in the C200H Special I/O Unit program.

CS1H/G-CPU□□H

CS1-series



With the CS1 PLCs, Memory Cards and specified ranges of the EM Area can be used as file memory. File memory can be used to store the entire user program, I/O memory contents, and/or parameter area contents.

File memory	Memory type	Capacity	Model
Memory Cards 	Flash memory	30 MB	HMC-EF372
		64 MB	HMC-EF672
EM File Memory 	RAM	EM Area capacity of CPU Unit (Max. capacity for CS1H-CPU67: 832 KB).	From the specified bank in the EM area of I/O memory to the last bank (specified in PC Setup).

Note: Memory Card Adapter: HMC-AP001 (The Memory Card Adapter can be used to mount Memory Cards in PC card slots to use the Cards on a personal computer.)

Specifications

CPU Units

Model	I/O bits	Program capacity	Data memory capacity (See Note.)	LD instruction processing speed	Built-in ports	Options
CS1H-CPU67H CS1D-CPU67H CS1D-CPU67S CS1D-CPU67P	5,120 bits (Up to 7 Expansion Racks)	250 kSteps	448 kWords	0.02 µs	Peripheral port and RS-232C port.	Memory Cards Inner Board such as Serial Communications Board, Loop Control Board (See note 1.)
CS1H-CPU66H		120 kSteps	256 kWords			
CS1H-CPU65H CS1D-CPU65H CS1D-CPU65S CS1D-CPU65P		60 kSteps	128 kWords			
CS1H-CPU64H		30 kSteps	64 kWords			
CS1H-CPU63H		20 kSteps				
CS1G-CPU45H	5,120 bits (Up to 7 Expansion Racks)	60 kSteps	128 kWords	0.04 µs		
CS1G-CPU44H CS1D-CPU44S	1,280 bits (Up to 3 Expansion Racks)	30 kSteps	64 kWords			
CS1G-CPU43H	960 bits (Up to 2 Expansion Racks)	20 kSteps				
CS1G-CPU42H CS1D-CPU42S		10 kSteps				

Note: The available data memory capacity is the sum of the Data Memory (DM) and the Extended Data Memory (EM).

Note: 1. A Loop Control Board cannot be mounted in CS1D-CPU□□D, use CS1D-CPU□□P instead.
A Serial communications Board cannot be mounted in CS1D-CPU□□P.

Common Specifications

Item		Specification
Control method		Stored program
I/O control method		Cyclic scan and immediate processing
Programming		Ladder diagram
Instruction length		1 to 7 steps per instruction
Ladder instructions		Approx. 400 (3-digit function codes)
Execution time		Basic instructions: 0.02 µs min., Special instructions: 0.04 µs min.
Function Blocks (CPU Ver. 3.0 or higher)		Languages supported for use in function block programming: Ladder program language and IEC 61131-3 Structured Text.
Number of tasks		288 (256 of which are also used as interrupt tasks) Cyclic tasks are executed each cycle and are controlled with TKON(820) and TKOF(821) instructions. The following 4 types of interrupt tasks are supported: Power OFF tasks:1 max., Scheduled interrupt tasks: 2 max., I/O interrupt tasks: 32 max., External interrupt tasks: 256 max.
Interrupt types (not applicable for CS1D CPUs)		Scheduled Interrupts:Interrupts generated at a time scheduled by CPU Unit's built-in timer. I/O Interrupts:Interrupts from Interrupt Input Units. Power OFF Interrupts:Interrupts executed when CPU Unit's power is turned OFF. External I/O Interrupts:Interrupts from Special I/O Units, CS1 Special Units, or Inner Board.
CIO (Core I/O) Area (The CIO Area can be used as work bits if not used as shown here.)	I/O Area	5,120: CIO 000000 to CIO 031915 (320 words from CIO 0000 to CIO 0319) Setting of first rack words can be changed from default (CIO 0000) so that CIO 0000 to CIO 0999 can be used. I/O bits are allocated to Basic I/O Units, such as CS1 Basic I/O Units, C200H Basic I/O Units, and C200H Group-2 High-density I/O Units.
	Link Area	3,200 (200 words): CIO 10000 to CIO 119915 (words CIO 1000 to CIO 1199) Link bits are used for data links and are allocated to Units in Controller Link Systems and PC Link Systems.
	CS1 CPU Bus Unit Area	6,400 (400 words): CIO 150000 to CIO 189915 (words CIO 1500 to CIO 1899) CS1 CPU Bus Unit bits store operating status of CS1 CPU Bus Units. (25 words per Unit, 16 Units max.)
	Special I/O Unit Area	15,360 (960 words): CIO 200000 to CIO 295915 (words CIO 2000 to CIO 2959) Special I/O Unit bits are allocated to CS1 Special I/O Units and C200H Special I/O Units. (See Note.) (10 words per Unit, 96 Units max.) The maximum number of slots, however, is limited to 80 including expansion slots, so maximum number of Units is actually 80.) **Note:** Some I/O Units are classified as Special I/O Units.
	Inner Board Area	1,600 (100 words): CIO 190000 to CIO 199915 (words CIO 1900 to CIO 1999) Inner Board bits are allocated to Inner Boards. (100 I/O words max.)
	SYSMAC BUS Area	800 (50 words): CIO 300000 to CIO 304915 (words CIO 3000 to CIO 3049) SYSMAC BUS bits are allocated to Slave Racks connected to SYSMAC BUS Remote I/O Master Units. (10 words per Rack, 5 Racks max.)

Note: A max. of 10 or 16 C200H Special I/O Units can be used depending on the CPU Unit. Some I/O Units are Special I/O Units.

Item			Specification
CIO (Core I/O) Area, contd. (The CIO Area can be used as work bits if not used as shown here.)	I/O Terminal Area		512 (32 words): CIO 310000 to CIO 313115 (words CIO 3100 to CIO 3131) I/O Terminal bits are allocated to I/O Terminal Units (but not to Slave Racks) connected to SYSMAC BUS Remote I/O Master Units. (1 word per Terminal, 32 Terminals max.)
	C200H Special I/O Unit Area		8,196 (512 words): CIO 000000 to CIO 051115 (words CIO 0000 to CIO 0511) C200H Special I/O Unit bits are allocated to C200H Special I/O Units and allow access separate from I/O refreshing.
		DeviceNet/ PROFIBUS-DP Area	1,600 (100 words):Outputs: CIO 005000 to CIO 009915 (words CIO 0050 to CIO 0099) Inputs: CIO 035000 to CIO 039915 (words CIO 0350 to CIO 0399) DeviceNet bits are allocated to Slaves according to DeviceNet remote I/O communications.
		PC Link Area	64 bits (4 words): CIO 027400 to CIO 025015 (words CIO 0247 to CIO 0250) When a PC Link Unit is used in a PC Link, use these bits to monitor PC Link errors and operating status of other CPU Units in PC Link.
Internal I/O Area			4,800 (300 words): CIO 120000 to CIO 149915 (words CIO 1200 to CIO 1499) 37,504 (2,344 words): CIO 380000 to CIO 614315 (words CIO 3800 to CIO 6143) These bits in CIO Area are used as work bits in programming to control program execution. They cannot be used for external I/O.
Work Area			8,192 bits (512 words): W00000 to W51115 (words W000 to W511) Control programs only. (I/O from external I/O terminals is not possible.) **Note:** When using work bits in programming, use bits in Work Area first before using bits from other areas.
Holding Area			8,192 bits (512 words): H00000 to H51115 (words H000 to H511) Holding bits are used to control execution of program, and maintain their ON/OFF status when PLC is turned OFF or operating mode is changed. Part of the Holding area is used for allocation of Function Block variables in CPU Ver. 3.0 and higher.
Auxiliary Area			Read only: 7,168 bits (448 words): A00000 to A44715 (words A000 to A447) Read/write: 8,192 bits (512 words): A44800 to A95915 (words A448 to A959) Auxiliary bits are allocated specific functions.
Temporary Area			16 bits (TR00 to TR15) Temporary bits are used to store ON/OFF execution conditions at program branches.
Timer Area			4,096: T0000 to T4095 (used for timers only)
Counter Area			4,096: C0000 to C4095 (used for counters only)
DM Area			32 kWords: D00000 to D32767 Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in DM Area maintain their status when PLC is turned OFF or operating mode is changed. Internal Special I/O Unit DM Area: D20000 to D29599 (100 words × 96 Units). Used to set parameters. CS1 CPU Bus Unit DM Area: D30000 to D31599 (100 words × 16 Units). Used to set parameters. Inner Board DM Area: D32000 to D32099. Used to set parameters for Inner Boards.
EM Area			32 kWords per bank, 13 banks max.: E0_00000 to EC_32767 max. (Not available on some CPU Units.) Used as a general-purpose data area for reading and writing data in word units (16 bits). Words in EM Area maintain their status when PLC is turned OFF or operating mode is changed. The EM Area is divided into banks, and addresses can be set by either of following methods. Changing current bank using EMBC(281) instruction and setting addresses for current bank. Setting bank numbers and addresses directly. EM data can be stored in files by specifying number of first bank. (EM file memory)
Data Registers			DR0 to DR15. Store offset values for indirect addressing. Data registers can be used independently in each task. One register is 16 bits (1 word).
Index Registers			IR0 to IR15. Store PLC memory addresses for indirect addressing. Index registers can be used independently in each task. One register is 32 bits (2 words).
Task Flag Area			32 (TK0000 to TK0031). Task Flags are read-only flags that are ON when corresponding cyclic task is executable and OFF when corresponding task is not executable or in standby status.
Trace Memory			4,000 words (500 data trace samples at the maximum sample size of 31 bits and 6 words)
File Memory			Memory Cards: Compact flash memory cards can be used (MS-DOS format). EM file memory: Part of EM Area can be converted to file memory (MS-DOS format). CompactFlash Memory Cards with 15-MB, 30-MB, or 64-MB capacities can be used.

Function Specifications

Item	Specification
Parallel Processing Mode	The program can be executed simultaneously with peripheral servicing (CS1G/CS1H only).
Battery-free operation	Flash memory is provided as a standard feature and automatically backs up the user program and system parameters.
Constant cycle time	1 to 32,000 ms (Unit: 1 ms)
Cycle time monitoring	Possible (Unit stops operating if cycle is too long): 1 to 40,000 ms (Unit: 10 ms)
I/O refreshing	Cyclic refreshing, immediate refreshing, refreshing by IORF(097).
I/O memory holding when changing operating modes	Possible (Depends on ON/OFF status of IOM Hold Bit in Auxiliary Area.)
Load OFF	All outputs on Output Units can be turned OFF.
Input time constant setting	Time constants can be set for inputs from CS1 Basic I/O Units. The time constant can be increased to reduce influence of noise and chattering or it can be decreased to detect shorter pulses on inputs. (CS1 Basic I/O Units only)
Mode setting at power-up	Possible
Memory Card functions	Automatic reading programs from Memory Card (autoboot).
	Memory Card Storage Data User program: Program file format (binary) PC System Setup: Data file format (binary) I/O Memory: Data file format (binary), text format, CSV format
	Memory Card Read/Write User program instructions, Peripheral Devices (such as Programming Console), Host Link computer.
Filing	Memory Card data and EM (Extended Data Memory) Area can be handled as files.
Debugging	Force-set/reset, differential monitoring, data tracing (scheduled, each cycle, or when instruction is executed), instruction error tracing.
Online editing	One or more program blocks in user programs can be overwritten when CPU Unit is in PROGRAM or MONITOR mode. This function is not available for block programming areas.
Program protection	Overwrite protection:Set using DIP switch. Copy protection: Password set using Peripheral Device.
Error check	User-defined errors (i.e., user can define fatal errors and non-fatal errors) The FPD(269) instruction can be used to check execution time and logic of each programming block.
Error log	Up to 20 errors are stored in error log. Information includes error code, error details, and time error occurred.
Serial communications	Built-in peripheral port: Peripheral Device (including Programming Console), Host Links, NT Links Built-in RS-232C port: Peripheral Device (excluding Programming Console), Host Links, no-protocol communications, NT Links
	Communications Board (sold separately): Protocol macros, Host Links, NT Links
Clock	Provided on all models. **Note:** Used to store time when power is turned ON and when errors occur.
Power OFF detection time	10 to 25 ms (not fixed)
Power OFF detection delay time	0 to 10 ms (user-defined, default: 0 ms)
Memory protection	Held Areas: Holding bits, contents of Data Memory and Extended Data Memory, and status of counter Completion Flags and present values. **Note:** If IOM Hold Bit in Auxiliary Area is turned ON, and PC Setup is set to maintain IOM Hold Bit status when power to PLC is turnedl ON, contents of CIO Area, Work Area, part of Auxiliary Area, timer Completion Flag and PVs, Index Registers, and Data Registers will be saved.
Sending commands to a Host Link computer	FINS commands can be sent to a computer connected via Host Link System by executing Network Communications Instructions from PLC.
Remote programming and monitoring	Host Link communications can be used for remote programming and remote monitoring through a Controller Link System or Ethernet network.
Eight-level communications (CPU Ver. 3.0 and higher)	Host Link communications can be used for remote programming and remote monitoring from devices on networks up to seven levels away (Controller Link Network, Ethernet Network, or other network).
Storing comments in CPU Unit	I/O comments can be stored in CPU Unit in Memory Cards, EM file memory, or the built-in Comment memory (CPU Ver. 3.0 and higher)
Program check	Program checks are performed at beginning of operation for items such as no END instruction and instruction errors. A Peripheral Device (excluding Programming Console) can also be used to check programs.
Control output signals	RUN output: The contacts will turn ON (close) while CPU Unit is operating. These terminals are provided only on C200HW-PA204R and C200HW-PA209R Power Supply Units.
Battery life	5 years at 25°C (Depending on the ambient operating temperature and communications conditions, 1.1 years min. Battery Set: CS1W-BAT01) **Note:** Use a replacement battery that is no more than 2 years old from the date of manufacture.
Self-diagnostics	CPU errors (watchdog timer), I/O verification errors, I/O bus errors, memory errors, and battery errors.
Other functions	Storage of number of times power has been interrupted, the times of the interrupts, and system operation time (in Auxiliary Area).

Specifications - Power Supply Units

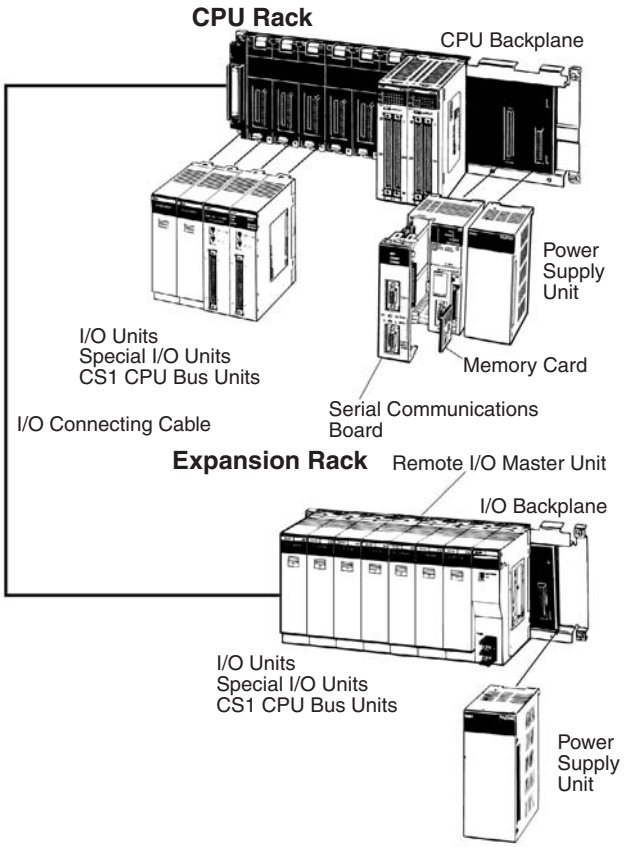
Item	Specifications					
Power Supply Unit	C200HW-PA204	C200HW-PA204S	C200HW-PA204R	C200HW-PA209R	C200HW-PD024	C200HW-PD106R
Supply voltage	100 to 120 V AC or 200 to 240 V AC, 50/60 Hz				24 V DC	100 V DC
Operating voltage range	85 to 132 V AC or 170 to 264 V AC				19.2 to 28.8 V DC	85 to 143 V DC
Power consumption	120 VA max.			180 VA max.	40 W max.	50 W max.
Inrush current	30 A max.			30 A max./100 to 120 V AC 40 A max./200 to 240 V AC	30 A max.	
Output capacity	4.6 A, 5 V DC (including CPU Unit power)			9 A, 5 V DC (including CPU Unit power)	4.6 A, 5 V DC (including CPU Unit power)	6 A, 5 V DC (including CPU Unit power)
	0.625 A, 26 V DC Total: 30 W	0.625 A, 26 V DC or 0.8 A, 24 V DC Total: 30 W	0.625 A, 24 V DC Total: 30 W	1.3 A, 26 V DC Total: 45 W	0.625 A, 26 V DC Total: 30 W	1 A, 26 V DC Total: 30 W
Output terminal	Not provided	24 V DC load current consumption Less than 0.3 A: +17%/–11% 0.3 A or greater: +10%/–11% (Lot No. 0197 or higher)	Not provided		Not provided	
RUN output (See Note 2.)	Not provided		Contact configuration: SPST-NO Switch capacity: 250 V AC, 2 A (resistive load) 250 V AC, 0.5 A (induction load), 24 V DC, 2 A	Contact configuration: SPST-NO Switch capacity: 240 V AC, 2 A (resistive load) 120 V AC, 0.5 A (inductive load) 24 V DC, 2 A (resistive load) 24 V DC, 2 A (inductive load)	Not provided	Contact configuration: SPST-NO Switch capacity: 250 V AC, 2 A (resistive load) 250 V AC, 0.5 A (induction load), 24 V DC, 2 A
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See Note 1.)				20 MΩ min. (at 500 V DC) between DC external and GR terminals (See Note 1.)	
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.				1,000 V AC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 10 mA max. (See Note 1.)	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.
	1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.					
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)					
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes (Sweep time 8 min ×10 = total time 80 min.) CPU Unit mounted to a DIN rail: 2 to 55 Hz, 2.9 m/s^2 in X, Y, and Z directions for 20 minutes. According to JIS C0040 / IEC 60068-2-6					
Shock resistance	147 m/s^2, 3 times each in X, Y, and Z directions According to JIS C0041 / IEC 60068-2-27					
Ambient operating temperature	0 to 55°C					
Ambient operating humidity	10% to 90% (with no condensation)					
Atmosphere	Must be free from corrosive gases.					
Ambient storage temperature	–20 to 75°C (excluding battery)					
Grounding	Less than 100 Ω					
Enclosure	IP20, intended for panel mounting.					
Weight	All models are each 6 kg max.					
CPU Rack Dimensions (mm) (See note 3.)	2 slots:198.5 × 157 × 123 (W x H x D) 8 slots: 435 × 130 × 123 (W x H x D) 3 slots: 260 × 130 × 123 (W x H x D) 10 slots:505 × 130 × 123 (W x H x D) 5 slots: 330 × 130 × 123 (W x H x D)					
Product standards	Conforms to UL, CSA, cULus, cUL, NK, Lloyd's, and EC directives.					cULus

Note: 1. Disconnect the Power Supply Unit's LG terminal from the GR terminal when testing insulation and dielectric strength.
2. Only when mounted to a Backplane.
3. Depth is 153 mm for C200HW-PA209R.
4. Enquire separately for general specifications of Process I/O Units.

Specifications - Duplex Power Supply Units

Item	Specifications	
Power Supply Unit	CS1D-PA207R	CS1D-PD024
Supply voltage	100 to 120 V AC or 200 to 240 V AC, 50/60 Hz	24 V DC
Operating voltage range	85 to 132 V AC or 170 to 264 V AC	19.2 to 28.8 V DC
Power consumption	150 VA max.	40 W max.
Inrush current	30 A max./100 to 120 V AC 40 A max./200 to 240 V AC	30 A max.
Output capacity	7 A, 5 V DC (including CPU Unit power)	4.3 A, 5 V DC (including CPU Unit power)
	1.3 A, 26 V DC Total: 35 W	0.56 A, 26 V DC Total: 28 W
Output terminal	Not provided	Not provided
RUN output (See Note 2.)	Contact configuration: SPST-NO Switch capacity: 240 V AC, 2 A (resistive load) 120 V AC, 0.5 A (inductive load) 24 V DC, 2 A (resistive load) 24 V DC, 2 A (inductive load)	Not provided
Insulation resistance	20 MΩ min. (at 500 V DC) between AC external and GR terminals (See Note 2.)	20 MΩ min. (at 500 V DC) between DC external and GR terminals (See Note 2.)
Dielectric strength	2,300 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 2.) Leakage current: 10 mA max.	1,000 V AC 50/60 Hz for 1 min between DC external and GR terminals, leakage current: 10 mA max. (See Note 2.)
	1,000 V AC 50/60 Hz for 1 min between AC external and GR terminals (See Note 1.) Leakage current: 10 mA max.	
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)	
Vibration resistance	10 to 57 Hz, 0.075-mm amplitude, 57 to 150 Hz, acceleration: 9.8 m/s^2 in X, Y, and Z directions for 80 minutes (Sweep time 8 min ×10 = total time 80 min.) CPU Unit mounted to a DIN rail: 2 to 55 Hz, 2.9 m/s^2 in X, Y, and Z directions for 20 minutes. According to JIS C0040 / IEC 60068-2-6	
Shock resistance	147 m/s^2, 3 times each in X, Y, and Z directions According to JIS C0041 / IEC 60068-2-27	
Ambient operating temperature	0 to 55°C	
Ambient operating humidity	10% to 90% (with no condensation)	
Atmosphere	Must be free from corrosive gases.	
Ambient storage temperature	–20 to 75°C (excluding battery)	
Grounding	Less than 100 Ω	
Enclosure	Mounted in a panel.	
Weight	All models are each 6 kg max.	

Basic System Configuration



CPU Rack

A CPU Rack consists of a CPU Unit, Power Supply Unit, CPU Backplane, Basic I/O Units, Special I/O Units, and CPU Bus Units. The Serial Communications Board and Memory Cards are optional.

Note: The Backplane depends on the type of CPU Rack, Expansion I/O Racks, and Slave Racks that are used.

Expansion Racks

Both C200H and CS1 Expansion Racks can be used.

- C200H Expansion I/O Racks can be connected to CPU Racks, CS1 Expansion Racks, or other C200H Expansion I/O Racks.
- CS1 Expansion Racks can be connected to CPU Racks or other CS1 Expansion Racks.

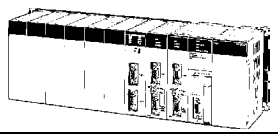
An Expansion Rack consists of a Power Supply Unit, a CS1 or C200H Expansion I/O Backplane, Basic I/O Units, Special I/O Units, and a CS1 CPU Bus Units.

Long-distance Expansion Racks

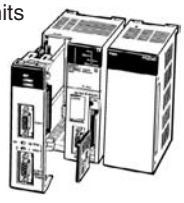
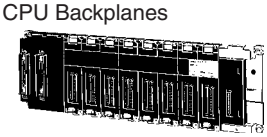
An I/O Control Unit and I/O Interface Units can be used to extend the normal limit of 12 m to 50 m for each of two series of CS1 Expansion Racks. The following Units can be mounted to Long-distance Expansion Racks: CS1 Basic I/O Units, CS1 Special I/O Units, and CS1 CPU Bus Units. (C200H Units cannot be mounted to Long-distance Expansion Racks.)

CPU Rack

Configuration

Name	Configuration	Remarks
CPU Rack 	CPU Backplane	One of each Unit required for every CPU Rack. Refer to the following table for model number.
	CPU Unit	
	Power Supply Unit	
	Memory Card	Install as required. Refer to the following table for model number.
	Serial Communications Board	

Products Used in CPU Racks

Name	Model	Specifications	
CPU Units 	CS1H-CPU67H	I/O bits: 5,120, Program capacity: 250 kSteps Data Memory: 448 kWords (DM: 32 kWords, EM: 32 kWords x 13 banks)	
	CS1H-CPU66H	I/O bits: 5,120, Program capacity: 120 kSteps Data Memory: 256 kWords (DM: 32 kWords, EM: 32 kWords x 7 banks)	
	CS1H-CPU65H	I/O bits: 5,120, Program capacity: 60 kSteps Data Memory: 128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)	
	CS1H-CPU64H	I/O bits: 5,120, Program capacity: 30 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)	
	CS1H-CPU63H	I/O bits: 5,120, Program capacity: 20 kSteps Data Memory: 32 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)	
	CS1G-CPU45H	I/O bits: 5,120, Program capacity: 60 kSteps Data Memory: 128 kWords (DM: 32 kWords, EM: 32 kWords x 3 banks)	
	CS1G-CPU44H	I/O bits: 1,280, Program capacity: 30 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 banks)	
	CS1G-CPU43H	I/O bits: 960, Program capacity: 20 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)	
	CS1G-CPU42H	I/O bits: 960, Program capacity: 10 kSteps Data Memory: 64 kWords (DM: 32 kWords, EM: 32 kWords x 1 bank)	
CPU Backplanes 	CS1W-BC022	2 slots (Connection to Expansion Backplane is not possible.)	These Backplanes are for CS1 Units only. Use CS1W-BC□□3 Backplanes if C200H Units are to be installed.
	CS1W-BC032	3 slots	
	CS1W-BC052	5 slots	
	CS1W-BC082	8 slots	
	CS1W-BC102	10 slots	

Name	Model	Specifications
Power Supply Units 	C200HW-PA204	100 to 120 V AC or 200 to 240 V AC, Output capacity: 4.6 A, 5 V DC
	C200HW-PA204S	100 to 120 V AC or 200 to 240 V AC (0.8 A 24 V DC service power) Output capacity: 4.6 A, 5 V DC
	C200HW-PA204R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC
	C200HW-PD024	24 V DC, Output capacity: 4.6 A, 5 V DC
	C200HW-PA209R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC
I/O Control Unit	CS1W-IC102	Connects to CS1 Expansion Racks (two Terminating Resistors included). Must be used together with I/O Interface Units to connect Long-distance Expansion Racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.
Memory Cards 	HMC-EF372	Flash memory, 30 MB
	HMC-EF672	Flash memory, 64 MB
	HMC-AP001	Memory Card adapter
Serial Communications Boards	CS1W-SCB21-V1	2 x RS-232C ports, protocol macro function
	CS1W-SCB41-V1	1 x RS-232C port + 1 x RS-422/485 port, protocol macro function
Programming Consoles	CQM1-PRO01-E	An English Keyboard Sheet (CS1W-KS001-E) is required.
	C200H-PRO27-E	
Programming Console Connection Cables	CS1W-CN114	Connects the CQM1-PRO01-E Programming Console. (Length: 0.05 m)
	CS1W-CN224	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)
	CS1W-CN624	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)
CX-One	CX-ONE-AL##C-E*1	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.
Programming Device Connecting Cables (for peripheral port)	CS1W-CN118	Connects DOS computer, D-Sub 9-pin receptacle (Length: 0.1 m)
	CS1W-CN226	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m)
	CS1W-CN626	Connects DOS computer, D-Sub 9-pin (Length: 6.0 m)
	XW2Z-200S-CV	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m)
	XW2Z-500S-CV	Connects DOS computer, D-Sub 9-pin (Length: 5.0 m)
Programming Device Connecting Cable (for RS-232C port)	XW2Z-200S-V	Connects DOS computer, D-Sub 9-pin (Length: 2.0 m) (For Host Link connection)
	XW2Z-500S-V	Connects DOS computer, D-Sub 9-pin (Length: 5.0 m) (For Host Link connection)
Battery Set	CS1W-BAT01	For CS1 Series only. Note: Use a replacement battery that is no more than 2 years old from the date of manufacture.

*1 ## = Number of licences; 01, 03, 10

Expansion Racks

Expansion Rack Configuration

Rack	Configuration	Remarks
CS1 Expansion Rack	CS1 Expansion I/O Backplane	One of each Unit is required.
	Power Supply Unit	
	For connection to a CPU Backplane or CS1 Expansion I/O Backplane: CS1 I/O Connecting Cable	
	For connection to a C200H Expansion I/O Backplane: CS1 to C200H I/O Connecting Cable	
C200H Expansion I/O Rack	C200H Expansion I/O Backplane	One of each Unit is required. A CS1 Expansion Rack cannot be connected after a C200H Expansion I/O Rack.
	Power Supply Unit	
	For connection to a CPU Backplane or CS1 Expansion I/O Backplane: CS1 to C200H I/O Connecting Cable	
	For connection to a C200H Expansion I/O Backplane: C200H I/O Connecting Cable	

Products Used in Expansion Racks

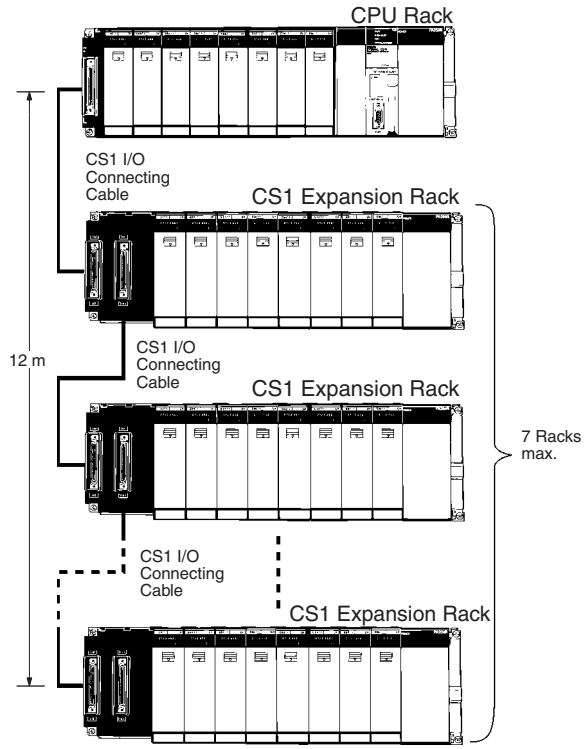
Name	Model	Specifications		Cable Length
CS1 Expansion I/O Backplanes	CS1W-BI032	3 slots	These Backplanes are for CS1 Units only. Use CS1W-BI□□3 Backplanes if C200H Units are to be installed.	---
	CS1W-BI052	5 slots		
	CS1W-BI082	8 slots		
	CS1W-BI102	10 slots		
C200H Expansion I/O Backplanes	C200HW-BI031	3 slots		
	C200HW-BI051	5 slots		
	C200HW-BI081-V1	8 slots		
	C200HW-BI101-V1	10 slots		
Power Supply Units	C200HW-PA204	100 to 120 V AC or 200 to 240 V AC Output capacity: 4.6 A, 5 V DC		
	C200HW-PA204S	100 to 120 V AC or 200 to 240 V AC (with power output terminal: 0.8 A, 24 V DC) Output capacity: 4.6 A, 5 V DC		
	C200HW-PA204R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC		
	C200HW-PA209R	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC		
	C200HW-PD024	24 V DC		

Name	Model	Specifications	Cable Length
I/O Interface Unit	CS1W-II102	Connects CS1 Expansion Racks. Must be used together with I/O Control Unit to connect Long-distance Expansion Racks (50 m max.). Not required to connect CS1 Expansion Racks within 12 m.	---
CS1 I/O Connecting Cables	CS1W-CN313	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes. When using a CS1W-CN313 or CS1W-CN713 I/O Connecting Cable with a CS1□-CPU□□H CPU Unit, use only Cables produced on or after September 20, 2001 (production number 2091). Cables with no production number, a 6-digit production number, or produced before September 20, 2001, cannot be used. **Reading the production number** □□□□ Year (e.g., 1997=7) Month (1 to 9, X (10), Y (11), Z (12)) Day (01 to 31)	0.3 m
	CS1W-CN713		0.7 m
	CS1W-CN223		2 m
	CS1W-CN323		3 m
	CS1W-CN523		5 m
	CS1W-CN133		10 m
	CS1W-CN133-B2		12 m
Long-distance Connecting Cables	CV500-CN312	For Long-distance Expansion Racks Connects the I/O Control Unit to I/O Interface Units or connects one I/O Interface Unit to the next I/O Interface Unit.	0.3 m
	CV500-CN612		0.6 m
	CV500-CN122		1 m
	CV500-CN222		2 m
	CV500-CN322		3 m
	CV500-CN522		5 m
	CV500-CN132		10 m
	CV500-CN232		20 m
	CV500-CN332		30 m
	CV500-CN432		40 m
	CV500-CN532		50 m
CS1-C200H I/O Connecting Cables	CS1W-CN311	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	0.3 m
	CS1W-CN711		0.7 m
	CS1W-CN221		2 m
	CS1W-CN321		3 m
	CS1W-CN521		5 m
	CS1W-CN131		10 m
	CS1W-CN131-B2		12 m
C200H I/O Connecting Cables	C200H-CN311	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	0.3 m
	C200H-CN711		0.7 m
	C200H-CN221		2 m
	C200H-CN521		5 m
	C200H-CN131		10 m

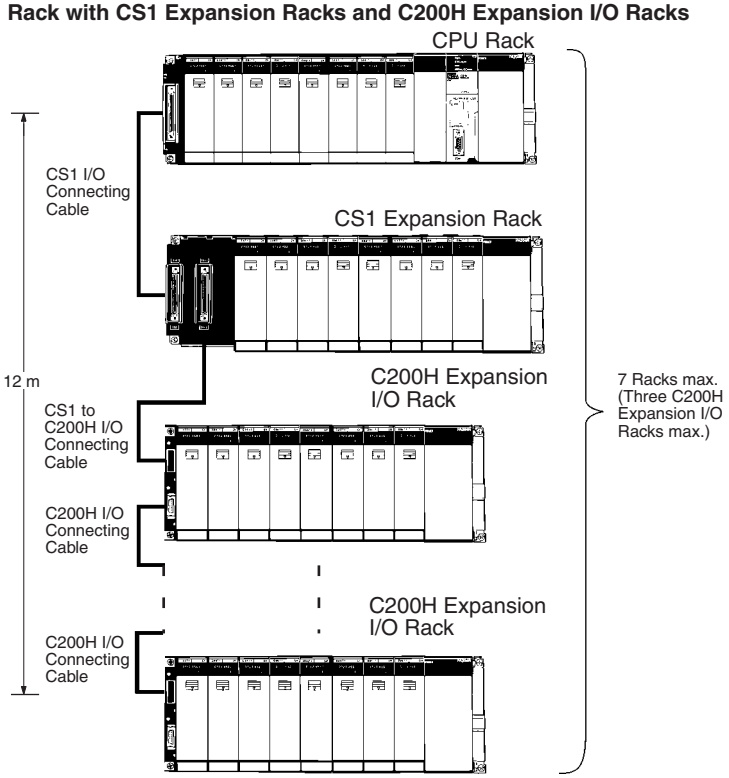
Expansion Rack Patterns

The following diagrams show the 5 possible patterns of Expansion Racks.

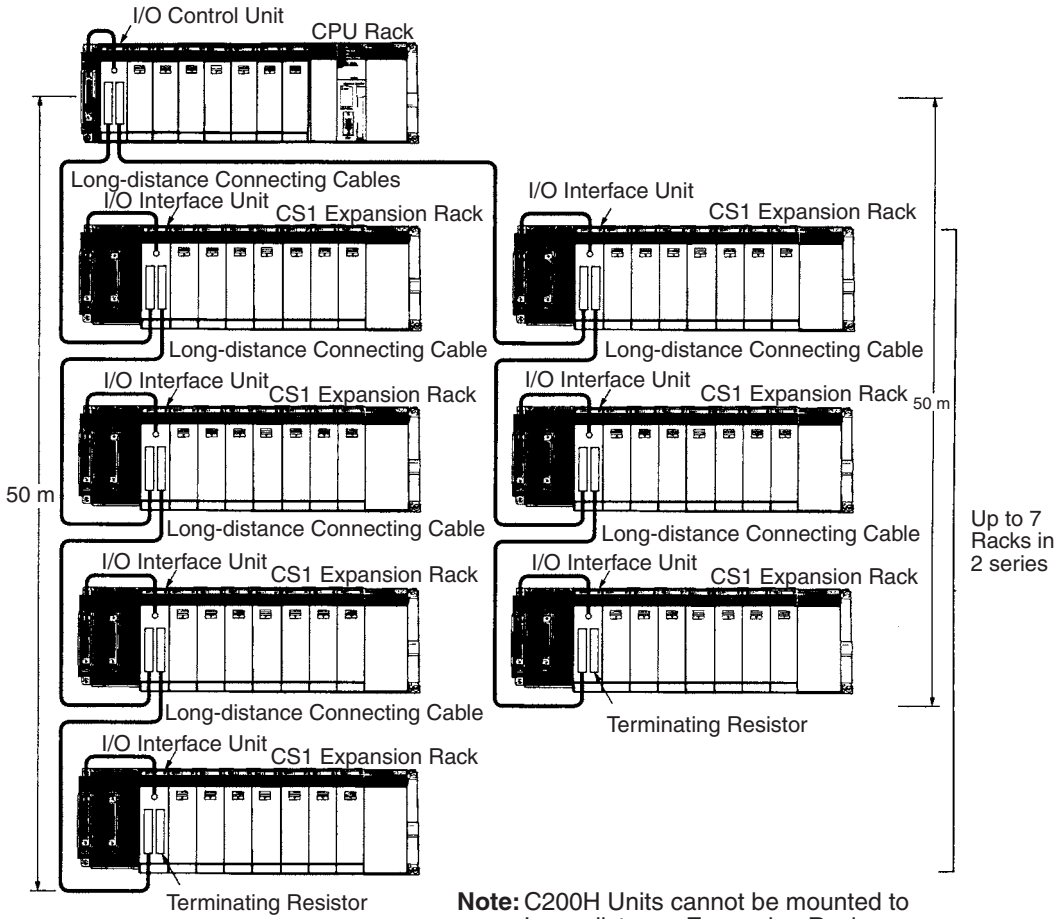
CPU Rack with CS1 Expansion Racks



CPU Rack with CS1 Expansion Racks and C200H Expansion I/O Racks

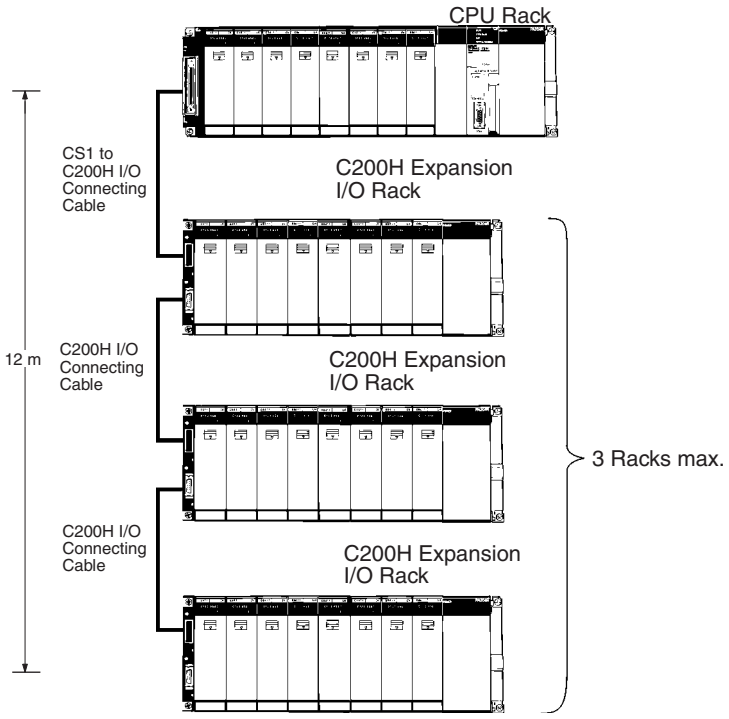


CPU Rack with CS1 Long-Distance Expansion Racks

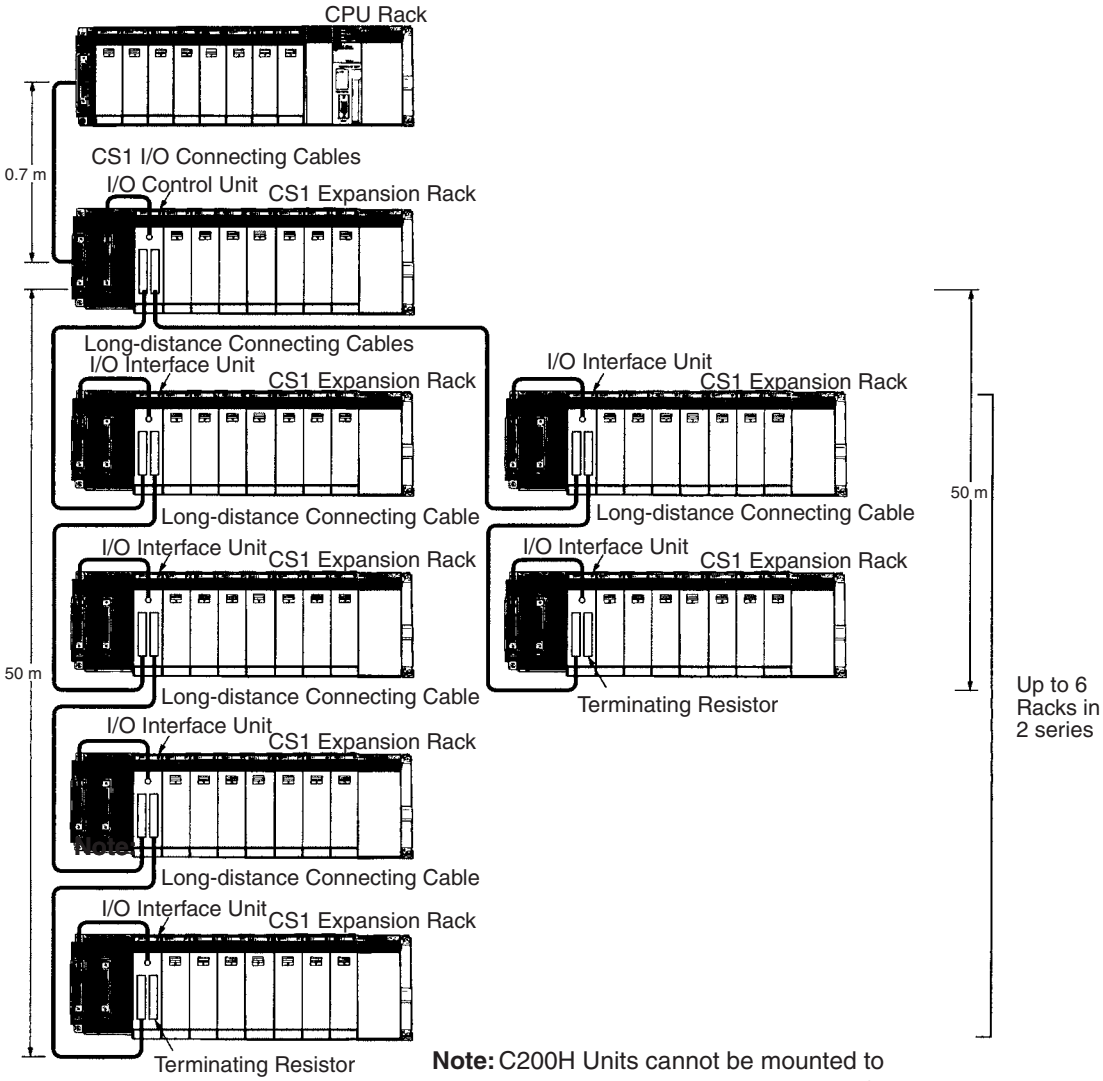


Note: C200H Units cannot be mounted to Long-distance Expansion Racks.

CPU Rack with C200H Expansion I/O Racks



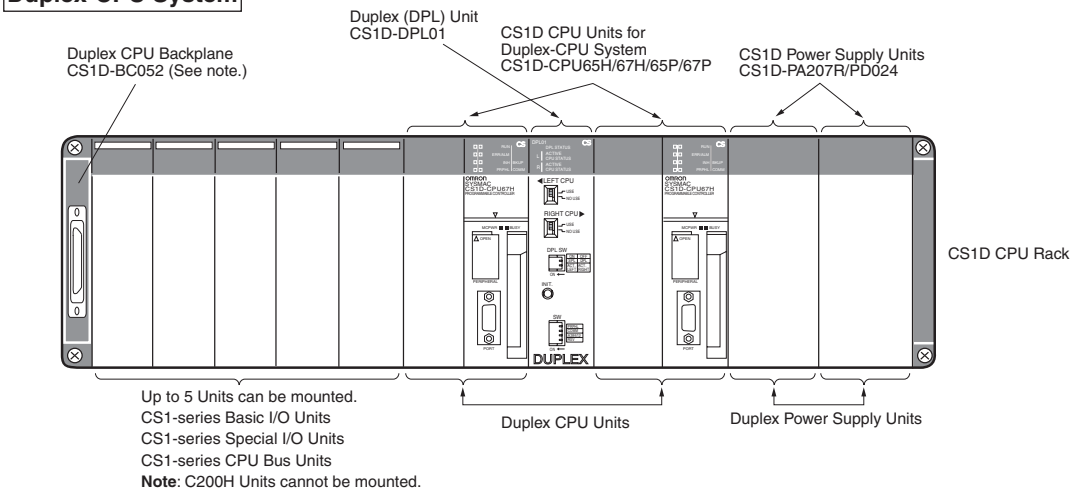
CPU Rack with CS1 Expansion Rack and CS1 Long-Distance Expansion Racks



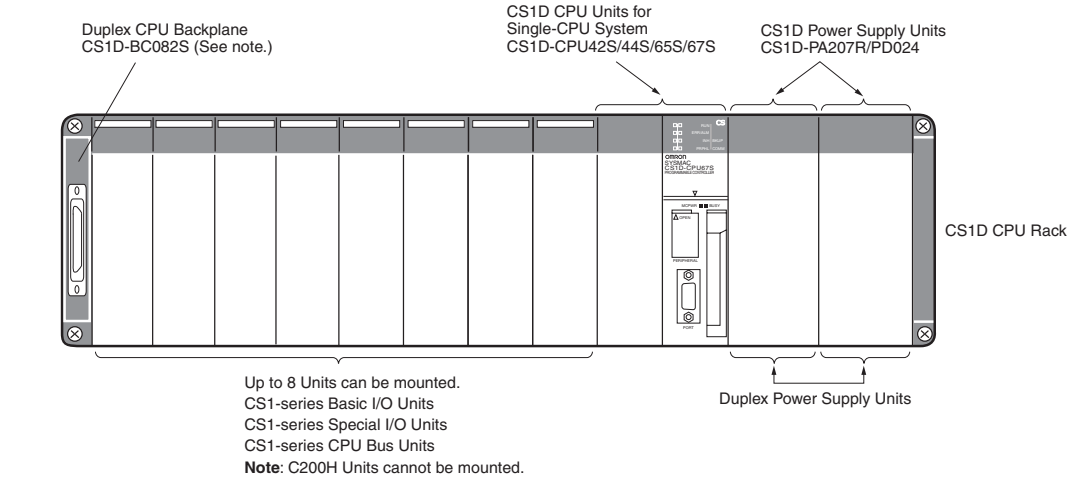
Note: C200H Units cannot be mounted to Long-distance Expansion Racks. (They can be mounted to the CS1 Expansion Rack with the I/O Control Unit mounted.)

System Configuration (Duplex Systems)

Duplex-CPU System



Single-CPU System



CPU Rack

A CPU Rack consists of a Duplex CPU Backplane to which CPU Units, Power Supply Units, a Duplex Unit, CS1-series Basic I/O Units, CS1-series Special I/O Units, and CS1-series CPU Bus Units are mounted.

Memory Cards and Inner Boards to mount in the CPU Units are optional. (Inner Board cannot be mounted to the CS1D-CPU□□H/P)

The CPU Units, Power Supply Units, Duplex CPU Backplane, and Duplex Unit are all designed specifically for CS1D PLCs.

Note: Different Backplanes are used for the CPU Rack and Expansion Racks. Be sure to use the correct Backplane.

Expansion Racks

An Expansion Rack consists of an Expansion Backplane to which Power Supply Units, CS1-series Basic I/O Units, CS1-series Special I/O Units, and CS1-series CPU Bus Units are mounted.

The Power Supply Units and Expansion Backplane are designed specifically for CS1D PLCs.

CS1-series Expansion Backplanes and C200H Backplanes cannot be connected.

Long-distance Expansion Racks

A Long-distance Expansion Rack consists of an Expansion Backplane to which an I/O Interface Unit, CS1-series Basic I/O Units, CS1-series Special I/O Units, and CS1-series CPU Bus Units are mounted. An I/O Control Unit is used to connect to the Long-distance Expansion Racks.

Using Long-distance Expansion Rack increases the normal limit of 12 m for the Rack to 50 m.

CS1D PLCs

With a CS1D Duplex-CPU System, two CPU Units can be mounted to the CPU Rack for Duplex Mode operation (Duplex Mode), or just one CPU Unit can be mounted for Simplex Mode operation. In either case, a Duplex Unit is required.

With a CS1D Single-CPU System, just one CPU Unit is mounted and a Duplex Unit is not required.

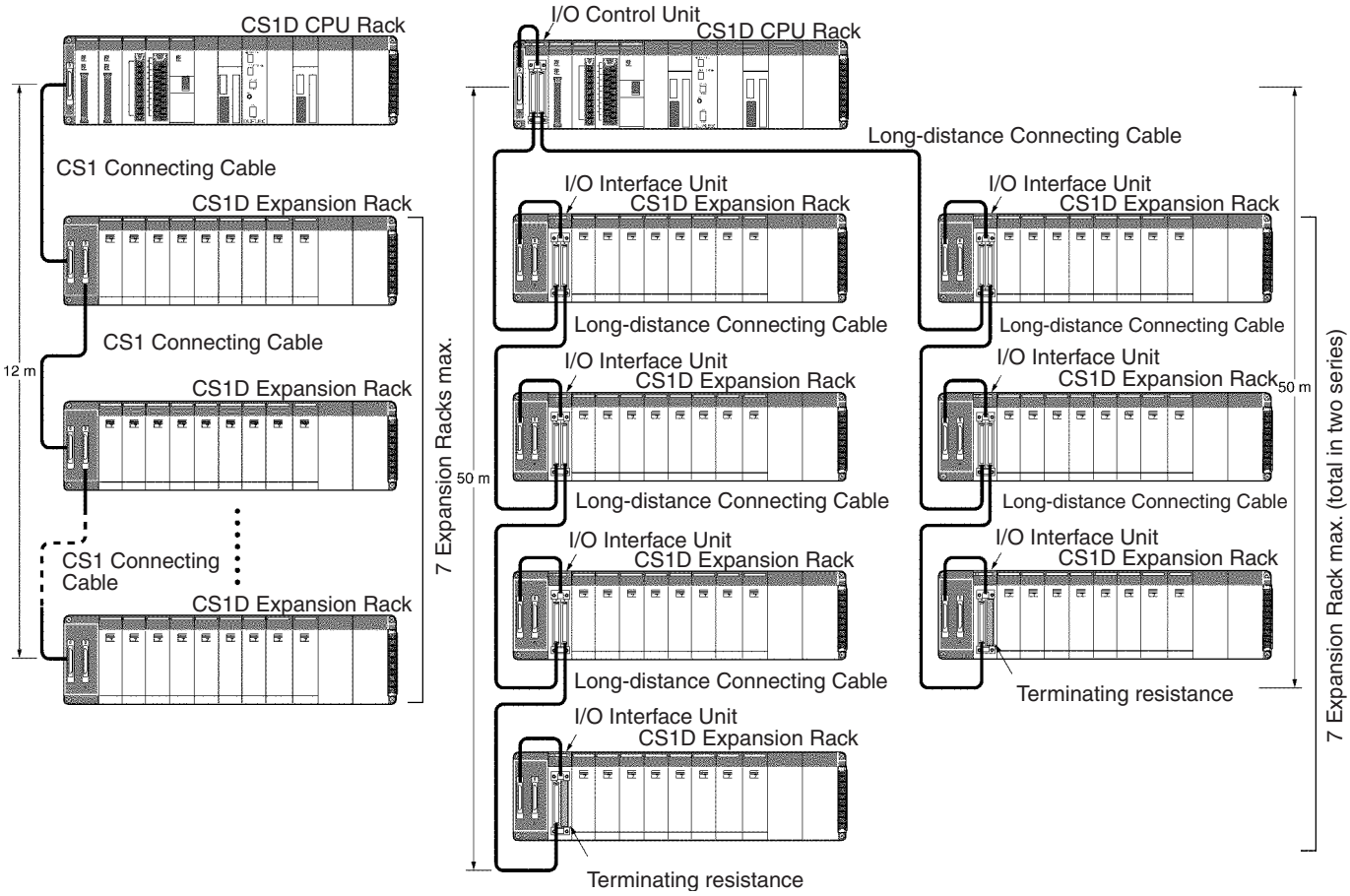
Also, two Power Supply Units can be mounted to any Rack to increase redundancy. (Racks can also be operated with only one Power Supply Unit.) With any of these combinations, there are no further restrictions if the system configuration, e.g., the same number of Expansion Racks can be used as with the other CS1-series PLCs.

Note: C200H Basic I/O Units, C200H Special I/O Units, and C200H CPU Bus Units cannot be mounted on any Rack.

Expansion Patterns for CS1D PLCs

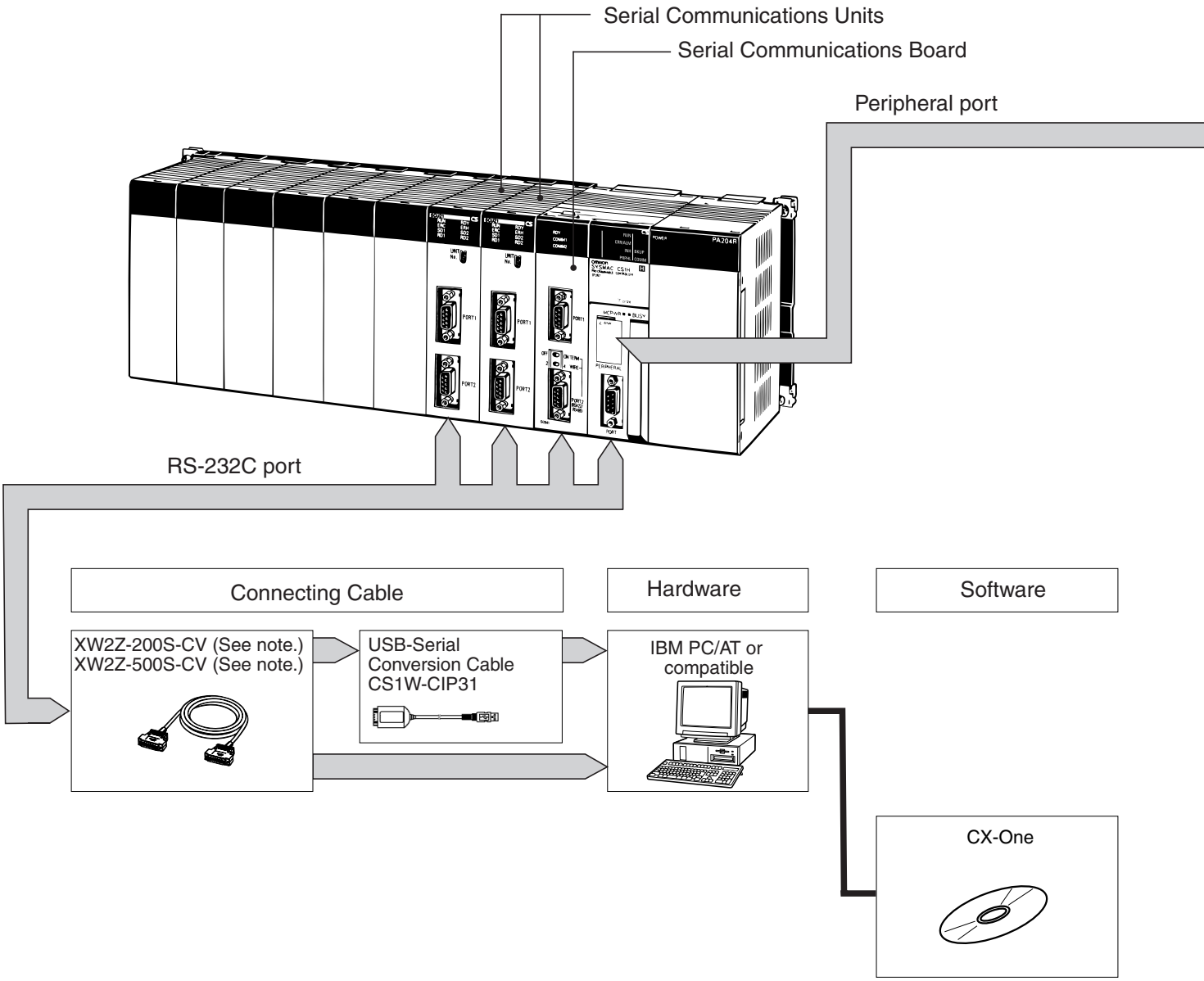
CS1D CPU Rack + CS1D Expansion Rack

CS1D CPU Rack + CS1D Long-distance Expansion Racks

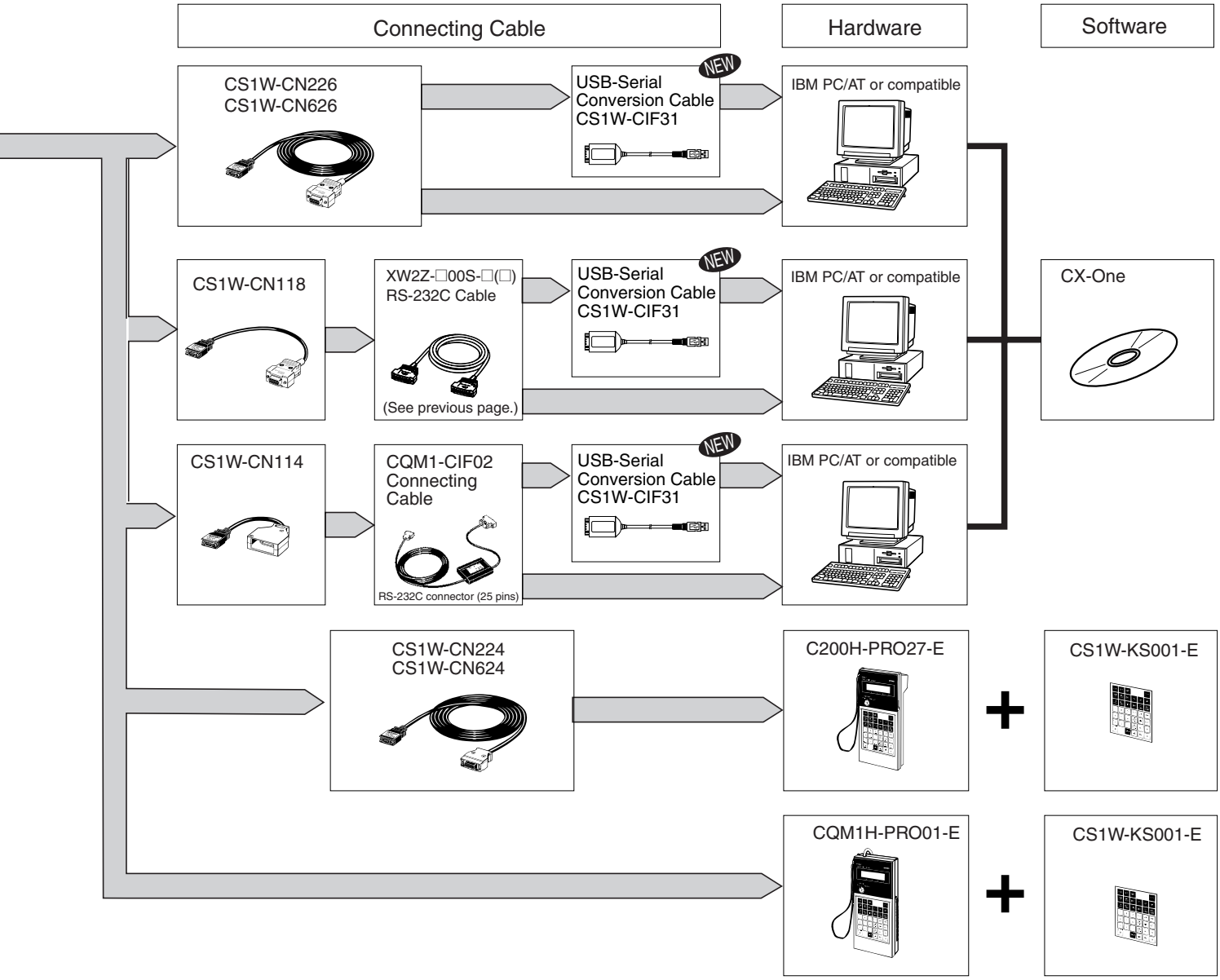


Name	Model	Specifications	Cable Length
Long-distance Connecting Cables	CV500-CN312	For Long-distance Expansion Racks Connects the I/O Control Unit to I/O Interface Units or connects one I/O Interface Unit to the next I/O Interface Unit.	0.3 m
	CV500-CN612		0.6 m
	CV500-CN122		1 m
	CV500-CN222		2 m
	CV500-CN322		3 m
	CV500-CN522		5 m
	CV500-CN132		10 m
	CV500-CN232		20 m
	CV500-CN332		30 m
	CV500-CN432		40 m
	CV500-CN532		50 m
CS1-C200H I/O Connecting Cables	CS1W-CN311	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	0.3 m
	CS1W-CN711		0.7 m
	CS1W-CN221		2 m
	CS1W-CN321		3 m
	CS1W-CN521		5 m
	CS1W-CN131		10 m
	CS1W-CN131-B2		12 m
C200H I/O Connecting Cables	C200H-CN311	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	0.3 m
	C200H-CN711		0.7 m
	C200H-CN221		2 m
	C200H-CN521		5 m
	C200H-CN131		10 m

Connections to Programming Devices

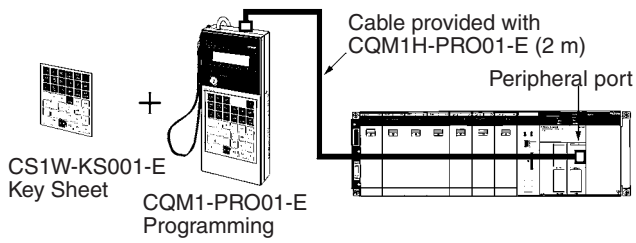


Note: Refer to the next page for details of cables for connecting to computers. Choose the appropriate cable for the communications mode.


Connecting Cable
Hardware
Software
CS1W-CN226
CS1W-CN626
USB-Serial Conversion Cable CS1W-CIF31
NEW
IBM PC/AT or compatible
CS1W-CN118
XW2Z-□00S-□(□) RS-232C Cable
(See previous page.)
USB-Serial Conversion Cable CS1W-CIF31
NEW
IBM PC/AT or compatible
CX-One
CS1W-CN114
CQM1-CIF02 Connecting Cable
RS-232C connector (25 pins)
USB-Serial Conversion Cable CS1W-CIF31
NEW
IBM PC/AT or compatible
CS1W-CN224
CS1W-CN624
C200H-PRO27-E
CS1W-KS001-E
CQM1H-PRO01-E
CS1W-KS001-E

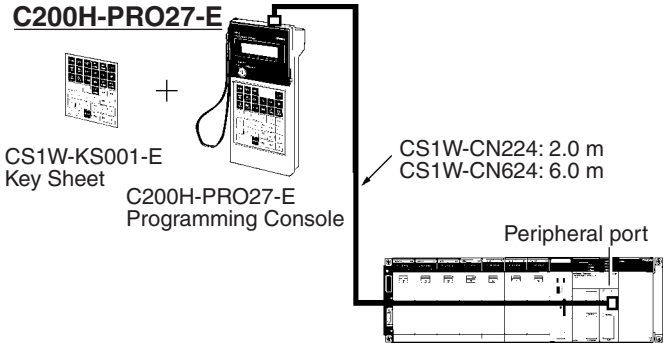
Programming Consoles

CQM1H-PRO01-E



Model	Cable	Cable length
CQM1H-PRO01-E	Not required.	---

C200H-PRO27-E

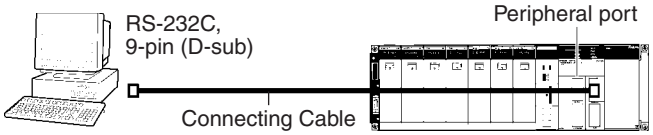


Model	Cable	Cable length
C200H-PR027-E	CS1W-CN224	2.0 m
	CS1W-CN624	6.0 m

Windows-based Programming Software: CX-Programmer

Name	Model		Specifications
CX-Programmer	WS02-CXPC1-EV□□	For 1 license	OS: Windows 95/98 or Windows NT/Me/ 2000/XP
	WS02-CXPC1-EL03-V□□	For 3 licenses	
	WS02-CXPC1-EL10-V□□	For 10 licenses	

Connecting to the Peripheral Port



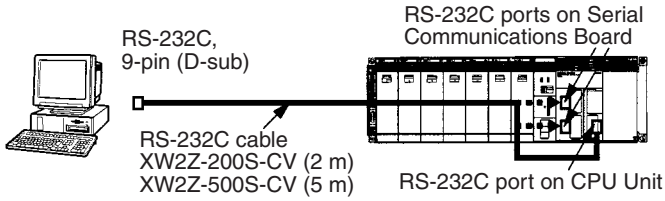
Peripheral Port Connecting Cables

Cable	Length	Computer connector
CS1W-CN226	2.0 m	D-sub, 9-pin, male
CS1W-CN626	6.0 m	

The following cables can be used for an RS-232C connection from the computer to the peripheral port.

Mode	Connecting cables		Length	Computer connector
Peripheral bus or Host Link	XW2Z-200S-CV or XW2Z-500S-CV	CS1W-CN118	2 or 5 m + 0.1 m	D-sub, 9-pin, male
Host Link	XW2Z-200S-V or XW2Z-500S-V			

Connecting to the RS-232C Port



RS-232C Port Connecting Cables

Mode	Cable	Length	Computer connector
Peripheral bus or Host Link	XW2Z-200S-CV	2.0 m	D-sub, 9-pin, male
	XW2Z-500S-CV	5.0 m	

Note: Cables with model numbers ending in “CV” are antistatic.

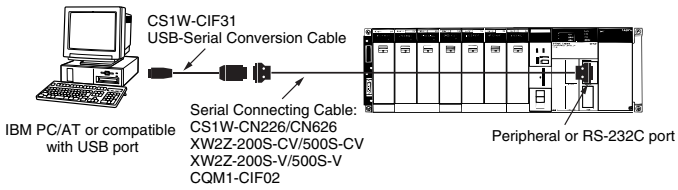
The following cables can be used for an RS-232C connection from the computer to an RS-232C port. (Unlike cables with model numbers ending in “-CV,” however, these cables do not support peripheral bus connection and do not have anti-static specifications.)

Mode	Cable	Length	Computer connector
Host Link	XW2Z-200S-V	2.0 m	D-sub, 9-pin, male
	XW2Z-500S-V	5.0 m	

The following serial communications modes can be used to connect a computer with the CX-Programmer to a CS1 PLC.

Mode	Features
Peripheral bus	The faster mode, peripheral bus is generally used for CX-Programmer connections. Only 1:1 connections are possible. The baud rate is automatically detected with the CS1.
Host Link	A standard protocol for host computers. Slower than peripheral bus, but allows modem or optical adapter connections, or long-distance or 1:N connections via RS422A/485.

Using a USB-Serial Conversion Cable to Connect to a Peripheral or RS-232C Port



General Specifications of USB-Serial Conversion Cable

USB interface standard		Conforms to USB Specification 1.1.
DTE speed		115.2 Kbits/s
Connectors	On computer	USB (A plug connector, male)
	On PLC	RS-232C (D-sub, 9-pin, female)
Power supply		Bus power (supplied from upstream, 5 V DC)
Current consumption		35 mA
Operating environment	Ambient temperature	0 to 55 °C
	Ambient humidity	10% to 90% (with no condensation)
	Ambient atmosphere	No corrosive gases
Weight		50 g

OS with Drivers for USB-Serial Conversion Cable

Windows 98, ME, 2000, or XP

Applicable Software

CX-Programmer, CX-Simulator, CX-Protocol, CX-Motion, CX-Positioner, CS-Process, DeviceNet Configurator, PLC Reporter 32, CX-Designer, and NT Support Software for Windows (NTST) (See note.)

Note: There are restrictions to the COM port numbers that can be used for the NTST.

Applicable Communications Middleware

FinsGateway and CX-Server

Applicable PLCs and PTs

The OMRON PLCs and PTs supported by the applicable software can be used. These are listed below.

PLCs

CS Series, CJ Series, C Series (C200HS, C200HX/HG/HE, C200H, C1000H, C2000H, CQM1, CPM1, CPM1A, SRMT, CQM1H, and CPM2C), CVM1, and CV Series

PTs

NS Series and NT Series

Peripheral Port Connecting Cables

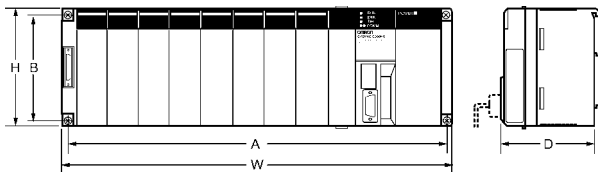
Computer	Serial Communications Node	Connecting Cable model number			Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	CS1W-CN226		0.5 m + 2.0 m	USB (A plug connector)
			CS1W-CN626		0.5 m + 6.0 m	
		CS1W-CIF31	XW2Z-200S-CV/ XW2Z-500S-CV	CS1W-CN118	0.5 m + (2.0 m or 5.0 m) + 0.1 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V/ XW2Z-500S-V		0.5 m + (2.0 m or 5.0 m) + 0.1 m	

RS-232C Port Connecting Cables

Computer	Serial Communications Node	Connecting Cable model number		Length	Computer connector
IBM PC/AT or compatible	Tool bus or SYSMAC WAY	CS1W-CIF31	XW2Z-200S-CV	0.5 m + 2.0 m	USB (A plug connector)
			XW2Z-500S-CV	0.5 m + 5.0 m	
	SYSMAC WAY	CS1W-CIF31	XW2Z-200S-V (See note.)	0.5 m + 2.0 m	
			XW2Z-500S-V (See note.)	0.5 m + 5.0 m	

Connection in Tool Bus Mode is not possible. The connector does not have ESD measures.

Dimensions

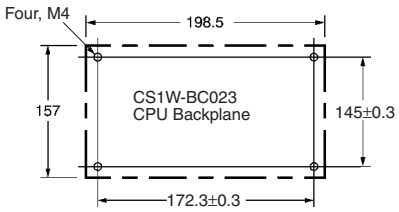


Unit: mm

Backplane	A	B	W	H	D
CS1W-BC022/023 (2 slots)	172.3	145	198.5	157	123
CS1W-BC032/033 (3 slots)	246	118	260	132	
CS1W-BC052/053 (5 slots)	316		330		
CS1W-BC082/083 (8 slots)	421		435		
CS1W-BC102/103 (10 slots)	491		505		
CS1D-BC052/082S (Duplex System)					

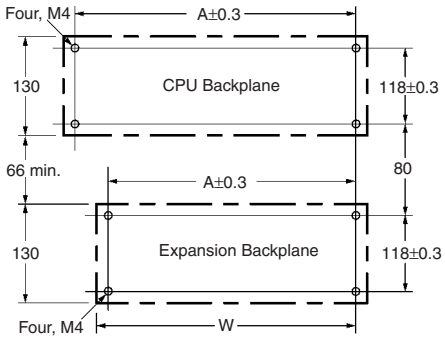
Backplanes

CPU Backplane with 2 Slots



Note: Expansion Backplanes cannot be connected to 2-slot CPU Backplanes.

CPU Backplane with 3, 5, 8, or 10 Slots

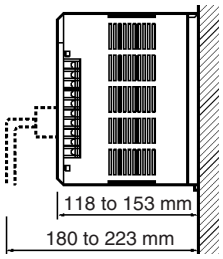


Unit: mm

Backplane	Model	A	W
CPU Backplanes	CS1W-BC022/023 (2 slots)	172.3	198.5
	CS1W-BC032/033 (3 slots)	246	260
	CS1W-BC052/053 (5 slots)	316	330
	CS1W-BC082/083 (8 slots)	421	435
	CS1W-BC102/103 (10 slots)	491	505
	CS1D-BC052/082S (Duplex System)		
CS1 Expansion Backplanes	CS1W-BI032/033 (3 slots)	246	260
	CS1W-BI052/053 (5 slots)	316	330
	CS1W-BI082/083 (8 slots)	421	435
	CS1W-BI102/103 (10 slots)	491	505
	CS1D-BI092 (Duplex System)		
C200H Expansion I/O Backplanes	C200HW-BI031 (3 slots)	175	189
	C200HW-BI051 (5 slots)	245	259
	C200HW-BI081-V1 (8 slots)	350	364
	C200HW-BI101-V1 (10 slots)	420	434

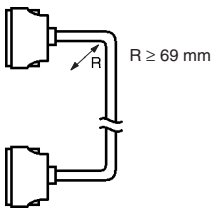
Mounting Depth

The depth of all Racks is from 118 to 153 mm depending on the Units that are mounted. Additional depth is required to connect Peripheral Devices and Cables. Be sure to allow sufficient mounting depth.

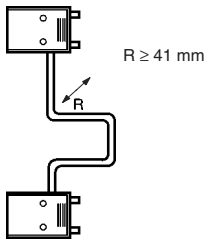


Note: I/O Connecting Cables require sufficient space to maintain the min. bending radius.

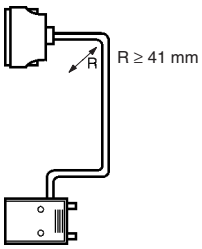
CS1 I/O Connecting Cable (Cable diameter: 8.6 mm)



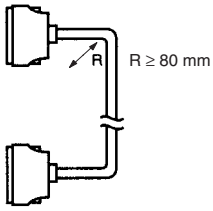
C200H I/O Connecting Cable (Cable diameter: 5.1 mm)



CS1 to C200H I/O Connecting Cable (Cable diameter: 5.1 mm)



Long-distance Connecting Cable (Cable diameter: 10 mm)



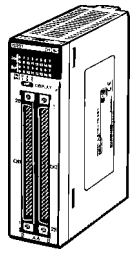
I/O Allocations

I/O Allocations

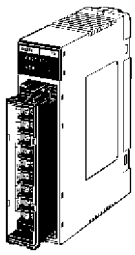
In CS1 PLCs, part of the I/O memory is allocated to each Unit. Units are divided into the following 3 groups for allocations.

- Basic I/O Units
- Special I/O Units
- CS1 CPU Bus Units

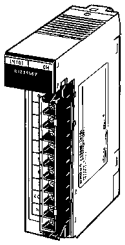
Basic I/O Units



CS1 Basic I/O Units



C200H Basic I/O Units



C200H Group-2 High-density I/O Units
(See Note 2.)

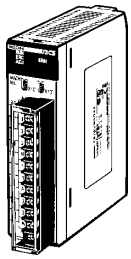
Allocations

CIO Area:
CIO 0000 to CIO 0319 (See Note 1.)
(Memory is allocated in word units in order of mounting position in the Racks.)

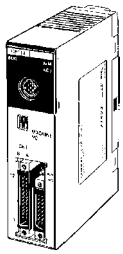
Note 1. The Rack's first word setting can be changed from the default setting (CIO 0000) to any word from CIO 0000 to CIO 9999. The first word setting can be changed only with a Programming Device other than a Programming Console.

2. The unit number setting on the front of C200H Group-2 High-density I/O Units is ignored. Words are allocated to these Units based on their location in the Rack.

Special I/O Units



CS1 Special I/O Units



C200H Special I/O Units
(See Note 2.)

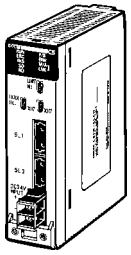
Allocations

Special I/O Unit Area:
CIO 2000 to CIO 2959
(Each Unit is allocated ten words based on its unit number.)

Note 1. Although there are 96 unit number settings, a maximum of 80 Units can actually be mounted to a PLC because that is the maximum number of slots possible.

2. Some Units classified as I/O Units (namely C200H High-density I/O Units) are actually treated as Special I/O Units.

CS1 CPU Bus Units



CS1 CPU Bus Units

Allocations

CS1 CPU Bus Unit Area:
CIO 1500 to CIO 1899
(Each Unit is allocated 25 words based on its unit number.)

Allocations to Basic I/O Unit Groups

Basic I/O Units include CS1 Basic I/O Units, C200H Basic I/O Units, and C200H Group-2 High-density I/O Units.

Allocated words in the CIO Area: CIO 0000 to CIO 0319

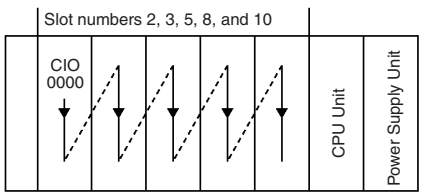
Basic I/O Units can be mounted to the CPU Rack, CS1 Expansion Racks, and C200HX/HG/HE Expansion I/O Racks.

Note: CS1 Basic I/O Units cannot be mounted to C200HX/HG/HE Expansion I/O Racks.

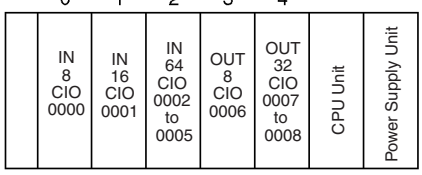
Allocation Methods

1. CPU Rack

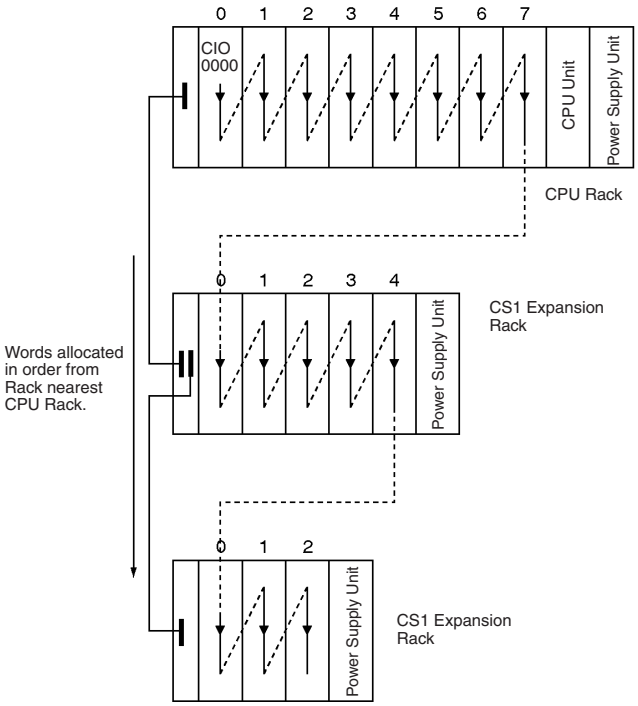
Basic I/O Units on the CPU Rack are allocated words left to right; Units are allocated as many words as required in word units. With CPU Ver. 2.0 and higher it is possible to specify start addresses per rack or per slot.



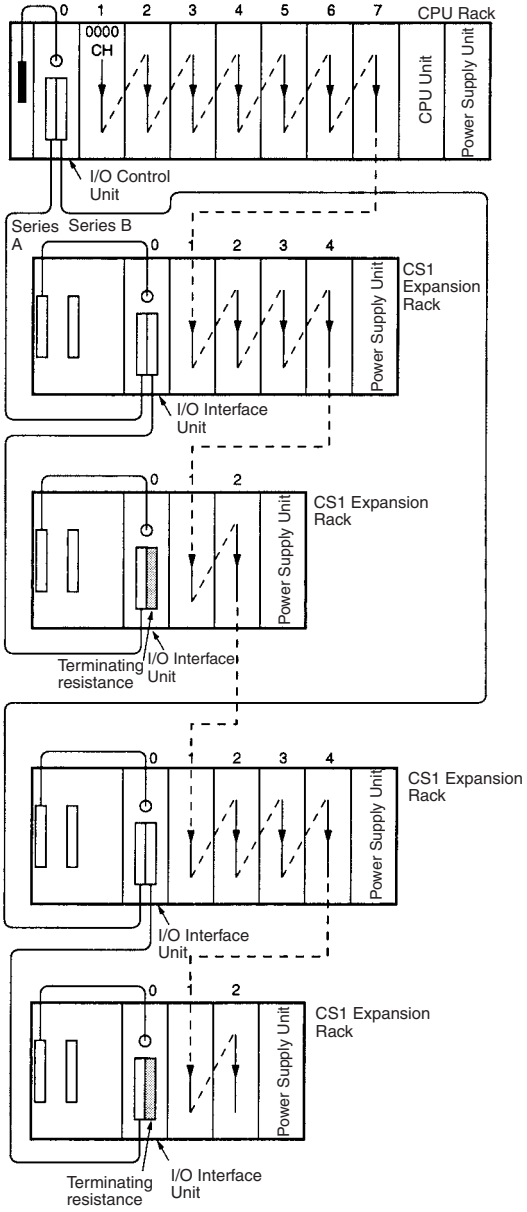
Example



2. Allocations to CS1 Expansion and C200H Expansion I/O Racks
I/O allocations to Basic I/O Units continue from the CPU Rack to the Expansion Racks. Words are allocated from left to right and each Unit is allocated as many words as it requires in word units, just like Units in the CPU Rack.



3. CS1 Long-distance Expansion Racks
Words are allocated to series A and then series B. Otherwise, allocations are the same as for other Racks.



Allocations to Special I/O Units

Special I/O Units include CS1 Special I/O Units and C200H Special I/O Units.

Each of these Units is allocated ten words in the Special I/O Unit Area (CIO 2000 to CIO 2959).

Special /O Units can be mounted to the CPU Rack, CS1 Expansion Racks, and C200H Expansion I/O Racks. (See note.)

Note: CS1 Special I/O Units cannot be mounted to C200H Expansion I/O Racks.

Each Unit is allocated 10 words in the Special I/O Unit Area, as shown in the following table.

Unit number	Words allocated
0	CIO 2000 to CIO 2009
1	CIO 2010 to CIO 2019
2	CIO 2020 to CIO 2029
...	...
15	CIO 2150 to CIO 2159
...	...
95	CIO 2950 to CIO 2959

Note: Special I/O Units are ignored during I/O allocation to Basic I/O Units. Slots containing Special I/O Units are treated as empty slots.

Allocations to CS1 CPU Bus Units

Each CS1 CPU Bus Unit is allocated 25 words in the CS1 CPU Bus Unit Area (CIO 1500 to CIO 1899).

CS1 CPU Bus Units can be mounted to the CPU Rack or CS1 Expansion Racks.

Each Unit is allocated 25 words in the CPU Bus Unit Area, as shown in the following table.

Unit number	Words allocated
0	CIO 1500 to CIO 1524
1	CIO 1525 to CIO 1549
2	CIO 1550 to CIO 1574
...	...
15	CIO 1875 to CIO 1899

Note: CS1 CPU Bus Units are ignored during I/O allocation to Basic I/O Units. Slots containing CS1 CPU Bus Units are treated as empty slots.

Current Consumption

The amount of current/power that can be supplied to the Units mounted in a Rack is limited by the capacity of the Rack's Power Supply Unit. The system must be designed so that the total current consumption of the Units does not exceed the maximum current for each voltage group and the total power consumption does not exceed the maximum for the Power Supply Unit.

CPU Racks and Expansion Racks

The following table shows the maximum currents and power that can be supplied by Power Supply Units on CPU Racks and Expansion Racks (both CS1 Expansion Racks and C200H Expansion I/O Racks).

Note: 1. When calculating current/power consumption in a CPU Rack, be sure to include the power required by the CPU Backplane and CPU Unit themselves.

2. Likewise, be sure to include the power required by the Expansion Backplane itself when calculating current/power consumption in an Expansion Rack.

Power Supply Unit	Max. Current Consumption			Max. Total Power Consumption
	5-V group	26-V group	24-V group	
C200HW-PA204	4.6 A	0.6 A	None	30 W
C200HW-PA204S	4.6 A	0.6 A	0.8 A	30 W
C200HW-PA204R	4.6 A	0.6 A	None	30 W
C200HW-PD204	4.6 A	0.6 A	None	30 W
C200HW-PA209R	9.0 A	1.3 A	None	45 W
C200HW-PD106R	6.0 A	1.0 A	None	30 W
CS1D-PA207R	7.0 A	1.3 A	None	35 W
CS1D-PD024	4.3 A	0.56 A	None	28 W

Be sure both Condition 1 and Condition 2 are met.

Condition 1: Maximum Current Supply

1. Current required at 5 V DC by all Units (A) ≤ Max. Current shown in table
2. Current required at 26 V DC by all Units (B) ≤ Max. Current shown in table
3. Current required at 24 V DC by all Units (C) ≤ Max. Current shown in table

Condition 2: Maximum Total Current Supply

1. A × 5 V DC + B × 26 V DC + C × 24 V DC ≤ Max. Power shown in table

Example Calculations

In this example, the following Units are mounted to a CPU Rack with a C200HW-PA204S Power Supply Unit.

Unit	Model	Quantity	5- V DC	26- V DC	24- V DC
CPU Backplane (8 slots)	CS1W-BC083	1	0.11 A	---	---
CPU Unit	CS1H-CPU67-EV1	1	1.10 A	---	---
Input Units	C200H-ID216	2	0.10 A	---	---
	CS1W-ID291	2	0.20 A	---	---
Output Units	C200H-OC221	2	0.01 A	0.075 A	---
Special I/O Unit	C200H-NC213	1	0.30 A	---	---
CPU Bus Unit	CS1W-CLK21	1	0.50 A	---	---
Service Power Supply Unit (24 V DC)		0.3 A used	---	---	0.3 A
Total current/power consumption 13.15+3.9+7.2 = 24.25 (≤30 W)			2.63 A (≤4.6) x 5 V = 13.15W	0.15 A (≤0.6A) x 26 V = 3.9 W	0.3 A (≤0.8A) x 24 V = 7.2 W

Current Consumption Tables

5- V DC Voltage Group

Name	Model	Consumption (A)
CPU Units (These values include current consumption by a Programming Console.)	CS1H-CPU67H CS1D-CPU67H CS1D-CPU67S	0.82 (See note.)
	CS1H-CPU66H	0.82 (See note.)
	CS1H-CPU65H CS1D-CPU65H CS1D-CPU65S	0.82 (See note.)
	CS1H-CPU64H	0.82 (See note.)
	CS1H-CPU63H	0.82 (See note.)
	CS1G-CPU45H	0.78 (See note.)
	CS1G-CPU44H CS1D-CPU44S	0.78 (See note.)
	CS1G-CPU43H	0.78 (See note.)
	CS1G-CPU42H CS1D-CPU42S	0.78 (See note.)
Duplex Process CPU Units	CS1D-CPU67P CS1D-CPU65P	1.04
Loop Control Boards	CS1W-LCB01	0.22 (See note.)
	CS1W-LCB05	0.22 (See note.)
Serial Communication Boards	CS1W-SCB21-V1	0.28 (See note.)
	CS1W-SCB41-V1	0.36 (See note.)
CPU Backplanes (for CS1 Units only)	CS1W-BC022	0.11
	CS1W-BC032	0.11
	CS1W-BC052	0.11
	CS1W-BC082	0.11
	CS1W-BC102	0.11
CPU Backplanes	CS1W-BC023	0.11
	CS1W-BC033	0.11
	CS1W-BC053	0.11
	CS1W-BC083	0.11
	CS1W-BC103	0.11
I/O Control Unit	CS1W-IC102	0.92
CS1 Expansion Backplanes (for CS1 Units only)	CS1W-BI032	0.23
	CS1W-BI052	0.23
	CS1W-BI082	0.23
	CS1W-BI102	0.23
CS1 Expansion Backplanes	CS1W-BI033	0.23
	CS1W-BI053	0.23
	CS1W-BI083	0.23
	CS1W-BI103	0.23
I/O Interface Unit	CS1W-II102	0.23
C200H Expansion I/O Backplanes	C200HW-BI031	0.15
	C200HW-BI051	0.15
	C200HW-BI081-V1	0.15
	C200HW-BI101-V1	0.15
CS1 Duplex Backplane	CS1D-BC052	Total 0.55
CS1 Duplex Unit	CS1D-DPL01	
CS1D Single CPU Backplane	CS1D-BC082S	0.17
CS1D Expansion Backplane	CS1D-BI092	0.28

Note: Add 0.15 A per port when the NT-AL001-E is connected.

Basic I/O Units

Category	Name	Model	Consumption (A)
C200H Input Units	DC Input Units	C200H-ID211	0.01
		C200H-ID212	0.01
	AC Input Units	C200H-IA121	0.01
		C200H-IA122	0.01
		C200H-IA122V	0.01
		C200H-IA221	0.01
		C200H-IA222	0.01
		C200H-IA222V	0.01
C200H Input Units	AC/DC Input Units	C200H-IM211	0.01
		C200H-IM212	0.01
	B7A Interface Units	C200H-B7AI1	0.10
		C200H-B7A12	0.10
	Interrupt Input Unit	C200HS-INT01	0.02
C200H Group-2 High-density Input Units	DC Input Units	C200H-ID216	0.10
		C200H-ID217	0.12
		C200H-ID218	0.10
		C200H-ID219	0.12
		C200H-ID111	0.12
CS1 Input Units	DC Input Units	CS1W-ID211	0.10
		CS1W-ID231	0.15
		CS1W-ID261	0.15
		CS1W-ID291	0.20
	AC Input Units	CS1W-IA111	0.11
		CS1W-IA211	0.11
	Interrupt Input Unit	CS1W-INT01	0.10
	High-speed Input Unit	CS1W-IDP01	0.10
	Safety Relay Unit	CS1W-SF200	0.10
C200H Output Units	Relay Output Units	C200H-OC221	0.01
		C200H-OC222	0.01
		C200H-OC222N	0.008
		C200H-OC225	0.05
		C200H-OC226N	0.03
		C200H-OC223	0.01
		C200H-OC224	0.01
		C200H-OC224N	0.01
	Transistor Output Units	C200H-OD411	0.14
		C200H-OD213	0.14
		C200H-OD214	0.14
		C200H-OD216	0.01
		C200H-OD211	0.16
		C200H-OD217	0.01
		C200H-OD212	0.18
		C200H-OD21A	0.16
	B7A Interface Units	C200H-B7A01	0.10
		C200H-B7A02	0.10
	Triac Output Units	C200H-OA223	0.18
		C200H-OA222V	0.20
		C200H-OA224	0.27
CS1 Output Units	Relay Output Units	CS1W-OC201	0.10
		CS1W-OC211	0.13
	Transistor Output Units	CS1W-OD211	0.17
		CS1W-OD212	0.17
		CS1W-OD231	0.27
		CS1W-OD232	0.27
		CS1W-OD261	0.39
		CS1W-OD262	0.39
		CS1W-OD291	0.48
		CS1W-OD292	0.48
	Triac Output Units	CS1W-OA201	0.23 max. (0.07+0.02× No. of points ON)
		CS1W-OA211	0.406 max. (0.07+0.021×No. of points ON)
C200H Group-2 High-density Output Units	Transistor Output Units	C200H-OD218	0.27
		C200H-OD21B	0.48
		C200H-OD219	0.48
CS1 I/O Units	DC Input/Transistor Output Units	CS1W-MD261	0.27
		CS1W-MD262	0.27
		CS1W-MD291	0.35
		CS1W-MD292	0.35
	TTL I/O Unit	CS1W-MD561	0.27
C200H I/O Units	B7A Interface Units	C200H-B7A21	0.10
		C200H-B7A22	0.10
	Analog Timer Unit	C200H-TM001	0.06

Note: This table may contain Units that are no longer in production

Special I/O Units

Category	Name	Model	Consumption (A)
C200H High-density I/O Units (Special I/O Units)	DC Input Unit	C200H-ID215	0.13
	TTL Input Unit	C200H-ID501	0.13
	Transistor Output Unit	C200H-OD215	0.22
	TTL Output Unit	C200H-OD501	0.22
	TTL I/O Unit	C200H-MD501	0.18
	DC Input Transistor Output Unit	C200H-MD215	0.18
		C200H-MD115	0.18
C200H Special I/O Units	Temperature Control Units	C200H-TC001	0.33
		C200H-TC002	0.33
		C200H-TC003	0.33
		C200H-TC101	0.33
		C200H-TC102	0.33
		C200H-TC103	0.33
	Heat/Cool Temperature Control Units	C200H-TV001	0.33
		C200H-TV002	0.33
		C200H-TV003	0.33
		C200H-TV101	0.33
		C200H-TV102	0.33
		C200H-TV103	0.33
	Temperature Sensor Units	C200H-TS001	0.45
		C200H-TS002	0.45
		C200H-TS101	0.45
		C200H-TS102	0.45
C200H Special I/O Units	PID Control Units	C200H-PID01	0.33
		C200H-PID02	0.33
		C200H-PID03	0.33
	Cam Positioner Unit	C200H-CP114	0.30
	ASCII Units	C200H-ASC02	0.20
		C200H-ASC11	0.25
		C200H-ASC21	0.30
		C200H-ASC31	0.30
	Analog Input Units	C200H-AD001	0.55
		C200H-AD002	0.45
		C200H-AD003	0.10
	Analog Output Units	C200H-DA001	0.65
		C200H-DA002	0.60
		C200H-DA003	0.10
		C200H-DA004	0.10
	Analog I/O Units	C200H-MAD01	0.10
	High-speed Counter Units	C200H-CT001-V1	0.30
		C200H-CT002	0.30
		C200H-CT021	0.45
	Motion Control Unit	C200H-MC221	0.65 (w/Teaching Box: 0.85)
		C200HW-MC402-E	0.60
	Position Control Units	C200HW- NC113	0.30
		C200HW-NC213	0.30
		C200HW-NC413	0.50
	ID Sensor Units	C200H-IDS01-V1	0.25
		C200H-IDS21	0.25
	Fuzzy Logic Unit	C200H-FZ001	0.30
	Voice Unit	C200H-OV001	0.30
	DeviceNet Master Unit	C200HW-DRM21-V1	0.25
	DeviceNet I/O Link Unit	C200HW-DRT21	0.25
	CANopen Unit	C200HW-CORT21-V1	0.25
	PROFIBUS-DP Master Unit	C200HW-PRM21	0.60
	PROFIBUS-DP I/O Link Unit	C200HW-PRT21	0.25
	CompoBus/S Master Unit	C200HW-SRM21-V1	0.15
	PC Link Unit	C200H-LK401	0.35

Category	Name	Model	Consumption (A)
CS1 Special I/O Unit	Analog Input Unit	CS1W-AD0□1-V1	0.13
		CS1W-AD161	0.15
	Analog Output Unit	CS1W-DA0□□	0.13
	Analog I/O Unit	CS1W-MAD44	0.20
	Isolated Thermocouple Input Unit	CS1W-PTS01-V1	0.15
		CS1W-PTS11	0.12
		CS1W-PTS51	0.25
		CS1W-PTS55	0.18
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	0.15
		CS1W-PTS12	0.12
		CS1W-PTS52	0.25
		CS1W-PTS56	0.18
	Isolated Temperature-resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.15
	Isolated DC Input Unit	CS1W-PDC01	0.15
		CS1W-PDC11	0.12
		CS1W-PDC55	0.18
	Isolated Pulse Input Unit	CS1W-PPS01	0.20
	Isolated Control Output Unit	CS1W-PMV01	0.15
		CS1W-PMV02	0.12
	Power Transducer Input Unit	CS1W-PTR01	0.15
	100-mV DC Input Unit	CS1W-PTR02	
	Motion Control Units	CS1W-MC221	0.60 (w/Teaching Box: 0.80 A)
		CS1W-MC421	0.70 (w/Teaching Box: 1.00 A)
	Position Control Units	CS1W-NC113/ 133	0.25
		CS1W-NC213/ 233	
		CS1W-NC413/ 433	0.36
	High-speed Counter Units	CS1W-CT021	
		CS1W-CT041	0.45
	SSI Input Unit	CS1W-CTS21	0.32
	Customizable Counter Units	CS1W-HCP22-V1	0.80
		CS1W-HCA12-V1 CS1W-HCA22-V1	0.75
		CS1W-HIO01-V1	0.60
	GP-IB Interface Unit	CS1W-GPI01	0.26
	RFID Sensor Unit	CS1W-V600C11	0.26
		CS1W-V600C12	0.32

CS1 CPU Bus Units

Category	Name	Model	Consumption (A)
CS1 CPU Bus Units	Loop Control Unit	CS1W-LC001	0.36
	Motion Control Unit	CS1W-MCH71	0.8
	Controller Link Units	CS1W-CLK52-V1	0.65
		CS1W-CLK21-V1	0.33
		CS1W-CLK12-V1	0.52
	SYSMAC LINK Unit	CS1W-SLK21	0.48
		CS1W-SLK11	0.47
	Serial Communications Unit	CS1W-SCU21	0.29 (See Note.)
	Ethernet Unit	CS1W-ETN□□, -ETN21D	0.40
	DeviceNet Unit	CS1W-DRM21-V1	0.29
	PROFIBUS-DP Master Unit	CS1W-PRM21	0.40

Note: Add 0.15 A per port when the NT-AL001-E is connected.
Note: This table may contain Units that are no longer in production

26-V Current Consumption

Category	Name	Model	Consumption (A)
C200H Output Units	Relay Output Units	C200H-OC221	0.075 for 8 points ON at the same time
		C200H-OC222	
		C200H-OC223	
		C200H-OC224	
		C200H-OC225	
		C200H-OC222N	0.09 for 8 points ON at the same time
		C200H-OC226N	
		C200H-OC224N	
	Transistor Output Units	C200H-OD216	0.075 for 8 points ON at the same time
		C200H-OD217	
CS1 Output Units	Relay Output Units	CS1W-OC201	0.006 for each point ON at the same time
		CS1W-OC211	
C200H Special I/O Units	Analog Input Unit	C200H-AD003	0.10
	Analog Output Units	C200H-DA003	0.20
		C200H-DA004	0.25
	Analog I/O Unit	C200H-MAD01	0.20
	ID Sensor Units	C200H-IDS01-V1	0.12
		C200H-IDS21	0.12
CS1 Special I/O Units	Analog Input Unit	CS1W-AD0□1-V1	0.09
		CS1W-AD161	0.06
	Analog Output Units	CS1W-DA041	0.18
		CS1W-DA08V	0.18
		CS1W-DA08C	0.25
	Analog I/O Unit	CS1W-MAD44	0.20
	Isolated Thermocouple Input Unit	CS1W-PTS01	0.15
		CS1W-PTS11	0.08
		CS1W-PTS55	0.06
	Isolated Temperature-resistance Thermometer Input Unit	CS1W-PTS02	0.15
		CS1W-PTS12	0.07
		CS1W-PTS56	0.06
	Isolated Temperature- resistance Thermometer Input Unit (Ni508.4 Ω)	CS1W-PTS03	0.15
	Isolated Two-wire Transmission Device Input Unit	CS1W-PTW01	0.16
	Isolated DC Input Unit	CS1W-PDC01	
		CS1W-PDC11	0.12
		CS1W-PDC55	0.06
	Isolated Pulse Input Unit	CS1W-PPS01	0.16
	Isolated Control Output Unit	CS1W-PMV01	
		CS1W-PMV02	0.12
	Power Transducer Input Unit	CS1W-PTR01	0.08
	100-mV DC Input Unit	CS1W-PTR02	
	Customizable Counter Unit	CS1W-HCA□2	0.15
	RFID Sensor Unit	CS1W-V600C1□	0.12

Note: This table may contain Units that are no longer in production

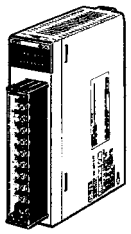
CS1 Unit Descriptions

Unit		Classification	Model	Page
I/O Units	Input Units	CS1 Basic I/O Unit	CS1W-ID2□□	300
			CS1W-IA□11	301
		C200H Basic I/O Unit	C200H-ID□11	300
			C200H-IA□11	301
			C200H-IM21□	301
		C200H Special I/O Unit	C200H-ID501	300
	Output Units	CS1 Basic I/O Unit	CS1W-OA2□	301
			CS1W-OC□□□	301
			CS1W-OD2□□	301
		C200H Basic I/O Unit	C200H-OA22□(□)	301
			C200H-OC22□(□)	301
			C200H-OD□□□	301
		C200H Group-2 High Density Units	C200H-OD2□□	301
		C200H Special I/O Unit	C200H-OD501	301
	I/O Units	CS1 Basic I/O Unit	CS1W-MD□□□	302
		C200H Special I/O Unit	C200H-MD□□□	302
High-speed Input Unit		CS1 Basic I/O Unit	CS1W-IDP01	302
Interrupt Input Unit		CS1 Basic I/O Unit	CS1W-INT01	313
		C2ooH Basic I/O Unit	C200H-INT01	313
Analog Timer Unit		C200H Special I/O Unit	C200H-TM001	315
Safety Relay Unit		CS1 Basic I/O Unit	CS1W-SF200	316
Analog I/O Units	Input Units	CS1 Special I/O Unit	CS1W-AD□□□(-V1)	318
		C200H Special I/O Unit	C200H-AD003	318
	Output Units	CS1 Special I/O Unit	CS1W-DA041/08V/08C	320
		C200H Special I/O Unit	C200H-DA00□	320
	Analog I/O Units	CS1 Basic I/O Unit	CS1W-MAD44	322
		C200H Special I/O Unit	C200H-MAD01	322
Loop Control Unit		CS1 CPU Bus Unit	CS1W-LC001	323
Loop Control Board		Inner Board	CS1W-LCB01/05	323
Duplex Process CPU			CS1D-CPU65P/67P	323
Process I/O Units		CS1 Special I/O Unit	CS1W-P□□0□	326
Temperature Sensor Units		CS1 Special I/O Unit	CS1W-PTS□□	336
		C200H Special I/O Unit	C200H-TS□□□	336
Temperature Control Units		C200H Special I/O Unit	C200H-TC□□□	337
Position Control Units		CS1 Special I/O Unit	CS1W-NC□□3	338
		C200H Special I/O Unit	C200HW-NC□□3	338
Motion Control Unit		CS1 Special I/O Unit	CS1W-MC□21	339
		C200H Special I/O Unit	C200HW-MC402-E	341
		CS1 CPU Bus Unit	CS1W-MCH71	343
High-speed Counter Units		CS1 Special I/O Unit	CS1W-CT0□1	345
			CS1W-CTS21	347
		C200H Special I/O Unit	C200H-CT021	345
ID Sensor Units		CS1 Special I/O Unit	CS1W-V600C1□	354
		C200H Special I/O Unit	C200H-IDS01-V1	354
ASCII Units		C200H Special I/O Unit	C200H-ASC□1	350
Serial Communications Boards/Unit	Serial Communications Boards	Inner Board	CS1W-SCB□1-V1	351
	Serial Communications Unit	CS1 CPU Bus Unit	CS1W-SCU21-V1	351
RS-232C/RS-422 Conversion Unit		---	NT-AL001	353
GP-IB Interface Unit		---	CS1W-GPI01	355
Ethernet Unit		CS1 CPU Bus Unit	CS1W-ETN21, CS1D-ETN21D	357
Controller Link Boards/ Unit	Controller Link Unit	CS1 CPU Bus Unit	CS1W-CLK□□-V1	359
	Controller Link Boards	Personal computer ISA board	3F8F7-CLK□□-V1	359
PROFIBUS-DP Units	PROFIBUS-DP Master Unit	CS1 CPU Bus Unit	CS1W-PRM21	361
	PROFIBUS-DP I/O Link Unit	C200H Special I/O Unit	C200HW-PRT21	362
DeviceNet and Compo-Bus/S Units	DeviceNet Unit	CS1 CPU Bus Unit	CS1W-DRM21-V1	363
	I/O Link Unit	C200H Special I/O Unit	C200HW-DRT21	365
	CompoBus/S Master Unit	C200H Special I/O Unit	C200HW-SRM21-V1	368
CANopen/User-defined CAN Unit		C200H Special I/O Unit	C200HW-CORT21-V1	366

CS1-series

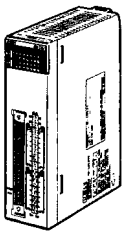
Basic I/O Units

I/O Units



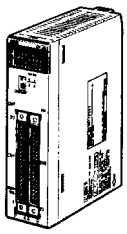
Input Unit
CS1W-ID211
16 points

Output Units
CS1W-OD21□
16 points



Input Unit
CS1W-ID231
32 points

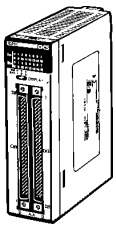
Output Units
CS1W-OD23□
32 points



Input Unit
CS1W-ID261
64 points

Output Units
CS1W-OD26□
64 points

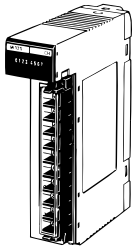
I/O Units
CS1W-MD26□
32/32 points



Input Unit
CS1W-ID291
96 points

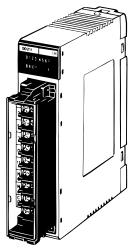
Output Units
CS1W-OD29□
96 points

I/O Units
CS1W-MD29□
48/48 points



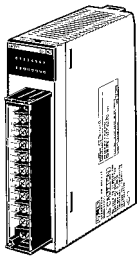
Input Unit
C200H-I□□□□
8 points

Output Units
C200H-O□□□□
5/8 points

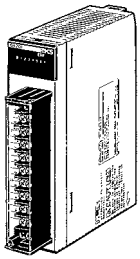


Input Unit
C200H-I□□□□
16 points

Output Units
C200H-O□□□□
16 points

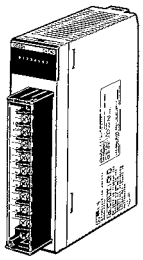


AC Input Units
CS1W-IA□11
16 points



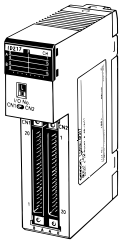
Triac Output Unit
CS1W-OA201
8 points

Triac Output Unit
CS1W-OA211
16 points



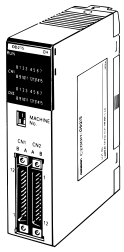
Relay Output Unit
CS1W-OC201
8 independent points

Relay Output Unit
CS1W-OC211
16 points



Input Unit
C200H-ID□□□
32/64 points

Output Units
C200H-OD□□□□
32/64 points



Input Unit
C200H-ID□□□
32 points

Output Units
C200H-OD□□□□
32 points

I/O Units
C200H-MD□□□□
16/16 points

DC Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
CS1 Basic I/O Unit	24 V DC	16 pts	Removable terminal block	CS1W-ID211	Input current: 7 mA
	24 V DC	32 pts	Connector	CS1W-ID231	Input current: 6 mA
	24 V DC	64 pts		CS1W-ID261	
	24 V DC	96 pts		CS1W-ID291	Input current: approx. 5 mA
C200H Basic I/O Unit	12 to 24 V DC	8 pts	Removable terminal block	C200H-ID211	Input current: 10 mA
	12 to 24 V DC	16 pts	Removable terminal block	C200H-ID212	Input current: 7 mA
C200H Group-2 I/O Units	24 V DC	32 pts	Connector	C200H-ID216	Input current: 4.1 mA
	24 V DC	64 pts		C200H-ID217	
	24 V DC	32 pts		C200H-ID218	Input current: 6 mA
	24 V DC	64 pts		C200H-ID219	
	12 V DC	64 pts		C200H-ID111	Input current: 4.1 mA
C200H Special I/O Unit	24 V DC	32 pts		C200H-ID215	Input current: 4.1 mA

TTL Input Units

Classification	Input voltage	Inputs	Connections	Model	Remarks
C200H Special I/O Unit	5 V DC	32 pts	Connector	C200H-ID501	Pulse-catch inputs

AC Input Units (and 100 V DC)

Classification	Input voltage	Inputs	Connections	Model
CS1 Basic I/O Units	100 to 120 V AC, or 100 to 120 V DC	16 pts	Removable terminal block	CS1W-IA111
	200 to 240 V AC	16 pts		CS1W-IA211
C200H Basic I/O Units	100 to 120 V AC	8 pts		C200H-IA121
		16 pts		C200H-IA122
				C200H-IA122V
	200 to 240 V AC	8 pts		C200H-IA221
		16 pts		C200H-IA222
				C200H-IA222V

AC/DC Input Units

Classification	Input voltage	Inputs	Connections	Model
C200H Basic I/O Units	12 to 24 V AC/ V DC	8 pts	Removable terminal block	C200H-IM211
	24 V AC/ V DC	16 pts		C200H-IM212

Relay Output Units

Classification	Outputs	Connections	Model
CS1 Basic I/O Units	8 pts (independent)	Removable terminal block	CS1W-OC201
	16 pts		CS1W-OC211
C200H Basic I/O Units	8 pts		C200H-OC221
	12 pts		C200H-OC222
	12 pts		C200H-OC222N
	16 pts		C200H-OC225
	16 pts		C200H-OC226N
	5 pts		C200H-OC223
	8 pts		C200H-OC224
	8 pts		C200H-OC224N

Transistor Output Units

Classification	Outputs	Max. switching capacity	Connections	Model
CS1 Basic I/O Units	16 pts	12 to 24 V DC, 0.5 A/pt, 8 A/Unit sinking	Removable terminal block	CS1W-OD211
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, short circuit protection, alarm		CS1W-OD212
	32 pts	12 to 24 V DC, 0.5 A/pt, 5 A/Unit, sinking	Connector	CS1W-OD231
		24 V DC, 0.5 A/pt, 5 A/Unit, sourcing, short circuit protection, alarm		CS1W-OD232
	64 pts	12 to 24 V DC, 0.3 A/pt, 6.4 A/Unit, sinking		CS1W-OD261
		24 V DC, 0.3 A/pt, 6.4 A/Unit, sourcing, short circuit protection, alarm		CS1W-OD262
	96 pts	12 to 24 V DC, 0.1 A sinking, 7.2 A/Unit		CS1W-OD291
		12 to 24 V DC, 0.1 A sourcing, 7.2 A/Unit		CS1W-OD292
C200H Basic I/O Units	8 pts	12 to 48 V DC, 1 A sinking	Removable terminal block	C200H-OD411
	8 pts	24 V DC, 2.1 A, sinking		C200H-OD213
	8 pts	24 V DC, 0.8 A, sourcing, short circuit protection		C200H-OD214
	8 pts	5 to 24 V DC, 0.3 A, sourcing		C200H-OD216
	12 pts	24 V DC, 0.3 A, sinking		C200H-OD211
	16 pts	24 V DC, 0.3 A, sinking		C200H-OD212
	12 pts	5 to 24 V DC, 0.3 A, sourcing		C200H-OD217
	16 pts	24 V DC, 1.0 A, sourcing, short circuit protection		C200H-OD21A
	16 pts	24 V DC, 0.3 A, sinking		C200H-OD212
C200H Group-2 I/O Units	32 pts	16 mA at 4.5 V to 100 mA at 26.4 V, sinking	Connector	C200H-OD218
	32 pts	500 mA at 24 V DC, sourcing, short circuit protection		C200H-OD21B
	64 pts	16 mA at 4.5 V to 100 mA at 26.4 V, sinking		C200H-OD219
C200H Special I/O Unit	32 pts	16 mA at 4.5 V to 100 mA at 26.4 V, sinking 128-pt dynamic outputs possible		C200H-OD215

TTL Output Unit

Classification	Outputs	Max. switching capacity	Connections	Model
C200H Special I/O Unit	32 pts	5 V DC, 35 mA 128-pt dynamic outputs possible	Connector	C200H-OD501

Triac Output Units

Classification	Outputs	Max. switching capacity	Connections	Model
CS1 Basic I/O Units	8 pts	250 V AC, 1.2 A, 50/60 Hz	Removable terminal block	CS1W-OA201
	16 pts	250 V AC, 0.5 A, 50/60 Hz		CS1W-OA211
C200H Basic I/O Units	8 pts	250 V AC, 1.2 A, 50/60 Hz		C200H-OA223
	12 pts	250 V AC, 0.3 A, 50/60 Hz		C200H-OA222V
	12 pts	250 V AC, 0.5 A, 50/60 Hz		C200H-OA224

Mixed I/O Units

Name	Classification	Inputs/ Outputs	Input voltage	Max. switching capacity	Connections	Model	Remarks
DC Input/ Transistor Output Units	CS1 Basic I/O Units	32 inputs/ 32 outputs	24 V DC	12 to 24 V DC, 0.3 A, sinking	Connector	CS1W-MD261	---
		32 inputs/ 32 outputs		24 V DC, 0.3 A, sourcing, load short protection, alarm		CS1W-MD262	---
		48 inputs/ 48 outputs	24 V DC	12 to 24 V DC, 0.1 A, sinking		CS1W-MD291	---
		48 inputs/ 48 outputs		12 to 24 V DC, 0.1 A, sourcing		CS1W-MD292	---
	C200H Special I/O Units	16 inputs/ 16 outputs	24 V DC	16 mA at 4.5 V to 100 mA at 26.4 V DC, sinking		C200H-MD215	Pulse-catch inputs, 128-pt dynamic outputs possible
		16 inputs/ 16 outputs	12 V DC	24 V DC, 50 mA, sinking		C200H-MD115	

Note: In addition to the normal I/O functions, C200H High-density I/O Units (Special I/O Units) provide the following functions.

- Dynamic I/O (except for OD501/OD215): In stead of normal static inputs and normal static outputs, dynamic outputs and dynamic inputs are used to increase I/O capacity to 128 inputs and 128 outputs through the use of strobe signal outputs. These functions can be used to reduce wiring to devices with more digits, such as displays and keyboards.
- Pulse-catch Inputs (except OD501/OD215): Eight of the inputs can be set as pulse-catch inputs to reliably capture short pulses from devices like photomicroswitches.

TTL I/O Unit

Name	Classification	Inputs/ Outputs	Input voltage	Max. switching capacity	Connections	Model	Remarks
TTL I/O Unit	CS1 Basic I/O Units	32 inputs + 32 outputs	5 V DC	5 V DC, 35 mA	Connector	CS1W-MD561	---
	C200H Special I/O Units	16 inputs/ 16 outputs				C200H-MD501	Pulse-catch, 128-pt dynamic outputs possible

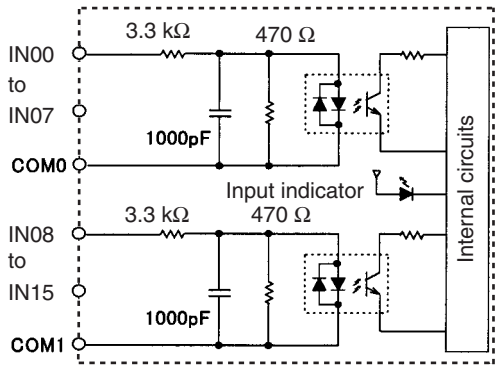
High-speed Input

Name	Classification	Inputs	Max. switching capacity	Model
Pulse-catch Input Unit	CS1 Basic I/O Units	16 pts	24 V DC, 7 mA	CS1W-IDP01

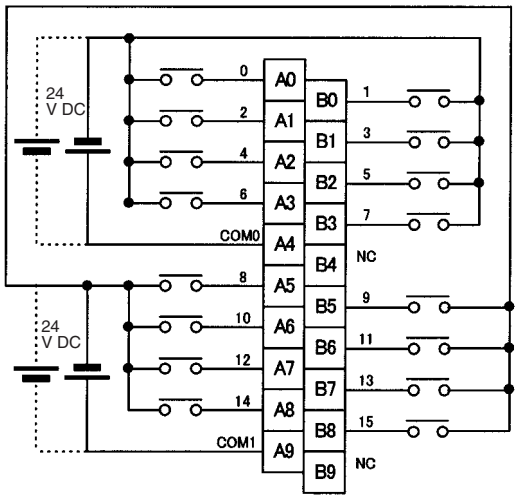
Circuit Configuration and Terminal Arrangement

CS1W-ID211

Circuit configuration

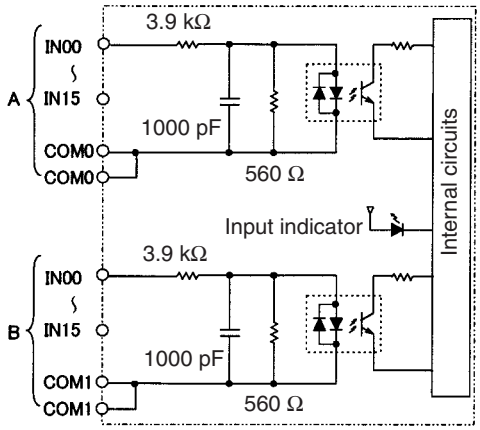
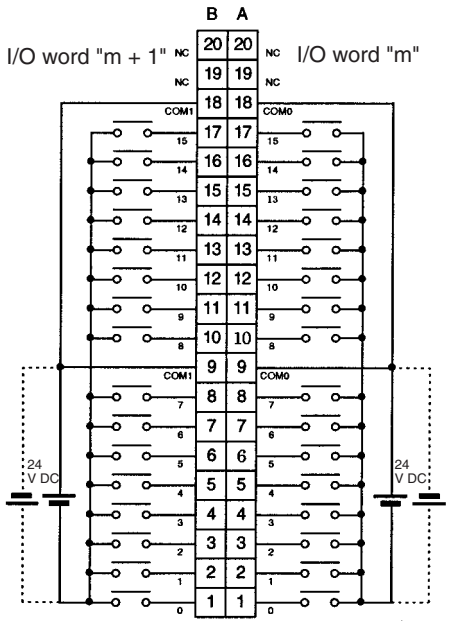


Terminal arrangement

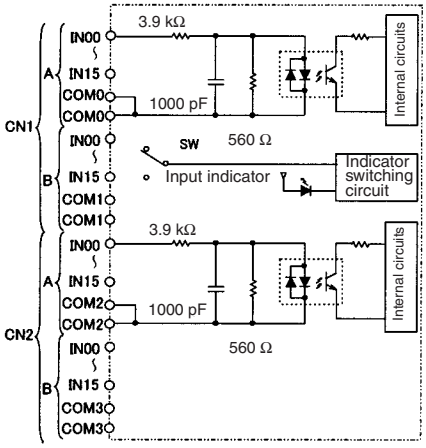
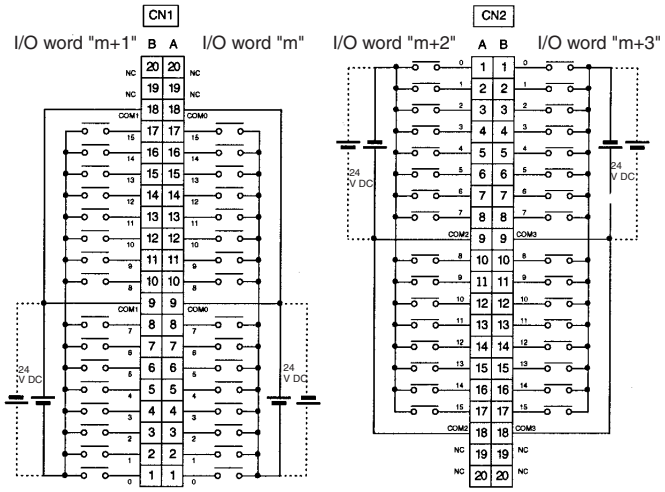


Polarity of the input power supply can connected in either direction.

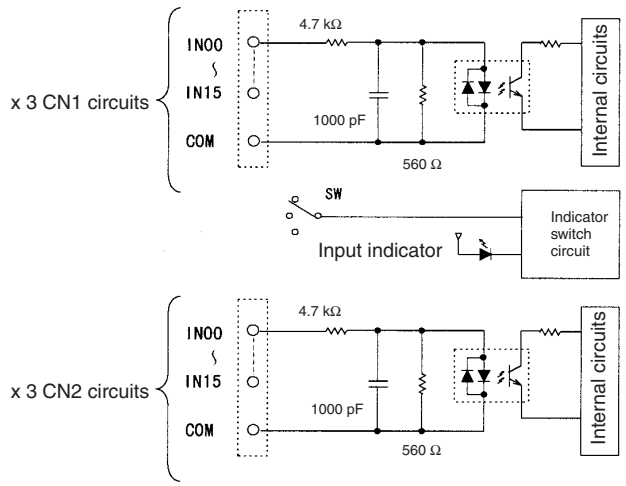
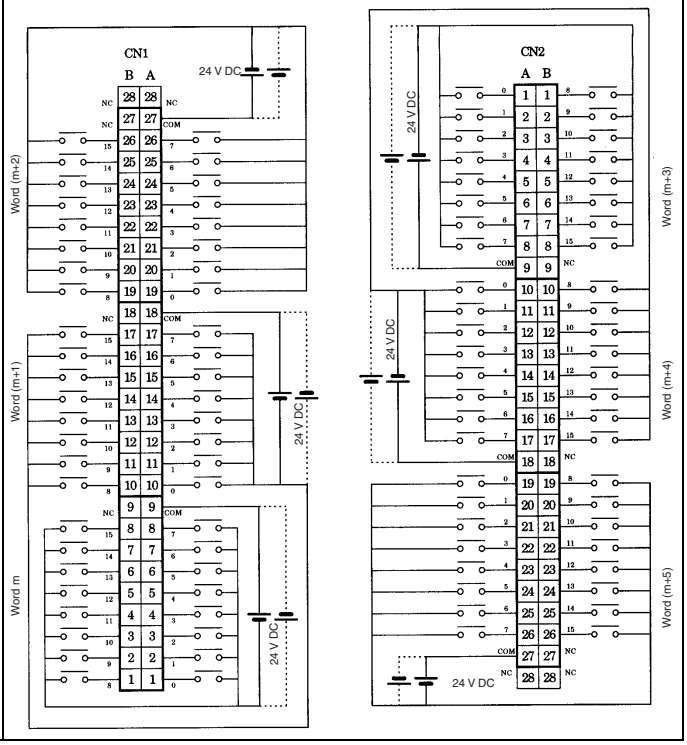
CS1W-ID231

Circuit configuration	Terminal arrangement
	

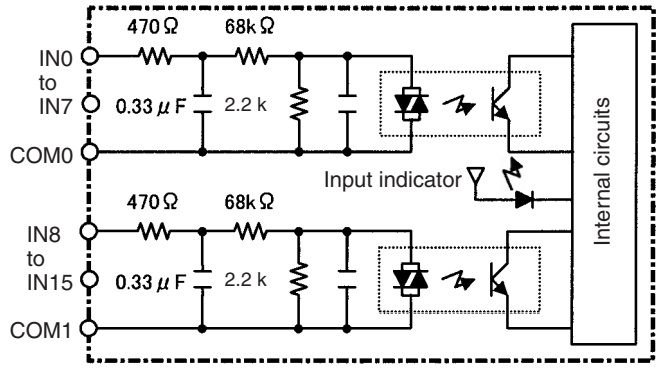
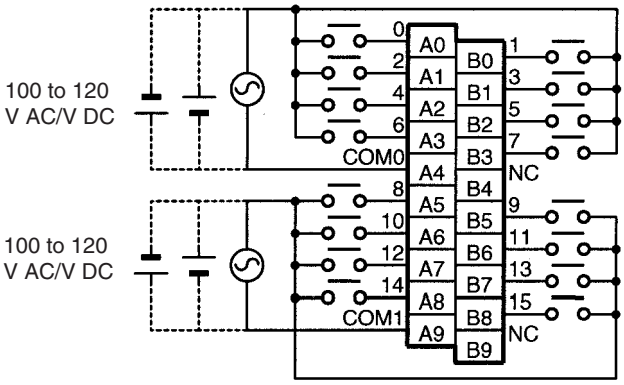
CS1W-ID261

Circuit configuration	Terminal arrangement
	

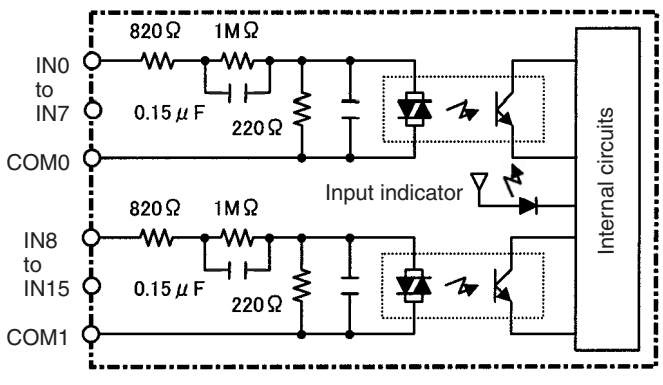
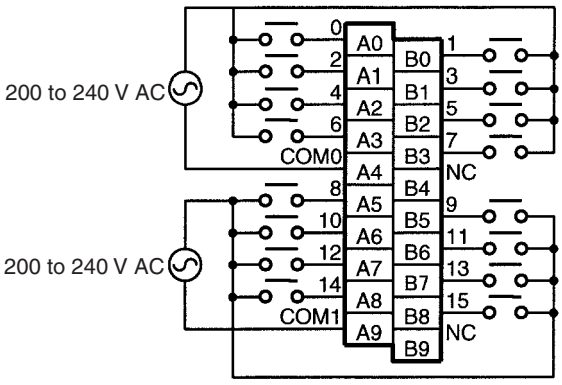
CS1W-ID291

Circuit configuration	Terminal arrangement
	

CS1W-IA111

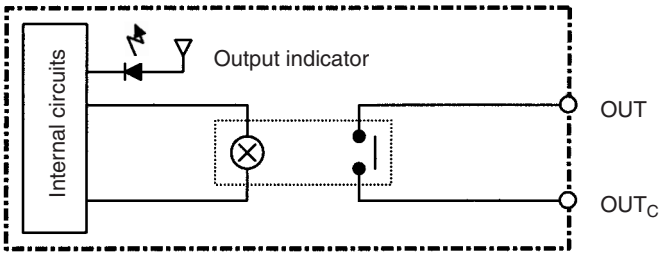
Circuit configuration	Terminal arrangement
	

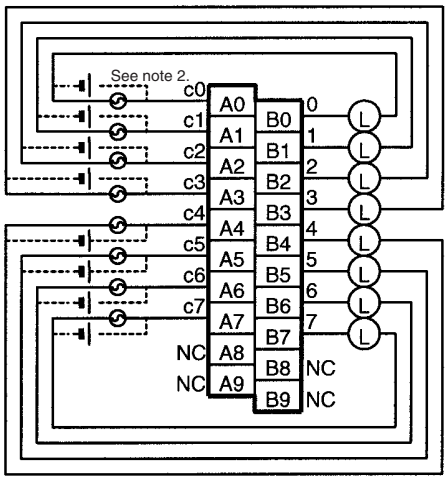
CS1W-IA211

Circuit configuration	Terminal arrangement
	

CS1W-OC201

Circuit configuration	Terminal arrangement



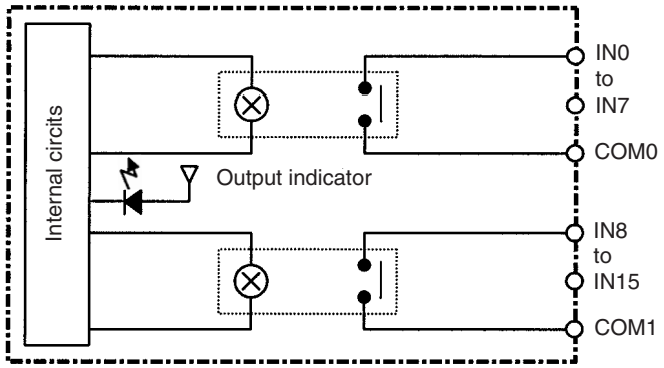


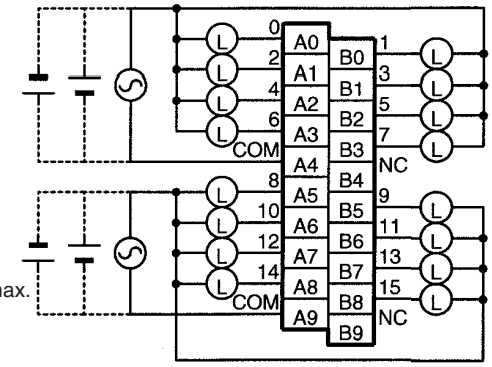
2 A 250 V AC,
2 A 24 V DC,
0.1 A 120 V DC max.

Note: There are no restrictions in the polarity when connecting a DC power supply.

CS1W-OC211

Circuit configuration	Terminal arrangement

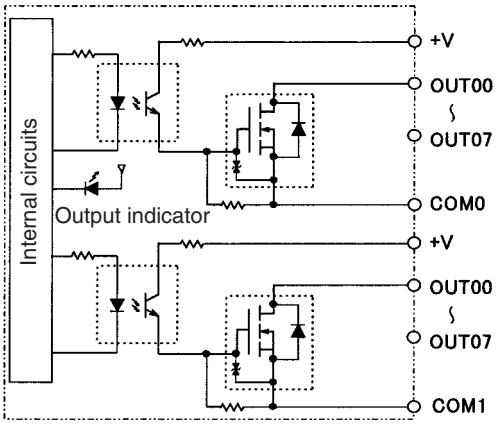


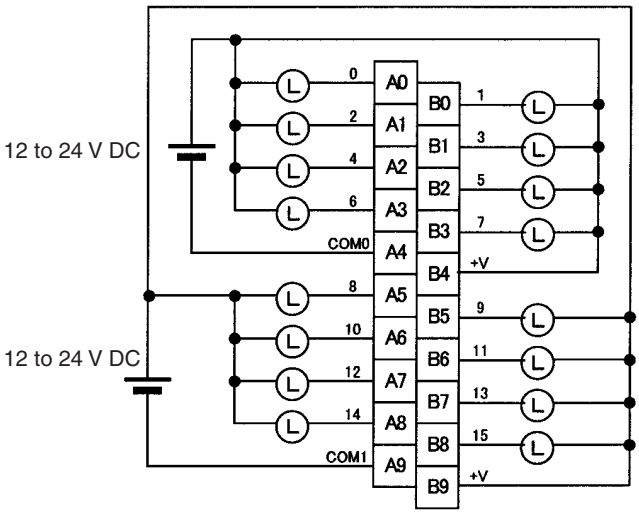


2 A 250 V AC,
2 A 24 V DC,
0.1 A 120 V DC max.

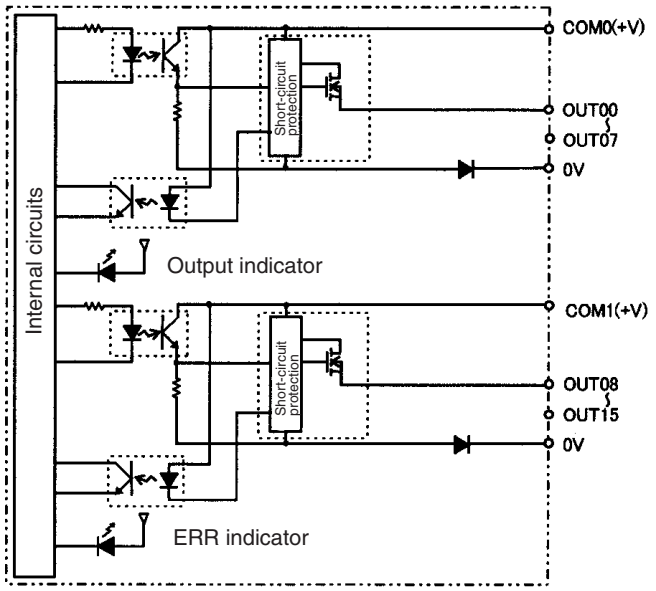
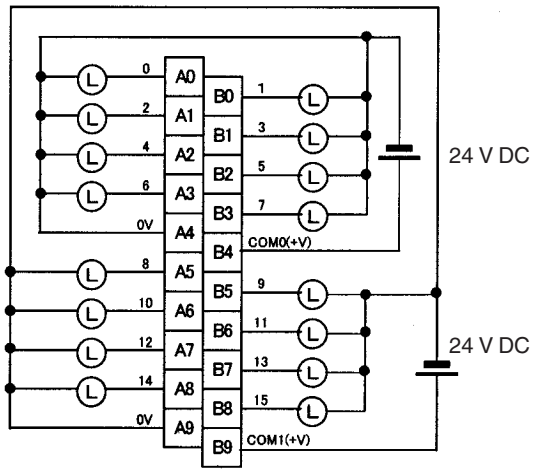
CS1W-OD211

Circuit configuration	Terminal arrangement

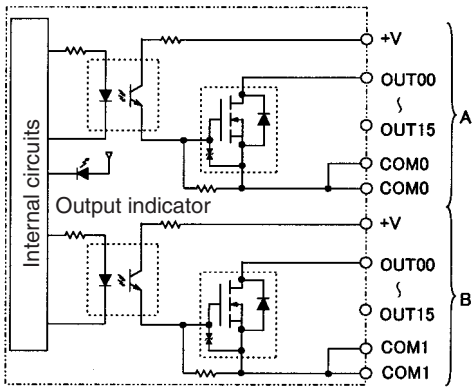
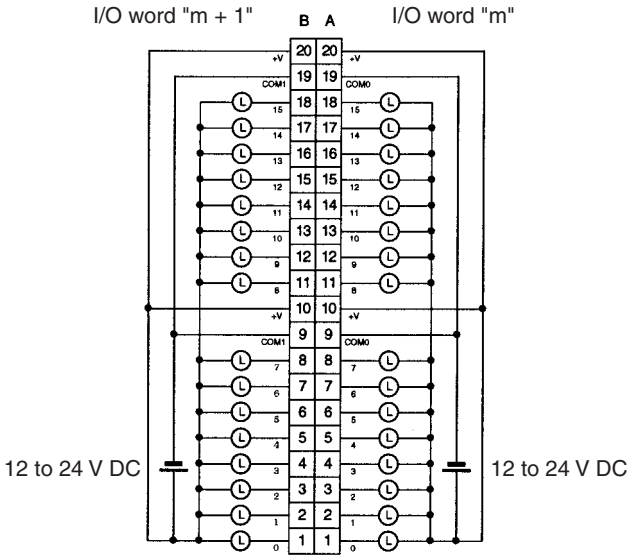




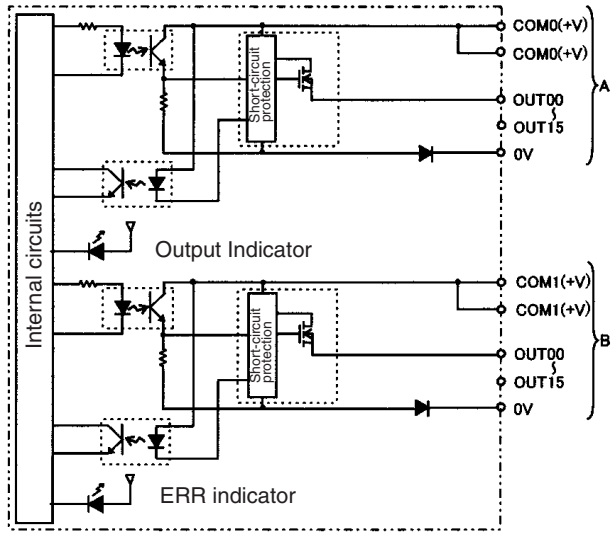
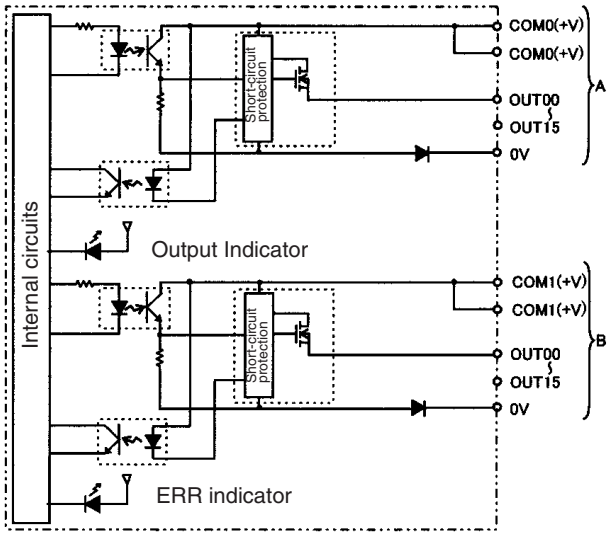
CS1W-OD212

Circuit configuration	Terminal arrangement
	

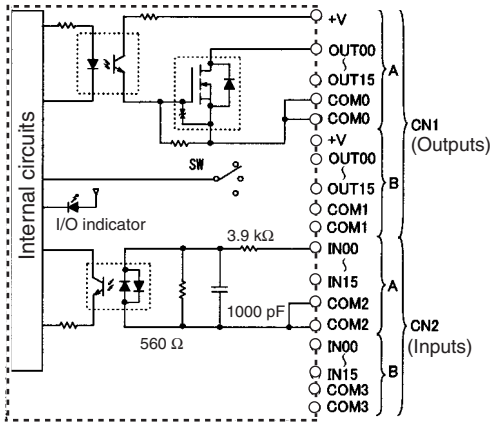
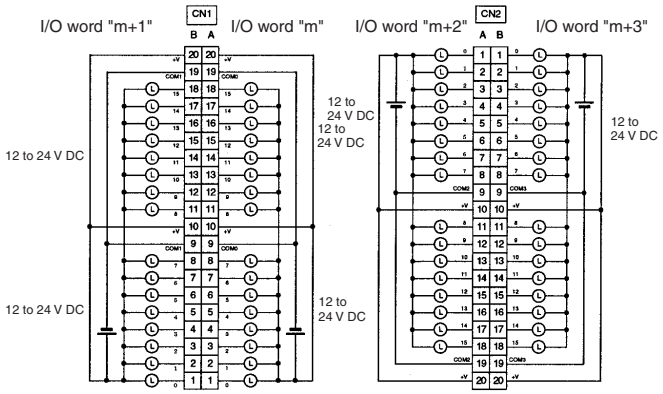
CS1W-OD231

Circuit configuration	Terminal arrangement
	

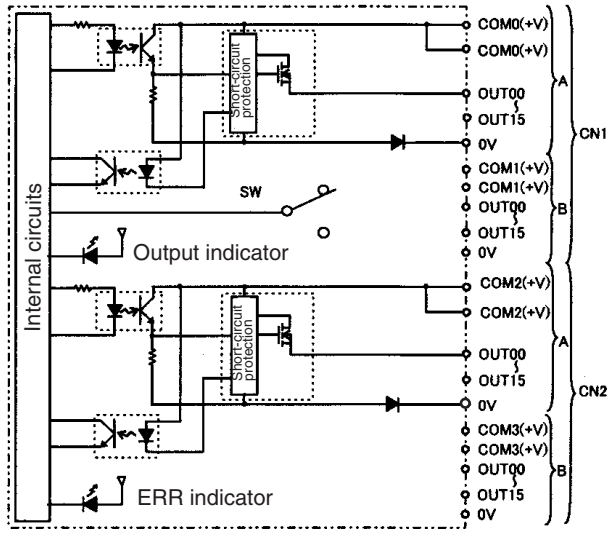
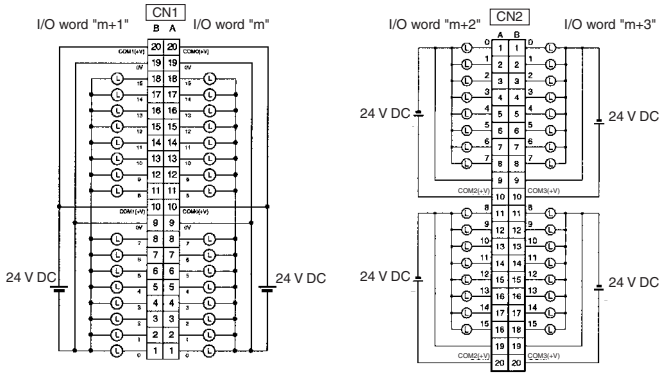
CS1W-OD232

Circuit configuration	Terminal arrangement
	

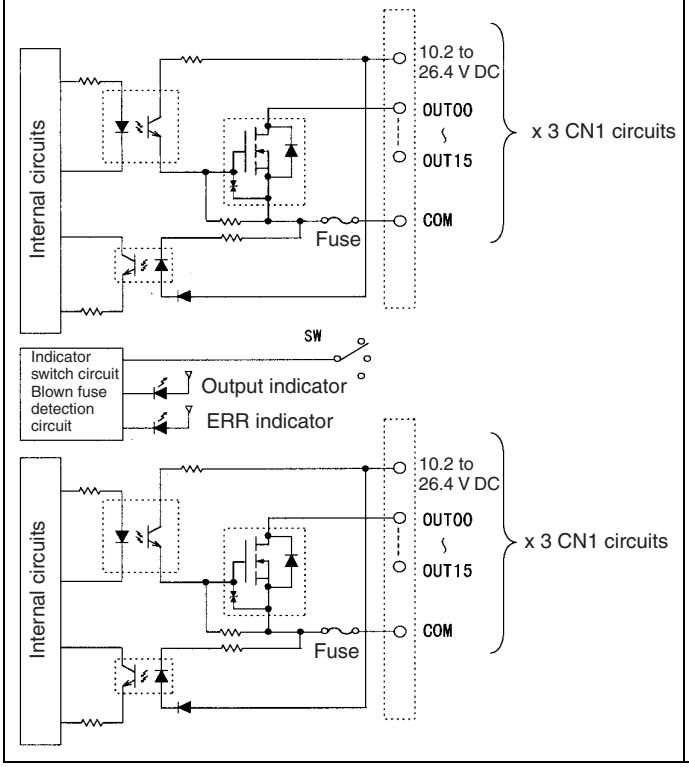
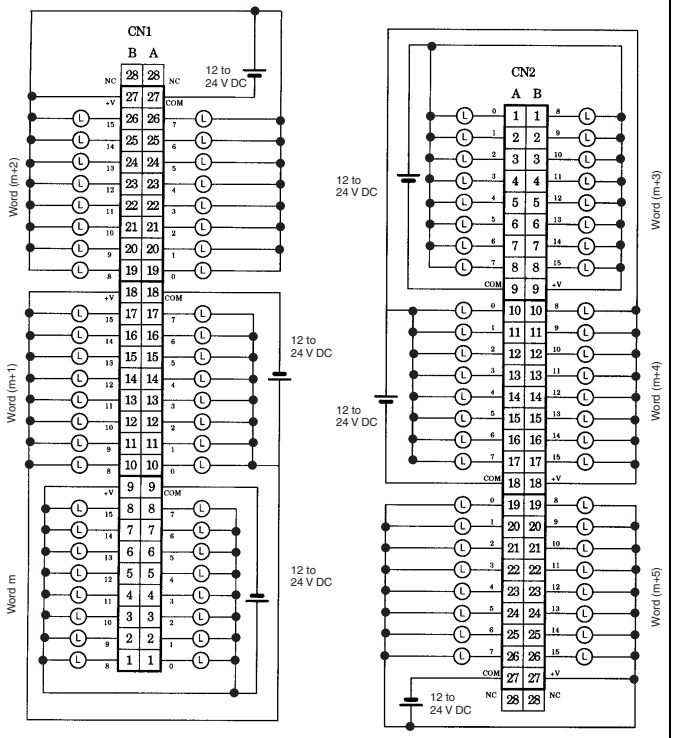
CS1W-OD261

Circuit configuration	Terminal arrangement
	

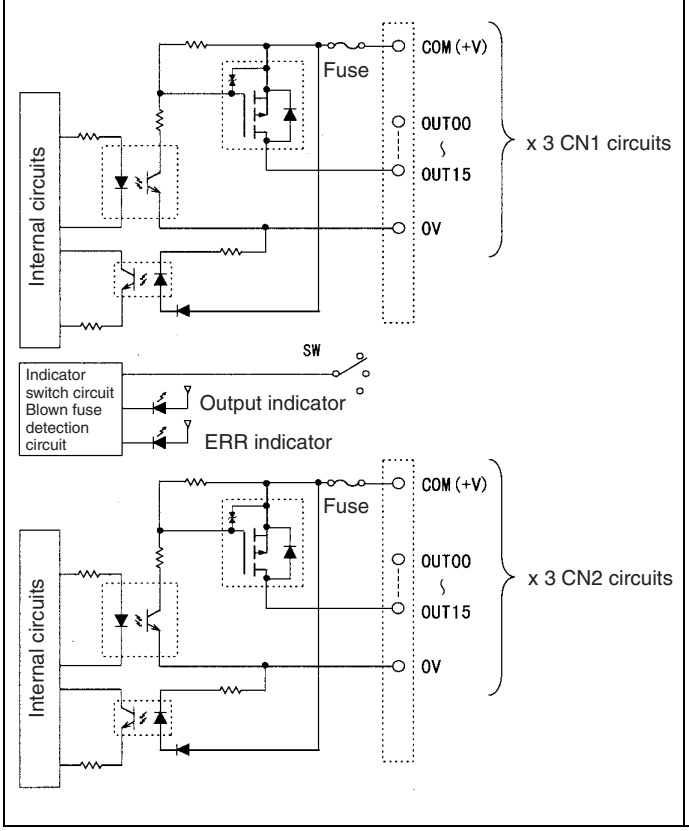
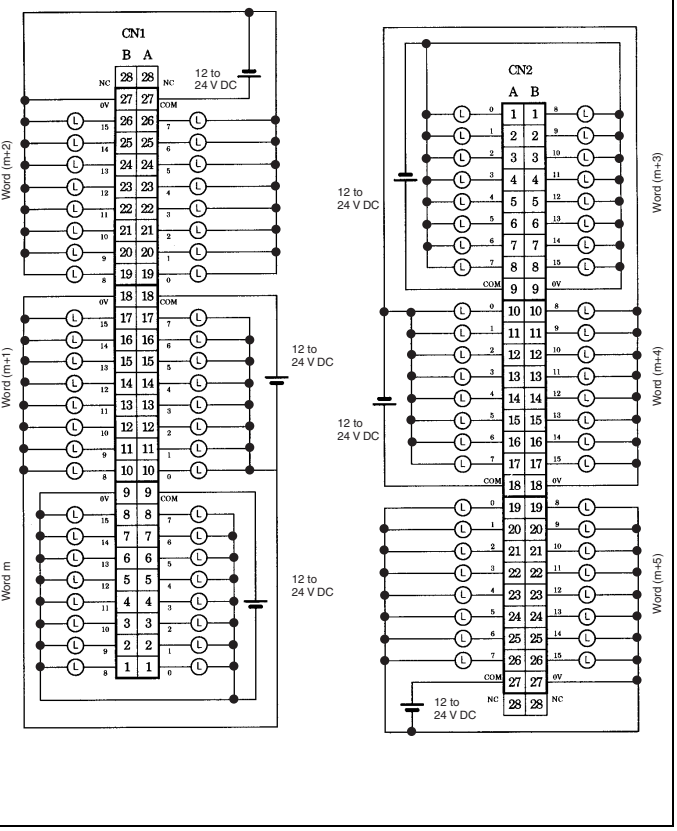
CS1W-OD262

Circuit configuration	Terminal arrangement
	

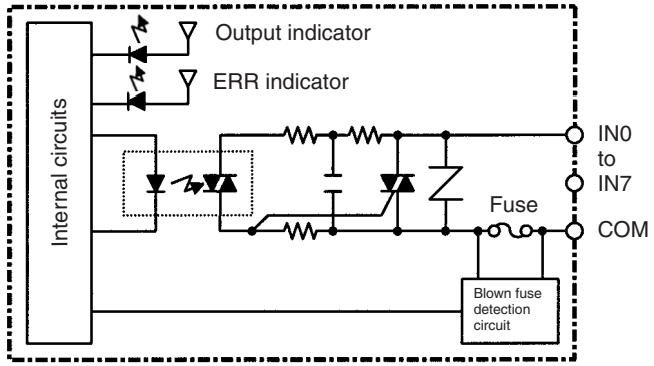
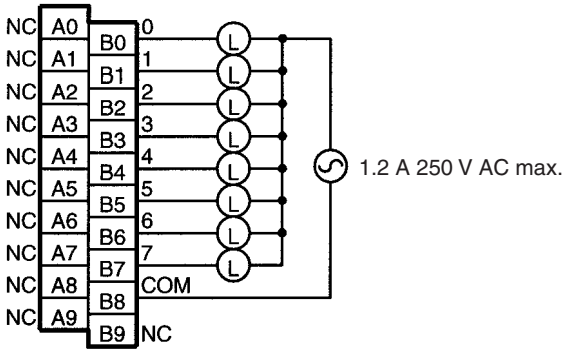
CS1W-OD291

Circuit configuration	Terminal arrangement
	

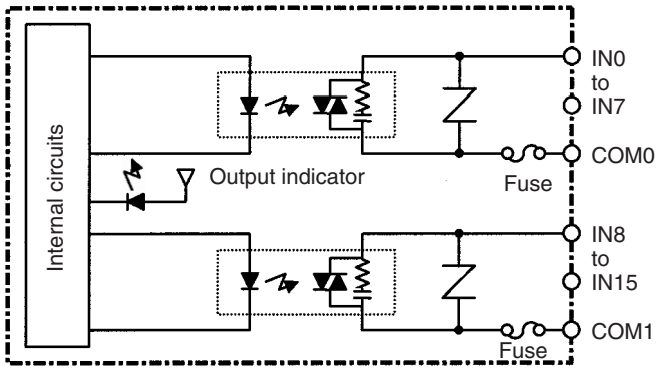
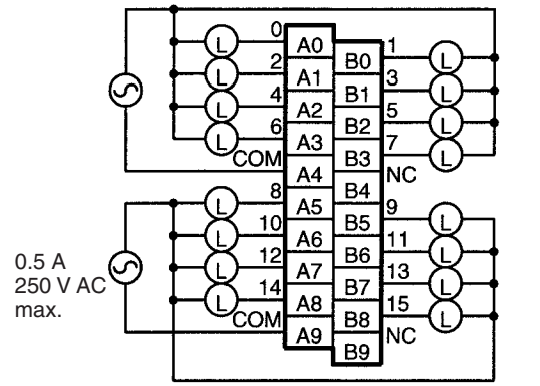
CS1W-OD292

Circuit configuration	Terminal arrangement
	

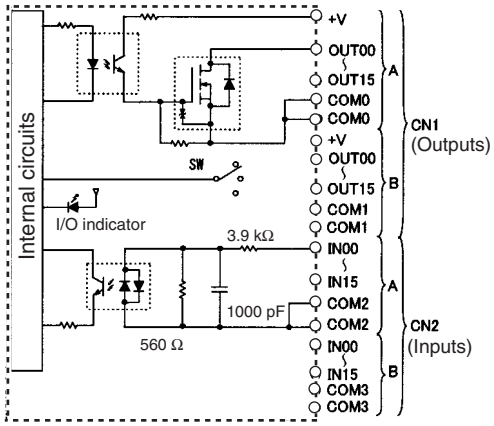
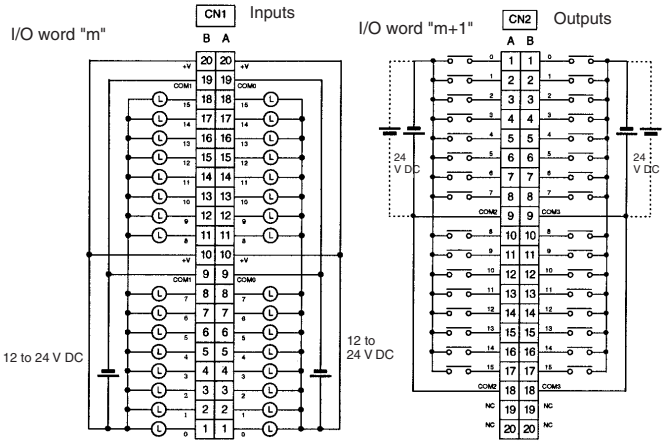
CS1W-OA201

Circuit configuration	Terminal arrangement
	

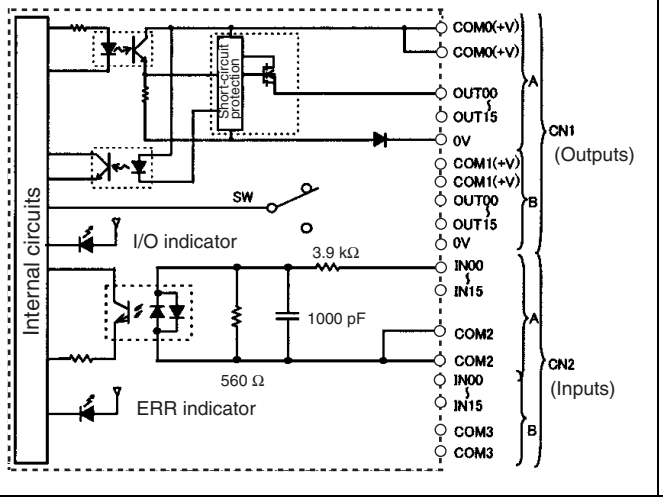
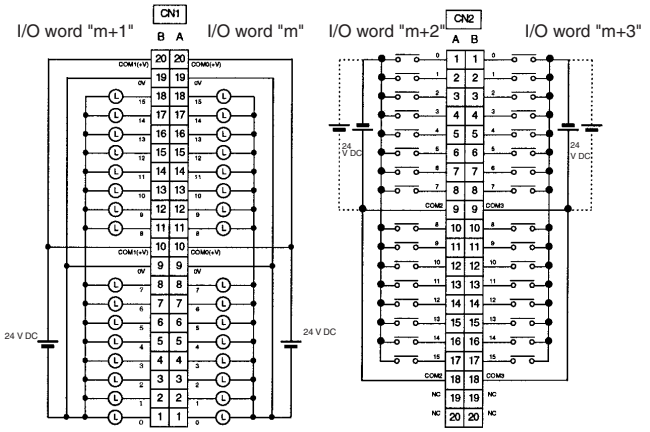
CS1W-OA211

Circuit configuration	Terminal arrangement
	

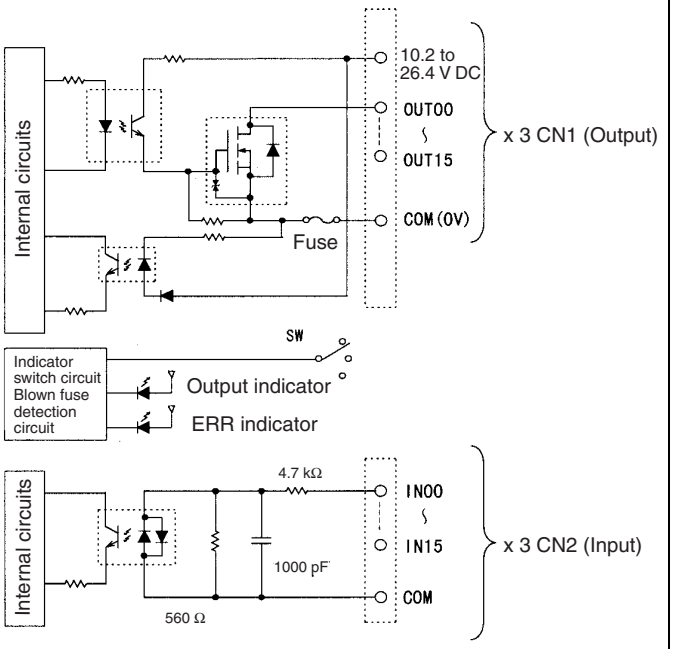
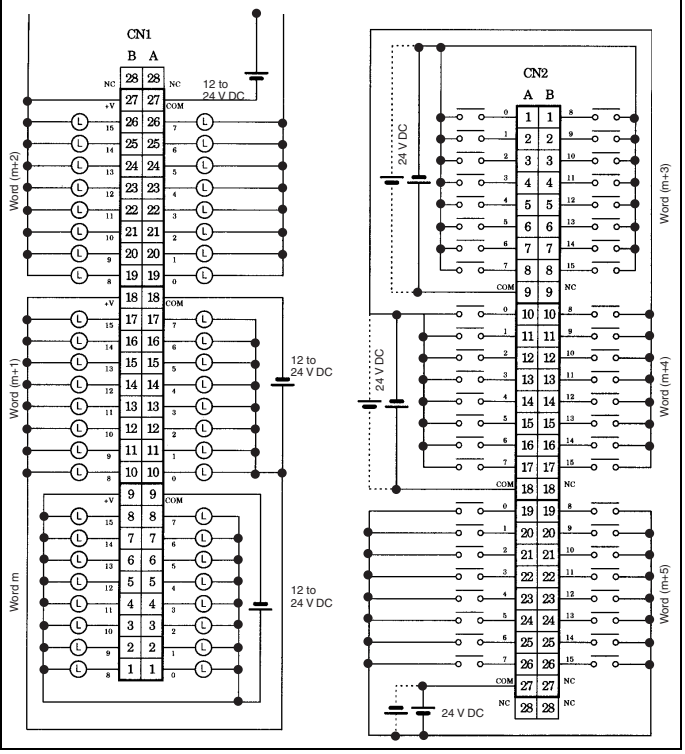
CS1W-MD261

Circuit configuration	Terminal arrangement
	

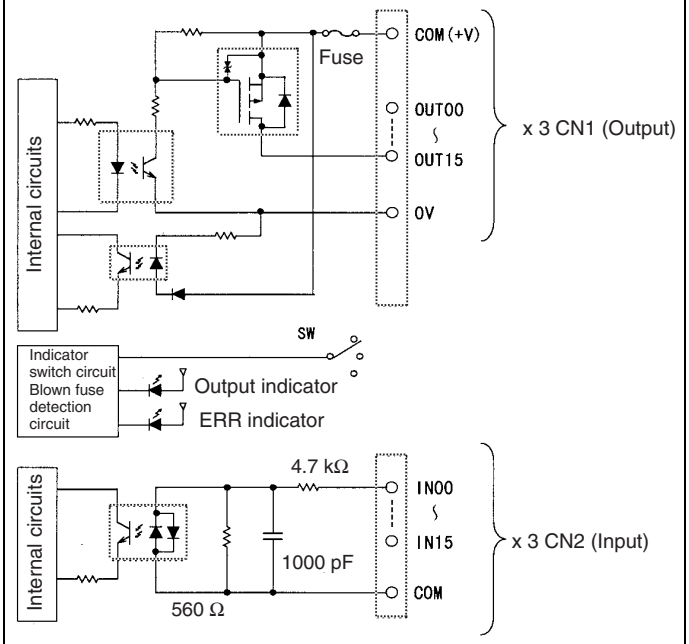
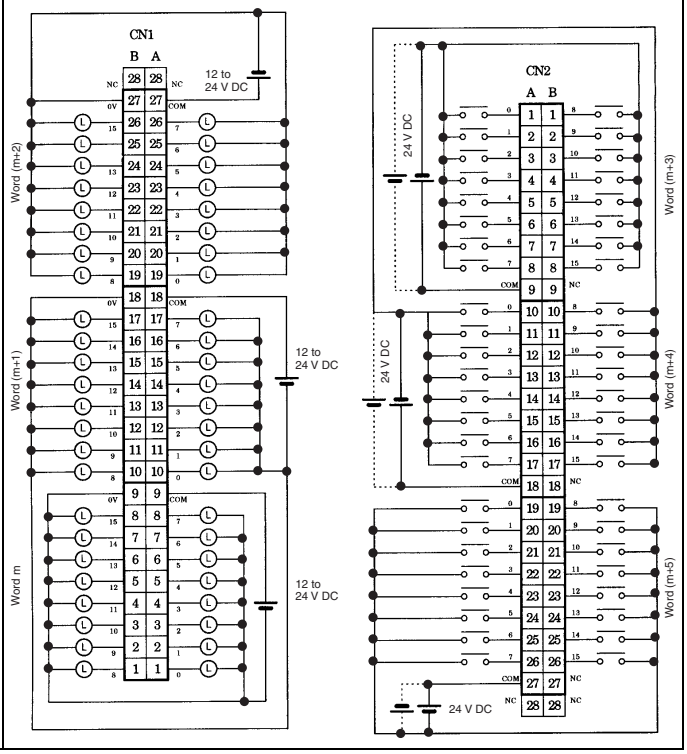
CS1W-MD262

Circuit configuration	Terminal arrangement
	

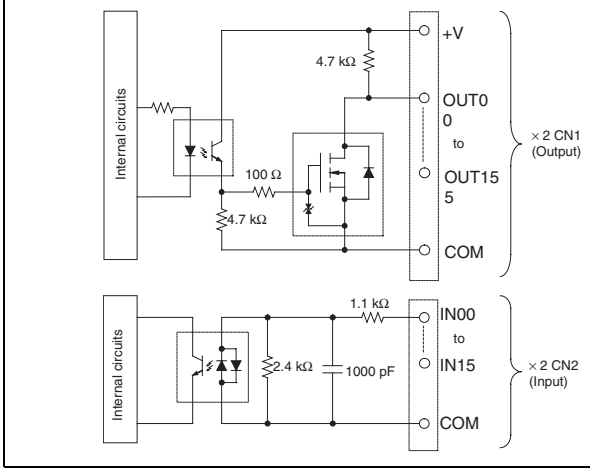
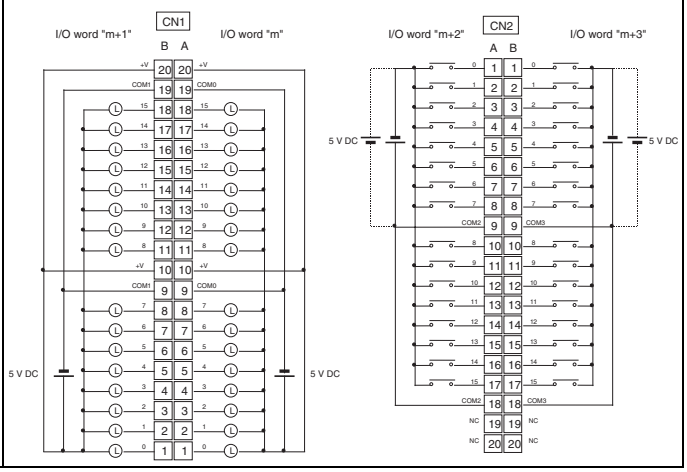
CS1W-MD291

Circuit configuration	Terminal arrangement
	

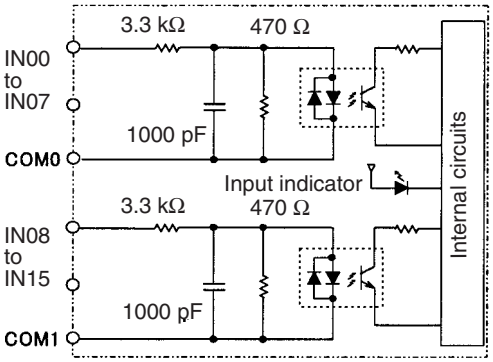
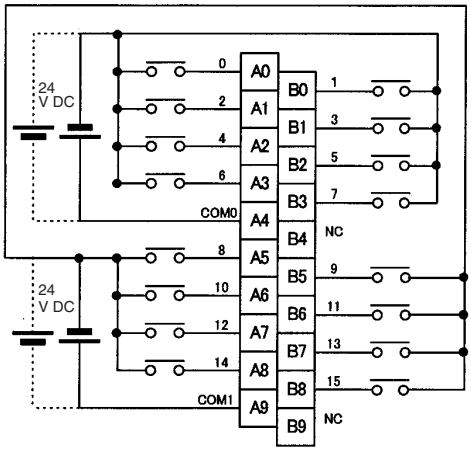
CS1W-MD292

Circuit configuration	Terminal arrangement
	

CS1W-MD561

Circuit configuration	Terminal arrangement
	

CS1W-IDP01

Circuit configuration	Terminal arrangement
	

*1 Polarity of the input power supply can be connected in either direction.
*2 Terminal numbers A0 to A9 and B0 to B9 are used in this manual, but they are not printed the Unit.

CS1W-INT01, C200HS-INT01

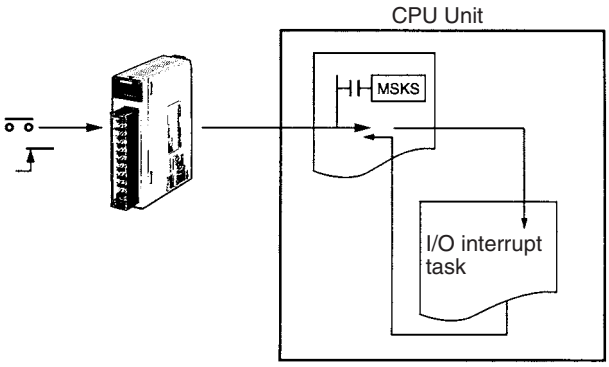
Interrupt Input Units



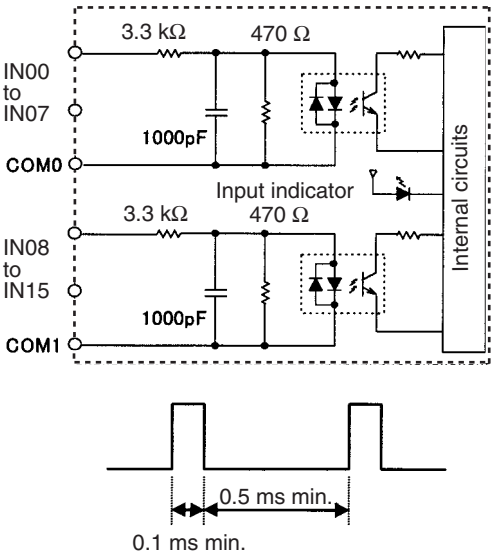
Triggers interrupt task execution in the CPU

- When the CPU Unit receives an Input from the Interrupt Input, the CPU Unit immediately suspends execution of the Cyclic Task (Regular Program) and executes the I/O Interrupt Task (CS1G/CS1H Only). The Interrupt Input Unit operates as a regular Input Unit in the CS1D PLCs.
- Mount the Interrupt Input Unit in the CPU Rack.
- Up to 2 CS1W-INT01 or 4 C200HS-INT01 Interrupt Input Units can be mounted.

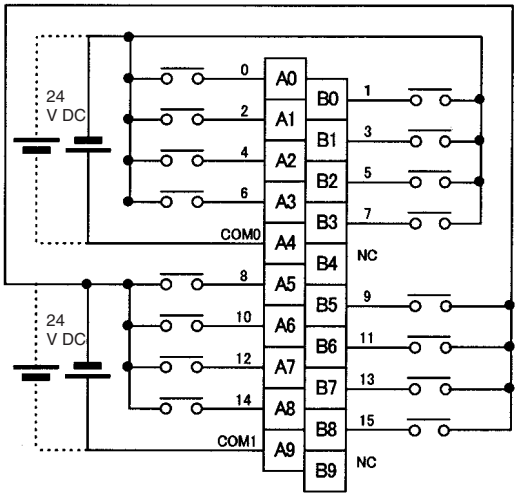
System Configuration



Circuit Configuration (CS1W-INT01)



Terminal Arrangement (CS1W-INT01)



Polarity of the input power supply can connected in either direction.

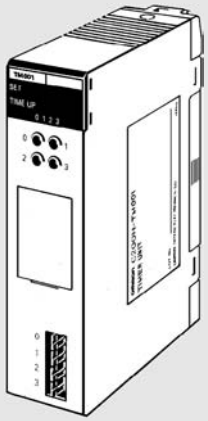
Specifications

Classifications	Input voltage	Inputs	Input pulse width	Connections	Allocations	Model
CS1W Basic I/O Unit	24 V DC	16 pts	ON: 0.1 ms min. OFF: 0.5 ms min.	Removable terminal block	16 bits (CIO 0319 to CIO 2000)	CS1W-INT01
C200H Basic I/O Unit	12 to 24 V DC	8 pts	ON: 0.2 ms max. OFF: 0.5 ms max.		8 bits	C200HS-INT01

Note: The interrupt function can be used with the CPU backplane (except CS1D) only.

C200H-TM001

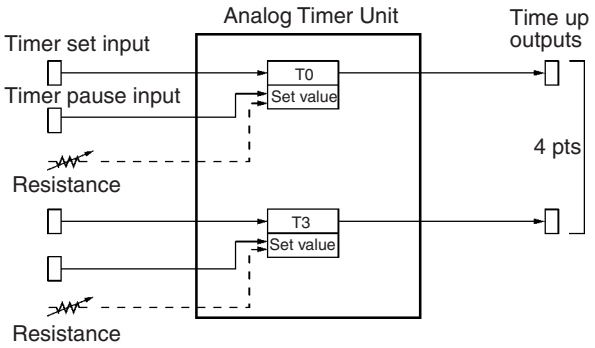
Analog Timer Unit



Easy On-site timer Adjustments

- Provides four timers easily adjusted on-site via front-panel adjustments or external variable resistors: No Programming Device required. Using timer pause inputs enables Usage as accumulative timer.

System Configuration



Specifications

Classification	Timers	Setting range	Time setting method	CPU Unit bits	Allocations (CIO 0319 to CIO 2000)	Model
C200H Basic I/O Unit	4 pts	0.1 to 1.0 s, 1 to 10 s, 2 to 60 s, 1 to 10 min	Internal or external variable resistor	Timer set input, timer pause input, and time up output	16 bits	C200H-TM001

CS1W-SF200

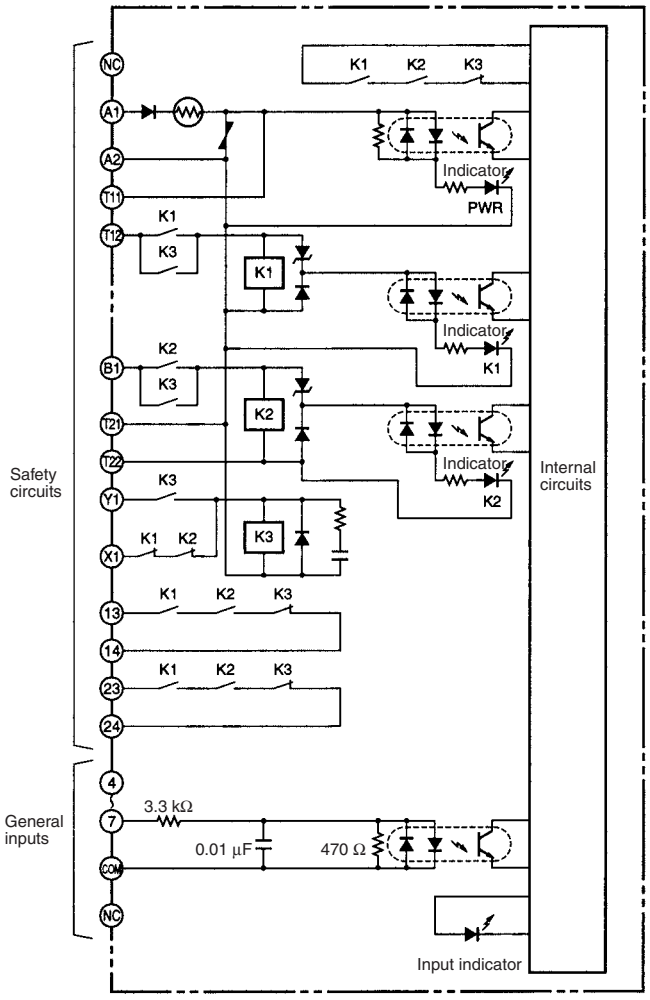
Safety Relay Unit



Reduced Wiring and Space for Safety Circuits

- This Safety Relay Unit mounts as an I/O Unit and provides both safety relays and inputs for monitoring.
- Safety relays and monitor inputs in 1 Unit to reduce wiring and space.
- Safety relays operate with separate power supply from PLC.
- Monitor safety circuit output, K1/K2 relay, or power status from PLC.
- Four general-purpose inputs provided.
- Safety standards: EN954-1 and EN60204-1

Internal Connections



Specifications

General

Item	Specifications
Contact resistance	100 mΩ (5 V DC, 1 A, voltage drop method)
Operating time	300 ms max. (not including bounce)
Response time	10 ms max. (time from input OFF to main contact OFF, not including bounce)
Insulation resistance (See note.)	20 MΩ min. (at 500 V DC) for following: Safety circuits-safety outputs, General inputs-safety outputs, Different poles of safety outputs, and safety circuits-general inputs
Withstand voltage (See note.)	2,500 V AC, 50/60 Hz for 1 min for following: Safety circuits-safety outputs, General inputs-safety outputs, Different poles of safety outputs 500 V AC, 50/60 Hz for 1 min for Safety circuits-general inputs
Durability	Mechanical: 5,000,000 min. (7,200 time/hr) Electrical: 100,000 min. (1,800 time/hr)
Weight	300 g

Note: Measured while mounted to PLC.

Ratings of Safety Circuits

Item		Specification
Power	Supply voltage	24 V DC
	Fluctuation	$^{-15\%}/_{+10\%}$ of supply voltage
	Consumption	24 V DC: 1.7 W max.
Inputs	Current	75 mA max.
Switching	Rated load	250 V AC, 5 A
	Rated ON current	5 A

Ratings of General Inputs

Item	Specifications
Power voltage	24 V DC
Fluctuation	$^{-15\%}/_{+10\%}$ of supply voltage
Input impedance	3.3 kΩ
Input current	7 mA typ. (24 V DC)
ON voltage/current	14.4 V DC min./3 mA min.
OFF voltage/current	5 V DC max./1 mA max.
ON/OFF response	8 ms max. (Set to 1 to 32 in PC Setup)
Circuits	4 points, 1 common
ON points	100% simultaneously ON

Analog I/O Selection Guide

Classification	Model	I/O capacity	Isolation between I/O points*	I/O ranges/types	Conversion time	Remarks	Page
Analog Input Units	CS1W-AD041-V1	4 inputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA	0.25 ms/pt	---	318
	CS1W-AD081-V1	8 inputs					
	CS1W-AD161	16 inputs				2 x 34-pin MIL connectors	318
	CS1W-PTW01	4 inputs	Yes	1 to 5 V, 4 to 20 mA	100 ms/4 pts	Built-in power supply for 2-wire transmission device, measured value alarms (HH, H, L, LL), other features	326
	CS1W-PDC11	4 inputs		4 to 20mA, 0 to 20mA, 0 to 10V, +/-10V, 0 to 5V, +/-5V, 1 to 5V, 0 to 1.25V, +/-1.25V	20 ms/4 pts, 10 ms/2 pts	Process value alarms (HH,H,L,LL) Rate-of-change calculation and alarm Input disconnection detection Top, bottom, valley hold Accumulated value output Variable range zero-span adjustment	326
	CS1W-PDC55	8 inputs		4 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V	250 ms/8 pts	Measured value alarms (H, L) and other features	326
	CS1W-PTR01		No	–1 mA to 1 mA, 0 to 1 mA	200 ms/8 pts	Motor overdrive prevention, measured value alarms (H, L), other features	326
	CS1W-PTR02			–100 mV to 100 mV, 0 to 100 mV		Measured value alarms (H, L), other features	326
	C200H-AD003			1 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA	1 ms/pt max.	---	318
Analog Output Units	CS1W-DA041	4 outputs	No	1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA	1 ms/pt	---	320
	CS1W-DA08V	8 outputs		1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V			
	CS1W-DA08C			4 to 20 mA			
	C200H-DA003	8 outputs	No	1 to 5 V, 0 to 10 V, –10 to 10 V	1 ms/pt max.	---	320
	C200H-DA004			4 to 20 mA			
Analog I/O Unit	CS1W-MAD44	4 inputs and 4 outputs	No	Inputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V	1 ms/pt	---	322
	C200H-MAD01	2 inputs and 2 outputs		Inputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V, 4 to 20 mA Outputs: 1 to 5 V, 0 to 5 V, 0 to 10 V, ±10 V	1 ms/pt max.		
Temperature Sensor Input Units	CS1W-PTS11	4 inputs	Yes	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, ±100 mV	20 ms/4 pts 10 ms/2 pts	Measured value alarms (HH, H, L, LL), input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range, other features.	
	CS1W-PTS12			Pt100Ω (JIS, IEC), JPt100Ω, Pt50Ω, Ni508.4Ω			
	CJ1W-PTS51			B, J, K, R, S, T, L	250 ms/4 pts	Measured value alarms (H, L), input disconnection alarm, and other features	336
	CJ1W-PTS52			Pt100 (IEC, JIS), JPt100	250 ms/8 pts		
	CJ1W-PTS55	8 inputs		B, J, K, R, S, T, L	250 ms/4 pts		
	CJ1W-PTS56			Pt100 (IEC, JIS), JPt100	250 ms/8 pts		
	C200H-TS001	4 inputs	No	K, J	4.8 s max.	---	336
	C200H-TS002			K, L			
	C200H-TS101			JPt100			
	C200H-TS102	5 inputs		Pt100			

Note: Inputs are isolated from PLC signals for all Units.

CS1W-AD□□1-V1, C200H-AD003

Analog Input Units



Convert Analog Signals to Binary Data

- Wire burnout detection
- Peak-hold function
- Moving average filter function
- Offset gain setting

Note: Analog Input Terminals are also available as remote I/O terminals for DeviceNet, PROFIBUS-DP or CompoBus/S.

Function

Converts input signals such as 1 to 5 V or 4 to 20 mA to binary values between 0000 and 0FA0 Hex and stores the results in the allocated words each cycle. The ladder diagram can be used to transfer the data to the DM Area or the SCALING instructions (e.g., SCL(194)) can be used to scale the data to the desired ranges.

Terminal Arrangement

CS1W-AD041-V1

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (–)	B2	A2	Input 1 (–)
AG	B3	A3	AG
Input 4 (+)	B4	A4	Input 3 (+)
Input 4 (–)	B5	A5	Input 3 (–)
N.C.	B6	A6	N.C.
N.C.	B7	A7	N.C.
N.C.	B8	A8	N.C.
N.C.	B9	A9	N.C.
N.C.	B10	A10	N.C.
		A11	N.C.

CS1W-AD081-V1

Input 2 (+)	B1	A1	Input 1 (+)
Input 2 (–)	B2	A2	Input 1 (–)
AG	B3	A3	AG
Input 4 (+)	B4	A4	Input 3 (+)
Input 4 (–)	B5	A5	Input 3 (–)
Input 6 (+)	B6	A6	Input 5 (+)
Input 6 (–)	B7	A7	Input 5 (–)
AG	B8	A8	AG
Input 8 (+)	B9	A9	Input 7 (+)
Input 8 (–)	B10	A10	Input 7 (–)
		A11	N.C.

CS1W-AD161

CN2 Inputs 9 to16

Input 9+	1	2	Input 10+
Current mode 9	3	4	Current mode 10
Input 9–	5	6	Input 10–
AG	7	8	AG
Input 11+	9	10	Input 12+
Current mode 11	11	12	Current mode 12
Input 11–	13	14	Input 12–
AG	15	16	AG
Input 13+	17	18	Input 14+
Current mode 13	19	20	Current mode 14
Input 13–	21	22	Input 14–
AG	23	24	AG
Input 15+	25	26	Input 16+
Current mode 15	27	28	Current mode 16
Input 15–	29	30	Input 16–
AG	31	32	AG
NC	33	34	NC

CN1 Inputs 1 to 8

Input 1+	1	2	Input 2+
Current mode 1	3	4	Current mode 2
Input 1–	5	6	Input 2–
AG	7	8	AG
Input 3+	9	10	Input 4+
Current mode 3	11	12	Current mode 4
Input 3–	13	14	Input 4–
AG	15	16	AG
Input 15+	17	18	Input 6+
Current mode 5	19	20	Current mode 6
Input 5–	21	22	Input 6–
AG	23	24	AG
Input 7+	25	26	Input 8+
Current mode 7	27	28	Current mode 8
Input 7–	29	30	Input 8–
AG	31	32	AG
NC	33	34	NC

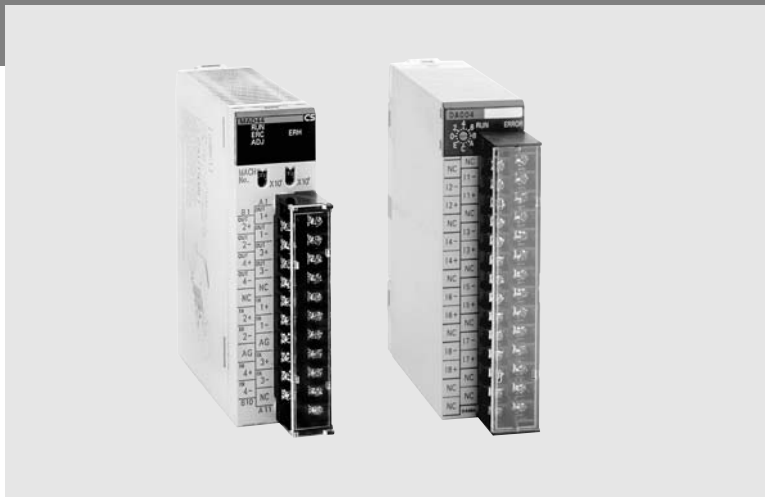
Specifications

Model			CS1W-AD041-V1	CS1W-AD081-V1	C200HW-AD003	CS1W-AD161
Classification			CS1 Special I/O Units		C200 Special I/O Units	CS1 Special I/O Units
Unit number			0 to 95	0 to 95	0 to F	0 to 94
Inputs			4 pts	8 pts	8 pts	16 pts
Signal range	Voltages	1 to 5 V	Yes			
		0 to 10 V	Yes			
		0 to 5 V	Yes	Yes	---	Yes
		–10 to 10 V	Yes			
	Currents	4 to 20 mA	Yes			
		0 to 20 mA	---			
Signal range settings			4 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	16 settings (one for each point)
Resolution			1/8000	1/8000	1/4000	1/8000
Conversion speed			0.25 ms/pt max.	0.25 ms/pt max.	1 ms/pt. max	0.25 ms/pt
Overall accuracy (at 25 °C)			Voltage: ±0.2% Current: ±0.4%			Voltage: ±0.2% Current: ±0.2%
Connections			Terminal block			2 x 34 point MIL connectors
Features	Wire burnout detection		Yes			
	Peak-hold function		Yes			
	Mean function		Yes			

Note: Process I/O Units with individually isolated channels are also available for analog I/O. Refer to page 326.

CS1W-DA0□□, C200H-DA00□

Analog Output Units



Convert Binary Data to Analog Signals

- Output limit
- Upper/Lower limit alarms
- Offset gain adjustment

Note: The functions provided depend in the model used. Analog Output Terminals are also available as remote I/O terminals for DeviceNet, PROFIBUS-DP or CompoBus/S.

Function

Binary data in the allocated words is converted to analog signals such as 1 to 5 V or 4 to 20 mA for output. All that is required in the ladder diagram is to place the data in the allocated words.

Terminal Arrangement

CS1W-DA08V/08C

N.C.	B1	A1	N.C.
Output 2 (+)	B2	A2	Output 1 (+)
Output 2 (–)	B3	A3	Output 1 (–)
Output 4 (+)	B4	A4	Output 3 (+)
Output 4 (–)	B5	A5	Output 3 (–)
Output 6 (+)	B6	A6	Output 5 (+)
Output 6 (–)	B7	A7	Output 5 (–)
Output 8 (+)	B8	A8	Output 7 (+)
Output 8 (–)	B9	A9	Output 7 (–)
N.C.	B10	A10	N.C.
		A11	N.C.

CS1W-DA041

N.C.	B1	A1	N.C.
Output voltage 2 (+)	B2	A2	Output voltage 1 (+)
Output 2 (–)	B3	A3	Output 1 (–)
Output current 2 (+)	B4	A4	Output current 1 (+)
N.C.	B5	A5	N.C.
N.C.	B6	A6	N.C.
Output voltage 4 (–)	B7	A7	Output voltage 3 (+)
Output 4 (–)	B8	A8	Output 3 (–)
Output current 4 (+)	B9	A9	Output current 3 (+)
N.C.	B10	A10	N.C.
		A11	N.C.

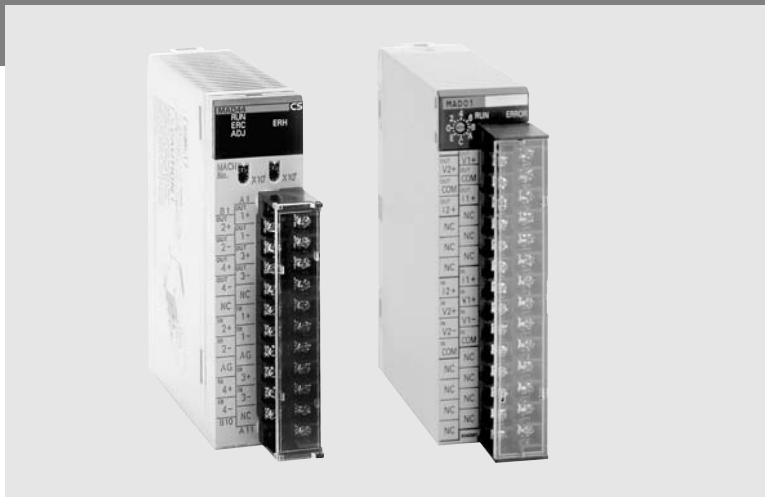
Specifications

Model			CS1W-DA041	CS1W-DA08V	CS1W-DA08C	C200H-DA003	C200H-DA004
Classification			CS1 Special I/O Units			C200H Special I/O Units	
Unit numbers			0 to 95	0 to 95	0 to 95	0 to F	0 to F
Outputs			4 pts	8 pts	8 pts	8 pts	8 pts
Signal range	Voltages	1 to 5 V	Yes	Yes	---	Yes	---
		0 to 10 V	Yes	Yes	---	Yes	---
		0 to 5 V	Yes	Yes	---	---	---
		–10 to 10 V	Yes	Yes	---	Yes	---
	Currents	4 to 20 mA	Yes	---	Yes	---	Yes
		0 to 20 mA	---	---	---	---	---
Signal range settings			4 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)	8 settings (one for each point)
Resolution			1/4000	1/4000	1/4000	1/4000	1/4000
Conversion speed			1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.	1.0 ms/pt max.
Overall accuracy (at 25 °C)			Voltage: ±0.3%FS Current: ±0.5%FS	±0.3% FS	±0.5% FS	±0.3% FS	±0.5% FS
Connections			Terminal block	Terminal block	Terminal block	Terminal block	Terminal block
Features	Output hold function		---	Yes	Yes	Yes	Yes

Note: Process I/O Units with individually isolated channels are also available for analog I/O. Refer to page 326.

CS1W-MAD44, C200H-MAD01

Analog I/O Units



Analog Inputs and Outputs combined in One Unit

- Moving average filter function
- Peak hold function
- Wire burnout detection
- Output hold function
- Ratio conversions

Function

One Unit performs both analog input and analog output operations. The Unit can also be used for ratio and bias processing, which can be performed on analog inputs to output the results as analog outputs.

Terminal Arrangement (CS1W-MAD44)

Output 2 (+)	B1	A1	Output 1 (+)
Output 2 (–)	B2	A2	Output 1 (–)
Output 4 (+)	B3	A3	Output 3 (+)
Output 4 (–)	B4	A4	Output 3 (–)
N.C.	B5	A5	N.C.
Input 2 (+)	B6	A6	Input 1 (+)
Input 2 (–)	B7	A7	Input 1 (–)
AG	B8	A8	AG
Input 4 (+)	B9	A9	Input 3 (+)
Input 4 (–)	B10	A10	Input 3 (–)
		A11	N.C.

Specifications

Model			C200H-MAD01	CS1W-MAD44
Classification			C200H Special I/O Unit	CS1 Special I/O Unit
Unit numbers			0 to F	0 to 95
Inputs			2 pts	4 pts
Outputs			2 pts	4 pts
Input signal ranges	Voltages	1 to 5 V	Yes	Yes
		0 to 5 V	---	Yes
		0 to 10 V	Yes	Yes
		–10 to 10 V	Yes	Yes
		4 to 20 mA	Yes	Yes
Output signal ranges	Currents	1 to 5 V	Yes	Yes
		0 to 5 V	---	Yes
		0 to 10 V	Yes	Yes
		–10 to 10 V	Yes	Yes
		4 to 20 mA	Yes	---
Resolution			1/4000 (inputs/outputs)	1/4000 (inputs/outputs)
Conversion speed			1.0 ms/pt max (inputs/outputs)	1.0 ms/pt max (inputs/outputs)
Overall accuracy	Inputs		Voltage: ±0.2% Current: ±0.4%	Voltage: ±0.2% Current: ±0.4%
	Outputs		Voltage: ±0.3% Current: ±0.5%	Voltage: ±0.3%
Connections			Terminal block	Terminal block
Features	Mean function		Yes	Yes
	Peak hold		Yes	Yes
	Wire burnout detection		Yes	Yes
	Output hold		Yes	Yes
	Ratio conversion		Yes	Yes

CS1W-LC001, CS1W-LCB01/05, CS1D-CPU□□P

Loop Control Unit



Integrate Process Control and Monitoring functions with PLC sequence control. With easy-to-use DCS-style function block configuration, complex control systems can be set up in minutes.

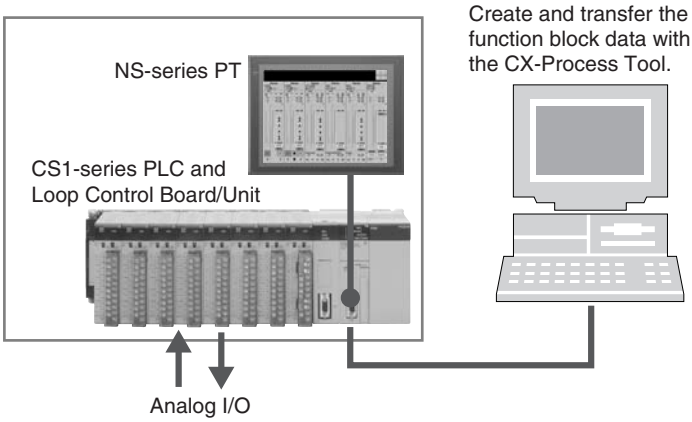
- The control system can be scaled to match the controlled system, from a few loops that replace a Controller to hundreds of loops that perform large-scale process control.
- A variety of control programs can be created by selecting from more than 70 kinds of function blocks suitable for loop control, such as PID calculations, Segment Programs, and square root calculations.
- The CX-Process Tool, included in CX-One, can be used for easy programming.
- A Tuning Screen can be opened in the CX-Process Tool to change parameters while monitoring the status.
- Duplex systems are available for applications that require high reliability.
- The NS Face Plate Auto Builder software can be used to automatically create a touch panel for NS-series PTs from a function block screen.

Function

The CS1-series Loop Control Boards and Units are packed with DCS functions and can use function block programs, which are ideal for process control. Graphical programming can be used, so function blocks can be pasted into a window and connected with the mouse.

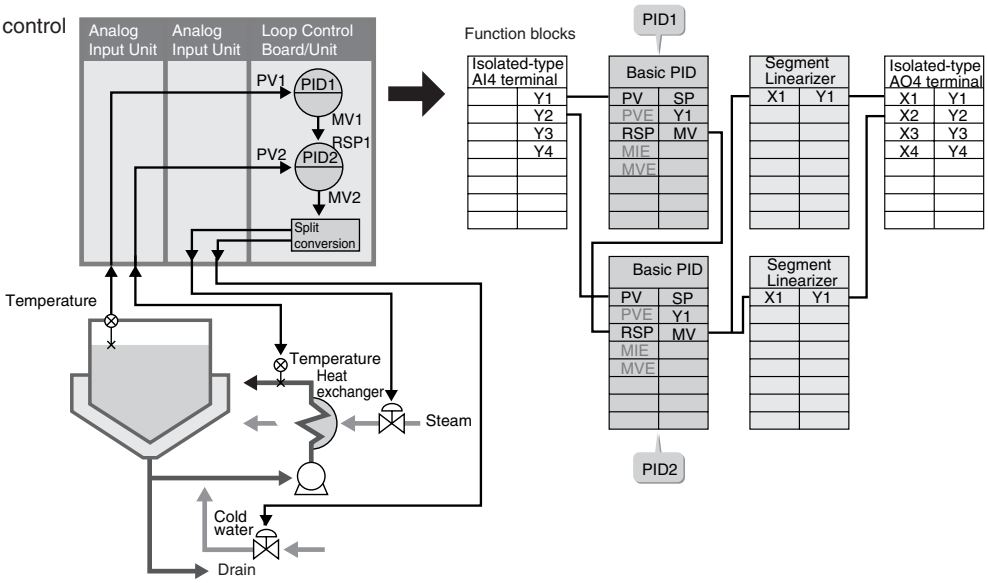
A wide variety of control methods can be executed, from regular PID control to cascade control and feed-forward control.

System Configuration



Function Block Example

Example: Cascade control



Specifications

Item		Specification			
Name		Loop Control Board			Loop Control Unit (See note 1.)
Unit type		CS-series Inner Board			CS-series CPU Bus Unit
Model		CS1W-LCB01 Standard Inner Board	CS1W-LCB05 Advanced Inner Board	CS1D-LCB05D Duplex Inner Board (See note 3.)	CS1W-LC001
Applicable PLCs		CS1G/H-CPU□□F	CS1G/H-CPU□□H	CS1D-CPU□□P (Duplex compatible)	CS-series
Mounting location		CPU Unit's Inner Board slot			CPU Rack
Max. number of Boards/Units		1 Board max. per CPU Unit			3 Units max. per CPU Unit
Data exchange with CPU Unit	Allocation of specific words in a data area	User Link Table function: A function block's ITEM data can be allocated to specified words in a CPU Unit data area (CIO, WR, HR, DM, or EM bank 0).			CPU terminal block: A function block's ITEM data can be allocated to any CPU Unit data area.
	Allocation of all data	HMI Interface function: The ITEM data of a Control Block, Operation Block, or External Controller Block can be allocated to a specified EM bank. (The default EM bank is bank 0.)			Send/Receive All Blocks: Can be allocated to any CPU Unit data area (no default setting).
Setting switches		None			Front panel rotary switches: Unit number setting (0 to F)
Indicators		Three LED indicators: Running, Ready, and Comm. port sending/receiving			Five LED indicators: Running, Comm. port sending, Comm. port receiving, CPU Unit error, and Unit error
Front panel connectors		One RS-232C port (for connection of an ES100X External Controller)			
Data Backup		Super capacitor backs up all function block data (including sequence tables and step ladder program instructions).			Battery backs up all function block data and contents of the error log.
Backup time of backup capacitor or battery		24 hrs at 25°C (The backup time is shorter at higher temperatures.)			5 years at 25°C (The battery life is shorter at higher temperatures.)
Data stored in flash memory		Function block data, data in RAM (can be backed up or recovered at any time), and error log data			Function block data and data in RAM (can be backed up or recovered at any time)
Effect on the CPU Unit's cycle time		0.8 ms max.		20 ms max. (See note 2.)	0.2 ms
Current consumption (supplied by the Power Supply Unit)		220 mA at 5 V DC Note: The current consumption is 150 mA higher when an NT-AL001 Link Adapter is being used.			360 mA at 5 V DC Note: The current consumption is 150 mA higher when an NT-AL001 Link Adapter is being used.
Dimensions		34.5 x 130 x 100.5 mm (W x H x D)			
Weight		100 g max.			220 g max.
Standard accessories		None			C200H-BAT09 Battery Set (factory installed in Unit)

Note: 1. The Loop Control Unit described in this table is equipped with the Version 2.5 functions.

2. The CPU Unit's cycle time will be extended by 2.1 s max during duplex initialization.

3. The CS1D-LCB05D Duplex Loop Control Board is not available separately.
It can only be purchased in combination with a Duplex CPU as models CS1D-CPU65P or CS1D-CPU67P.

Functional Specifications

Item			Specifications		
Model numbers			**CS1W-LCB01**	**CS1W-LCB05** **CS1D-LCB05D**	**CS1W-LC001**
Operation method			Function block method		
Operation cycle			Settable cycles: 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, or 2 s(default: 1 s) Can be set for each function block. (See note 1.)		Settable cycles: 0.1, 0.2, 0.5, 1, or 2 s (default: 1 s) Can be set for each function block.
Number of function blocks	Analog operation	Control blocks (See note 2.)	50 blocks max.	500 blocks max.	32 blocks max.
		Operation blocks (See note 3.)			249 blocks max.
		External controller blocks	32 blocks max. (CS1D-LCB05D not included)		
	Sequence control	Sequence tables	None	200 tables max. 32 conditions and 32 actions per table max. (expandable to 64 conditions and 64 actions per table) 6,400 rules total max.	None
		Step ladder program blocks	20 blocks max. 2,000 commands total 100 commands max. per block Separable into a 100 steps max.	200 blocks max. 4,000 commands total 100 commands max. per block Seperable into a 100 steps max.	
	I/O blocks	Field terminal blocks	80 blocks max.		
		User link tables	2,400 data items max.		None
		All data	HMI functions 2,040 words max. Allocated 1 EM Area bank	HMI functions 20,040 words max. Allocated 1 EM Area bank	Send/Receive All Blocks: 1 block each max.
		CPU terminal blocks	None		16 blocks max.
		Node terminal blocks	None		1000 blocks max.
	System common blocks		1 block max.		
Method for creating and transfering function blocks			Created and transferred using CX-Process Tool (purchased separately).		
Control methods	PID control method		PID with 2 degrees of freedom (with auto-tuning)		
	Control combinations		Any of the following function blocks can be combined: Basic PID control, cascade control, feed-forward control, sample PI control, Smith dead time compensation control, PID control with differential gap, override control, program control, time-proportional control, etc.		
Alarms	PID block internal alarms		4 PV alarms (upper upper-limit, upper limit, lower limit, lower lower-limit) and 1 deviation alarm per PID block		
	Alarm blocks		High/low alarm blocks, deviation alarm blocks		

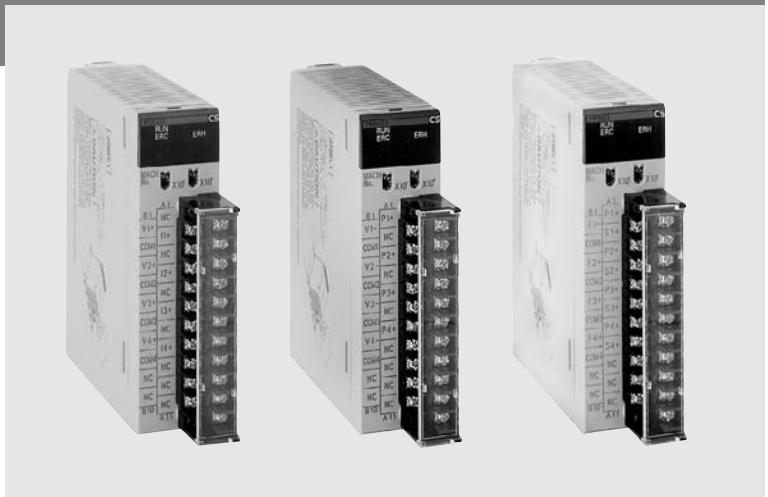
Note: 1. Operation cycles of 0.01, 0.02, and 0.05 s cannot be set for the CS1D-LCB05D.

2. Control blocks such as those for PID control.

3. Operation blocks for process control such as those for alarms, square roots, time/date calculations, and pulse-train computations.

CS1W-P□□□□

Process I/O Units



Wide variety of built-in signal conversion functions for direct process signal inputs.

- External converters, isolators or transducers are not required: Greatly reduces costs, space requirements, and labor.
- Receives temperature and other analog inputs.
- Built-in alarms on measured value and rate-of change reduce the amount PLC programming.
- Control outputs can be limited with the output rate-of-change limit and output high/low limit.
- Data processing includes peak/bottom hold and top/valley hold functions.
- Count the number of times that a preset threshold value is exceeded and totalize analog values.

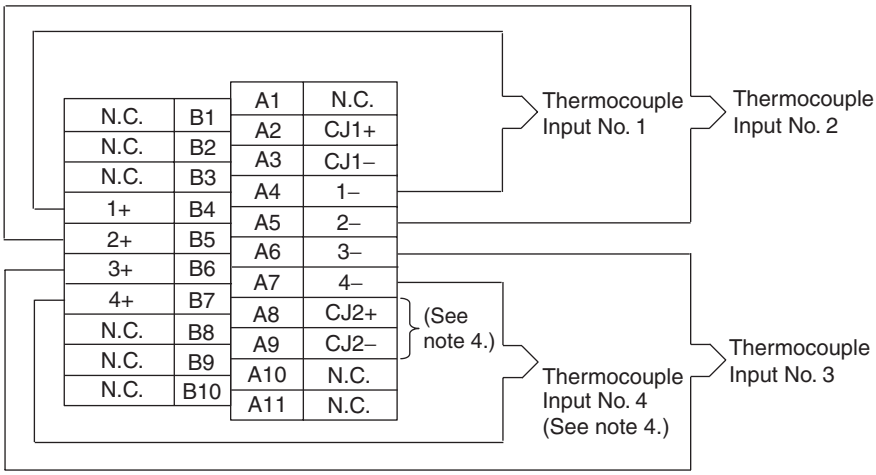
Function

Choose from a total of 13 models, including 11 isolated-type models, to handle essentially all normal data collection and process control applications. High-speed (10 ms) and high-resolution (1/64,000) models are available for use in a wide range of applications, from data logging to high-speed temperature control.

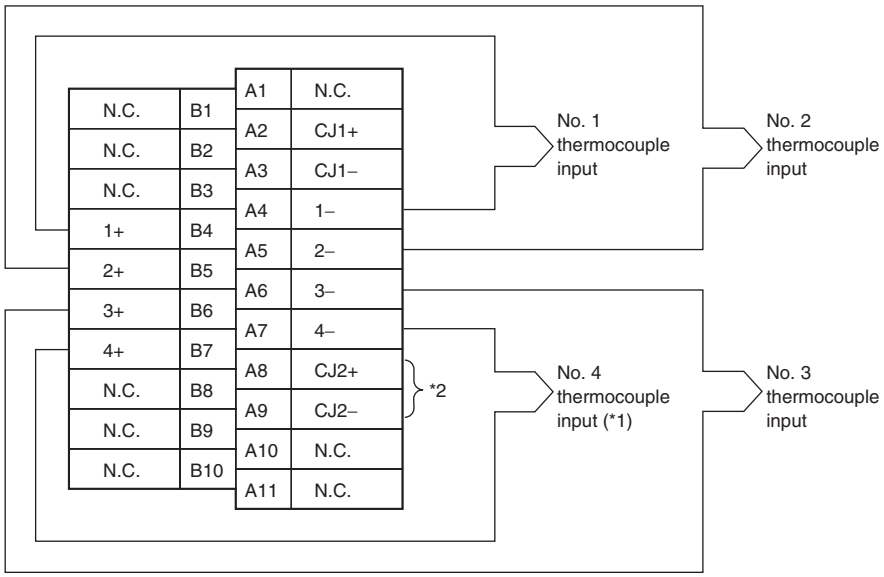
Terminal Arrangement

CS1W-PTS01-V1

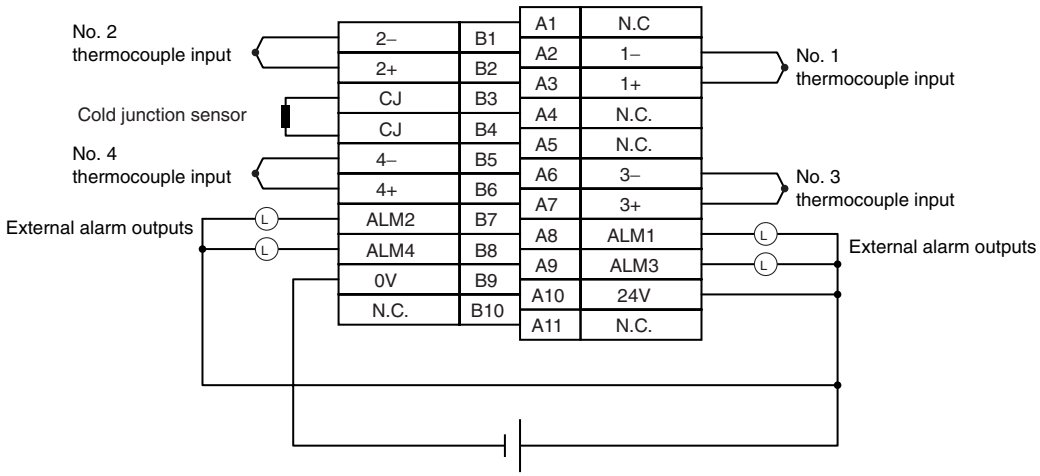
CS1W-PTS01-V1 Isolated-type Thermocouple Input Unit



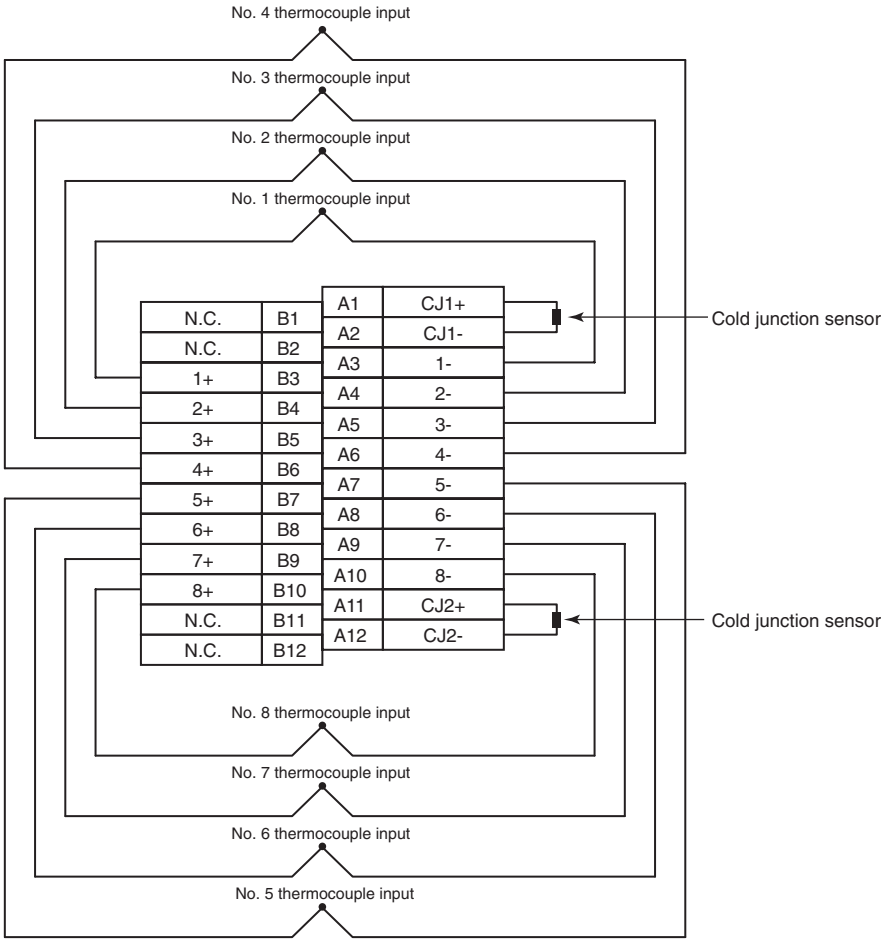
CS1W-PTS11



CS1W-PTS51

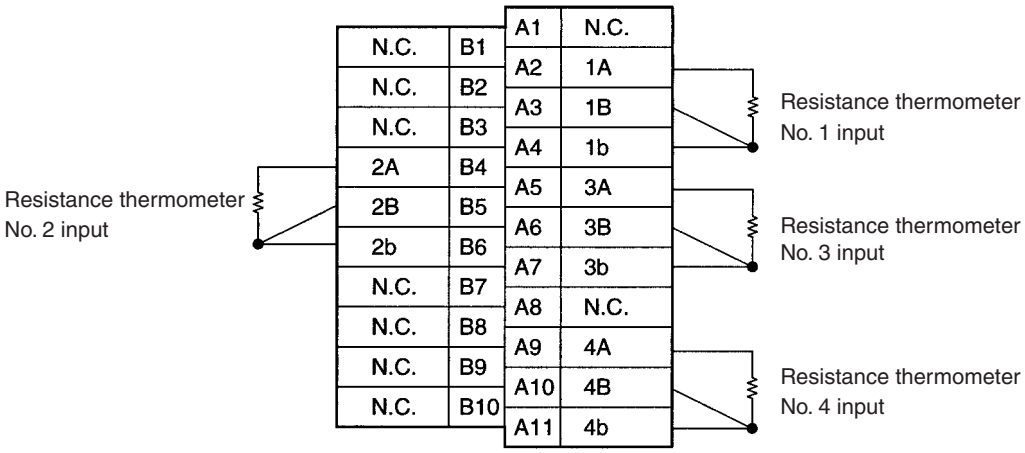


CS1W-PTS55



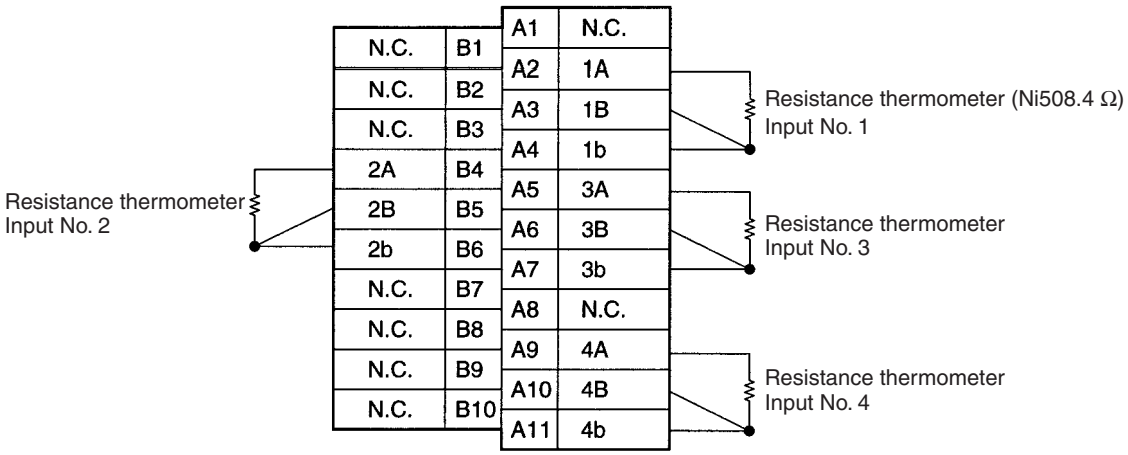
CS1W-PTS02

CS1W-PTS02 Isolated-type Resistance Thermometer Unit

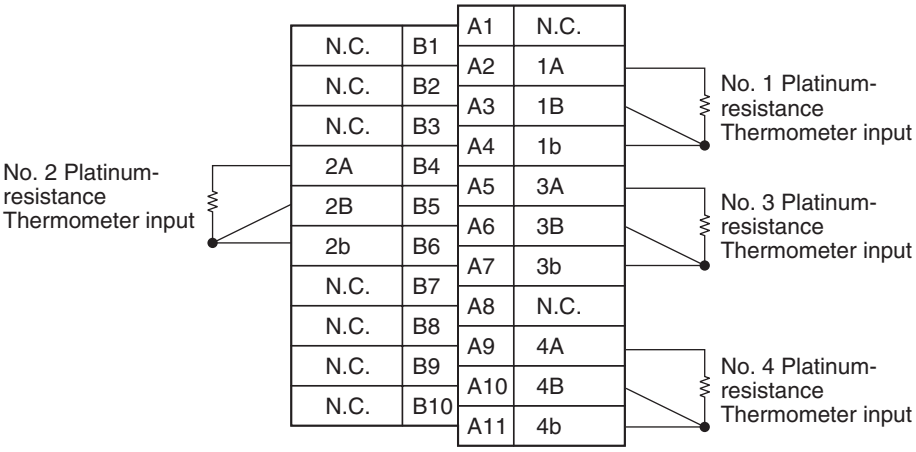


CS1W-PTS03

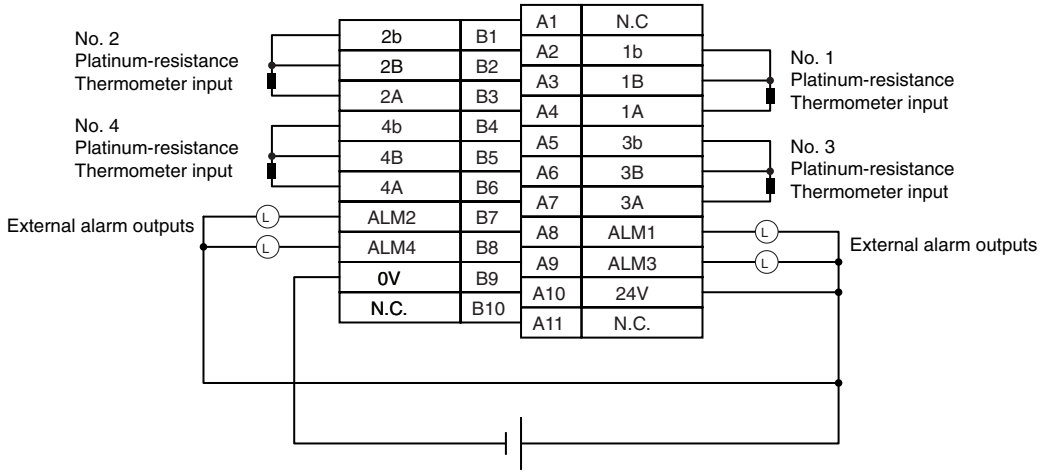
CS1W-PTS03 Isolated-type Resistance Thermometer Unit



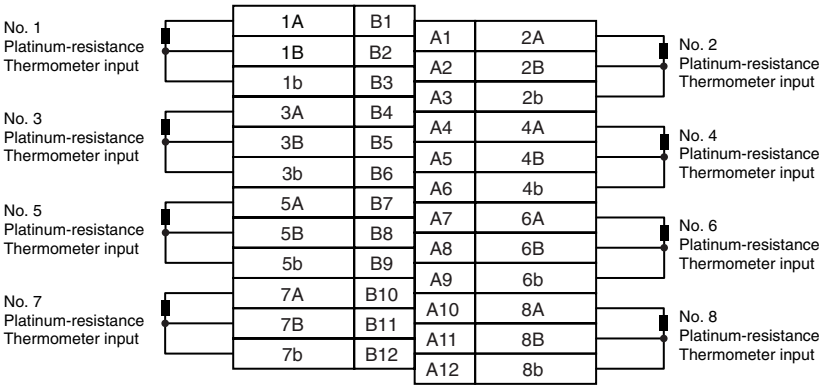
CS1W-PTS12



CS1W-PTS52

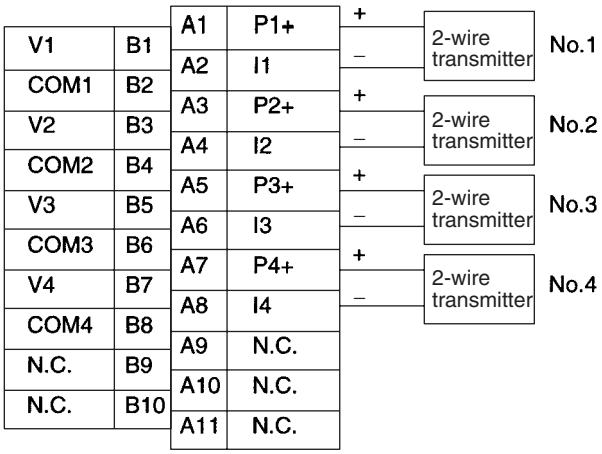


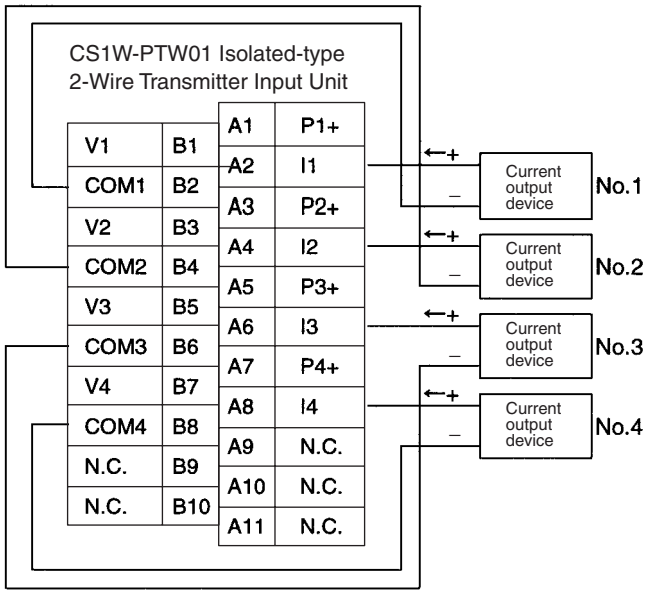
CS1W-PTS56



CS1W-PTW01

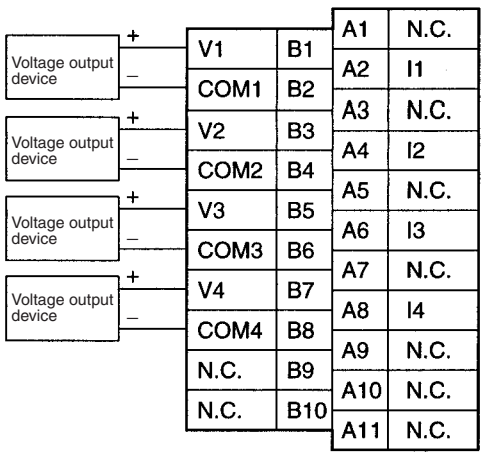
CS1W-PTW01 Isolated-type 2-Wire Transmitter Input Unit



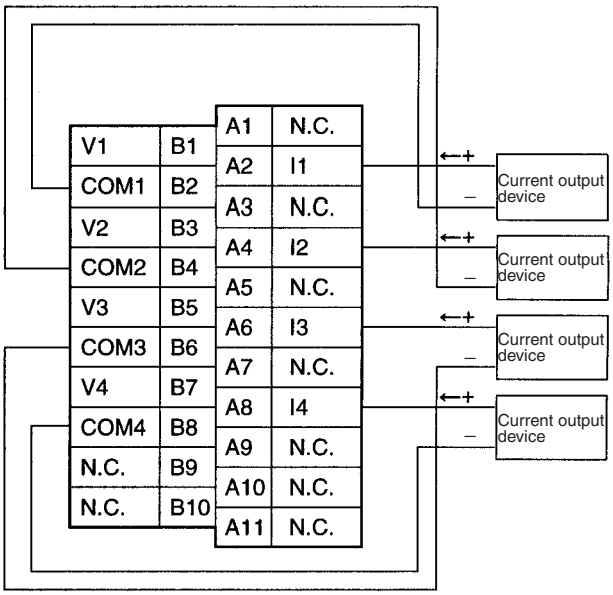


CS1W-PDC01

Voltage input

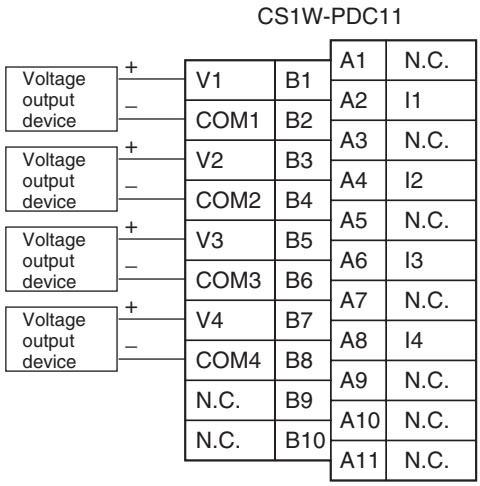


Current input

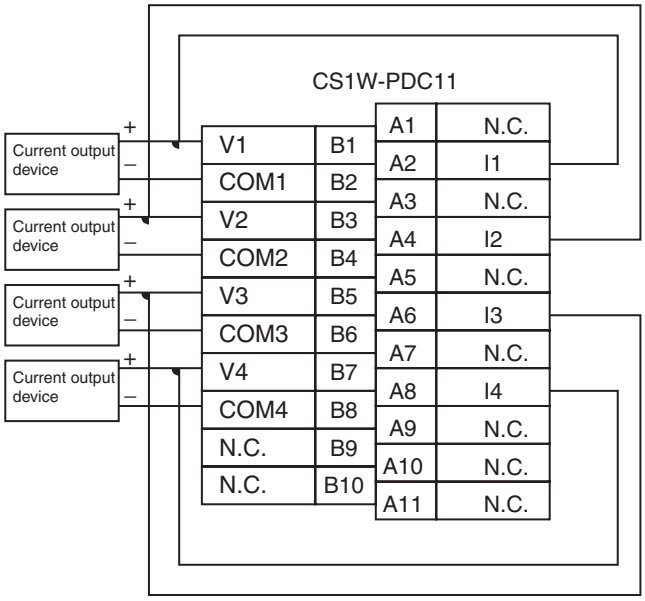


CS1W-PDC11

Voltage Inputs

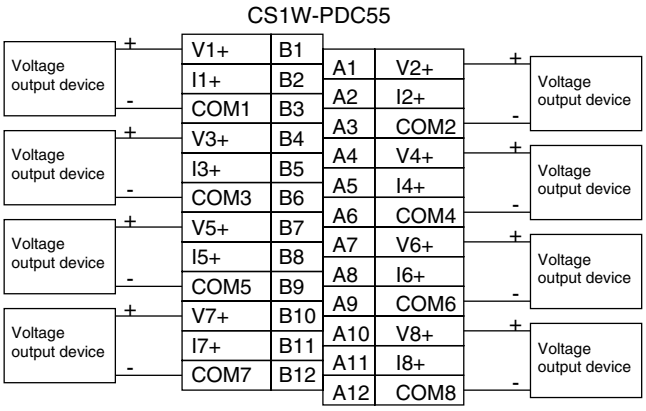


Current inputs

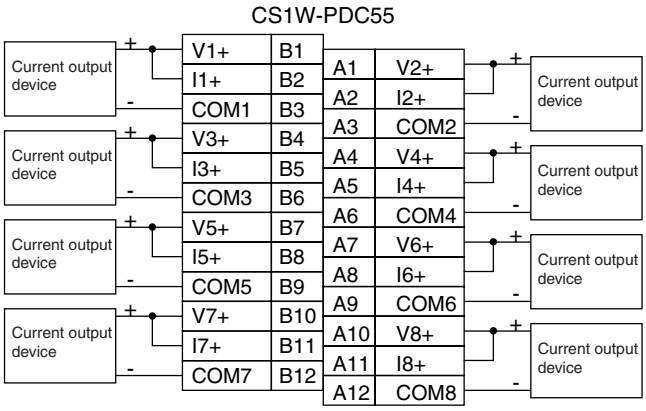


CS1W-PDC55

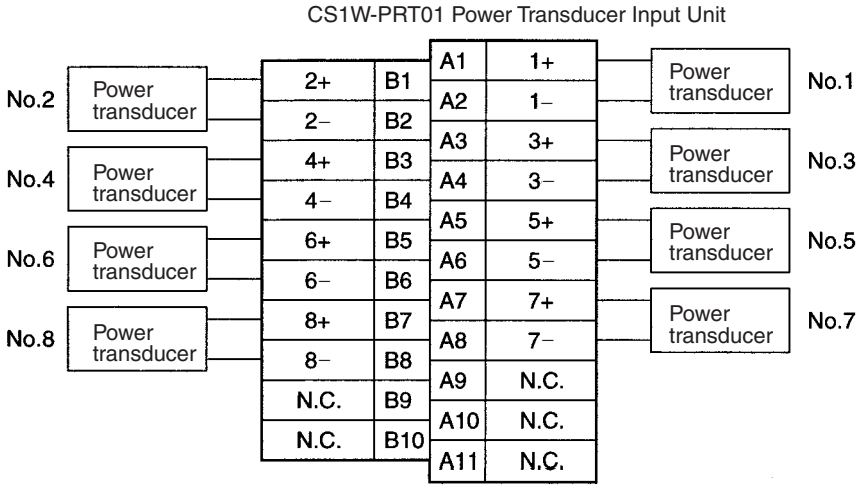
Voltage Inputs



Current inputs

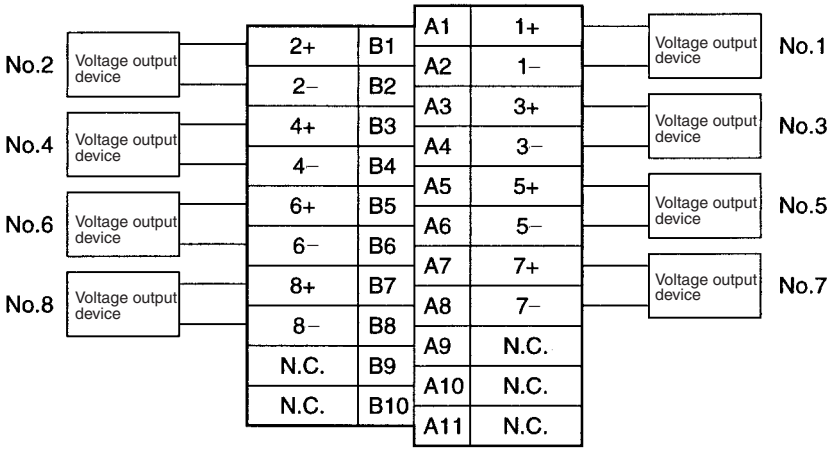


CS1W-PTR01



CS1W-PTR02

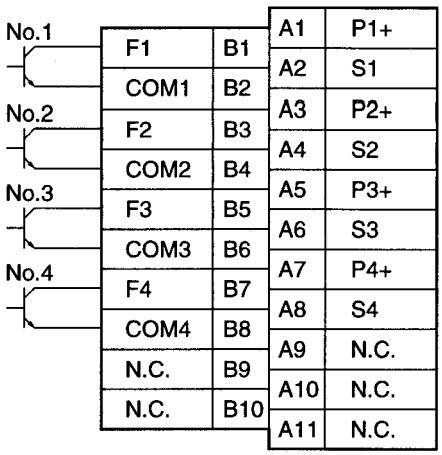
CS1W-PRT02 Analog Input Unit



CS1W-PPS01

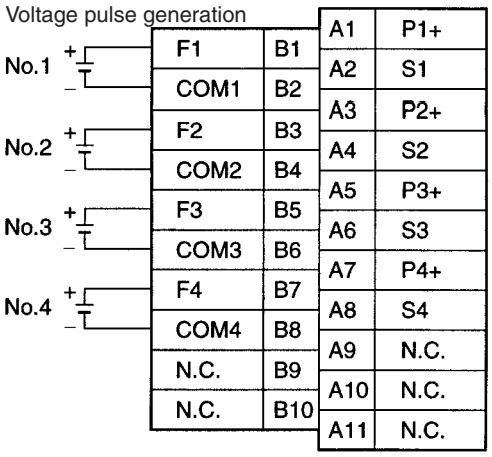
No-voltage Semiconductor Input

CS1W-PPS01 Isolated-type Pulse Input Unit



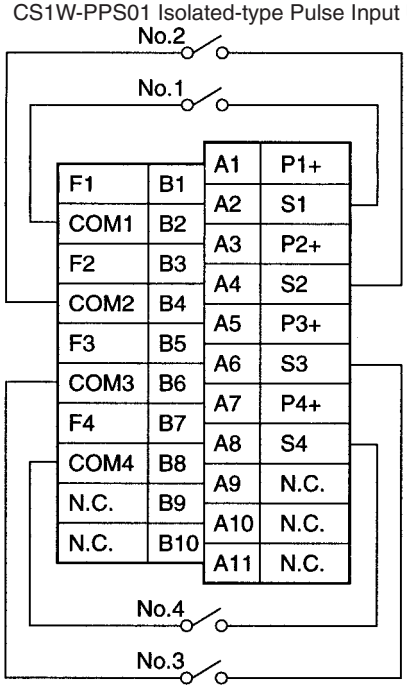
Voltage Input

CS1W-PPS01 Isolated-type Pulse Input Unit



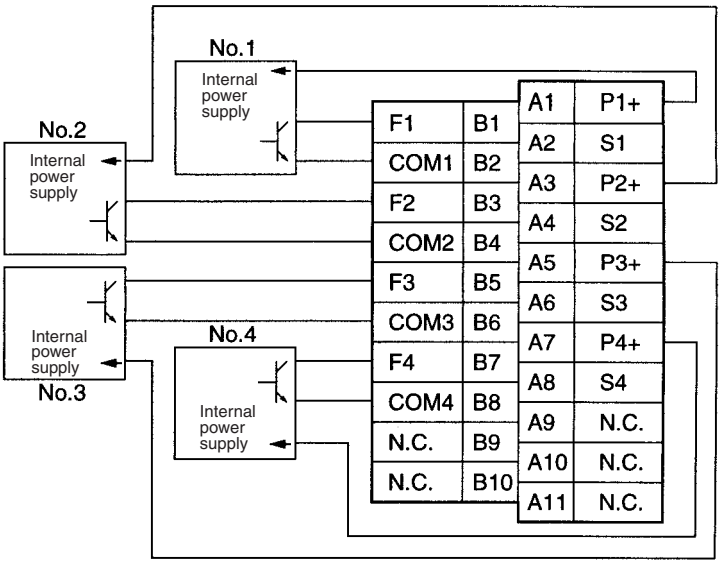
Contact Input

CS1W-PPS01 Isolated-type Pulse Input Unit



3-wire Sensor Input

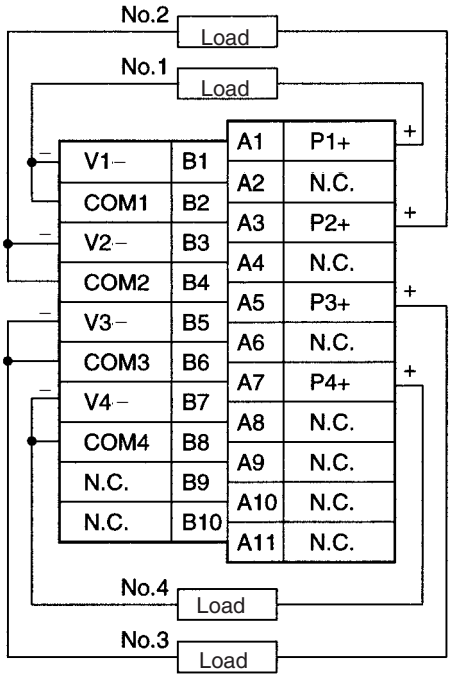
CS1W-PPS01 Isolated-type Pulse Input Unit



CS1W-PMV01

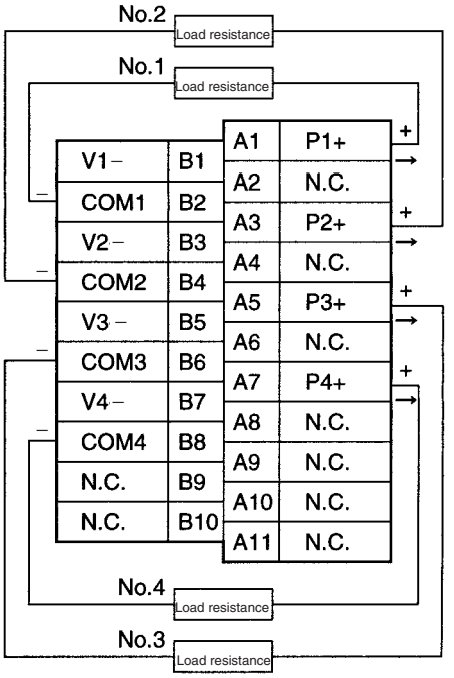
Voltage Output

CS1W-PMV01 Isolated-type Analog Output Unit



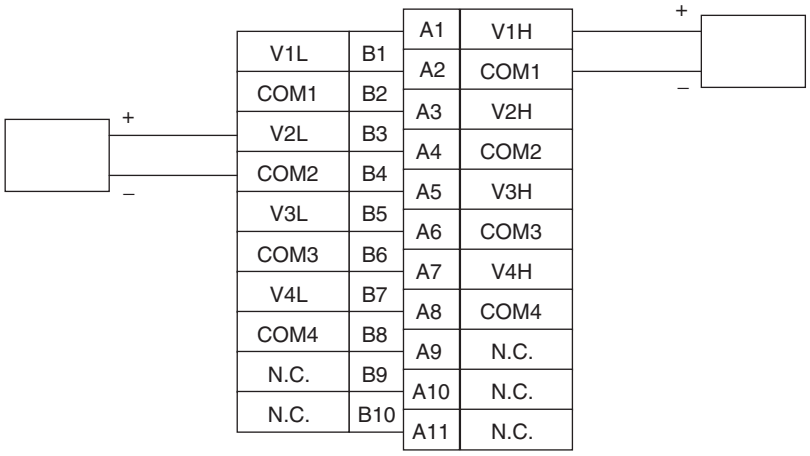
Current Output

CS1W-PMV01 Isolated-type Analog Output Unit



CS1W-PMV02

CS1W-PMV02
Isolated-type Analog Output Unit



Specifications

Unit name	Model	I/O capacity	Field I/O isolation	I/O range/type	Accuracy/effective resolution	Main features
Isolated-type Thermocouple Input Unit	CS1W-PTS11	4 inputs	All inputs isolated.	B, E, J, K, L, N, R, S, T, U, WRe5-26,PL II, ±100 mV	Standard accuracy: ±0.05% of full scale Temp coefficient: ±0.01%/°C Effective resolution: 1/64,000 Conversion cycle: 20 ms/4 pts 10 ms/2 pts	Output scaling, measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range
Isolated-type Resistance Thermometer Input Unit	CS1W-PTS12	4 inputs	All inputs isolated.	Pt100Ω (JIS, IEC), JPt100Ω, Pt50Ω, Ni508.4Ω	Standard accuracy: Larger of ±0.05% of full scale or ±0.1°C Temp coefficient: ±0.01%/°C Effective resolution: 1/64,000 Conversion cycle:20 ms/4 pts 10 ms/2 pts	Output scaling, measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms, top hold, bottom hold, valley hold, zero span adjustment over user-set range
Isolated-type Thermocouple Input Units (Economical type)	CS1W-PTS51	4 inputs	All inputs are isolated	B, J, K, R, S, T, L	Overall accuracy: ± 0.3% of PV or ± 1°C, whichever is larger, ± 1digit max. Conversion cycle: 250 ms/4 pts	Process value alarms (H, L) Process value alarm DO output Input disconnection detection
	CS1W-PTS55	8 inputs				
Isolated-type Resistance Thermometer Input Unit (Economical type)	CS1W-PTS52	4 inputs	Alle inputs are isolated	Pt100 (JIS, IEC), JPt100	Overall accuracy: ± 0.3% of PV or ± 0.8°C, whichever is larger, ± 1 digit max. Conversion cycle: 250 ms/4 pts	Process value alarms (H, L) Process valu alarm DO output Input disconnection detection
	CS1W-PTS56	8 inputs				
Isolated-type Two-wire Transmission Device Input Unit	CS1W-PTW01	4 inputs	All inputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: ±0.2% Temp coefficient: ±0.015%/°C Resolution: 1/4,096 Conversion cycle: 100 ms/4 pts	Built-in power supply for 2-wire transmission device output scaling (±32,000), measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms
Isolated-type Analog Input Unit	CS1W-PDC11	4 inputs	All inputs isolated.	4 to 20 mA, 0 to 20 mA, 0 to 10 V, ±10 V, 0 to 5 V, ± 5 V, 1 to 5 V, 0 to 1.25 V, ±1.25 V	Standard accuracy: ±0.05% of full scale Temp coefficient: ±0.01%/°C Effective resolution: 1/64,000 Conversion cycle:20 ms/4 pts 10 ms/2 pts	Output scaling, measured value alarms (HH, H, L, LL), rate-of-change operation and alarms, input disconnection alarms, top hold, bottom hold, valley hold, total value measurement
	CS1W-PDC55	8 inputs	All inputs isolated	4 to 20 mA, 0 to 10 V, 0 to 5 V, 1 to 5 V	Standard accuracy: ±0.3% full scale. Resolution 1/16000. Conversion cycle 250 ms/8 pts	Measured value alarms (H, L), input detection
Isolated-type Pulse Input Unit	CS1W-PPS01	4 inputs	All inputs isolated.	Max. counting speed: 20 K pulses/s (voltage input or no-voltage semi-conductor input) or 20 pulses/s (contact input)	---	Built-in sensor power supply, contact bounce filter, unit pulse conversion, accumulative and instantaneous value output, 4 instantaneous value alarms.
Isolated-type Control Output Unit	CS1W-PMV01	4 outputs	All outputs isolated.	4 to 20 mA, 1 to 5 V	Standard accuracy: 4 to 20 mA: ±0.1% 1 to 5 V: ±0.2% Temp coefficient: ±0.015%/°C 4,000 (outputs) Conversion cycle: 100 ms/4 pts	Output disconnection alarms, control output answerback input, output rate-of-change limit, output high/low limits
Isolated-type Power Voltage Output Unit	CS1W-PMV02	4 outputs	All outputs isolated	0 to 10 V, ±10 V, 0 to 5 V, ±5 V, 0 to 1 V, ±1 V	Standard accuracy: ±0.1% Temp coefficient: ±0.015%/°C Resolution (at full scale): ±10 V or ±1 V: 1/16,000 0 to 10 V, 0 to 1 V, or ±5 V: 1/8,000 0 to 5 V: 1/4,000 Conversion cycle: 40 ms/4 pts	Output rate-of-change limit, Output high/low limit, Output scaling (±32,000)
Power Transducer Input Unit	CS1W-PTR01	8 inputs	No isolation between inputs.	±1 mA, 0 to 1 mA	Standard accuracy: ±0.2% Temp coefficient: ±0.015%/°C Resolution: 1/4,096 Conversion cycle: 200 ms/8 pts	Motor overdrive prevention at startup, output scaling (±32,000), measured value alarms (H, L)
Analog Input Unit	CS1W-PTR02	8 inputs	No isolation between inputs.	±100 mV, 0 to 100 mV	Standard accuracy: ±0.2% Temp coefficient: ±0.015%/°C Resolution: 1/4,096 Conversion cycle: 200 ms/8 pts	Output scaling (±32,000), measured value alarms (H, L)

Note: Refer to pages 318 to 322 for descriptions of the Analog I/O Units (CS1W-AD0□□, CS1W-DA0□□, CS1W-MAD44.)

CS1W-PTS□□, C200H-TS□□□

Temperature Sensor Units



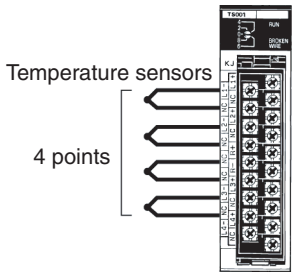
Direct Input from Four to Eight Temperature Sensors

- Input directly from up to eight temperature sensors with one Unit. (The types of temperature sensor and temperature ranges can be set separately for each input for the CS1W-PTS□□.)
- Models available with isolated inputs to prevent unwanted current flow between temperature sensor inputs (CS1W-PTS□□ only).
- Provided with measured value alarms (4 points each) (CS1W-PTS□□ only).
- Sensor disconnection detection provided.

Function

Using input from thermocouples or resistance thermometers (up to 8 inputs), the Unit converts the measured temperatures into BCD or binary data and stores them in the allocated relay area every cycle. The data can be processed using the ladder program.

Circuit Configuration



Specifications

Model			CS1W-PTS11	CS1W-PTS51	CS1W-PTS55	CS1W-PTS12	CS1W-PTS52	CS1W-PTS56	C200H-TS001/002/101/102
Classification			CS1 Special I/O Units						C200H Special I/O Units
Unit numbers			0 to 95	0 to 95	0 to 95	0 to 95	0 to 95	0 to 95	0 to 9
Inputs			4 pts	4 pts	8 pts	4 pts	4 pts	8 pts	4 pts
Input signals	Thermocouples	K	Yes	Yes	Yes	---	---	---	TS001, TS002
		J	Yes	Yes	Yes	---	---	---	TS001
		L	Yes	Yes	Yes	---	---	---	TS002
		R	Yes	Yes	Yes	---	---	---	---
		S	Yes	Yes	Yes	---	---	---	---
		T	Yes	Yes	Yes	---	---	---	---
		E	Yes	---	---	---	---	---	---
		B	Yes	Yes	Yes	---	---	---	---
		N	Yes	---	---	---	---	---	---
		W	Yes	---	---	---	---	---	---
		U	Yes	---	---	---	---	---	---
		PLII	Yes	---	---	---	------	---	---
		±100 mV	Yes	---	---	---	---	---	---
	Resistance thermometers	JPt100	---	---	---	Yes	Yes	Yes	TS101
		PT100	---	---	---	Yes	Yes	Yes	TS102
		Ni508.4Ω	---	---	---	Yes	Yes	Yes	---
Input signal range settings			4 pts set individually	4 pts set individually	8 pts set individually	4 pts set individually	4 pts set individually	8 pts set individually	One setting for all 4 pts
A/D conversion output data			4-digit binary	4-digit binary or BCD	4-digit binary or BCD	4-digit binary	4-digit binary or BCD	4-digit binary or BCD	4-digit BCD
Conversion speed			20 ms/ 4 points, 10 ms/ 2 points	250 ms/Unit	250 ms/Unit	20 ms/ 4 points, 10 ms/ 2 points	250 ms/Unit	250 ms/Unit	4.8 s max. (when 4 pts are set for Unit)
Overall accuracy	Standard accuracy		±0.05% of full scale	±0.3% of PV or ±1°C, whichever is larger, ±1 digit max.		Larger of ±0.05% of full scale or ±0.1°C	±0.3% of PV or ±0.8°C, whichever is larger, ±1 digit max.		±1% + 1°C
	Temperature coefficient		±0.01%/°C						
	Cold junction compensation error		±1°C			---			
Connections			Terminal block						

Note: Refer to page 326 for information on CS1W-PTS□□ Process I/O Units.

C200H-TC□□□

Temperature Control Units



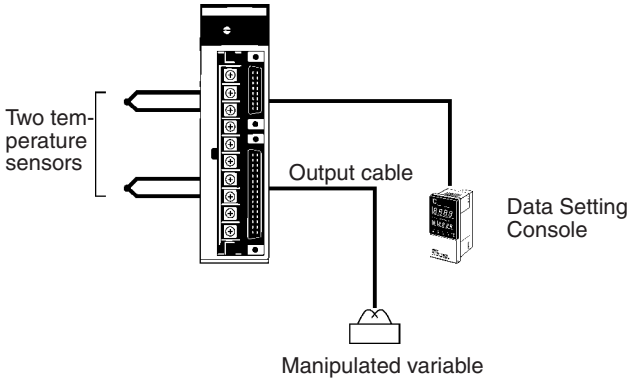
One Unit Functions as Two Temperature Controllers

- Supports 2-loop PID control (two degrees of freedom) or ON/OFF control.
- Input directly from two temperature sensors (thermocouples: R, S, K, J, T, E, B, N, L, or U) or platinum resistance thermometers (JPt00, Pt100).
- Open-collector, voltage, or current outputs
- Sampling period: 500 ms
- Run/start control.
- Two internal alarms per loop.
- Detects heater burnout though current detectors for both loops.
- Record up to eight sets of target values, alarm values, and PID parameters.
- Connects to Data Setting Console.

Function

Perform 2-loop PID control based on inputs from thermocouples or platinum resistance thermometers to control a transistor, voltage, or current output. Words allocated to the Unit in memory can be manipulated from the ladder diagram to start/stop operation, set the target value, read the process value, or perform other operations.

System Configuration



Specifications

General

Classification	Temperature sensor inputs	Control outputs	Unit numbers	Model
C200H Special I/O Unit	Thermocouples (R, S, K, J, T, E, B, N, L, or U)	Open-collector (pulse)	0 to 9	C200H-TC001
		Voltage (pulse)		C200H-TC002
		Current (linear)		C200H-TC003
	Platinum resistance thermometers (JPt00, Pt100)	Open-collector (pulse)		C200H-TC101
		Voltage (pulse)		C200H-TC102
		Current (linear)		C200H-TC103

Data Setting Console

Specifications	Model
Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	C200H-DSC01

CS1W-NC□□□, C200HW-NC□□□

Position Control Units



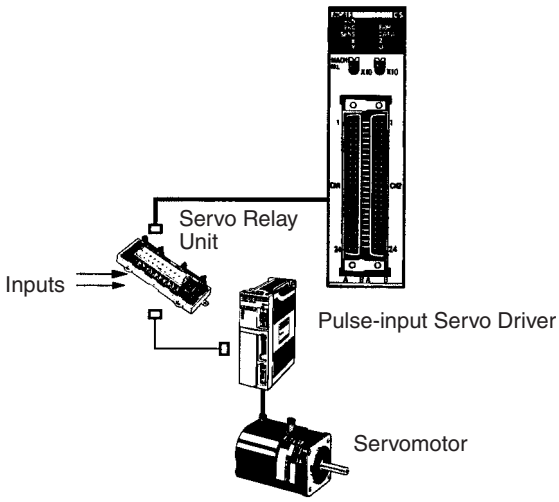
High-speed, High-precision Positioning with 1, 2, or 4 Axes

- Simple positioning systems can be created by directly specifying operation from the CPU Unit when required.
- Positioning data is saved in internal flash memory, eliminating the need to maintain a backup battery.
- Use Windows-based Support Software to easily create positioning data and store data and parameters in files. (Use WS01-NCTF1-E with C200HW-NC□ models and WS02-NCTC1-E with CS1W-NC□□ models.)
- Interrupt feeding, forced starting, and other features also supported.

Function

These Position Control Units support open-loop control with pulse-train outputs. Position using automatic trapezoid or S-curve acceleration and deceleration. Models available with 1, 2, or 4 axes. Use in combination with servomotors or stepping motors that accept pulse-train inputs.

System Configuration



Specifications

Model	CS1W-NC113 CS1W-NC133	CS1W-NC213 CS1W-NC233	CS1W-NC413 CS1W-NC433	C200HW-NC113	C200HW-NC213	C200HW-NC413
Unit name	Position Control Unit					
Classification	CS1 Special I/O Units			C200H Special I/O Units		
Unit numbers	0 to 95			0 to 15 (0 to F)		
Control method	Open-loop, automatic trapezoid acceleration/deceleration					
Control output signals	CS1W-NC□13: Open-collector outputs CS1W-NC□33: Line-driver outputs			Open-collector		
Controlled axes	1	2	4	1	2	4
Operating modes	Direct operation or memory operation					
Data format	Binary (hexadecimal)			BCD		
Affect on scan time for end refresh	0.29 to 0.41 ms max./unit			2.6 to 4.5 ms max./unit		
Affect on scan time for IOWR/IORD	0.6 to 0.7 ms max./instructions			2.6 to 5.5 ms max./instructions		
Startup time	2 ms min. (Refer to operation manual for conditions.)			7.51 ms min. (Refer to operation manual for conditions.)		
Position data	–1,073,741,823 to +1,073,741,823 pulses			–9,999,999 to +9,999,999 pulses		
No. of positions	100 per axis					
Speed data	1 to 500 kpps (in 1-pps units)			1 to 500 kpps (specified as factor)		
No. of speeds	100 per axis					
Acceleration/ deceleration times	0 to 250 s (time to max. speed)					
Acceleration/ deceleration curves	Trapezoidal or S-curve					
Saving data in CPU	Flash memory					
Windows-based Support Software	CX-Position			SYSMAC-NCT (WS01-NCTF1-E)		

CS1W-MC421/-MC221

Motion Control Units



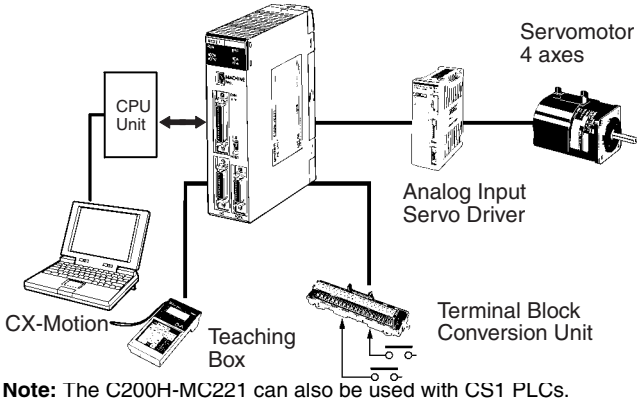
High-precision, Two-axis Motion Control with Multi-tasking G-language Programming

- High-speed control of up to 4 axes with one Unit and up to 76 axes with one PLC (19 Units x 4 axes) (assumes that Power Supply Unit capacity is not exceeded).
- Winding operations easily controlled at high-speed using traverse positioning control.
- High-speed response to commands from CPU Unit (8 ms for 2 axes, 13 ms for 4 axes).
- Encoder response of 2 Mpps possible with 4x frequency multiplication for applications with high-speed, high-precision servomotors.
- D interrupt code outputs to CPU Unit at end of positioning or at specified positions (D code output time: 3.3 ms max.).
- CX-Motion Windows-based Support Software Define user mnemonics to use in place of G codes to simplify MC program development and analysis.
- Servo trace function from CX-Motion to trace error counter changes or motor speeds.
- Automatic Loading Function MC programs and positioning data can be automatically downloaded from computer memory when required by the MC Unit.

Function

The Motion Controller provides closed-loop control with analog outputs for up to 2 or 4 axes, and supports the G language for advanced, high-speed, high-precision position control, such as traverse operation. Multi-tasking allows you to run the two axes independently for a wider range of application.

System Configuration



Note: The C200H-MC221 can also be used with CS1 PLCs.

Specifications

General

Model		CS1W-MC421	CS1W-MC221
Classification		CS1 Special I/O Unit	
Control method		Closed loop with automatic trapezoid or S-curve acceleration/deceleration	
Control output signals		Analog	
Internal programming language		G language (Program started by command sent from CPU Unit's ladder program.)	
Controlled axes		4 axes max.	2 axes max.
Maximum position value		–39,999,999 to 39,999,999 (for minimum setting unit of 1)	
Synchronous axis control		4 axes max.	2 axes max.
Positioning	Linear interpolation	4 axes max.	2 axes max.
	Arc interpolation	2 axes max. in a plane	
	Helical interpolation	2-axis arc interpolation in a plane + feed axis	---
	Traverse	2-axis traverse feeding	
	Infinite feed	Infinite feeding of one or more axes	
	Interrupt feed	Interrupt feeding for specified axes (Positioning can be specified for when there is no interrupt.)	
Task programming capacity	Number of tasks	4 tasks max.	2 tasks max.
	Number of programs	25 programs when using 4 tasks	50 programs when using 2 tasks
	Program capacity	500 blocks per task when using 4 tasks	1,000 blocks per task when using 2 tasks

CX-Motion: Windows-based Support Software

Model	WS02-MCTC1-EV□
Supported MC Units	CS1W-MC221/421, C200H-MC221, and CV500-MC221/421
Applicable computer	DOS, OS: Windows 95/98 or Windows NT Version 4.0
Functions	Functions required for MC Unit control: Creating/editing/saving/printing system parameters, positioning data, and MC programs; monitoring MC Unit operation

C200HW-MC402-E

Motion Control Unit



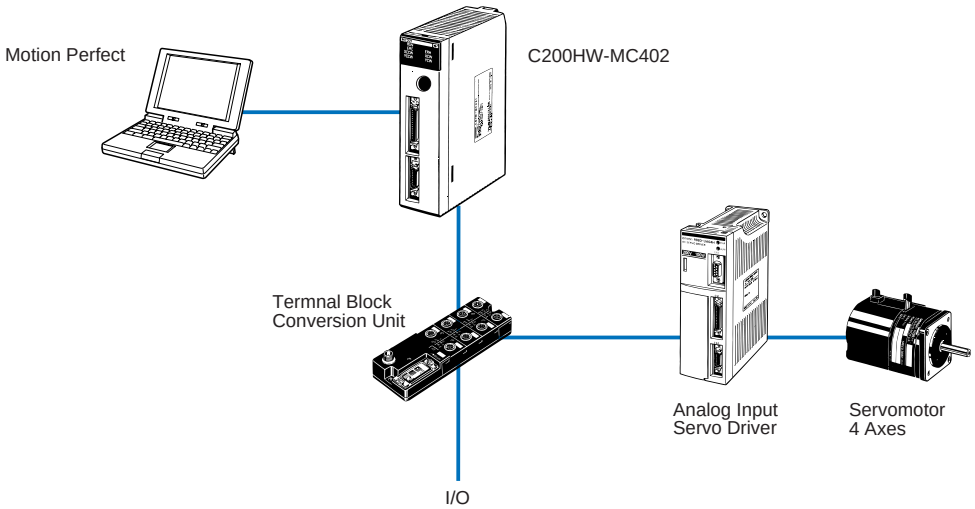
Advanced multi-axes Motion Control with Multi-task BASIC language programming

- Advanced Motion control of 4 axes per unit and up to 16 modules can be installed in one PLC
- Analogue outputs for position, Speed and Torque control
- Hardware registration input for every axis
- Electronic CAM profiles and axes synchronization
- Friendly Motion Perfect Windows-based programming and debugging software. Provides versatile test and monitoring functions including a 4-channel software oscilloscope.

Function

The advanced Motion control unit provides closed-loop control of up to 4 axes, programmed in a multi-task BASIC type language and supported by the powerful software tool. The unit provides a complete command set, allowing applications such as flying saws, rotaring knives, any synchronization and electronic CAM profile to be easily programmed.

System Configuration



Specifications

General

Model		C200HW-MC402-E
Classification		C200H Special I/O Unit
Control Method		Closed loop Position, Speed and Torque control
Control Output signals		Analogue
Programming language		BASIC type motion control language
Controlled axes		4 real axes and 4 virutal axes
Measurement units		User definable
Positioning	Linear interpolation	4 axes
	Arc interpolation	For any 2 axes
	Helical interpolation	For any 3 axes
	Axes Synchronization	For any 2 axes
	Axes Linked CAM profile	For any 2 axes
	Hardware Registration Interrupt	4 axes
Task programming capacity	Number of tasks	Up 5 tasks simultaneous plus interface task
	Number of programs	14
	Data storage capacity	251 (VR) + 16000 (Table) max.

Motion Perfect Software

Model	Motion Perfect
Supported MC Units	C200HW-MC402-E, R88A-MCW151-E, R88A-MCW151-DRT-E
Applicable computer	Windows 95/98/2000/NT4.0
Functions	Programming and debugging software tool. Test and moitoring functions including a 4-channel software oscillos-cope.

CS1W-MCH71

Motion Control Unit



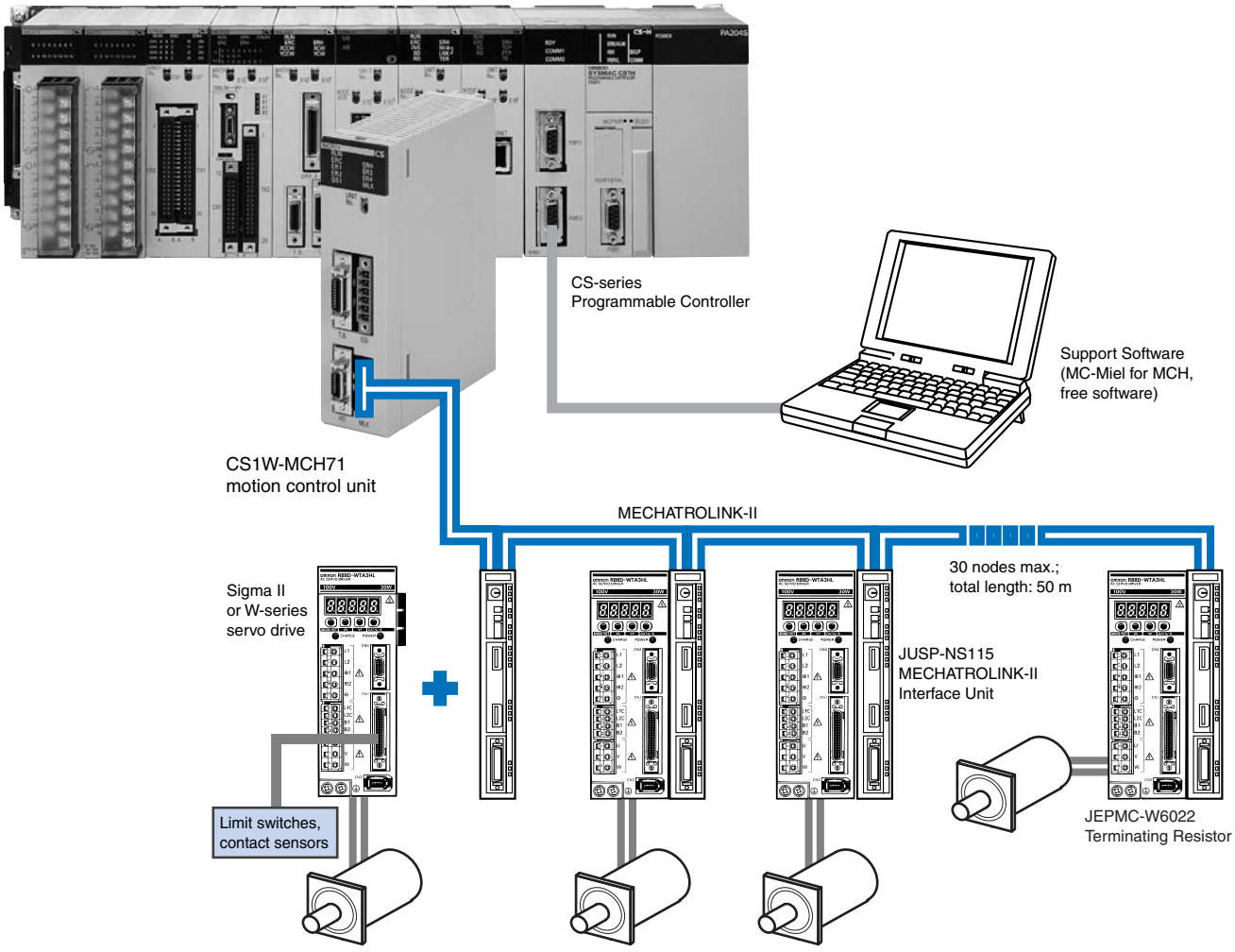
Multi-axes Motion Control over high-speed MECHATROLINK-II

- Up to 30 axes controlled with less wiring
- Supports Position, speed and Torque control
- Electronic CAM profiles and axes synchronization
- Hardware registration input for every axis
- Program control commands, like Multi-task programming and branching commands, and various arithmetic operations for maximum program efficiency
- Access to the complete system from one point

Function

Multi-axes control is made easy by freely combining control axes. Up to 32 axes can be used, including 30 physical axes and two virtual axes, and each axis can be set individually. Position Control, synchronized control (electronic gear, electronic Cam, follow-up), speed control, and torque control are all supported, enabling a wide range of applications. By using high-speed servo communications, motion programs, system parameters, system data, and servo drive parameters can be set and read from the software tool.

System Configuration



Ordering Information

Motion Controller

Name	Model
Motion Control Unit	CS1W-MCH71
Support Software	MC-Miel (free of charge)

Mechatrolink-II related devices

Name	Model	Remarks
Mechatrolink-II Interface Unit	JUSP-NS115	For Sigma-II and W-series Servo drives
Mechatrolink-II Terminator	JEPMC-W6022	Terminating resistor
Mechatrolink-II Cables	JEPMC-W6003-A5	0.5 meter
	JEPMC-W6003-01	1 meter
	JEPMC-W6003-03	3 meters
	JEPMC-W6003-05	5 meters
	JEPMC-W6003-10	10 meters
	JEPMC-W6003-20	20 meters
	JEPMC-W6003-30	30 meters
24V DC I/O Module	JEPMC-IO2310	64 Inputs, 64 Outputs
Counter Module	JEPMC-PL2900	Reversible counters, 2 channels
Pulse Output Module	JEPMC-PL2910	Pulse train positioning, 2 channels

Specifications

General

Model		CS1W-MCH71
Classification		CS-series CPU Bus unit
Applicable PLCs		CS-series, new version (CS1[]-CPU[][]H)
Control Method		MECHATROLINK-II (Position, Speed and Torque control)
Controlled devices		Sigma-II and W-series Servo Drives (ver. 38 or later) with MECHATROLINK-II Interface and various I/O Units.
Programming language		BASIC type motion control language
Controlled axes		32 max, including 30 physical or virtual axes and 2 virtual axes
Control functions	Positioning (PTP)	Executes positioning independently for each axis at a specified speed or the speed system parameter. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/Unit)
	Linear interpolation	Executes linear interpolation for up to eight axes at a time at the specified interpolation feed speed. (Simultaneous specification: Up to eight axes/block, Simultaneous execution: Up to 32 blocks/system)
	Circular interpolation	Executes circular interpolation for two axes in either clockwise or counterclockwise at the specified interpolation feed speed. Helical circular interpolation is also possible with single-axis linear interpolation added. (Simultaneous specification: Two or three axes/block, Simultaneous execution: Up to 16 blocks/system)
	Other functions	Origin searches, interrupt feeding, timed positioning, traverse positioning, independent electronic cam, synchronized electronic cam, link operation, electronic gear, follow-up synchronization, speed reference, torque reference
Motion programs	Number of tasks, number of programs	Up to 8 tasks and 256 programs/Unit (8 parallel branches per task max.)
	Program capacity	In motion program conversion, 8,000 blocks/Unit max. (2 Mbytes); number of blocks: 800
	Data capacity	Position data: 10,240 points/Unit; Cam data: 32 max.; 16,000 points/Unit
	Subroutine nesting	Five levels max.

CS1W-CT0□1, C200H-CT021

High-speed Counter Units



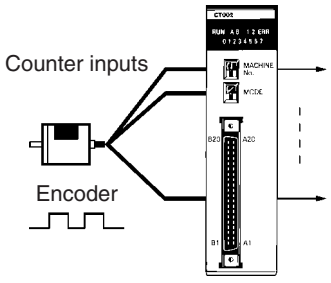
Two- and four-channel high-speed counter units with built-in fast control I/O

- Max. input frequency = 500 kHz. (when line driver input is used)
- Output turns ON less than 0.5 ms after set value is reached. (may deviate during execution of IORD/IOWR instructions)
- 32-bit counting range.
- 2- and 4-axis operation available.
- Digital variable noise filter provided.
- 5-, 12-, and 24-V line driver inputs available. (5- and 12-V line driver input is only available, however, for 1 axis with the CS1W-CT021 and 2 axes with the CS1W-CT041.)
- Supports simple, ring, and linear counting modes.
- Supports offset phase input, up and down pulse input, and pulse+direction input.
- Supports 4 external control inputs, and a total of 16 functions can be set including open gate, close gate, preset, reset, capture, stop/capture/reset combinations, and reset enable.
- One Unit supports 4 external outputs and 28 internal outputs with counter value zone comparisons, target comparisons, delays, holds, programmable outputs, and hysteresis settings.
- Pulse rate measurement function and data logging.
- Counter outputs and external control inputs can be used to trigger interrupt tasks in the CPU Unit.
- Settings can be changed during Unit operation.

Function

The High-speed Counter Units count pulse signal inputs that are too fast to be detected by normal Input Units. The Units can be programmed to produce outputs according to counter values for specified conditions, and many other functions are supported.

System Configuration



Terminal Arrangement

Item		Connector 2 (CN2)		Pin No.
		Row A	Row B	
Power Supply (to feed the outputs)		-PS: 0V	+PS: 12 to 24V	1
Digital Outputs [0-3] (NPN/PNP)		O2: NPN	O2: PNP	2
		O3: NPN	O3: PNP	3
Spare				4
Digital Inputs [0-3]		I2: 0V	I2: 24V	5
		I3: 0V	I3: 24V	6
Spare				7
Counter 1 & Counter 2	A	CH2: LD- / 0V	CH2: LD+	8
		CH2: 12V	CH2: 24V	9
	B	CH2: LD- / 0V	CH2: LD+	10
		CH2: 12V	CH2: 24V	11
	Z	CH2: LD- / 0V	CH2: LD+	12
		CH2: 12V	CH2: 24V	13
Spare				14
Counter 3 & Counter 4*	A	CH4: LD- / 0V	CH4: LD+	15
		CH4: 12V	CH4: 24V	16
	B	CH4: LD- / 0V	CH4: LD+	17
		CH4:12V	CH4: 24V	18
	Z	CH4: LD- / 0V	CH4: LD+	19
		CH4:12V	CH4: 24V	20

Connector 1 (CN1)		Pin No.
Row A	Row B	
-PS: 0V	+PS:12 to 24V	1
O0: NPN	O0: PNP	2
O1: NPN	O1: PNP	3
		4
I0: 0V	I0: 24V	5
I1: 0V	I1: 24V	6
		7
CH1: LD- / 0V	CH1: LD+	8
CH1: 5V	CH1: 24V	9
CH1: LD- / 0V	CH1: LD+	10
CH1: 5V	CH1: 24V	11
CH1: LD- / 0V	CH1: LD+	12
CH1: 5V	CH1: 24V	13
		14
CH3: LD- / 0V	CH3: LD+	15
CH3: 5V	CH3: 24V	16
CH3: LD- / 0V	CH3: LD+	17
CH3: 5V	CH3: 24V	18
CH3: LD- / 0V	CH3: LD+	19
CH3: 5V	CH3: 24V	20

Specifications

General

Classification	Number of counters	Encoder A and B input, pulse input, Z signal	Maximum counting speed	Unit numbers	Model
C200H Special I/O Unit	2	Open-collector Input voltage: 12 V DC or 24 V DC	50 kcps	0 to F	C200H-CT021
		RS-422 line driver	75 kcps		
CS1 Special I/O Unit	2	Open-collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (5- and 12- V DC input only possible for 1 axis.)	50 kcps	0 to 92 (4 unit numbers per Unit)	CS1W-CT021
		RS-422 line driver	500 kcps		
	4	Open-collector Input voltage: 5 V DC, 12 V DC, or 24 V DC (5- and 12- V DC input only possible up to 2 axes.)	50 kcps		CS1W-CT041
		RS-422 line driver	500 kcps		

CS1W-CTS21

SSI Encoder Input Unit

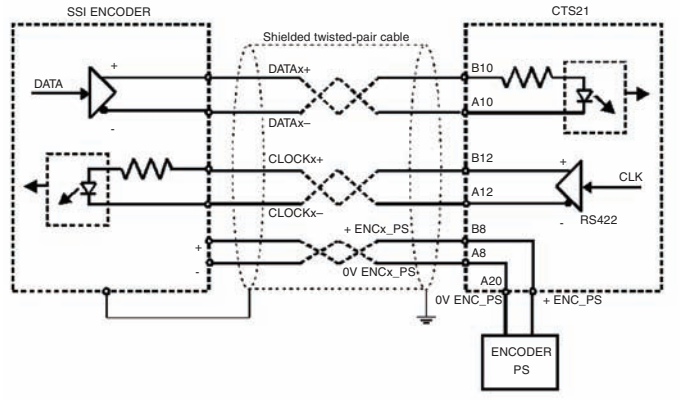
SSI (synchronous serial interface) is a standard communication protocol developed for absolute encoders. It provides easier connection and reduced wiring compared to parallel connection.



Specifications

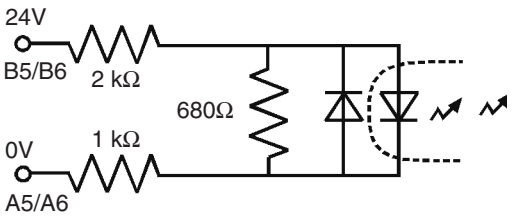
SSI Communication

Item	Specification
CLK lines	Non-isolated differential line driver, RS422 compliant
DATA lines	Electrically isolated differential line receiver, RS422 compliant
Number of data-bits	9 to 31 (default: 24)
Value coding	Gray/Binary/Tannenbaum/Raw (default Gray)
Clock frequency	100kHz to 1.5MHz
Monoflop time	10µs to 99,990µs (default: 40 µs)
Sample rate	About 2500 Samples/sec with 2 encoders connected (with default settings)



Input Specifications

Item	Digital Inputs
Input Voltage	24 V DC (19.6 V to 26.4 V)
Input Current (typical)	7.6 mA
ON Voltage (min.)	19.6 V
OFF Voltage (max.)	4 V
Max. repetition rate	1 kHz
Min. pulse width	10 µs
Input Voltage	24 V DC (19.6V to 26.4V)



Output Specifications

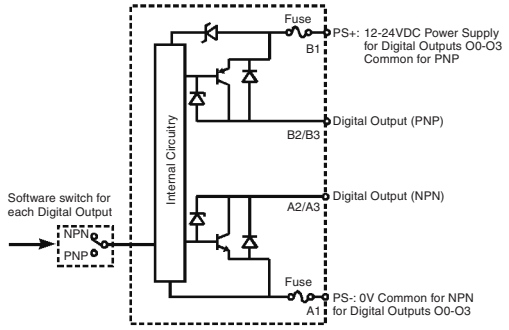
Item	Specification
Driver Type	Open Collector (NPN/PNP selectable)
Operating Voltage Range	12-24 V (10.2 to 26.4 V)
Maximum Switching Capacity	46 mA at 10.2 V to 100 mA at 20.4 V to 26.4 V (400mA max./common) (linear behaviour)
Minimum Switching Current	5 mA
Output ON-delay	0.1ms max.
Output OFF-delay	0.1ms max.
Leakage Current	0.1mA max.

The power supplied to the Unit, to feed the Digital Outputs, has to be supplied externally and should be a double insulated class II (overvoltage) type with ratings from 12 to 24VDC (10.2 to 26.4VDC). Characteristics of the Power Supply Input circuitry are summarised in the following table.

Item	Specification
Operating Voltage Range	10.2-26.4 V DC
Current Consumption	25 mA max. (excl. load current)
Internal Fault Protection	Two 1 A (not replaceable) fuses in Power Supply lines
Reverse Polarity Protection	Yes

The Digital Outputs are insulated from the I/O-bus but not from each other. They are not short circuit protected.

Digital Output Circuitry:



Connector (CN1 and CN2) Pin-layout

Use the following table to make connections directly to the soldering terminals of the connector jack(s) (see *Nomenclature* section for position of connectors 1 and 2 and rows A and B):

Connector 2 (CN2)				Connector 1 (CN1)			
Row A		Row B		Row A		Row B	
A1	0V_PS[1]	24V_PS[2]	B1	A1	0V_PS[1]	24V_PS[2]	B1
A2	O2 NPN	O2 PNP	B2	A2	O0 NPN	O0 PNP	B2
A3	O3 NPN	O3 PNP	B3	A3	O1 NPN	O1 PNP	B3
A4			B4	A4			B4
A5	0V I2	24V I2	B5	A5	0V I0	24V I0	B5
A6	0V I3	24V I3	B6	A6	0V I1	24V I1	B6
A7			B7	A7			B7
A8	0V ENC2_PS[3]	+ ENC2_PS[4]	B8	A8	0V ENC1_PS[3]	+ ENC1_PS[4]	B8
A9			B9	A9			B9
A10	DATA2 -	DATA2 +	B10	A10	DATA1 -	DATA1 +	B10
A11			B11	A11			B11
A12	CLOCK2 -	CLOCK2 +	B12	A12	CLOCK1 -	CLOCK1 +	B12
A13			B13	A13			B13
A14			B14	A14			B14
A15			B15	A15			B15
A16			B16	A16			B16
A17			B17	A17			B17
A18			B18	A18			B18
A19			B19	A19			B19
A20	0V ENC_PS[3]	+ ENC_PS[4]	B20	A20	0V ENC_PS[3]	+ ENC_PS[4]	B20

Serial Communication Units

Serial Communications Features

Unit	Model	Ports	Serial communications mode							BASIC programming	Message communications
			Protocol macros	Host Link	NT Links	No-protocol	Peripheral bus	Programming Console bus	Serial Gateway (see note)		
			General-purpose external devices	Host computers	OMRON PTs	General-purpose external devices	Programming Devices	Programming Console	CompoWay/F devices, Inverters, Servo Drives	General-purpose external device	
CPU Units	All models	Port 1: Peripheral	No	Yes	Yes	No	Yes	Yes	No	No	No
		Port 2: RS-232C	No	Yes	Yes	Yes	Yes	No	Yes	No	No
ASCII Units	C200H-ASC11	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No
		Port 2: RS-232C	No	No	No	No	No	No	Yes	Yes	No
	C200H-ASC21	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No
		Port 2: RS-422A/485	No	No	No	No	No	No	Yes	Yes	No
	C200H-ASC31	Port 1: RS-232C	No	No	No	No	No	No	Yes	Yes	No
		Port 2: RS-232C	No	No	No	No	No	No	Yes	Yes	No
Serial Communications Boards/Units	CS1W-SCB21-V1	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
		Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
	CS1W-SCB41-V1	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
		Port 2: RS-422A/485	Yes	Yes	Yes	No	No	No	No	No	No
	CS1W-SCU21-V1	Port 1: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No
		Port 2: RS-232C	Yes	Yes	Yes	No	No	No	No	No	No

Note: Requires SCU/SCB Ver 1.2 or later mounted on CS1 CPU Unit Ver 3.0.

C200H-ASC□□

ASCII Units



Easily Perform Serial Data Communications

- Perform ASCII communications with a wide range of external devices.
- The C200H-ASC11/ASC21/ASC31 function as special processing units with BASIC programming.
- Large-capacity user memory: 200 Kbytes
- Model available with RS422A/485 port.
- Various forms of data exchanges with CPU Unit: Select the best method for the read/write trigger and timing.
- High-speed data exchanges possible with shared memory (not dependant on I/O refresh).
- A wide range of interrupt processes: Interrupts from CPU to ASCII Unit, communications interrupt, key interrupts, timer interrupts, error interrupts, etc.
- Easy control of transmission control signals.
- Calculation instructions for error check codes.
- Many BASIC debugging functions (break points, 1-step execution, execution stop monitoring, etc.)
- Error log supported with up to 30 error records.

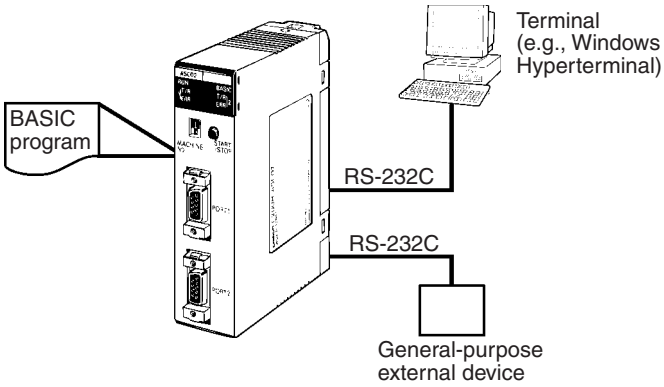
Function

The ASCII Units support BASIC language programming and RS-232C and RS422A/485 serial communications. BASIC programming enables ASCII communications with essential any external device. It can also be used as a special processing unit to aid the CPU Unit without using external communications.

The C200H-ASC11/ASC21/ASC31 provide shared memory with the CPU Unit, and both the ASCII Unit and the CPU Unit can access the shared memory asynchronously, providing for high-speed data exchanges between the two Units without using interrupts.

A library interface toolkit is available for the creation of user-defined library routines in BASIC or C.

System Configuration



Specifications

General

Classification	User memory	Shared memory	Serial communications ports	Unit numbers	Model
C200H Special I/O Unit	200 Kbytes	Provided (90 words in I/O memory)	RS-232C x 2	0 to F	C200H-ASC11
			RS-232C x 1, RS-422A/485 x 1		C200H-ASC21
			RS-232C x 2, RS-232C x 1 for terminal		C200H-ASC31

Note: The C200H-ASC02 can also be used with CS1 PLCs.

CS1W-SCU21-V1/-SCB□1-V1

Serial Communications Units/Boards



Supports Protocol Macros, Host Link Communications, and 1:N NT Links

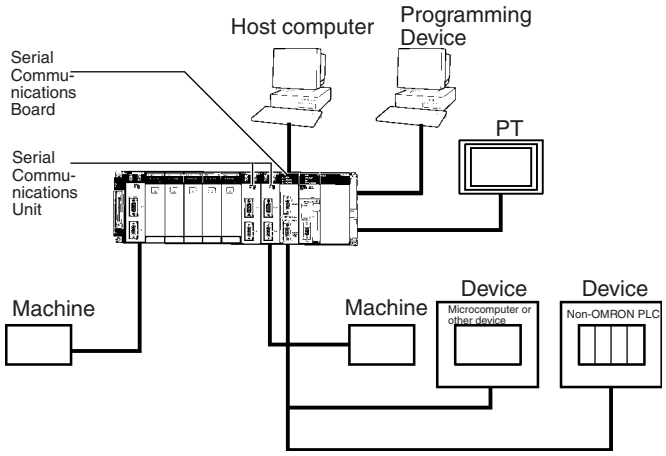
- Serial Communications Board
- Increase the number of serial ports without using I/O slots.
- Connect general-purpose external devices 1:N using RS-422A/485.
- Generate interrupts to the CPU Unit when data is received.
- Serial Communications Unit
- Mount up to 16 Units (including all other CPU Bus Units) on CPU or Expansion Racks. Ideal for systems that require many serial ports.

Function

Either an Inner Board or CPU Bus Unit can be used to increase the number of serial ports (RS-232C or RS-422A/485) two at a time. You can specify Protocol Macros, Host Link Communications, or 1:N NT Links separately for each port. With the CS1 Series, you can always install the right number of serial ports for your system.

The Serial Gateway function available in SCU/SCB Units Ver.1.2 and higher enable seamless access to field devices like temperature controllers, inverters or servo drives over multiple network layers. The Gateway function handles the de/encapsulation of serial communication messages in the higher-layer FINS communication, e.g. over Controller Link or Ethernet.

System Configuration



Specifications

General

Unit	Classification	Serial communications modes	Serial	Unit numbers	Model
Serial Communications Board	Inner Board	Set separately for each port: Protocol Macro, Host Link, or 1:N NT Link, Serial Gateway or non-protocol communications.	RS-232C x 2	---	CS1W-SCB21-V1
			RS-232C x 1, RS-422A/485 x 1		CS1W-SCB41-V1
Serial Communications Unit	CS1 CPU Bus Unit		RS-232C x 2	0 to F	CS1W-SCU21-V1

Protocol Macros

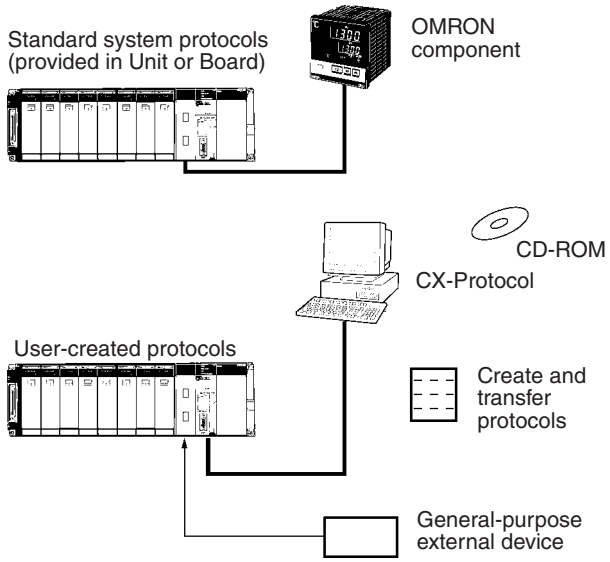
Easily Create Protocols for Data Exchange with External Devices; Execute with One Instruction

Function

Protocols for communications with external devices can be easily created according to the communications standards required by the external device. Protocol macros enable communications with essentially any external device with an RS-232C or RS-422A/485 port without programming communications in the PLC.

Standard system protocols are provided as a standard feature for communications with OMRON components, such as Temperature Controllers, Panel Meters, Bar Code Readers, and Modems. A Windows-based tool called CX-Protocol is also available to enable creation of protocols for most any external device.

System Configuration



Types of Protocol

Protocols	External devices	Required products
Standard system protocols	OMRON components	Serial Communications Board or Unit
User-created protocols	General-purpose external device	Serial Communications Board or Unit + CX-Protocol (Windows-based protocol support software)

Standard System Protocols

Component		Model	Send/receive sequences
CompoWay/F-compatible components		OMRON CompoWay/F slave components	CompoWay/F command send/response receive
Digital Controllers and Temperature Controllers	Small Digital Controller with Communications (53 x 53 mm)	E5CK	Present value read, set point read, manipulated variable read, etc. Set point write, alarm write, PID parameter write, etc.
	Temperature Controllers with Digital Indications (Thermac J with communications) (96 x 96 mm or 48 x 96 mm)	E5□J-A2H0	
	Digital Controllers with Communications (96 x 96 mm)	ES100□	
	High-density Temperature Controller with communications (8 control points)	E5ZE	
Intelligent Signal Processors (special specifications)		K3T□	Display value read, comparison value read, write, etc.
Bar Code Readers	Laser Scanner type	V500	Read start, data read, read stop, etc.
	CCD type	V520	
Laser Micrometer		3Z4L	Measurement condition set, continuous measurement start, etc.
Visual Inspection Systems	High speed, high precision, low cost	F200	Measurement, continuous measurement, etc.
	High-precision inspection/positioning	F300	
	Character inspection software/positioning software	F350	Measurement, positioning, inspection, character inspection, etc.
RFID Controllers	Electromagnetic coupling (for short distances)	V600	Carrier data read, autoread, write, etc.
	Microwave (for long distances)	V620	
Hayes Modem AT Command		---	Modem initialize, dial, send, etc.
OMRON PLCs with Host Link (C-mode) protocol		C-Series PLCs	---
OMRON PLCs with Host Link (FINS) protocol		CS/CJ-series PLCs	Requires SCU/SCB Ver. 1.2 or higher

NT-AL001

RS-232C/RS-422A Adapter Unit



Allows integration of RS232C devices into RS-422A networks.

- Long-distance transmissions are possible through an RS-422A interface. By converting from RS-232C to RS-422A and then back to RS-232C, a transmission distance of up to 500 m can be achieved.
- No power supply is required. If the 5-V terminal (150 mA max.) is connected from the RS-232C device, a separate power supply is not required to drive the Adapter Unit.
- The removable terminal block enables wiring not possible with D-sub connectors. (The RS-232C interface is 9-pin D-sub.)

Specifications

RS-232C Interface

Item	Specification
Baud rate	64 Kbps max.
Transmission distance	2 m max.
Connector	9-pin, D-sub connector (female)

RS-422A Interface

Item	Specification
Baud rate	64 Kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminal block	8 terminals, M3.0; detachable

CS1W-V600□□□/C200H-IDS01-V1

RFID Sensor Unit



Easy integration of RFID Systems into PLC's.

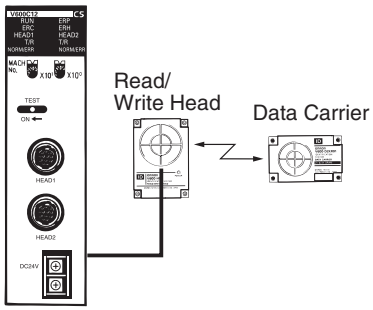
- Connects V600 RFID read/write heads directly to the PLC.
- Function checking possible with standard hand-held Programming Console.
- Read data from Data Carriers simply by sending a read command.
- The C200H-IDS01-V1 can read/write up to 1,024 bytes. The CS1W-V600C11/12 can read/write up to 2,048 bytes.

Function

Read/write data in Data Carrier memory by sending read/write commands from the CPU Unit to the Read/Write Head.

One Read/Write Head can be connected to the CS1W-V600C11 and two Read/Write Heads can be connected to the CS1W-V600C12. The data transfer speed has been increased in both models.

System Configuration



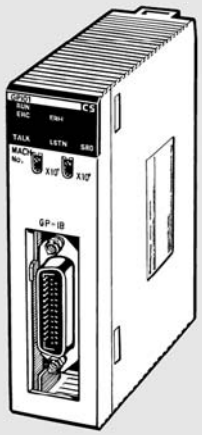
Specifications

Classification	Connectable ID System	Connectable Read/ Write Heads	External power supply	Unit numbers	Model
CS1 CPU Bus Unit	V600 Series (electromagnetic, for short distances)	1 Read/Write Head	Not required	0 to 95	CS1W-V600C11
		2 Read/Write Heads	24 V DC	0 to 94	CS1W-V600C12
C200H Special I/O Unit		---	Not required	0 to 9	C200H-IDS01-V1

CS1W-GPI01

GP-IB Interface Unit

- Enables communications between SYSMAC CS-series PLCs and GP-IB instruments.
- Conforms to the standard interface IEEE-488-1978 (GP-IB).
- Usable in either Master Mode (controller) or Slave Mode (talker, listener).
- Communications with GP-IB instruments are easily implimented simply by using the INTELLIGENT I/O READ and INTELLIGENT I/O WRITE (IORD/IOWR) instruction in the ladder program in the CPU Unit to read and write buffer memory in the GP-IB Interface Unit.



Specifications

Item	Specification
Name	SYSMAC CS-series GP-IB Interface Unit
Model number	CS1W-GPI01
Unit type	CS1 Special I/O Unit
Mounting location	CS1 CPU Rack or CS1 Expansion Rack
Max. number of GP-IB Interface Units	Up to 4 GP-IB Interface Units per CPU Unit
Unit number setting range	0 to 95
GP-IB Interface Unit settings when editing the I/O tables offline with the CX-Programmer	Number of unit numbers used: 1 Number of input words allocated: 5 Number of output words allocated: 5
Transmission method	8-bit parallel data transfer
Communications method	Half duplex
Interface	Conforms to IEEE-488-1978 (24-pin) standards
Handshaking method	Three-line handshaking
Functional specifications (GP-IB interface functions)	Master mode: SH1, AH1, T6, TE0, L4, LE0, C1 to C4, and C28 Slave mode: SH1, AH1, T6, TE0, L4, LE0, SR1, RL0, PP0, DC1, and DT0
Connection configurations	Star configuration or daisy-chain configuration
Transmission distance	Limits on the length of cables in the system (All three of these conditions must be satisfied simultaneously.) Total cable length ≤ Number of devices in the system × 2 m Total cable length ≤ 20 m Length of a single cable ≤ 4 m (for a 1:1 connection)
Max. number of connected devices	15 devices max. including the GP-IB Interface Unit
GP-IB device address	0 to 30
Delimiters	Select from the following: CR + LF, CR, LF, EOI, or user-set code.
Max. data transfer size	512 bytes max. in a single reception or transmission
Max. number of connectors	2 (connectors can be stacked)
Current consumption	5 VDC, 330 mA
Dimensions	35 × 130 × 101 mm (W × H × D)
Weight	258 g max.

OMRON

Communications Networks

Overview

Level	Network	Functions	Communications	Unit/Board
Information networks	Ethernet	Host computer to PLC	FINS messages	Ethernet Unit
		PLC to PLC		
		Host computer to CPU Unit memory card	FTP server	
		UNIX computer or other socket service to PLC	Socket services	
	Controller Link	Computers connected directly to network and PLC	FINS messages	Controller Link Support Board and Unit
			Data links (offsets and automatic setting)	
Control networks	Controller Link	PLC to PLC	FINS messages	Controller Link Unit
			Data links (offsets and automatic setting)	
	DeviceNet		FINS messages on open network	DeviceNet Master Unit
	DeviceNet	PLC to components (slaves)	High-capacity remote I/O on open network (fixed or user allocations)	DeviceNet Master Unit
	PROFIBUS-DP	PLC to components (slaves)	High-capacity remote I/O on open network (user allocations)	PROFIBUS-DP Master, I/O Unit
	CAN/CANopen	Component to components	Freely configurable, object-oriented communication using CANopen or user-defined CAN protocols	CANopen Unit
	CompoBus/S	PLC to components (slaves)	High-speed remote I/O with OMRON network (fixed allocations)	CompoBus/S Master Unit

Specifications

Communications

Network	Ethernet	Controller Link	PROFIBUS-DP	DeviceNet	CANopen	CompoBus/S
Messages	Yes	Yes	Limited to DPV1 devices	Yes	Yes	---
Data links	---	Yes	Manually configurable	---	Yes	---
Remote I/O	---	---	Yes	Yes	Yes	Yes
Maximum speed	10/100 Mbps	2 Mbps Comm cycle: Approx. 34 ms (Wired: 32 nodes, 2-Kbits + 2-Kword data links)	12 Mbps Comm cycle from 1 ms	500 Kbps Comm cycle: Approx. 5 ms (128 inputs and 128 outputs)	1 Mbps (acyclic, on-event communication)	750 Kbps (See note 1.) Comm cycle: Approx. 1 ms (128 inputs and 128 outputs)
Total distance	---	Twisted-pairs:1 km (at 500 bps) Optical: 20 km	1200 m up to 93.75 kbps, 100 m at 12 Mbps. Extension by optical links is possible.	500 m (at 125 kbps)	5 km at 10 kbps to 40 m at 1 Mbps	Trunk line: 500 m (See note 2.) Communications cycle: 6 ms max.
Maximum nodes	---	32/62 with repeaters	126 with repeaters	63	127	32
Communications media	---	Special twisted-pair cable or optical cable	PROFIBUS cable	DeviceNet cable	ISO11898. e.g. DeviceNet cable	2-core or 4-core VCTF cable, special flat cable (See note 3.)
Network data link capacity	---	32,000/62,000 words	---	---	---	---
Remote I/O capacity	---	---	300 words (C200H) 7000 words (CJ1, CS1)	32,000 pts (with Configurator) 2,048 pts (without Configurator)	Up to 200 words configurable	256 pts
Supporting PLCs	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE	CS1, CJ1, C200HX/HG/HE/HS, CQM1/CQM1H (I/O link), CPM1A (I/O link)	CS1, CJ1, CVM1, CV Series, C200HX/HG/HE, C200HS, CQM1/CQM1H (with I/O Link), CPM2C (with I/O Link)	CS1, C200HX/HG/HE	CS1, CJ1, C200HX/HG/HE, C200HS, CQM1/CQM1H, CPM2C-S1□0C (-DRT) SRM1; CPM1A/CPM2C (with I/O Link)

Note: 1. For high-speed communications mode. Trunk line length is 100 m (30 m max. for 4-core VCTF or special flat cable).
2. For long-distance communications mode (200 m max. for 4-core VCTF or special flat cable).
3. Different types of cables cannot be mixed.

CS1W-ETN□□

Ethernet Units



Enables fast data transfer within Factory Automation systems, and easily links FA systems to plant management systems

- Access socket services simply by manipulating specific bits in memory.
- Take advantage of data transfer by e-mail.
- Seamless communication with Controller Link and other networks.
- Use the Ethernet standard protocols, TCP/IP and UDP/IP.
- Use OMRON's standard FINS message communications.
- Exchange files with host computers using FTP.
- Set communications parameters with the CX-Programmer setup menus.

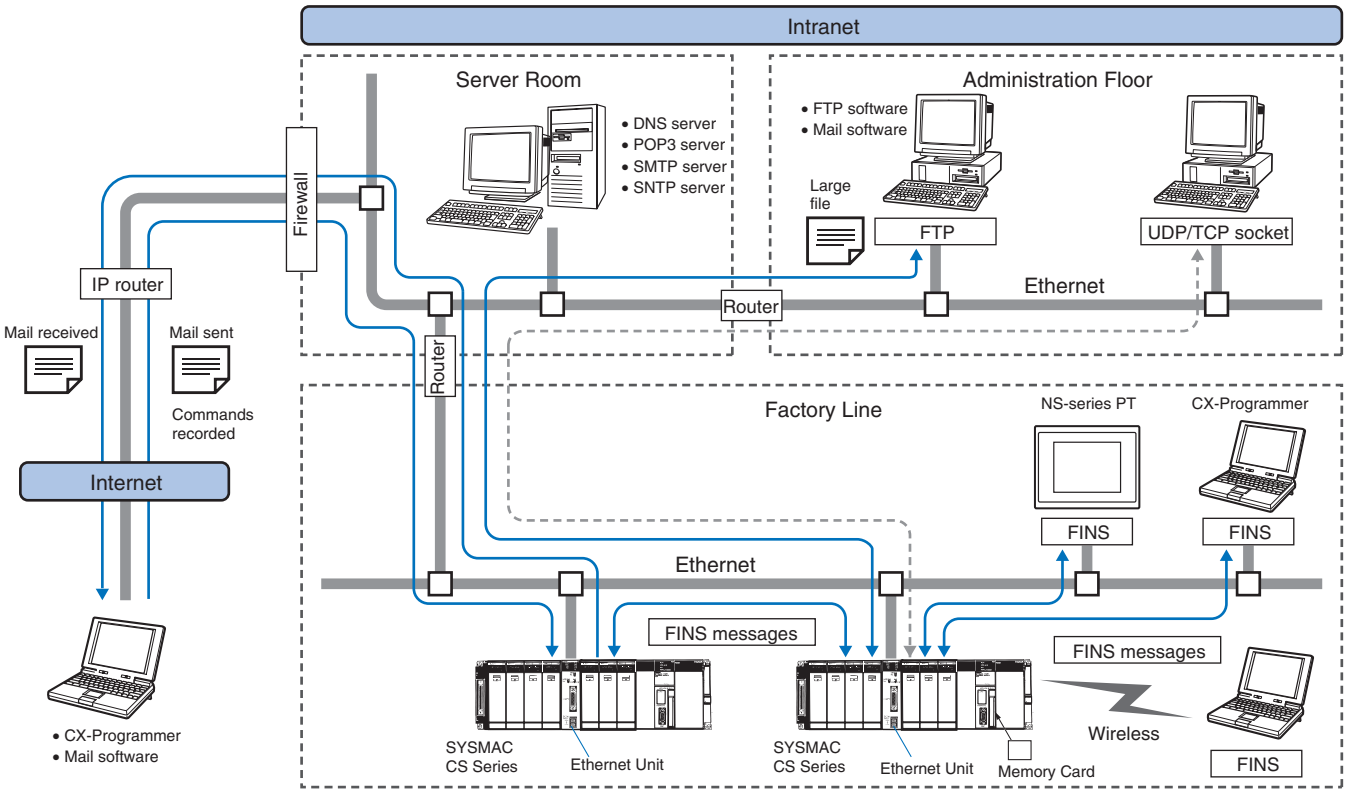
Features of the 100Base-TX Model

- While the 100Base-TX model maintains backward compatibility with the earlier models (10Base-5 and 10Base-T), the new model has a basic system repsonse performance about 4 times faster.
- The FINS message communications capabilities have been improved dramatically.
  - Increased number of nodes (from 124 to 254 nodes)
  - Supports TCP/IP protocol as well as the earlier UDP/IP protocol.
  - The host computer's IP address can be set dynamically (DHCP).
- A mail receiving function has been added (POP3).
- A function has been added that automatically corrects the PLC's internal clock (SNTP) .
- Various kinds of servers can be specified by their host name (DNS).

Function

Achieve a wide range of communications from PLCs connected to an Ethernet network: Transfer data with TCP/IP or UDP/IP socket services, executed OMRON's standard FINS commands, transfer files with FTP, or send mail with SMTP. Select the communications services that are required and flexibly connect PLCs on an information level Ethernet network.

System Configuration



Specifications

Unit name	Type	Communications service	Connector	Model
Ethernet Unit (100Base-TX)	CS CPU Bus Unit	FINS communications service (TCP/IP, UDP/IP), FTP server functions, socket services, mail transmission service, mail receive (remote command receive), automatically adjusted PLC built-in clock, server/host name specification)	100Base-TX (10Base-T)	CS1W-ETN21
				CS1D-ETN21D

CS1W-CLK□□-V1, 3G8F7-CLK□□-V1, CS1W-RPT0□

Controller Link Units and PCI Boards



OMRON's efficient and easy-to-use FA Network

- Achieve high-capacity, flexible data links.
- Transfer large volumes of data through a message service.
- Connect through twisted-pair cables or optical fiber cables.
- Connect CS1, CJ1, C200HX/HG/HE and CQM1H PLCs.
- Complete error correction and troubleshooting functions.
- Quick configuration of communication links with CX-Programmer's setup menus.
- Increase network reliability with duplex connections for optical networks.
- Use either ring mode or bus mode for optical networks.

Function

Controller Link is OMRON's proprietary FA-level network. It supports automatic data links between PLCs and between PLCs and host computer, as well as programmed data transfers using a message service.

You get high-capacity, flexible data links and high-capacity data transfers with messages. For a low-cost communications system, twisted-pair cables can be used.

System Configuration

Use Repeater Units for T-branch Wiring, Extension, Expansion, and Optical Sections

T-branching Enables More Flexible Wiring Solution for Layout, Building, and Expansion of Networks



Wired Types Support Long-distance Extension

The total extended length that was previously 500 m at 2 Mbps can be extended to up to 1.5 km by using two Repeater Units.

Connect up to 64 Nodes Using Wired Types

Networks can be constructed with up to 62 nodes when Controller Link Units/Support Boards with -V1 suffix are combined with Repeater Units.

Wiring with Optical Cables Increases Noise Immunity

Using two Repeater Units for optical ring enables wiring with optical cables in parts of the network subject to noise.

Simpler, More Flexible Data Links

Change Data Link Tables Whilte Data Links Are Active

- When data link tables are changed due to additional nodes or other networking changes, data link tables can be transferred without stopping any data link communications.
- Flexbile system configurations can be changed by combining node expansion using Repeater Units.

Specifications

Unit/Board	Classification	Compatible PLC	Media	Model	Connections
Controller Link Units	CPU Bus Unit	CS Series	Wired	CS1W-CLK21-V1	Can be mounted together with previous Controller Link Units/Support Boards.
			Optical ring (H-PCF cable)	CS1W-CLK12-V1 (See note.)	
			Optical ring (GI cable)	CS1W-CLK52-V1 (See note.)	
Controller Link Support Boards	Personal computer board (for PCI bus)	---	Wired	3G8F7-CLK21-EV1	
			Optical ring (H-PCF cable)	3G8F7-CLK12-EV1	
			Optical ring (GI cable)	3G8F7-CLK52-EV1	
Controller Link Repeater Units	---	Not mounted to PLC	Twisted-pair cable	CS1W-RPT01	Unit mounted independently using either DIN Track or screws.
			Optical ring (H-PCF cable)	CS1W-RPT02	
			Optical ring (GI cable)	CS1W-RPT03	

Note: Lot numbers for the CS1W-CLK12-V1 and CS1W-CLK52-V1 are 030602 or later (June 2003 or later).

Main Specifications Related to Version Upgrade for Unit Ver. 1.2

Item		Unit Ver. 1.2 or later	Pre-Ver. 1.2
Number of data link words		Number of send/receive words per Unit Total of Area 1 and Area 2: 20,000 words max.	Number of send/receive words per Unit Total of Area 1 and Area 2: 12,000 words max.
		Number of send words per Unit Total of Area 1 and Area 2: 1,000 words max.	
Data Link Area allocations	User-set allocations	Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area	
	Automatically set equal allocations	Area 1: CIO Area (including data link words), Area 2: DM Area and EM Area	
	Automatically set 1: N allocations	Areas 1 and 2: CIO Area (including data link words), DM Area, and EM Area	
Maximum number of Controller Link Units connected to a single CPU Unit		8 Units max.	4 Units max.

Note: CX-Programmer Ver. 5.0 or higher is requested to set a data link area with a maximum number of send and receive words of 20,000 words per Controller Unit, or to allocate the same area for Area 1 and Area 2.

Specifications for Networks Using Repeaters

Item	Segment (See note 1.)	Total network
Transmission path configuration	Multi-drop	Tree (using Repeaters to connect each segment)
Baud rate/maximum transmission distance (See note 2.)	2 Mbps: 500 m 1 Mbps: 800 m 500 kbps: 1 km	2 Mbps: 1.5 km 1 Mbps: 2.4 km 400 kbps: 3.0 km
Maximum number of nodes	Controller Link Unit + Repeater Unit Total number of nodes: 32	Controller Link Unit: 62 nodes (using a Controller Link Unit htat supports 62 nodes)
Maximum number of Repeater levels (See note 3.)	---	2 levels

Note: 1. Specifications for each segment are the same as for Wired Controller Link networks.

2. Maximum transmission distance: Total wired cable length between the two nodes separated by the longest total wired cable length.

3. Maximum number of Repeater levels: Maximum number of Repeaters in a path linking any two nodes. For optical ring types, one set of two Units comprises one level.

CS1W-PRM21

PROFIBUS-DP Master Unit



- PROFIBUS-DP master class one with support of DP-V1 data types.
- 7 kWord I/O
- Simple configuration through FDT/DTM based configurator
- Special CPU unit
- Handles data independent of the CPU unit, thus reducing CPU load

Function

The CS1W-PRM21 is a master system (DPM1). It exchanges I/O data and communication/status information with the CPU of the PLC. To configure the CS1W-PRM21 a serial port of the CPU can be used. But because configuring is done through FINS communication virtual any accesspoint on the PLC network can be used. It exchanges data and commands with PROFIBUS-DP slave stations over the PROFIBUS network.

Specifications

Model			Remarks
CS1W-PRM21	Main function	Basic PROFIBUS-DP master Class 1 functions plus: DPV1 data types support	
	Unit No.	0-15	Special CPU unit
	Maximum number of units mountable per PLC	16	Maximum depends on PLC CPU-type
	Configurator	FTD/DTM based	Incorporates a Generic DTM to use with GSD-file based slaves
	Supported baud rate(s)	All baud rates as specified by the standard EN50170 Volume 2, the PROFIBUS extensions to EN50170, as well as the standard IEC61158: 9.6 kBit/s, 19.2 kBit/s, 45.45 kBit/s. 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3 MBit/s, 6 MBit/s, 12 MBit/s	The baud rate value to be used must be selected through the Configurator.
	Selectable PROFIBUS address	0-125	Set through the configurator
	Maximum number of PROFIBUS slaves	125	
	Maximum number of I/O points	7168 words	
	Maximum number of I/O points per PROFIBUS slave	244 bytes In / 244 bytes Out	
	Control and status ares size	25 words	
	Supported Global_Control services	Sync Unsync Freeze Unfreeze Clear	Through Control Area
	Supported Master-Slave communication services	Data_Exchange Slave_Diag Set_PRM Chk_Cfg Global_Control	
	Power consumption	400 mA at 5 V	
	Dimensions	34.5 mm wide x 130 mm height x 111.2 mm depth	
	Weight	154 gr	
	Ambient temperature	Operating: 0 °C to 50 °C	

C200HW-PRT21

PROFIBUS-DP Slave Unit

I/O Link Unit for C200H□ and CS1 PLC
Ideal for distributed control.

- OMRON's C200HS, C200HE, C200HG, C200HX and CS1 PLCs can be used as an intelligent Slave on a PROFIBUS-DP network.
- Default 2 words in + 2 words out, maximum 100 words in + 100 words out.
- Simple PROFIBUS-DP node address setting by rotary switches.
- Supports SYNC/FREEZE and Fail-Safe functions.



Specifications

Communication Specifications

Applicable standard	EN 50170 vol. 2
Station type	Modular station, max. 32 modules Configurable with In-, Out- and I/O-modules of 1, 2, 4, 8 and 16 words Total of 0 to 100 words in + 0 to 100 words out, with consistency over the full length
Bus connector	9-pin female sub-D connector (RS-485 PROFIBUS connector)
Bus termination	External
Baud rate (auto-detect)	9.6 / 19.2 / 45.45 / 93.75 / 187.5 / 500 kbit/s, 1.5 / 3 / 6 / 12 Mbit/s
PROFIBUS address range	0 to 125, Remote setting not supported
Communication cable	Type A (EN 50170 vol. 2)
Minimum slave interval time	0.5 ms
Supported DP functions	Data_Exchange Slave_Diag Set_Prm Chk_Cfg Global_Control (SYNC, FREEZE, CLEAR) Get_Cfg RD_Imp RD_Outp
PROFIBUS-DP GSD file	OC_04AC.GSD

Unit Specifications

Host PLC system	C200HS, C200HE, C200HG, C200HX, CS1	
Maximum number of Units per PLC system	C200HS C200HE-CPU11/32/42 C200HG-CPU33/43 C200HX-CPU34/44	10
	All others	16
Slave unit mounting position	CPU Rack or Expansion I/O Rack Unit: cannot be mounted to SYSMAC BUS Slave Racks Unit: cannot be used on a C200H PLC system	
Current consumption	250 mA at 5 V DC (from PLC power supply)	
Weight	180 g	
Switch settings	Special I/O Unit number (0-F) by notary switch PROFIBUS-DP mode address (o to 125) by 3 rotary switches	
LED indicators	Unit status: RUN (green LED), ERR (red LED) Network status: COMM (green LED), BF (red LED)	
No. of IR words	PLC to Slave Unit: 3 words (1 word of control data + 2 words slave input data) Slave unit to PLC: 5 words (3 words of unit status + 2 words slave output data)	
No. of DM settings	8 words of Unit setup information	
Amount of I/O data per Unit	Default (DM settings all 0000)	all PLC's: 2 words in + 2 words out
	With user defined DM settings	C200HS: up to 80 words in + out all others: up to 100 words in + 100 words out
Storage temperature	- 20 °C to + 75 °C	
Operating temperature	0 °C to + 55 °C	
Operating humidity	10% to 90% (non-condensing)	
Conformance to EMC- and environmental standards	EN50081-2 EN61131-2	

CS1W-DRM21-V1

DeviceNet Unit



Multivendor Field Network

- Control of up to 32,000 points (2,000 words) per master.
- Remote I/O communications can be allocated in any area using DM settings.
- 16 DeviceNet Units can be mounted for each CPU Unit (3 max. for fixed allocations).
- When using the Configurator (see note), remote I/O can be allocated in an order independent of node address.

Note: The Configurator is allocating a node-address if connected to DeviceNet using a DeviceNet communication card. It is not doing this if connected through the serial communications interface of the CPU.

- DeviceNet Units can be used as a master and a slave, and this functionality can be used simultaneously.

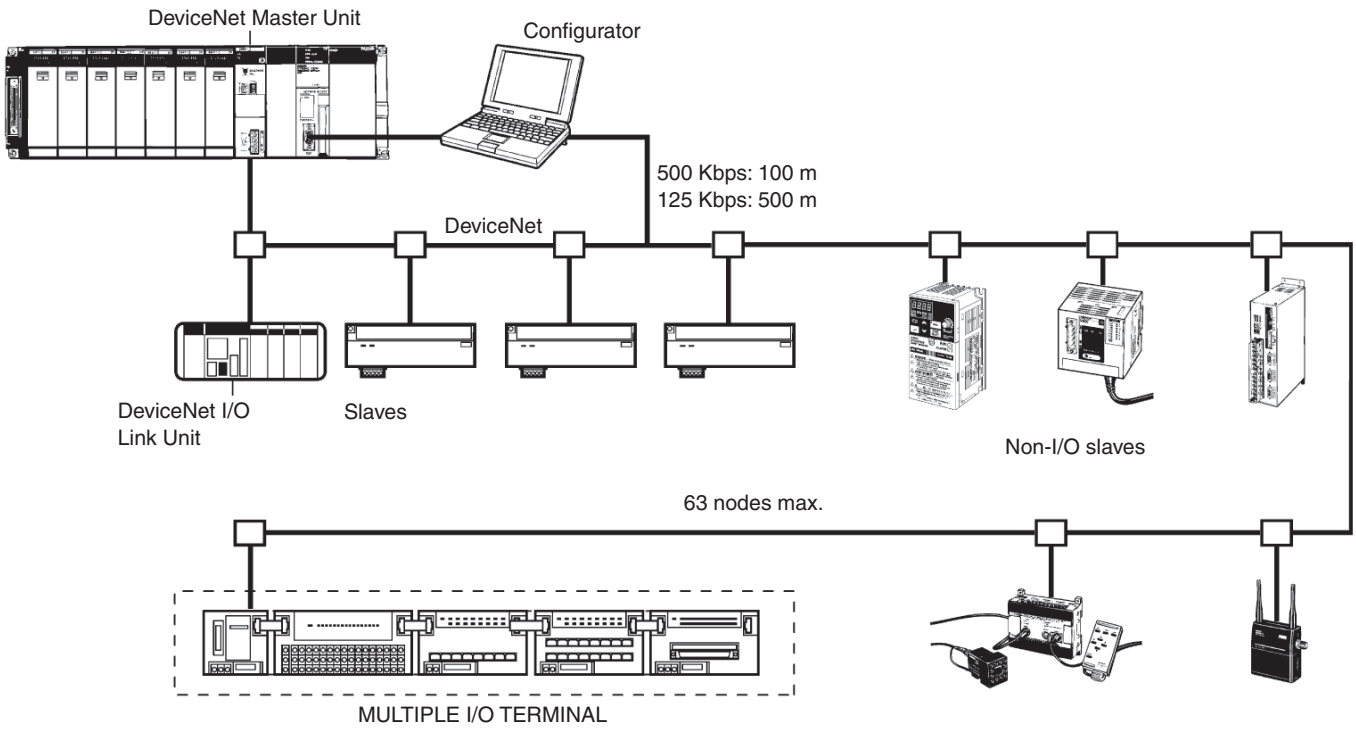
Note: DeviceNet Units allow DeviceNet networks to be treated exactly like Controller Link, Ethernet, or other networks for message communications or remote programming and monitoring by a CX-Programmer.

Function

OMRON supports the DeviceNet open field network, a multivendor network for machine/line control and information. The following types of communications are possible.

1. Remote I/O communications for automatic data transfers between the CPU Unit and Slaves (with no programming in the CPU Unit).
2. Explicit message communications. This can be programmed from the CPU unit (IOWR and CMND instructions) and read from/write to other DeviceNet units.
3. With explict message communication FINS commands can be send to other devices that support FINS messaging.

System Configuration



Ordering Information

Compatible PLCs		Maximum number of I/O points			Model
		Fixed allocations	User-set allocations		
			Using allocated DM Area words	Using Configurator	
CS1 Series	When used as a master	Input: 1,024 points Output: 1,024 points Total: 2,048 points (128 words)	Input: 8,000 points Output: 8,000 points Total: 16,000 points (1,000 words)	Input: 8,000 points x 2 blocks Output: 8,000 points x 2 blocks Total: 32,000 points (2,000 words)	CS1W-DRM21
	When used as a slave	Input: 16 points Output: 16 points Total: 32 points (2 words)	Input: 1,600 points Output: 1,600 points Total: 3,200 points (200 words)	Input: 1,600 points x 1 block Output: 1,600 points x 2 blocks Total: 4,800 points (300 words)	

Specifications

Master/Slave Specifications

Communications power supply voltage				11 to 25 V DC (supplied from the communications connector) (See note 1.)
Current consumption				Communications:30 mA max. Internal circuit:290 mA max.
Max. number of connectable slaves	Remote I/O, explicit message service			63 (See note 2.)
Max. number of I/O points	Fixed allocations		When used as a master	2,048 points
			When used as a slave	32 points
	User-set allocations	Using allocated DM Area words	When used as a master	16,000 points
			When used as a slave	3,200 points
		Using Configurator	When used as a master	32,000 points
			When used as a slave	4,800 points
Number of allocated words	Fixed allocations		When used as a master	64 input and 64 output words Software switch/status area: 25 words
			When used as a slave	1 input word, 1 output word (See note 3.)
	User-set allocations	Using allocated DM Area words	When used as a master	500 input and 500 output words Software switch/status area: 25 words
			When used as a slave	100 input and 100 output words (See note 3.) Software switch/status area: 25 words
		Using Configurator	When used as a master	500 input words x 2 blocks, 500 output words x 2 blocks Software switch/Status area: 25 words
			When used as a slave	100 input words x 1 blocks, 100 output words x 2 blocks Software switch/Status area: 25 words
Max. message length				542 bytes (See note 4.)
Max. number of Units mountable to PLC	Fixed allocations			3
	User-set allocations			16
Weight				172 g max.

Note: 1. Refer to the *DeviceNet (CompoBus/D) Operation Manual (W267)* for the communications power supply specifications.

2. The DeviceNet unit uses a node of the 64 supported by DeviceNet, leaves connection is possible to 63 slaves.

3. When the DeviceNet is used a slave, “input” and “output” respectively refer to input from the master to the slave and output from the slave to the master.

4. The maximum message length includes the command code when using the CMND instruction.

5. The CS1W–DRM21 cannot perform message communications with the E5ZE-8□D1□B. Use the E5ZE-8□D1□B-V2, which is a later version. For details on the E5ZE-8□D1□B-V2, refer to the catalog for the product itself (SGTD-017).

DeviceNet Unit

Classification	Types of communications	Specifications	Unit numbers	Model
CS1 CPU Bus Unit	Remote I/O communications master (fixed or user-set allocations) Remote I/O communications slave (fixed or user-set allocations) Message communications	Up to 16 Units can be mounted when a Configurator is used.	0 to F (Configurator required to mount 16 Units.)	CS1W-DRM21
C200H Special I/O Unit	Remote I/O communications master			C200HW-DRM21-V1
	Remote I/O communications slave			C200HW-DRT21

DeviceNet Configurator

Model number	Specifications
WS02-CFDC1-E	Software only (Windows 95, 98, NT 4.0, 2000, or XP)
3G8E2-DRM21-E-V1	PC card with software (Windows 95 or 98)

C200HW-DRT21

DeviceNet I/O Link Unit



I/O Link Unit is ideal for distributed control. PLC can be used as an Intelligent Slave on the DeviceNet.

- Intelligent DeviceNet Slave
- Supports I/O and message communications.
- Maximum I/O area size:
  512 input points (32 words)
  512 output points (32 words)
- Programming Console or Configurator freely allocates I/O areas.

Ordering Information

Name	Max. number I/O points	Model
I/O Link Unit (for SYSMAC CS1, C200HX/HG/HE)	512 inputs, 512 outputs (1,024 points in total)	C200HW-DRT21

Specifications

Ratings/Characteristics

General Specifications

Item	Specification
Communications power supply voltage	11 to 25 V DC
Current consumption	Communications power supply: 45 mA max. Internal circuit power supply: 250 mA max. at 5 V DC
Max. number of I/O points	512 input points (32 words) 512 output points (32 words)
Default area	Write area (linking with Master's write area): 1 word out of 350 IR words Read area (linking with Master's read area): 1 word out of 50 IR words
No. of connectable Units	10 max. (CS1/C200HX/HG/HE CPU Unit handles up to 880 I/O points)
	16 max. (CS1/C200HX/HG/HE CPU Unit handles more than 880 I/O points)
Weight	250 g max.

Function Specifications

Settings (Slave)

Item	Specification	
Function	A write area block and a read area block can be freely allocated to any areas or addresses respectively	
Allowable setting area	Both read and write areas can be allocated to IR, DM, HR, AR, LR, T/C, and EM areas	
First address	A readable or writable area by word (with some restrictions)	
Area size	Set in 1-byte increments up to 64 bytes for both read and write areas	
Setting method	Configurator	Refer to the *DeviceNet Configurator Operation Manual (W328)*.
	Programming Console	**1.** Write the set value to I/O setting area allocated to the Special I/O Area. **2.** Turn ON the software switch allocated to the Special I/O Area and write the settings. **3.** Turn the Programming Console OFF and ON or reset the AR area.

Message Communications

Item	Specification
Function	Supports messages that can be written to or read from the CS1/C200HX/HG/HE's user I/O areas (i.e., IR, DM, HR, AR, LR, T/C, and EM areas)
Master	OMRON's Master Unit or compatible unit from Rockwell
Max. message size	Slave (C200HW-DRT21) 200 bytes per READ or WRITE command

Dimensions

35 × 130 × 101 mm (W × H × D)

Precautions

Refer to the relevant catalog for details on CS1-series and C200HX/HG/HE PLCs (CS1 Series: Cat. No. P047; C200HX/HG/HE: Cat. No. P036).

C200HW-CORT21-V1

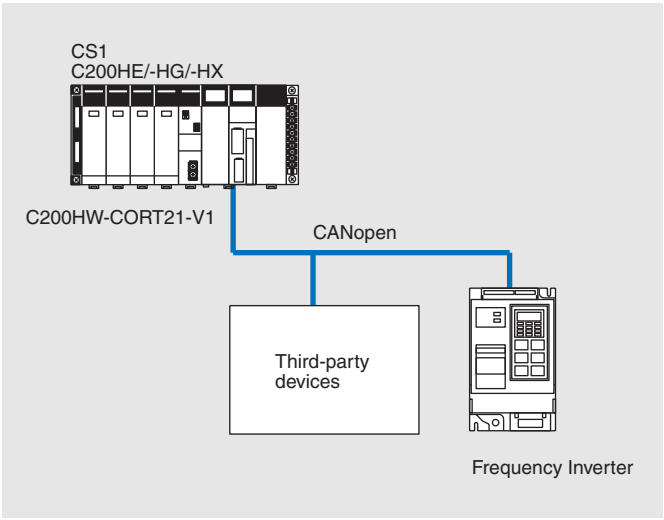
CAN & CANopen communication unit

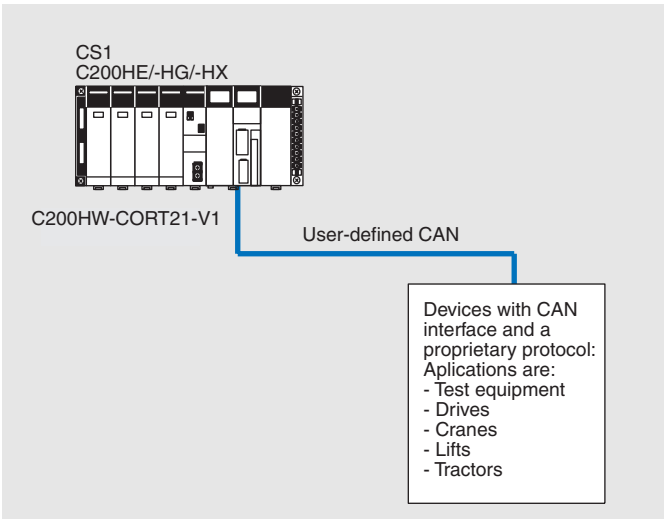


CAN & CANopen communication unit Supports CANopen, but can also be used to communicate with a user-defined CAN protocol

- PDO's configurable with CANopen Configurator or IOWR PLC instructions
- Able to transceive any user defined CAN message up to 2000 msgs/s using IOWR PLC instructions
- Able to set any arbitrary baud rate supported by the CAN controller
- Mountable on C200H Alpha and CS1 backplanes

System Configuration





Specifications

Installation	Host PLC system	C200HE, C200HG, C200HX, CS1-series	
	Maximum number of Units per PLC system	C200HE C200HG-CPU3□-E/CPU4□-E C200HX-CPU3□-E/CPU4□-E	10
		All others	16
	Unit mounting position	CPU Rack of Expansion I/O Rack Unit cannot be mounted to SYSMAC BUS Slave Racks	
	Current consumption	Internal I/O power supply: 250 mA at 5V DC max. (from PLC) Network power supply: 45 mA max. (from communications connector)	
	Network power supply	24 V DC ± 10%	
	Weight	250 g	
Environment	Storage temperature	- 20 °C to + 75 °C	
	Operating temperature	0 °C to + 55 °C	
	Operating humidity	10 to 90% (non-condensing)	
	Conformance to EMC- and environmental standards	EN50081-2 EN61131-2	
User Interface	Switch settings	Special I/O Unit number (0~F) by rotary switch (front) Network baud rate (10 kbit/s ~ 1000 kbit/s) by 3 DIP-switches (front) CANopen node address (001 ~ 127) by 7 DIP-switches (rear)	
	Indicators	Unit status: RUN (green LED), ERR (red LED) Network status: 2 x 7-segment display	
PLC Interface	No. of IR words	PLC → Unit: 3 words (1 word control data + 2 words CANopen transmit data) Unit → PLC: 5 words (3 words Unit status + 2 words CANopen receive data)	
	No. of DM settings	20 words	
	Amount of I/O data per Unit	Default [DM settings all 0000]: 2 words in + 2 words out With user defined DM settings: additionally up to 100 words in + 100 words out	
	Message communications	By IOWR/IORD instructions	
Network interface	CAN interface	ISO 11898, High Speed CAN	
	Bus connector	5-pin mal open style connector	
	Node address	1 to 127, remote setting not supported	
	Baud rate	10, 20, 50, 125, 250, 500, 800, 1000 kbit/s (Note: Refer to appendix D for the configuration of any arbitrary baud rate via the DM settings.)	
	Profile	Communication Profile DS301 version 4.0 Manufacturer Specific Application Profile	
	Supported functions	Boot-up type	Minimum
		NMT	Slave
		Number of PDOs	Max. 64 transmit PDOs and 64 receive PDOs
		PDO transmission modes	Default: Asynchronous
			Configurable: Synchronous cyclic Synchronous acyclic
		PDO linking	Supported
		PDO mapping	Variable
		Application objects	Default configuration: Transmit objects: 4 x 8-bit Receive objects: 4 x 8-bit
			Additionally configurable: Transmit objects: 8-bit (max. 100) 16-bit (max. 100) 32-bit (max. 50) 64-bit (max. 25) Receive objects: 8-bit (max. 100) 16-bit (max. 100) 32-bit (max. 50) 64-bit (max. 25) The total size of additonally configured transmit- and receive objects is limited to 100 words each.
		Number of SDOs	1 server
		Emergency Message	EMCY Producer
		Synchronisation	SYNC Consumer
		Error control servies	Heartbeat (1 producer and 1 consumer) and Node guarding
		Storing of Parameters	Yes, can be stored in non-volatile memory
		User defined CAN messages	Transmission using IOWR PLC instruction Reception through configurable identifier filter
	EDS file	CORT21V1.eds	

C200HW-SRM21-V1

CompoBus/S Master Unit



CompoBus/S is a high-speed I/O bus

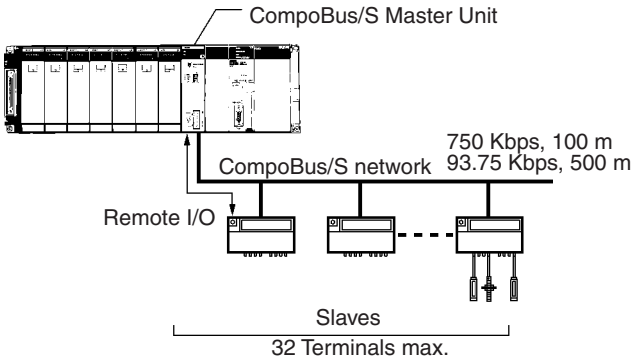
- Up to 256 I/O points per Master.
- Up to 32 Slaves per Master.
- Communications cycle time: 0.5 ms (at 750 kbps).
- Communications distance: Up to 500 m (at 93.75 kbps).

Free wiring with any branching method for up to 200 m (in long-distance communications mode).

Function

A high-speed ON/OFF bus that automatically transfers remote I/O status to the CPU Unit without any programming in the CPU Unit. High-speed remote I/O is supported by a communications cycle time of 1 ms maximum for 256 I/O points.

System Configuration



Specifications

General

Classification	Communications	Specifications	Unit number	Model
C200H Special I/O Unit	Remote I/O	No. of mountable Units: 16	0 to F	C200HW-SRM21-V1

Unit Specifications

Current consumption		150 mA max. at 5 V DC
Number of I/O points		256 points (128 inputs/128 outputs), 128 points (64 inputs/64 outputs) (switchable)
Number of occupied words		256 points:20 words (8 input words/8 output words, 4 status data) 128 points:10 words (4 input words/4 output words, 2 status data)
PLC		CS1, C200HX (-ZE), C200HG (-ZE), C200HE (-ZE), C200HS
Number of Master Units mountable	C200HE	128 points: 10, 256 points: 5
	C200HG-CPU33/43	128 points: 10, 256 points: 5
	C200HG-CPU53/63	128 points: 16, 256 points: 8
	C200HX-CPU34/44	128 points: 10, 256 points: 5
	C200HX-CPU54/64	128 points: 16, 256 points: 8
	C200HS	128 points: 10, 256 points: 5
	CS1	128 points: 16, 256 points: 8
Number of points per node number		8 points
Max. number of Slaves per Master		32
Status data		Communications Error Flag and Active Slave Node (see note)
Weight		200 g max.
Approved standards		UL 508 (E95399), CSA C22.2 No. 142 (LR51460)

These flags use the AR area.

Communications Specifications

Communications method		CompoBus/S protocol
Coding method		Manchester coding method
Connection method		Multi-drop method and T-branch method (see note 1)
Communications baud rate		750,000 bps, 93,750 bps (see note 2)
Communications cycle time	High-speed communications mode	0.5 ms with 8 Slaves for inputs and 8 Slaves for outputs
		0.8 ms with 16 Slaves for inputs and 16 Slaves for outputs
	Long-distance communications mode	4.0 ms with 8 Slaves for inputs and 8 Slaves for outputs
		6.0 ms with 16 Slaves for inputs and 16 Slaves for outputs
Communications cable		2-conductor VCTF cable (0.75 x 2), 4-conductor VCTF cable (0.75 x 4) Special Flat Cable
Communications distance	High-speed communications mode	2-conductor VCTF cable: Main line length:100 m max. Branch line length:3 m max. Total branch line length:50 m max. Special Flat Cable, 4-conductor VCTF cable: Main line length:30 m max. Branch line length:3 m max. Total branch line length:30 m max. (When Special Flat Cable is used to connect fewer than 16 Slaves, the main line can be up to 100 m long and the total branch line length can be up to 50 m.)
	Long-distance communications mode	2-conductor VCTF cable: Main line length:500 m max. Branch line length:6 m max. Total branch line length:120 m max. Special Flat Cable, 4-conductor VCTF cable: Variable branch wiring (total cable length 200 m max.) (There are no limits on the branching format or main, branch, or total line lengths. The terminator must be connected to the point in the system farthest from the master.)
Max. number of connecting nodes		32
Error control checks		Manchester code check, frame length check, and parity check

Note: 1. A terminator must be connected to the point in the system most remote from the Master.

2. The communications baud rate is set by the DIP switch.

OMRON

Ordering Information

International Standards

The indicated standards are those current for UL, CSA, cULus, NK and Lloyds standards and EC directives as of September 2004.
Abbreviations used:
U = UL, U1 = UL Class I Div.2 for hazardous locations, C = CSA, UC = cULus, UC1 = cULus Class I Div.2 for hazardous locations
CU = cUL, N = NK (Nippon Kaiji Kyokai), L = Lloyd's Register, CE = EC Directives. Please contact OMRON representative for application conditions.

CPU Rack

Name	Specifications			Model	Standards
CPU Units (See note.)	**I/O bits**	**Program capacity**	**Data memory capacity**	**---**	**---**
	5,120	250 kSteps	448 kWords (DM: 32 kWords, EM: 32 kWords ×13 banks)	CS1H-CPU67H	UC1, N, L, CE
	5,120	120 kSteps	256 kWords (DM: 32 kWords, EM: 32 kWords ×7 banks)	CS1H-CPU66H	
	5,120	60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords ×3 banks)	CS1H-CPU65H	
	5,120	30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords ×1 bank)	CS1H-CPU64H	
	5,120	20 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords ×1 bank)	CS1H-CPU63H	
	5,120	60 kSteps	128 kWords (DM: 32 kWords, EM: 32 kWords ×3 banks)	CS1G-CPU45H	
	1,280	30 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords ×1 bank)	CS1G-CPU44H	
	960	20 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords ×1 bank)	CS1G-CPU43H	
	960	10 kSteps	64 kWords (DM: 32 kWords, EM: 32 kWords ×1 bank)	CS1G-CPU42H	
CPU Backplanes (for CS1 Units only)	2 slots (Does not connect to Expansion Rack.)			CS1W-BC022	U, C, N, L, CE
	3 slots			CS1W-BC032	
	5 slots			CS1W-BC052	
	8 slots			CS1W-BC082	
	10 slots			CS1W-BC102	
CPU Backplanes (for CS1- and C200H I/O Units)	2 slots (Does not connect to Expansion Rack.)			CS1W-BC023	U, C, N, L, CE
	3 slots			CS1W-BC033	
	5 slots			CS1W-BC053	
	8 slots			CS1W-BC083	
	10 slots			CS1W-BC103	
Power Supply Units	100 to 120 V AC or 200 to 240 V AC; Output capacity: 4.6 A, 5 V DC			C200HW-PA204	U, C, N, L, CE
	100 to 120 V AC or 200 to 240 V AC (with 0.8 A, 24 V DC service power supply) Output capacity: 4.6 A, 5 V DC			C200HW-PA204S	
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC			C200HW-PA204R	U, C
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC			C200HW-PA209R	U, C, N, L, CE
	24 V DC, Output capacity: 4.6 A, 5 V DC			C200HW-PD024	UC1, N, L, CE
	100 V DC, Output capacity: 6 A, 5 V DC			C200HW-PD106R	U, C
I/O Control Unit	For Expansion Racks connected over a distance of more than 12 m (2 terminating resistors included. C200H Units cannot be used on Long-distance Expansion Racks.)			CS1W-IC102	U, C, CE
Memory Cards	Flash memory, 30 MB			HMC-EF372	L, CE
	Flash memory, 64 MB			HMC-EF672	
	Memory Card Adapter (for computer PCMIA slot)			HMC-AP001	CE
Serial Communications Boards	2 × RS-232C ports, protocol macro function			CS1W-SCB21-V1	U, C, N, L, CE
	1 × RS-232C port + 1 × RS-422/485 port, protocol macro function			CS1W-SCB41-V1	
Programming Consoles	An English Keyboard Sheet (CS1W-KS001-E) is required. (Connects to peripheral port on CPU Unit only. Cannot be connected to RS-232C port.)			CQM1-PRO01-E	U, C, CE
				C200H-PRO27-E	U, C, N, CE
Programming Console Key Sheet	For C200H-PRO27 and CQM1H-PRO01			CS1W-KS001-E	CE
Programming Console Connecting Cables	Connects the C200H-PRO27-E Programming Console. (Length: 2.0 m)			CS1W-CN224	
	Connects the C200H-PRO27-E Programming Console. (Length: 6.0 m)			CS1W-CN624	
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.			CX-ONE-AL□□C-E[*1]	---
Peripheral Device Connecting Cables (for peripheral port)	Connects personal computers, D-Sub 9-pin receptacle (Length: 0.1 m) (Conversion cable to connect RS-232C cable to peripheral port)			CS1W-CN118	CE
	Peripheral bus or Host Link		Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	CS1W-CN226	
			Connects personal computers, D-Sub 9-pin (Length: 6.0 m)	CS1W-CN626	
Peripheral Device Connecting Cables (for RS-232C port)	Peripheral bus or Host Link, antistatic		Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-CV	---
			Connects personal computers, D-sub 9-pin (Length: 5.0 m)	XW2Z-500S-CV	
	Host Link		Connects personal computers, D-Sub 9-pin (Length: 2.0 m)	XW2Z-200S-V	
			Connects personal computers, D-Sub 9-pin (Length: 5.0 m)	XW2Z-500S-V	
USB-Serial Conversion Cable	Converts between USB and RS-232C, cable length: 0.5 m PC driver provided on CD-ROM. Refer to *Using a USB-Serial Conversion Cable to Connect to a Peripheral or RS-232C Port* on page 291 for specifications.			CS1W-CIF31	---
Battery Set	For CS1 Series only. (Install a replacement battery within 2 years of the production date.)			CS1W-BAT01	L, CE

[*1] □□ = Number of licences; 01, 03, 10

Note: When using a CS1W-CN313 or CS1W-CN713 I/O Connecting Cable with a CS1□-CPU□□H CPU Unit, use only Cables produced on or after September 20, 2001 (production number 2091). Cables with no production number, a 6-digit production number, or produced before September 20, 2001, cannot be used.

SYSMAC CS1D Duplex System

Name	Specifications			Model	Standards
Duplex CPU Units	I/O capacity	Program capacity	Data memory capacity	---	UC1, N, L, CE
	5,120 points	60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords x 3 banks)	CS1D-CPU65H	
		250 Ksteps	448 Kwords (DM: 32 Kwords, EM: 32 Kwords x 13 banks)	CS1D-CPU67H	
Duplex process control CPUs (include LCB05 option board for duplex system)	5,120 points	60 Ksteps	128 Kwords (DM: 32 Kwords, EM: 32 Kwords x 3 banks)	CS1D-CPU65P CS1D-CPU67P	UC1, CE
Single CPU Units supporting online I/O unit replacement	5120	250 kSteps	448 kWords (DM: 32 kWords, EM 32 kWords x 13 banks)	CS1D-CPU67S	UC1, N, L, CE
	5120	60 kSteps	128 kWords (DM: 32 kWords, EM 32 kWords x 3 banks)	CS1D-CPU65S	
	1280	30 kSteps	64 kWords (DM: 32 kWords, EM 32 kWords x 1 bank)	CS1D-CPU44S	
	960	10 kSteps	64 kWords (DM: 32 kWords, EM 32 kWords x 1 bank)	CS1D-CPU42S	
Duplex Unit	---			CS1D-DPL01	UC1, N, L, CE
CS1D Power Supply Units	100 to 120 VAC or 200 to 240 VAC, 50/60 Hz (with RUN output) Output capacity: 7 A, 5 VDC; 1.3 A, 26 VDC, 35 W total max.			CS1D-PA207R	
	24 VDC, Output capacity: 4.3 A, 5 VDC; 0.56 A, 26 VDC, 28 W total max.			CS1D-PD024	
Duplex CPU Backplane	5 slots, supports dual CPUs and duplex unit, dual power supplies and on-line Unit replacement			CS1D-BC052	
Single CPU backplane	8 slots (supports dual power supply and on-line Unit replacement)			CS1D-BC082S	
Expansion Backplane	9 slots (Used both for CS1D Expansion Racks and CS1D Long-distance Expansion Racks.)			CS1D-BI092	
Controller Link Units	Optical ring type with H-PCF cable			CS1D-CLK12-V1	
	Optical ring type with GI cable			CS1D-CLK52-V1	
CX-One	Omron's integrated software for programming and configuration of all control system components, including PLCs, HMI, drives, temperature controllers and advanced sensors.			CX-ONE-AL□□C-E[*1]	---
Optical Fiber Cable	H-PCF cable for for interconnection between Duplex Controller Link Units, cable length: 50 cm			CS1D-CN051	---

[*1] □□ = Number of licences; 01, 03, 10

Expansion Racks

Name	Specifications		Model	Standards
CS1 Expansion Backplanes (for CS1 Units only)	3 slots		CS1W-BI032	U, C, N, L, CE
	5 slots		CS1W-BI052	
	8 slots		CS1W-BI082	
	10 slots		CS1W-BI102	
CS1 Expansion Backplanes (for CS1 and C200H I/O Units)	3 slots		CS1W-BI033	U, C, N, L, CE
	5 slots		CS1W-BI053	
	8 slots		CS1W-BI083	
	10 slots		CS1W-BI103	
C200H Expansion I/O Backplanes	3 slots		C200HW-BI031	U, C, N, L, CE
	5 slots		C200HW-BI051	
	8 slots		C200HW-BI081-V1	
	10 slots		C200HW-BI101-V1	
Power Supply Units	100 to 120 V AC or 200 to 240 V AC, Output capacity: 4.6 A, 5 V DC		C200HW-PA204	
	100 to 120 V AC or 200 to 240 V AC (with service supply: 0.8 A, 24 V DC), Output capacity: 4.6 A, 5 V DC		C200HW-PA204S	
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 4.6 A, 5 V DC		C200HW-PA204R	U, C
	100 to 120 V AC or 200 to 240 V AC (with RUN output) Output capacity: 9 A, 5 V DC		C200HW-PA209R	U, C, N, L, CE
	24 V DC, Output capacity: 4.6 A, 5 V DC		C200HW-PD024	UC1, N, L, CE
	100 V DC, Output capacity: 6 A, 5 V DC		C200HW-PD106R	U, C
I/O Interface Unit	For Expansion Racks connected over a distance of more than 12 m. (C200H Units cannot be used on Long-distance Expansion Racks.)		CS1W-II102	U, C, N, L, CE
CS1 I/O Connecting Cables	Connects CS1 Expansion I/O Backplanes to CPU Backplanes or other CS1 Expansion I/O Backplanes.	Length: 0.3 m	CS1W-CN313	N, L, CE
		Length: 0.7 m	CS1W-CN713	
		Length: 2 m	CS1W-CN223	
		Length: 3 m	CS1W-CN323	
		Length: 5 m	CS1W-CN523	
		Length: 10 m	CS1W-CN133	
		Length: 12 m	CS1W-CN133-B2	
Long-distance Expansion Rack Cables	Connect I/O Control Unit to I/O Interface Unit or connects two I/O Interface Units	Length: 0.3 m	CV500-CN312	N, L, CE
		Length: 0.6 m	CV500-CN612	N, L, CE
		Length: 1 m	CV500-CN122	
		Length: 2 m	CV500-CN222	N, CE
		Length: 3 m	CV500-CN322	N, CE
		Length: 5 m	CV500-CN522	N, CE
		Length: 10 m	CV500-CN132	N, L, CE
		Length: 20 m	CV500-CN232	N, CE
		Length: 30 m	CV500-CN332	N, L, CE
		Length: 40 m	CV500-CN432	N, CE
		Length: 50 m	CV500-CN532	N, L, CE
CS1 to C200H I/O Connecting Cables	Connects C200H Expansion I/O Backplanes to CPU Backplanes or CS1 Expansion I/O Backplanes.	Length: 0.3 m	CS1W-CN311	N, L, CE
		Length: 0.7 m	CS1W-CN711	
		Length: 2 m	CS1W-CN221	
		Length: 3 m	CS1W-CN321	
		Length: 5 m	CS1W-CN521	
		Length: 10 m	CS1W-CN131	
		Length: 12 m	CS1W-CN131-B2	
C200H I/O Connecting Cables	Connects C200H Expansion I/O Backplanes to other C200H Expansion I/O Backplanes.	Length: 0.3 m	C200H-CN311	N, L, CE
		Length: 0.7 m	C200H-CN711	
		Length: 2 m	C200H-CN221	
		Length: 5 m	C200H-CN521	L, CE
		Length: 10 m	C200H-CN131	

I/O Units

CS1 Basic I/O Units

Classification	Name	Specifications	Mountable Racks					Words allocated (CIO 0000 to CIO 0319)	Model	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
CS1 Input Units	DC Input Units	24 VDC, 16 inputs, 7 mA	Yes	No	Yes	Yes	No	1	CS1W-ID211	UC1, N, L, CE
		24 VDC, 32 inputs, 6 mA	Yes	No	Yes	Yes	No	2	CS1W-ID231	
		24 VDC, 64 inputs, 6 mA	Yes	No	Yes	Yes	No	4	CS1W-ID261	
		24 VDC, 96 inputs, approx. 5 mA	Yes	No	Yes	Yes	No	6	CS1W-ID291	U, C, N, L, CE
	AC Input Units	100 to 120 VAC, 100 to 120 VDC, 16 inputs	Yes	No	Yes	Yes	No	1	CS1W-IA111	UC1, N, L, CE
		200 to 240 VAC, 16 inputs	Yes	No	Yes	Yes	No	1	CS1W-IA211	UC, N, L, CE
	Interrupt Input Unit	24 VDC, 16 inputs, 7 mA	Yes	No	Yes (See note.)	Yes (See note.)	No	1	CS1W-INT01	UC1, N, L, CE
	High-speed Input Unit	24 VDC, 16 inputs, 7 mA	Yes	No	Yes	Yes	No	1	CS1W-IDP01	
	Safety Relay Unit	24 VDC, 2 channels with 4 inputs each, 4 pts/common	Yes	No	Yes	Yes	No	1	CS1W-SF200	U, C, CE
CS1 Output Units	Relay Output Units	250 VAC or 120 VDC, independent contacts, 8 outputs, 2 A	Yes	No	Yes	Yes	No	1	CS1W-OC201	UC1, N, L, CE
		250 VAC or 120 VDC, 16 outputs, 2 A	Yes	No	Yes	Yes	No	1	CS1W-OC211	
	Transistor Output Units	12 to 24 VDC, 0.5A, 16 sinking outputs	Yes	No	Yes	Yes	No	1	CS1W-OD211	
		24 VDC, 0.5A, 16 sourcing outputs	Yes	No	Yes	Yes	No	1	CS1W-OD212	U, C, N, L, CE
		12 to 24 VDC, 0.5A, 32 sinking outputs	Yes	No	Yes	Yes	No	2	CS1W-OD231	UC1, N, L, CE
		24 VDC, 0.5A, 32 sourcing outputs	Yes	No	Yes	Yes	No	2	CS1W-OD232	U, C, N, L, CE
		12 to 24 VDC, 0.3A, 64 sinking outputs	Yes	No	Yes	Yes	No	4	CS1W-OD261	UC1, N, L, CE
		24 VDC, 0.3A, 64 sourcing outputs	Yes	No	Yes	Yes	No	4	CS1W-OD262	
		12 to 24 VDC, 0.1A, 96 sinking outputs	Yes	No	Yes	Yes	No	6	CS1W-OD291	U, C, N, L, CE
		12 to 24 VDC, 0.1A, 96 sourcing outputs	Yes	No	Yes	Yes	No	6	CS1W-OD292	
	Triac Output Units	250 VAC, 1.2 A, 8 outputs	Yes	No	Yes	Yes	No	1	CS1W-OA201	UC, N, L, CE
		250 VAC, 0.5 A, 16 outputs	Yes	No	Yes	Yes	No	1	CS1W-OA211	
CS1 I/O Units	DC Input/ Transistor Output Units	24 VDC, 6 mA, 32 inputs, 12 to 24 VDC, 0.3 A, 32 sinking outputs	Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD261	UC1, N, L, CE
		24 VDC, 6 mA, 32 inputs, 24 VDC, 0.3 A, 32 sourcing outputs	Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD262	U, C, N, L, CE
		24 VDC, approx. 5 A, 48 inputs, 12 to 24 VDC, 0.1 A, 48 outputs, sinking inputs/outputs	Yes	No	Yes	Yes	No	Inputs: 3 Outputs: 3	CS1W-MD291	
		24 VDC, approx. 5A, 48 inputs, 12 to 24 VDC, 0.1 A, 48 outputs, sourcing inputs/outputs	Yes	No	Yes	Yes	No	Inputs: 3 Outputs: 3	CS1W-MD292	
	TTL I/O Unit	5 VDC, 32 inputs, 32 outputs	Yes	No	Yes	Yes	No	Inputs: 2 Outputs: 2	CS1W-MD561	UC, N, L, CE

Note: Interrupt inputs are not supported on these Racks (i.e., used as normal I/O Unit).

C200H Basic I/O Units

Classification	Name	Specifications	Mountable Racks					Words allocated (CIO 0000 to CIO 0319)	Model	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
C200H Input Units (See note 1.)	DC Input Units	12 to 24 VDC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-ID211	U, C, N, L, CE
		24 VDC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-ID212	
	AC Input Units	100 to 120 VAC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA121	U, C, N, L
		100 to 120 VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA122	
		100 to 120 VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA122V	CE
		200 to 240 VAC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA221	U, C, N, L
		200 to 240 VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA222	
		200 to 240 VAC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IA222V	CE
	AC/DC Input Units	12 to 24 VAC/VDC, 8 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IM211	U, C, N, L, CE
		24 VAC/VDC, 16 inputs	Yes	Yes	Yes	No	Yes	1	C200H-IM212	
	Interrupt Input Unit	12 to 24 VDC, 8 inputs	Yes	Yes (See note 2.)	Yes (See note 2.)	No (See note 2.)	No	1	C200HS-INT01	
C200H Output Units (See note 1.)	Relay Bit Output Units	250 VAC/24 VDC, 2 A, 8 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC221	U, C, N
		250 VAC/24 VDC, 2 A, 12 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC222	
		250 VAC/24 VDC, 2 A, 12 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC222N	CE
		250 VAC/24 VDC, 2 A, 16 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC225	U, C, N, L
		250 VAC/24 VDC, 2 A, 16 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC226N	CE
		250 VAC/24 VDC, 2 A, independent contacts, 5 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC223	U, C, N, L
		250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC224	
		250 VAC/24 VDC, 2 A, independent contacts, 8 outputs max.	Yes	Yes	Yes	No	Yes	1	C200H-OC224N	CE
C200H Output Units (See note 1.)	Transistor Output Units	12 to 48 VDC, 1 A, 8 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD411	U, C, N, L, CE
		24 VDC, 2.1 A, 8 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD213	
		24 VDC, 0.8 A, 8 sourcing outputs, load short-circuit protection.	Yes	Yes	Yes	No	Yes	1	C200H-OD214	U, C, N, L
		5 to 24 VDC, 0.3 A, 8 sourcing outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD216	
		24 VDC, 0.3 A, 12 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD211	U, C, N, L, CE
		5 to 24 VDC, 0.3 A, 12 sourcing outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD217	
		24 VDC, 0.3 A, 16 sinking outputs	Yes	Yes	Yes	No	Yes	1	C200H-OD212	
		24 VDC, 1 A, 16 sourcing outputs, load short-circuit protection.	Yes	Yes	Yes	No	Yes	1	C200H-OD21A	CE
	Triac Output Units	250 VAC, 1.2 A, 8 outputs	Yes	Yes	Yes	No	Yes	1	C200H-OA223	CE
		250 VAC, 0.3 A, 12 outputs	Yes	Yes	Yes	No	Yes	1	C200H-OA222V	
		250 VAC, 0.5 A, 12 outputs	Yes	Yes	Yes	No	Yes	1	C200H-OA224	U, C, N, L

Note: 1. C200H Units cannot be used with CS1D CPU Units.

2. Interrupt inputs are not supported on these Racks (i.e., used as normal I/O Unit).

3. The C200H-ID001 (no-voltage contacts, 8 inputs, NPN) and C200H-ID002 (no-voltage contacts, 8 inputs, PNP) cannot be used.

C200H Group-2 High-density I/O Units

Classification	Name	Specifications	Mountable Racks					Words allocated (CIO 0000 to CIO 0319)	Model	Standards
			CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
C200H Group-2 High-density Input Units (See note.)	DC Input Units	24 VDC, 32 inputs	Yes	Yes	Yes	No	No	2	C200H-ID216	U, C, N, L, CE
		24 VDC, 64 inputs	Yes	Yes	Yes	No	No	4	C200H-ID217	
		24 VDC, 32 inputs, 6 mA	Yes	Yes	Yes	No	No	2	C200H-ID218	U, C, CE
		24 VDC, 64 inputs, 6 mA	Yes	Yes	Yes	No	No	4	C200H-ID219	
		12 VDC, 64 inputs	Yes	Yes	Yes	No	No	4	C200H-ID111	U, C
C200H Group-2 High-density Output Units (See note.)	Transistor Output Units	16 mA/4.5 V to 100 mA/26.4 V, 32 sinking outputs	Yes	Yes	Yes	No	No	2	C200H-OD218	U, C, N, L, CE
		0.5 A/ 24 VDC, 32 sourcing outputs, load short-circuit protection	Yes	Yes	Yes	No	No	2	C200H-OD21B	U, C, CE
		16 mA/4.5 V to 100mA/ 26.4 V, 64 sinking outputs	Yes	Yes	Yes	No	No	4	C200H-OD219	U, C, N, L, CE

Note: C200H Units cannot be used with CS1D CPU Units.

Connectors for CS1 32- and 64-point I/O units, and C200H Group-2 High-density I/O Units

Part	Connection		Remarks	Model	Standards
Applicable connector	Soldered (included with Unit)		From Fujitsu Socket: FCN-361J040-AU Connector bar: FCN-360C040-J2	C500-CE404	---
	Crimped		From Fujitsu Socket: FCN-363J040 Connector bar: FCN-360C040-J2 Contacts: FCN-363J-AU	C500-CE405	
	Pressure welded		From Fujitsu: FCN-367J040-AU	C500-CE403	
Terminal block connection parts	1:1 connections	Special Cable	For CS1W-ID231/ID261/OD231/ OD232/OD261/OD262/MD261/ MD262 and C200H-ID216/ID217/ ID218/ID219/ID111/OD218/OD21B/ OD219	XW2Z-□□□B (See note 1.)	
		Terminal Block Unit		XW2B-40G4	
				XW2B-40G5	
				XW2D-40G6	
	1:2 connections	Special Cable		XW2Z-□□□D (See notes 1 and 2.)	
		Terminal Block Unit		XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	
				XW2C-20G5-IN16	

Note: 1. Refer to page 384 (Wiring Devices) for details. (Square boxes indicate the cable length.)

2. The XW2Z-□□□D, CS1W-OD□□□, and C200H-OD□□□ cannot be connected. Only the inputs of the CS1W-MD□□□ can be connected.

Connectors for CS1 96-point I/O Units

Part	Connection		Remarks	Model	Standards
Applicable connectors	Soldered (included with Unit)		From Fujitsu Socket: FCN-361J056-AU Connector bar: FCN-360C056-J3	CS1W-CE561	---
	Crimped		From Fujitsu Socket: FCN-363J056 Connector bar: FCN-360C056-J3 Contacts: FCN-363J-AU	CS1W-CE562	
	Pressure welded		From Fujitsu: FCN-367J056-AU	CS1W-CE563	
Terminal block	1:1	Special Cable	For CS1W-ID291/OD291/OD292/ MD291/MD292	XW2Z-□□□H-1 (see note.)	
		Terminal Block Unit		XW2B-60G4	
				XW2B-60G5	
	1:2	Special Cable		XW2Z-□□□H-2 (see note.)	
		Terminal Block Unit		XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	
				XW2B-40G4	
				XW2B-40G5	
				XW2D-40G6	
	1:3	Special Cable		XW2Z-□□□H-3 (see note.)	
		Terminal Block Unit		XW2B-20G4	
				XW2B-20G5	
				XW2D-20G6	

Note: Refer to page 384 (Wiring Devices) for details. (Square boxes indicate the cable length.)

C200H High-density I/O Units Classified as Special I/O Units

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
DC Input Units	24 V DC, 32 inputs	Yes	Yes	Yes	No	Yes	0 to 9	C200H-ID215	U, C, N, L, CE
TTL Input Units	5 V DC, 32 inputs	Yes	Yes	Yes	No	Yes		C200H-ID501	
Transistor Output Units	24 V DC, 32 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-OD215	
TTL Output Units	5 V DC, 32 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-OD501	
TTL I/O Units	5 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD501	
DC Input/Transistor Output Units	24 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD215	
	12 V DC, 16 inputs, 16 sinking outputs	Yes	Yes	Yes	No	Yes		C200H-MD115	U, C, N

Connectors for C200H High-density I/O Units

Part	Connection	Remarks	Model	Standards
Applicable connectors	Soldered (included with Unit)	From Fujitsu Socket: FCN-361J024-AU Connector bar: FCN-360C024-J2	C500-CE241	---
	Crimped	From Fujitsu Socket: FCN-363J024 Connector bar: FCN-360C024-J2 Contacts: FCN-363J-AU	C500-CE242	
	Pressure welded	From Fujitsu: FCN-367J024-AU/F	C500-CE243	
Terminal block connection parts	Special Cable	For C200H-ID215/ID501/OD215/MD115/MD215 For C200H-ID215/ID501/MD115/MD215/MD501 □□□ = cable length	XW2Z-□□□A (See note.)	
	Terminal Block Connector		XW2B-20G4	
			XW2B-20G5	
			XW2D-20G6	
			XW2B-20G5-D	
			XW2B-40G5-T	
	Special Cable		XW2Z-□□□A (see note)	
	Terminal Block Connector		XW2C-20G6-IN16	

Note: Refer to page 384 (Wiring Devices) for details. (Square boxes indicate the cable length.)

C200H Special I/O Units (Cannot be used with CS1D)

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Temperature Control Units	Thermocouple input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-TC001	U, C, CE
	Thermocouple input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TC002	
	Thermocouple input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TC003	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes		C200H-TC101	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TC102	
	Temperature-resistance thermometer input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TC103	
Data Setting Console	Used with Temperature Control Units. Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	---					---	C200H-DSC01	---
	Connecting Cable, 2 m	---						C200H-CN225	
	Connecting Cable, 4 m	---						C200H-CN425	

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Heat/Cool Temperature Control Units	Thermocouple input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-TV001	U, C, CE
	Thermocouple input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TV002	
	Thermocouple input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TV003	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes		C200H-TV101	
	Temperature-resistance thermometer input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-TV102	
	Temperature-resistance thermometer input, PID current output	Yes	Yes	Yes	No	Yes		C200H-TV103	
Temperature Sensor Units	Thermocouple input, K/J selectable	Yes	Yes	Yes	No	Yes	0 to 9	C200H-TS001	U, C
	Thermocouple input, K/L selectable	Yes	Yes	Yes	No	Yes		C200H-TS002	
	Temperature-resistance thermometer, JPt 100	Yes	Yes	Yes	No	Yes		C200H-TS101	
	Temperature-resistance thermometer, Pt 100	Yes	Yes	Yes	No	Yes		C200H-TS102	
PID Control Units	Voltage output/current input, time-proportioning PID, or ON/OFF transistor output	Yes	Yes	Yes	No	Yes	0 to 9	C200H-PID01	U, C, CE
	Voltage output/current input, time-proportioning PID, or ON/OFF voltage output	Yes	Yes	Yes	No	Yes		C200H-PID02	
	Voltage output/current input, PID current output	Yes	Yes	Yes	No	Yes		C200H-PID03	
Data Setting Console	Used with PID Control Units. Monitoring, setting, and changing present values, set points, alarm values, PID parameters, bank numbers, etc.	---					---	C200H-DSC01	---
	Connecting Cable, 2 m	---						C200H-CN225	
	Connecting Cable, 4 m	---						C200H-CN425	
ASCII Units	200-Kbyte RAM, 2 RS-232C ports	Yes	Yes	Yes	No	Yes	0 to F	C200H-ASC11	U, C, CE
	200-Kbyte RAM, RS-232C port, RS-422/485 port	Yes	Yes	Yes	No	Yes		C200H-ASC21	
	200-Kbyte RAM, 3 RS-232C ports (1 terminal only)	Yes	Yes	Yes	No	Yes		C200H-ASC31	
Analog Input Units	4 to 20 mA, 1 to 5/0 to 10 V/–10 to +10 V (selectable); 8 inputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes	0 to F	C200H-AD003	U, C, N, L, CE
Ánalog Output Units	1 to 5 V, –10 to +10 V (selectable), 8 outputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes	0 to F	C200H-DA003	U, C, N, L, CE
	4 to 20 mA, 8 outputs; 1/4,000 resolution	Yes	Yes	Yes	No	Yes		C200H-DA004	
Analog I/O Units	2 inputs (4 to 20 mA,1 to 5 V, etc.) 2 outputs (4 to 20 mA, 1 to 5 V, etc.)	Yes	Yes	Yes	No	Yes		C200H-MAD01	
High-Speed Counter Units	Two-axis pulse input, counting rate: 75 kcps max., line driver compatible	Yes	Yes	Yes	No	Yes	0 to F	C200H-CT021	U, C, CE

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Motion Control Units	G-language programmable, two-axis analog outputs	Yes	Yes	Yes	No	Yes	0 to F	C200H-MC221	U, C, CE
	MC Support Software IBM PC/AT or compatible	---					---	CV500-ZN3AT1-E	---
	Connecting Cable: 3.3 m	---						CV500-CIF01	
	Teaching Box	---						CVM1-PRO01	U, C, CE
	Connection cable for Teaching Box: 2 m long	---						CV500-CN224	CE
	Memory Pack	---						CVM1-MP702	U, C, CE
	Terminal Block Conversion Unit Simplifies wiring.	---						XW2B-20J6-6	---
	Connecting Cable for Terminal Block Conversion Unit	---						XW2Z-100J-F1	
	4 axes, analog+digital I/O, Motion Perfect BASIC language	Yes	Yes	Yes	No	No	0 to F	C200HW-MC402-E	CE
Position Control Units	One-axis pulse-train open-collector output	Yes	Yes	Yes	No	Yes	0 to F	C200HW-NC113	U, C, CE
	Two-axis pulse-train open-collector output	Yes	Yes	Yes	No	Yes		C200HW-NC213	
	Four-axis pulse-train open-collector output	Yes	Yes	Yes	No	Yes		C200HW-NC413	
	Peripheral Port Connecting Cables for computer	---					---	CS1W-CN226 (2 m)	CE
								CS1W-CN626 (6 m)	
	RS-232C Port Connecting Cables for computer	---						XW2Z-200S-CV (2 m) NCT V1.11 or earlier	---
								XW2Z-500S-CV (5 m) NCT V1.11 or earlier	
								XW2Z-200S (2 m) (See note 1.)	
								XW2Z-500S (5 m) (See note 1.)	
	1-axis Relay Unit for C200HW-NC113							XW2B-20J6-1B	
	2-axis Relay Unit for C200HW-NC213/NC413							XW2B-40J6-2B	
	1-axis U, H, M Connecting Cables for C200HW-NC113							XW2Z-050J-A6 (0.5 m)	
								XW2Z-100J-A6 (1 m)	
	2-axis U, H, M Connecting Cables for C200HW-NC213/NC413							XW2Z-050J-A7 (0.5 m)	
								XW2Z-100J-A7 (1 m)	
	1-axis UEP Connecting Cables for C200HW-NC113							XW2Z-050J-A8 (0.5 m)	
								XW2Z-100J-A8 (1 m)	
	2-axis UEP Connecting Cables for C200HW-NC213/NC413	---					---	XW2Z-050J-A9 (0.5 m)	---
								XW2Z-100J-A9 (1 m)	

CS1 Special I/O Units

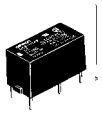
Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
Analog Input Units	4 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000	Yes	No	Yes	Yes	No	0 to 95	CS1W-AD041-V1	UC1, N, L, CE
	8 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000							CS1W-AD081-V1	
	16 inputs (1 to 5 V, 0 to 5 V, 0 to 10 V,–10 to 10 V, 4 to 20 mA)						0 to 94	CS1W-AD161	UC1, N, CE
Analog Output Units	4 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000						0 to 95	CS1W-DA041	UC1, N, L, CE
	8 outputs (1 to 5 V, 0 to 5 V, 0 to 10 V, –10 to 10 V, 4 to 20 mA) Resolution: 1/4,000							CS1W-DA08V	
	8 outputs (4 to 20 mA) Resolution: 1/4,000							CS1W-DA08C	
Analog I/O Unit	4 inputs (4 to 20 mA, 1 to 5 V, etc.) 4 outputs (1 to 5 V, 0 to 10 V, etc.)							CS1W-MAD44	
Process I/O Units									
Isolated Thermocouple Input Unit	4 inputs, B, E, J, K, N, R, S, T, U, WRe5-26, PLII, ±100 mV	Yes	No	Yes	Yes	No	0 to 95	CS1W-PTS11	UC1, CE, N
	4 inputs, B, J, K, R, S, T, L							CS1W-PTS51	CE, UC1
	8 inputs, B, J, K, R, S, T, L							CS1W-PTS55	UC1, CE
Isolated Temperature-resistance	4 inputs, Pt100Ω (JIS, IEC), JPt100Ω, Pt150Ω, Ni508.4Ω							CS1W-PTS12	UC1, CE, N
Thermometer Input Unit	4 inputs, Pt100Ω (JIS, IEC), JP5100Ω							CS1W-PTS52	UC1, CE
	8 inputs, Pt100Ω (JIS, IEC), JPt100Ω							CS1W-PTS56	
Isolated Two-wire Transmission Device Input Unit	4 inputs, 4 to 20 mA, 1 to 5 V							CS1W-PTW01	UC1, CE
Isolated DC Input Unit	4 inputs, 4 to 20 mA, 1 to 5 V, 0 to 5 V, ±5 V, 0 to 10 V, ±10 V							CS1W-PDC01	
	4 inputs, 4 to 20 mA, 0 to 20 mA, 0 to 10 V, ±10V, 0 to 5 V, ±5V, 1 to 5 V, 0 to 1.25 V, ±1.25 V							CS1W-PDC11	UC1, CE, N
	8 inputs, 4 to 20 mA, 0 to 10 V, 1 to 5 V, 0 to 5 V							CS1W-PDC55	
Isolated Pulse Input Unit	4 inputs							CS1W-PPS01	UC1, CE
Isolated Control Output Unit	4 outputs, 4 to 20 mA, 1 to 5 V							CS1W-PMV01	
	4 outputs, 0 to 10 V, ±10 V, 0 to 5 V, ±5 V, 0 to 1 V, ±1 V							CS1W-PMV02	
Power Transducer Input Unit	8 inputs, 0 to 1 mA, ±1 mA							CS1W-PTR01	
100-mV DC Input Unit	8 inputs, 0 to 100 mA, ±100 mV							CS1W-PTR02	
Loop Control Units	Control loops: 32 Porcesses: 250	Yes	No	No	No	No	0 to F	CS1W-LC001	UC1, N, CE
Loop Control Boards	50 blocks maximum including both adjustment and operation blocks	CPU Unit Inner Board for CS1-H PLCs						CS1W-LCB01	UC1, N, CE
	500 blocks maximum including both adjustment and operation blocks							CS1W-LCO05	

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
High-Speed Counter Units	Pulse input: 2 pts Counting speed: 500 kcps max.	Yes	No	Yes	Yes	No	0 to 92	CS1W-CT021	U, C, CE
	Pulse input: 4 pts Counting speed: 500 kcps max.							CS1W-CT041	
	Solder terminal; 40p and a Connector Cover	---					---	C500-CE401	---
	Solderless terminal; 40p and a Connector Cover (Crimped)	---						C500-CE402	
	Pressure welded terminal; 40p	---						C500-CE403	
	Solder terminal; 40p and a Connector Cover (Horizontal-type)	---						C500-CE404	
	Crimp-style terminal; 40p and a Connector Cover (Horizontal-type)	---						C500-CE405	
Position Control Units	One-axis pulse train open-collector output	Yes	No	Yes	Yes	No	0 to 95	CS1W-NC113	U, C, N, L, CE
	Two-axis pulse train open-collector output							CS1W-NC213	
	Four-axis pulse train open-collector output						0 to 94	CS1W-NC413	
	One-axis pulse train line-driver output						0 to 95	CS1W-NC133	
	Two axis pulse train line-driver output							CS1W-NC233	
	Four axis pulse train line-driver output						0 to 94	CS1W-NC433	
SSI Unit	SSI encoder inputs: 2 channels	Yes	No	Yes	Yes	No	0 to 94	CS1W-CTS21	CE
Motion Control Units	4 axes, analog outputs, G language	Yes	No	Yes	Yes	No	0 to 93	CS1W-MC421	U, C, CE
	2 axes, analog outputs, G language							CS1W-MC221	
	MCH high-speed serial link						0 to F	CS1W-MCH71	
Computer Connecting Cables	Peripheral port on CPU Unit	---						CS1W-CN226 (2 m)	CE
								CS1W-CN626 (6 m)	
	RS-232C port on CPU Unit							XW2Z-200S-CV (2 m)	---
								XW2Z-500S-CV (5 m)	
Teaching Box		---					---	CVM1-PRO01	U, C, CE
Teaching Box Connecting Cable (2 m)								CV500-CN224	CE
Memory Pack								CVM1-MP702	U, C, CE
MC Terminal Block Conversion Unit for 2 Axes (simplifies wiring I/O connectors)								XW2B-20J6-6	---
MC Terminal Block Conversion Unit for 4 Axes (simplifies wiring I/O connectors)								XW2B-40J6-7	
MC Terminal Block Conversion Unit Cable								XW2Z-100J-F1	
Serial Communications Unit	Two RS-232C Ports	Yes	No	Yes	Yes	No	0 to F	CS1W-SCU21-V1	U, C, L, N, CE
RS-232C–RS-422A Conversion Unit	1 RS-232C port and 1 RS-422A terminal block	---					---	NT-AL001	---
Ethernet Unit	100Base-Tx	Yes	No	Yes	Yes	No	0 to F	CS1W-ETN21 CS1D-ETN21D	UC1, L, N,
Controller Link Units	Wired	Yes	No	Yes	Yes	No	0 to F	CS1W-CLK21-V1	U, C, L, N, CE
	Optical (H-PCF cable)						0 to F	CS1W-CLK12-V1	U, C, CE
	Optical (GI fiber 62.5/125 μm)							CS1W-CLK52-V1	
Controller Link Support Boards	Wired	---					---	3G8F7-CLK21-V1	CE
	Optical (H-PCF cable)							3G8F7-CLK12-V1	
	Optical (GI fiber 62.5/125 μm)							3G8F7-CLK52-V1	
Controller Link Relay Terminals	Wired (a set of 5)	---					---	CJ1W-TB101	---
Controller Link Repeater Units	Twisted-pair	---					---	CS1W-RPT01	UC1, CE
	Optical ring (H-PCF cable)	---					---	CS1W-RPT02	
	Optical ring (GI cable)	---					---	CS1W-RPT03	
GPIB Unit	Supports Master and Slave Modes	Yes	No	Yes	Yes	No	0 to 95	CS1W-GPI01	UC, CE

Name	Specifications	Mountable Racks					Unit No.	Model	Standards
		CPU Rack	C200H Expansion I/O Racks	CS1 Expansion Racks	CS1 Long-distance Racks	SYSMAC BUS Slave Racks			
DeviceNet Unit	Functions as master and/or slave; allows control of 2,048 points max. per master.	Yes	No	Yes	Yes	No	---	CS1W-DRM21-V1	0 to F
PROFIBUS-DP Unit	Master Unit for up to 7000 remote I/O words	Yes	No	Yes	Yes	No	0 to F	CS1W-PRM21	CE
	Master Unit for up to 300 remote I/O words	Yes	Yes	Yes	No	No		C200HW-PRM21	
	I/O Link for up to 200 I/O words							C200HW-PRT21	U, L, C, CE
CAN/CANopen Unit	Freely configurable CAN communication, or CANopen protocol	Yes	Yes	Yes	No	No	0 to F	C200HW-CORT21-V1	U, C, CE

Note: 1. A 25-pin to 9-pin adapter is required to connected to a 9-pin, D-sub RS-232C connector on an IBM PC/AT or compatible.
Note: Setting tool software for the Processing I/O Units also supports CS1W-AD□□□, CS1WS-DA□□□, and CS1W-MAD44.

Optional Products

Name	Specifications		Model	Standards
I/O Unit Cover 	Cover for 10-pin terminal block		C200H-COV11	---
Terminal Block Covers 	Short protection for 10-pin terminal block (package of 10 covers); 8 pts		C200H-COV02	
	Short protection for 19-pin terminal block (package of 10 covers); 12 pts		C200H-COV03	
C200H Unit Connector Cover 	Protective cover for unused I/O Connecting Cable connectors		C500-COV01	
CS1 Special I/O Unit Connector Cover	Protective cover for unused I/O Connecting Cable connectors		CV500-COV01	
C200H Expansion I/O Backplane Insulation Plates 	Electrically insulate C200H Expansion I/O Backplanes from the control panel to increase noise resistance.	For 3-slot Backplane	C200HW-ATT32	N, L, CE
		For 5-slot Backplane	C200HW-ATT52	
		For 8-slot Backplane	C200HW-ATT82	
		For 10-slot Backplane	C200HW-ATTA2	
Relay 	24 V DC, for C200H-OC221/OC222/OC223/OC224/OC225		G6B-1174P-FD-US	---
Programming Console Mounting Bracket 	Used to attach C200H-PRO27-E Hand-held Programming Console to a panel.		C200H-ATT01	
Space Unit	Used for empty I/O slot on the CS1W-BC□□3/BI□□3 or C200HW-BI□□□.		C200H-SP001	---
	Used for empty I/O slot on CS1W-BC□□2/BI□□2 and CS1D-BC□□□(S)/BI□□□		CS1W-SP001	
	Used for empty Power Supply Unit slot on CS1D-BC□□□(S)/BI□□□; same shape as the CS1W-PA207R.		CS1W-SP002	
	Used for empty Power Supply Unit slot on CS1D-BC□□□(S)/BI□□□; same shape as the CS1W-PA207R.		CS1W-SP002	
Battery Set	For CS-series CPU Units. (Use batteries within wo years of manufacture).		CS1W-BAT01	L, CE
Terminating Resistor (See note.)	Mounts to end of CS1 Long-distance Expansion Rack		CV500-TER01	U, C

Note: Two Terminating Resistors are included with the CS1W-IC102 I/O Control Unit.

Mounting Rails and Accessories

Name	Specifications	Model number	Standards
DIN rail Mounting Bracket	1 set (2 included)	C200H-DIN01	---
DIN rails	Length: 50 cm; height: 7.3 cm	PFP-50N	
	Length: 1 m; height: 7.3 cm	PFP-100N	
	Length: 50 cm; height: 16 mm	PFP-100N2	
End Plate	---	PFP-M	
Spacer		PFP-S	

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P08E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

Wiring Systems

G7□ Relay I/O Blocks and Cables		383
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	G70D Relay Output Terminal Blocks	387
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I/O Connecting Cable Selection Guide		416

OMRON

Wiring Systems

Introduction to I/O Blocks, I/O Terminals, and I/O Block Bases

G70D, G7TC, and G70A-ZOC16

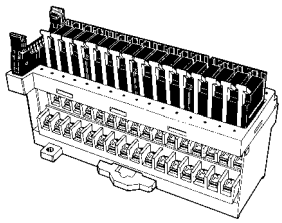
Unify Wiring with One Connecting Cable.
Simplify Connections to the Controller and Reduce Wiring in the Control Panel.
Improve Surge Suppression and Increase Capacity at the Same Time.

G70D

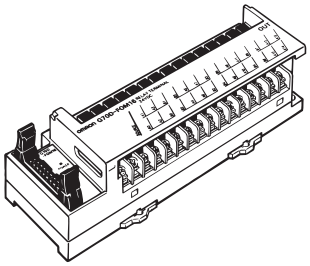
Compact Output Terminals Save Control Panel Space

- The G70D Series consists of 16-point Relay Output Terminals.
- Two configurations are available: The standard low-profile version is just 156 × 51 × 39 mm (W×D×H) and the vertical version is just 135 × 46 × 81 mm (W×D×H).
- Relay output models are equipped with G6D power relays (low-profile: SPST-NO 3 A/common; vertical: SPST-NO 3 A/output) and power MOSFET relay models are equipped with G3DZ power MOSFET relays (SPST-NO 0.3 A/output).
- The flat models have 2 common terminals. The vertical models have 16 independent outputs.

Note: See page 392 and page 387 for more details.



Vertical models
(G70D-VSOC16/VFOM16)



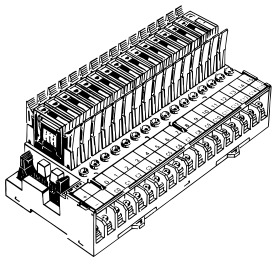
Low-profile models
(G70D-SOC16/FOM16)

G7TC

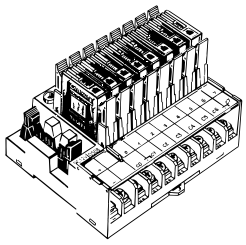
Both Input Blocks and Output Blocks are Available. G7TC I/O Blocks are Ideal as Controller Interfaces.

- Output Blocks with 8 or 16 outputs are available. Input Blocks with 16 inputs are available.
- The 16-point Output Blocks are available with PNP circuits.
- The 16-point models are just 182 × 85 × 68 mm (W×D×H) and the 8-point models are just 102 × 85 × 68 mm (W×D×H).
- Equipped with G7T I/O Relays (SPST-NO 5 A/output).
- G7TC models conform to UL and CSA standards.
- 16-point models with independent terminals.
- Models are also available with G3TA Solid State Relays.

Note: See page 398 for more details.



16-point model



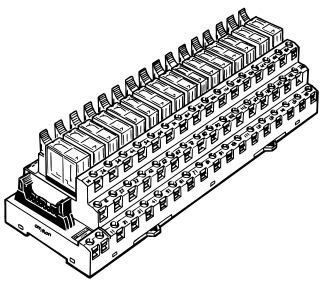
8-point model

G70A-ZOC16

High-capacity Relay Sockets can be Equipped with G2R (SPDT) Relays.

- Sixteen relay terminal sockets for output relays only.
- Models are available with PNP circuits.
- Compact case is just 234 × 75 × 64 mm (W×D×H).
- Install OMRON G2R Power Relays, G3R Solid State Relays, G3RZ Power MOSFET Relays, and H3RN Timers as required. (Relays and Timers are sold separately.)
- High-capacity 10-A Terminal Block
- Conforms to VDE standards.
- Sixteen independent terminals

Note: See page 386 for more details.



*Relays are sold separately.

G70D-SOC08

Space-saving and Labor-saving 8-point Output Block

- Compact terminal block is just 68 × 80 × 44 mm (W × H × D, when mounted upright).
- Independent contacts and shorting bars allow easy common connections.
- The common can now be connected with a shorting bar in the G70D-SOC08 and G70R-SOC08.
- No tools are required to remove Relays, so Relay replacement is easier than ever.
- The attached terminal cover prevents shocks.
- Equipped with operation indicators.
- Built-in diodes absorb coil surge.
- Mount either to DIN rail or via screws.

Note: See page 389 for details.

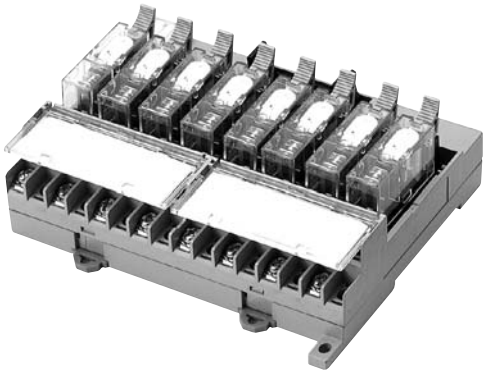


G70R-SOC08

Space-saving and Labor-saving 8-point Output Block

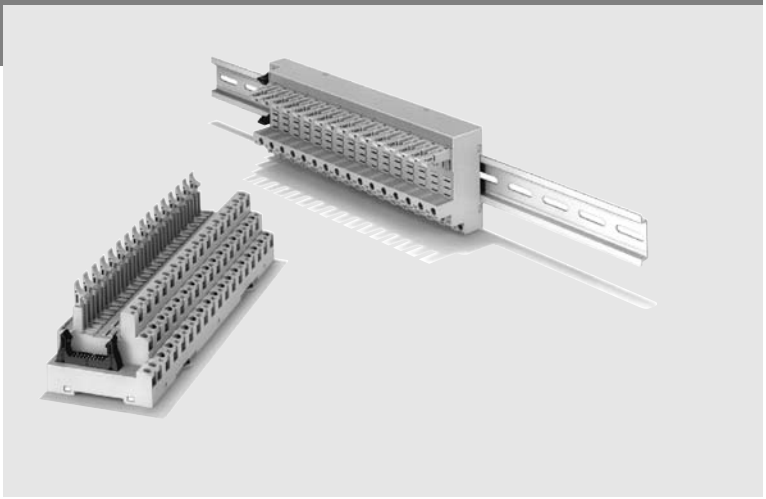
- Compact terminal block is just 136 × 80 × 55 mm (W × H × D, when mounted upright).
- Independent contacts and shorting bars allow easy common connections.
- The common can now be connected with a shorting bar in the G70D-SOC08 and G70R-SOC08.
- No tools are required to remove Relays, so Relay replacement is easier than ever.
- The attached terminal cover prevents shocks.
- Built-in diodes absorb coil surge.
- Mount either to DIN rail or via screws.

Note: See page 395 for details.



G70A-ZOC16

I/O Terminal Bases



16-point I/O Block accepts Various Devices such as G2R Relays, Solid State Relays, and Timers for More System Flexibility

- Connects to a PLC or SBC with a simple snap-in connector.
- The G70A-ZOC16-3 can be combined with a DRT1-OD32ML I/O Terminal for DeviceNet connectivity or an SRT2-VOD16ML Connector Terminal for CompoBus/S connectivity.
- SPDT relays can be mounted.
- Conforms to VDE (VDE0106) and CE standards.
- Electric-shock preventive (finger-touch protection) terminal block
- DIN rail mountable
- High-capacity (10 A) terminal block
- Excellent noise resistance characteristics
- Built-in diodes for coil surge suppression

Ordering Information

Internal I/O circuit common	Rated voltage	Model	Compatible Relays/Timers (sold separately)
NPN compatible (+ common)	24 V DC	G70A-ZOC16-3	G2R-1-S (SPDT), G2R-1-SN (SPDT with indicator), G3R-OA202SZN, G3R-OA202SLN, G3R-ODX02SN, G3R-OD201SN, G3RZ-201SLN, H3RN-1, and H3RN-11
PNP compatible (– common)	24 V DC	G70A-ZOC16-4	

Note: Each relay to be mounted must incorporate a coil that has proper specifications within the maximum rated voltage range.

Specifications

Ratings/Characteristics

Item		G70A-ZOC16-3 and G70A-ZOC16-4
Contact resistance		10 mΩ (excluding the resistance of the relay to be used)
Permissible current		10 A
Max. operating voltage		380 V AC, 125 V DC
Terminal block	Dielectric strength	4,000 V AC, 50/60 Hz for 1 min between connector and output terminals 2,000 V AC, 50/60 Hz for 1 min between output terminals 250 V AC, 50/60 Hz for 1 min between connectors
	Insulation resistance	1,000 MΩ (at 250/500 V)
	Vibration resistance	Malfunction: 10 to 61.2 to 10 Hz, 0.1-mm double amplitude 0.2; 61.2 to 150 to 61.2 Hz, 14.7 m/s^2
Shock resistance		Malfunction: 200 m/s^2 (approx. 20G)
Noise immunity		Noise level: 2.0 kV; pulse width: 100 ns to 1 μs
Ambient temperature		Operating: 0°C to 55°C (with no condensation or icing)
Ambient humidity		Operating: 35% to 85%
Coil surge absorption element		Diode: 1 A, 400 V
Protection against reversed connection		Diode (2 A, withstand inverse voltage: 40 V)
Tensile strength		No damage when a tensile force of 49 N is applied for 1 second in any direction
I/O terminal tightening torque		Tightening strength: 0.59 N·m; Tensile strength 49 N for 1 min
Weight		Approx. 400 g

Accessories (Order Separately)

G79 Connecting Cables

Cable Type	Model
Cable with Loose Wire and Crimp Terminals	G79-Y□C
Cable with Loose Wires	G79-A□C
Cable with Three Connectors (1:3)	G79-□C-□-□
Cable with Two Connectors (1:2)	G79-□C-□
Cable with One Connector (1:1)	G79-□C

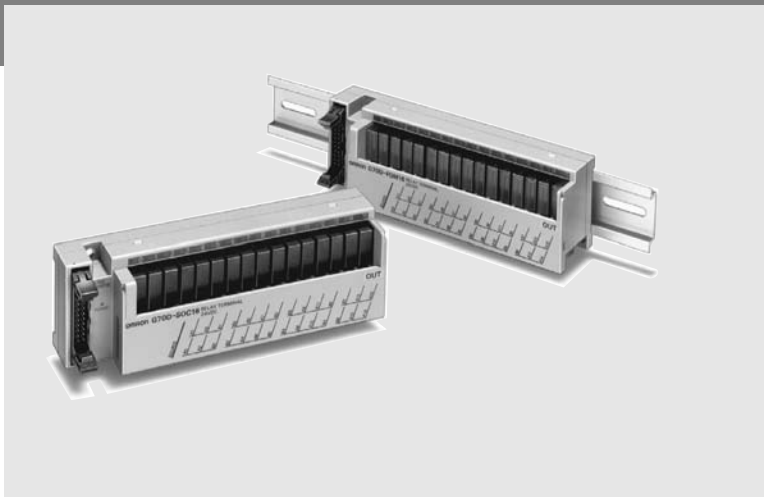
Short Bar

Applicable I/O block	Model
G70A-ZOC 16-4	G78-16-E

Note: See pages page 401 for details.

G70D

Relay output terminal blocks



Compact, Low-profile 16-point Output Block

- Compact terminal block is just 156 × 51 × 39 mm (W × D × H)
- Models with Power MOSFET Relays are available for high-frequency switching of AC or DC loads.
- Wire loads directly from terminal blocks; no need for relaying.
- Operation indicators show each I/O signal's ON/OFF status at a glance.
- The G70D-SOC16 and G70D-FOM16 can be combined with a DRT1-OD32ML I/O Terminal for DeviceNet connectivity or an SRT2-VOD16ML Connector Terminal for CompoBus/S connectivity.
- Equipped with surge-absorbing diodes.
- Relay Removal Tool included.
- Mount either to DIN rail or via screws.

Ordering Information

Classification	Points	Internal output circuit common	Rated voltage	Model
Relay outputs	16 points (SPST-NO × 16)	NPN compatible (+common)	24 V DC	G70D-SOC16
		PNP compatible (– common)		G70D-SOC16-1
Power MOSFET relay outputs		NPN compatible (+ common)		G70D-FOM16
		PNP compatible (– common)		G70D-FOM16-1

These are all non-standard model and require a special order. Contact your OMRON representative for details on availability.

Specifications

Ratings

Relay Specifications

Note: The following specifications apply to G6D Relays mounted in a G70D Output Block and not the G6D Relay itself.

Coil Ratings (per G6D Relay)

Rated voltage	24 V DC
Rated current	10.5 mA
Coil resistance	2,880 Ω
Must-operate voltage	70% max. of rated voltage
Must release voltage	10% min. of rated voltage
Max. voltage	130% of rated voltage
Power consumption	Approx. 200 mW

Note: 1. The must-operate voltage is 75% or less of the rated voltage if the relay is mounted upside down.

2. Rated current and coil resistance were measured at a coil temperature of 23°C with a tolerance of ±10%.

3. Operating characteristics were measured at a coil temperature of 23°C.

4. The maximum allowable voltage is the maximum value of the allowable voltage range for the relay coil operating power supply. There is no continuous allowance.

5. The rated current includes the terminal's LED current.

Contact Ratings (per G6D Relay)

Load	Resistive load (cosϕ = 1)
Rated load	3 A at 250 V AC, 3 A at 30 V DC
Rated carry current	3 A
Max. switching voltage	250 V AC, 30 V DC
Max. switching current	3 A
Min. permissible load (reference value) (see note 2)	10 mA at 5 V DC
Life expectancy	Electrical: 100,000 operations min. (under and at the rated load at 1,800 operations/hr) Mechanical: 20,000,000 operations min. (at 18,000 operations/hr)

Note: 1. Up to 3 A can be carried by the power supply terminals for outputs (terminals B0 to B7.)

2. This value is for a switching frequency of 120 times per minute.

Power MOSFET Relay Specifications

Input (per G3DZ Power MOSFET Relay)

Rated voltage		24 V DC
Operating voltage		19.2 to 28.8 V DC
Voltage level	Must-operate	19.2 V DC max.
	Must release	1 V DC min.
Input impedance		4 kΩ±20%
Rated current		8.2 mA±20%

Output (per G3DZ Power MOSFET Relay)

Load voltage	3 to 264 V AC, 3 to 125 V DC
Load current	100 μA to 0.3 A
Inrush current	6 A (10 ms)

Note: The rated current includes the terminal's LED current.

Characteristics

Item	G70D-SOC16(-1)	G70D-FOM16(-1)
Classification	Relay outputs	Power MOSFET relay outputs
Contact form	16 points (SPST-NO × 16)	
Contact mechanism	Single	---
Contact material	AgCdO	---
Contact resistance	100 mΩ max. (see note 2)	---
Isolation method	---	Photocoupler
Must-operate time	10 ms max. (see note 3)	6 ms max.
Release time	10 ms max. (see note 3)	
Output ON-resistance	---	2.4 Ω max.
Open-state leakage current	---	10 μA max. (at 125 V DC)
Max. switching frequency	Mechanical:18,000 operations/hr Rated load:1,800 operations/hr	---
Insulation resistance	100 MΩ min. (at 500 V DC)	
Dielectric strength	2,000 V AC for 1 min between coil and contact	2,000 V AC for 1 min between input and output terminals
Noise immunity	Power input (normal mode): 600 V for 10 min with a pulse width of 100 ns to 1 μs Power input (common mode): 1.5 kV for 10 min with a pulse width of 100 ns to 1 μs Input cable (coiling): 1.5 kV for 10 min with a pulse width of 100 ns to 1 μs Unit body (coiling): 600 V for 10 min with a pulse width of 100 ns to 1 μs	
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.5-mm amplitude (1.0-mm double) Malfunction: 10 to 55 to 10 Hz, 0.375-mm amplitude (0.75-mm double)	
Shock resistance	Destruction:300 m/s^2 (approx. 30G), Malfunction:100 m/s^2 (approx. 10G)	
Operating voltage range	24 V DC $^{+10\%}/_{-15\%}$	
Current consumption	Approx. 300 mA at 24 V DC (see note 4)	Approx. 300 mA at 24 V DC (see note 5)
Cable length	Between block and controller: 5 m max. (reference value for AWG28) Between block and external device: Dependent on load	
LED color	Operation indicator: orange; power supply: green	
Coil surge absorber	Diode (400 V, 300 mA)	
Ambient temperature	Operating: 0°C to 55°C	
Ambient humidity	Operating: 35% to 85%	
Mounting strength	No damage when 5 kgf (49 N) pull load was applied for 1 s in all directions (except for 1 kgf (9.8 N) in direction of rail)	
Terminal strength	Tightening torque: 0.78 to 0.98 N·m), Pull strength: 49 N for 1 min	
Weight	Approx. 200 g	

Note: 1. These values are initial values.
2. Measurement condition: 1 A at 5 V DC
3. Ambient temperature: 23°C
4. Current consumption is when all points are ON and includes G6D Relay coil current but does not include any external load current.
5. Current consumption is when all points are ON and includes G3DZ input current but does not include any external load current.

Accessories (Order Separately)

G79 Connecting Cables

Cable Type	Model
Cable with Loose Wire and Crimp Terminals	G79-Y□C
Cable with Loose Wires	G79-A□C
Cable with Three Connectors (1:3)	G79-□C-□-□
Cable with Two Connectors (1:2)	G79-□C-□
Cable with One Connector (1:1)	G79-□C

Note: See page 401 for details.

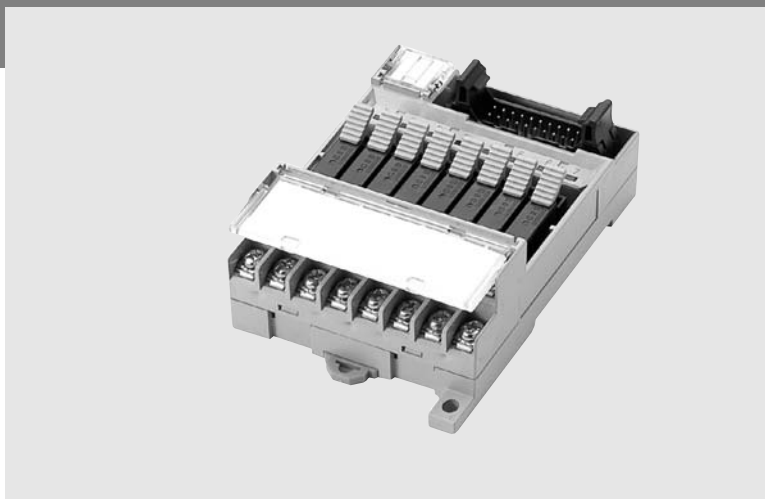
Replacement Relays

Applicable Output Block	Rated voltage	Model
G70D-SOC16 G70D-SOC16-1	24 V DC	G6D-1A
G70D-FOM16 G70D-FOM16-1	24 V DC	G3DZ-2R6PL (see note)

Note: This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

G70D-SOC08

Relay Output Terminal Block



Space-saving and Labor-saving 8-point Output Block

- Compact terminal block is just 68 × 80 × 44 mm (W × H × D, when mounted upright)..
- Independent contacts and shorting bars allow easy common connections.
- The common can now be connected with a shorting bar in the G70D-SOC08 and G70R-SOC08.
- No tools are required to remove Relays, so Relay replacement is easier than ever.
- The attached terminal cover prevents shocks.
- Equipped with operation indicators.
- Built-in diodes absorb coil surge.
- Mount either to DIN rail or via screws.

Ordering Information

Classification	Points	Internal output circuit common	Rated voltage	Model
Relay outputs	8 points (SPST-NO × 8)	NPN compatible (+ common)	24 V DC	G70D-SOC08

This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

Specifications

Ratings

The following specifications apply to G6D Relays mounted in a G70D Output Block and not the G6D Relay itself.

Coil Ratings (per G6D Relay)

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Release voltage	Max. allowable voltage	Power consumption
24 V DC	10.5 mA	2,880 Ω	70% max. of rated voltage	10% min. of rated voltage	130%	Approx. 200 mW

Note: 1. The must-operate voltage is 75% max. of the rated voltage if the Relay is mounted upside down.

2. Rated current and coil resistance were measured at a coil temperature of 23°C with a tolerance of ±10%.

3. Operating characteristics were measured at a coil temperature of 23°C.

4. The maximum allowable voltage is the maximum value of the allowable voltage range for the relay coil operating power supply. There is no continuous allowance.

5. The rated current includes the current consumption of the operation indicator.

Contact Ratings (per G6D Relay)

Item	Load	Resistive load (cosϕ = 1)
Rated load		5 A at 250 V AC, 5 A at 30 V DC
Rated carry current		5 A
Max. switching voltage		250 V AC, 30 V DC
Max. switching current		5 A
Max. switching capacity (reference value)		1,250 VA, 150 W
Min. permissible load (reference value; see note.)		5 V DC, 10 mA
Life expectancy	Electrical	100,000 operations min. (at or below the rated load at 1,800 operations/hr)
	Mechanical	20,000,000 operations min. (at 18,000 operations/hr)

Note: This value is for a switching frequency of 120 times per minute.

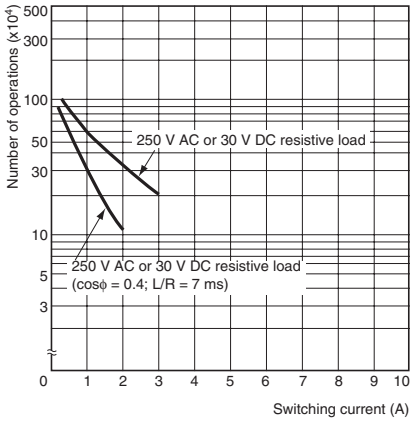
Characteristics

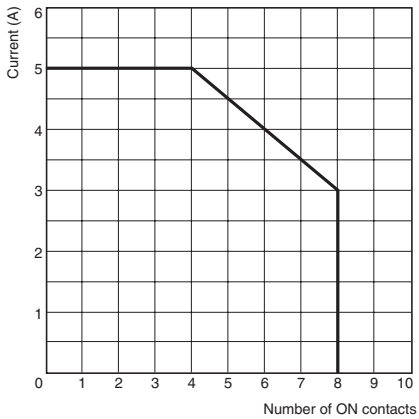
	Model	G70D-SOC08
Item		**Relay outputs**
Contact form		8 points (SPST-NO × 8)
Contact mechanism		Single
Contact resistance (See note 1.)		100 mΩ max.
Must-operate time (See note 2.)		100 ms max.
Release time (See note 3.)		10 ms max.
Max. switching frequency	Mechanical	18,000 operations/hr
	Rated load	1,800 operations/hr
Insulation resistance		100 MΩ min. (at 500 V DC)
Dielectric strength	Between coil and contact	2,000 V AC for 1 min
	Between contacts of same polarity	750 V AC for 1 min
	Between contacts of different polarity	1,500 V AC for 1 min
Vibration resistance	Destruction	10 to 55 to 10 Hz, 0.5-mm amplitude (1.0-mm double)
	Malfunction	10 to 55 to 10 Hz, 0.5-mm amplitude (1.0-mm double)
Shock resistance	Destruction	300 m/s^2
	Malfunction	100 m/s^2
Noise immunity	Power input (normal mode)	600 V for 10 min with a pulse width of 100 ns to 1 μs
	Power input (common mode)	1.5 kV for 10 min with a pulse width of 100 ns to 1 μs
	Input cable (coiling)	1.5 kV for 10 min with a pulse width of 100 ns to 1 μs
	Unit body (coiling)	600 V for 10 min with a pulse width of 100 ns to 1 μs
Allowable power supply voltage fluctuation		24 V DC +10%/–15%
Current consumption (See note 3.)		Approx. 80 mA at 24 V DC
Cable length	Between block and controller	5 m max. (reference value for AWG 28)
	Between block and external device	Determine appropriate length for the connected load.
LED indicator color		Orange
Coil surge absorber		Diode
Ambient operating temperature		–10 to 55°C
Ambient storage temperature		35% to 85%
Ambient operating humidity		–20 to 65°C
Mounting strength		No damage when 49 N pull load was applied for 1 s in all directions (except for 9.8 N min. in direction of track)
Terminal strength	Tightening torque	9.8 N·m
	Pull strength	49 N for 1 min
Weight		Approx. 145 g

Note: 1. These values are initial values.
2. Measurement conditions: 1 A at 5 V DC
3. Ambient temperature: 23°C
4. The current consumption is the value when all points are ON and includes the G6D Relay coil current.

Engineering Data

Life expectancyMaximum switching capacity



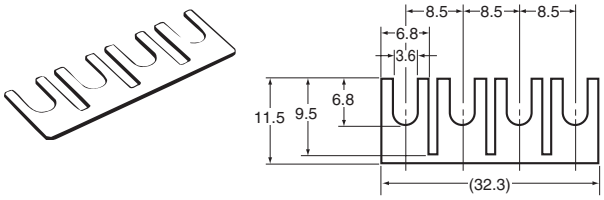


- When using with a carry current of 5 A, no more than 4 contacts may be ON.
- The carry current is 3 A when all contacts are ON.

Note: The data shown in these graphs is based on actual values sampled from a production line; please use this data for reference only. As a general rule, allow for slight variations in the Relays because the Relays are mass produced.

Accessories for the G70D-SOC08 (Order Separately)

Shorting Bar



Applicable Output Block	Model
G70D-SOC08	G6B-4-SB

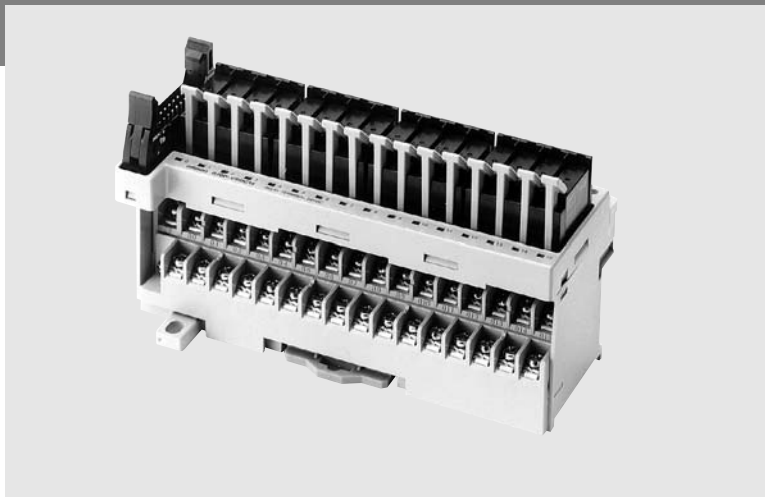
Replacement Relays

Applicable Output Block	Rated voltage	Model
G70D-SOC08	24 V DC	G6D-1A (See note.)
		G6D-1A-AP (See note.)

Note: The minimum permissible load (reference value) for the G6D-1A is 10 mA at 5 V DC.

G70D-VSOC16/-VFOM16

Relay output terminal blocks



Easy-to-use, Space-saving 16-point Output Block

- Slim terminal block is just 135 × 40 mm (W × D).
- Independent contacts and short bars allow easy common connections.
- An Expansion Terminal Block can be mounted for power line connections.
- M3.5 fork-type crimp terminals (with a maximum terminal width of 6.2 mm) can be used.
- Lever mechanism allows Relays to be installed and removed easily without tools.
- Relay models and power MOSFET Relay models are available.
- Equipped with operation indicators.
- Can be combined with a DRT1-OD32ML I/O Terminal for DeviceNet connectivity or an SRT2-VOD16ML Connector Terminal for CompoBus/S connectivity.
- Built-in diode absorbs coil surge.
- Mount either to DIN rail or via screws.

Ordering Information

Classification	Points	Internal output circuit common	Rated voltage	Model
Relay outputs	16 points (SPST-NO × 16)	NPN compatible (+ common)	24 V DC	G70D-VSOC16
Power MOSFET Relay outputs				G70D-VFOM16

These are all non-standard model and require a special order. Contact your OMRON representative for details on availability.

Specifications

Ratings

Relay Specifications

Note: The following specifications apply to G6D Relays mounted in a G70D Output Block and not the G6D Relay itself.

Coil Ratings (per G6D Relay)

Rated voltage	24 V DC
Rated current	10.5 mA
Coil resistance	2,880 Ω
Must-operate voltage	70% max. of rated voltage
Release voltage	10% min. of rated voltage
Max. allowable voltage	130% of rated voltage
Power consumption	Approx. 200 mW

Note: 1. The must-operate voltage is 75% max. of the rated voltage if the Relay is mounted upside down.
2. Rated current and coil resistance were measured at a coil temperature of 23°C with a tolerance of ±10%.
3. Operating characteristics were measured at a coil temperature of 23°C.
4. The maximum allowable voltage is the maximum value of the allowable voltage range for the relay coil operating power supply. There is no continuous allowance.
5. The rated current includes the current consumption of the operation indicator.

Contact Ratings (per G6D Relay)

Load	Resistive load (cosϕ = 1)
Rated load	3 A at 250 V AC, 3 A at 30 V DC
Rated carry current	5 A (see note 1)
Max. switching voltage	250 V AC, 30 V DC
Max. switching current	5 A
Max. switching capacity	1,250 VA, 150 W
Min. permissible load (reference value) (See note .2)	5 V DC, 1 mA
Life expectancy	Electrical: 100,000 operations min. (under and at the rated load at 1,800 operations/hr), Mechanical: 20,000,000 operations min. (at 18,000 operations/hr)

Note: 1. Up to 5 A can be carried when 8 or fewer outputs are ON.
2. This value is for a switching frequency of 120 times per minute.

Power MOSFET Relay Specifications

Note: The following values apply to G3DZ Relays mounted in a G70D Output Block and not the G3DZ Relay itself.

Input (per G3DZ Power MOSFET Relay)

Rated voltage		24 V DC
Operating voltage		19.2 to 28.8 V DC
Voltage level	Must operate	19.2 V DC max.
	Must release	1 V DC min.
Input impedance		4 kΩ±20%
Rated current		8.2 mA±20%

Note: The rated current includes the current consumption of the operation indicator.

Output (per G3DZ Power MOSFET Relay)

Load voltage	3 to 264 V AC, 3 to 125 V DC
Load current	100 μA to 0.3 A
Inrush current	6 A (10 ms)

Characteristics

Item	G70D-VSOC16	G70D-VFOM16
	Relay outputs	Power MOSFET Relay outputs
Contact form	16 points (SPST-NO × 16)	
Contact mechanism	Single	---
Contact resistance	100 mΩ max. (see note 2)	---
Isolation method	---	Photocoupler
Must-operate time	10 ms max. (see note 3)	6 ms max.
Release time	10 ms max. (see note 3)	10 ms max.
Output ON-resistance	---	2.4 Ω max.
Open-circuit leakage current	---	10 μA max. (at 125 V DC)
Max. switching frequency	Mechanical:18,000 operations/hr Rated load:1,800 operations/hr	---
Insulation resistance	100 MΩ min. (at 500 V DC)	
Dielectric strength	2,000 V AC for 1 min between coil and contact	2,000 V AC for 1 min between input and output terminals
Noise immunity	Power input (normal mode): 600 V for 10 min with a pulse width of 100 ns to 1 μs Power input (common mode): 1.5 kV for 10 min with a pulse width of 100 ns to 1 μs Input cable (coiling): 1.5 kV for 10 min with a pulse width of 100 ns to 1 μs Unit body (coiling): 600 V for 10 min with a pulse width of 100 ns to 1 μs	
Vibration resistance	Destruction: 10 to 55 to 10 Hz, 0.5-mm amplitude (1.0-mm double) Malfunction: 10 to 55 to 10 Hz, 0.375-mm amplitude (0.75-mm double)	
Shock resistance	Destruction: 300 m/s^2, Malfunction: 100 m/s^2	
Operating voltage range	24 V DC $^{+10\%}/_{-15\%}$	
Current consumption	Approx. 170 mA at 24 V DC (see note 4)	Approx. 125 mA at 24 V DC (see note 5)
Cable length	Between block and controller:5 m max. (reference value for AWG28) Between block and external device:Dependent on load	
LED color	Operation indicator: orange	
Coil surge absorber	Diode (600 V, 1 A)	
Ambient temperature	Operating: –25°C to 55°C (with no icing or condensation)	
Ambient humidity	Operating: 45% to 85%	
Mounting strength	No damage when 49 N pull load was applied for 1 s in all directions (except for 9.8 N min. in direction of rail)	
Terminal strength	Tightening torque: 0.78 to 1.18 N·m, Pull strength: 49 N for 1 min	Tightening torque: 0.78 to 0.98 N·m, Pull strength: 49 N for 1 min
Weight (see note 6)	Approx. 280 g	

Note: 1. These values are initial values.

2. Measurement condition: 1 A at 5 V DC

3. Ambient temperature: 23°C

4. Current consumption is when all points are ON and includes G6D Relay coil current but does not include any external load current.

5. Current consumption is when all points are ON and includes G3DZ input current but does not include any external load current.

6. The Unit weighs approximately 315 g with the Expansion Terminal Block mounted.

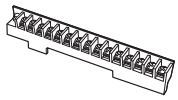
Accessories (Sold Separately)

G79 Connecting Cables

Cable Type	Model
Cable with Loose Wire and Crimp Terminals	G79-Y□C
Cable with Loose Wires	G79-A□C
Cable with Three Connectors (1:3)	G79-□C-□-□
Cable with Two Connectors (1:2)	G79-□C-□
Cable with One Connector (1:1)	G79-□C

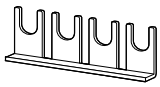
Note: See page 401 for details.

Expansion Terminal Block

Applicable Output Block	Appearance	Model
G70D-VSOC16 G70D-VFOM16		G70D-ET (see note)

Note: This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

Short Bar

Applicable Output Block	Appearance	Model
G70D-VSOC16 G70D-VFOM16		G6D-4-SB

Replacement Relays

Applicable Output Block	Rated voltage	Model
G70D-VSOC16	24 V DC	G6D-1A (see note 1)
	24 V DC	G6D-1A-AP (see notes 2 and 3)
G70D-VFOM16	24 V DC	G3DZ-2R6PL (see note 3)

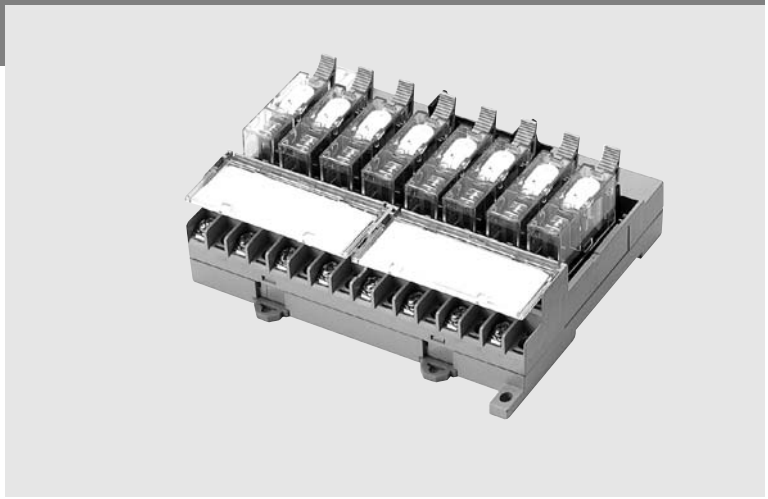
Note: 1. The minimum permissible load (reference value) for the G6D-1A is 10 mA at 5 V DC.

2. The minimum permissible load (reference value) for the G6D-1A-AP is 1 mA at 5 V DC.

3. These are non-standard models and require a special order. Contact your OMRON representative for details on availability.

G70R-SOC08

Relay output terminal block



Space-saving and Labor-saving 8-point Output Block

- Compact terminal block is just 136 × 80 × 55 mm (W × H × D) when mounted upright).
- Independent contacts and shorting bars allow easy common connections.
- The common can now be connected with a shorting bar in the G70D-SOC08 and G70R-SOC08.
- No tools are required to remove Relays, so Relay replacement is easier than ever.
- The attached terminal cover prevents shocks.
- Built-in diodes absorb coil surge.
- Mount either to DIN rail or via screws.

Ordering Information

Classification	Points	Internal output circuit common	Rated voltage	Model
Relay outputs	8 points (SPST-NO × 8)	NPN compatible (+ common)	24 V DC	G70R-SOC08

This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

Specifications

Ratings

The following specifications apply to G2R Relays mounted in a G70R Output Block and not the G2R Relay itself.

Coil Ratings (per G2R Relay)

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Release voltage	Max. allowable voltage	Power consumption
24 V DC	25.8 mA	1,100 Ω	70% max. of rated voltage	15% min. of rated voltage	130%	Approx. 530 mW

Note: 1. The must-operate voltage is 75% max. of the rated voltage if the Relay is mounted upside down.

2. Rated current and coil resistance were measured at a coil temperature of 23°C with a tolerance of ±10%.

3. Operating characteristics were measured at a coil temperature of 23°C.

4. The maximum allowable voltage is the maximum value of the allowable voltage range for the relay coil operating power supply. There is no continuous allowance.

5. The rated current includes the current consumption of the operation indicator.

Contact Ratings (per G2R Relay)

Item	Load	Resistive load (cosϕ = 1)
Rated load		10 A at 250 V AC, 10 A at 30 V DC
Rated carry current		10 A
Max. switching voltage		380 V AC, 125 V DC
Max. switching current		10 A
Max. switching capacity (reference value)		2.50 VA, 300 W
Min. permissible load (reference value; see note.)		5 V DC, 10 mA
Life expectancy	Electrical	100,000 operations min. (at the rated load and 1,800 operations/hr)
	Mechanical	10,000,000 operations min. (at 18,000 operations/hr)

Note: This value is for a switching frequency of 120 times per minute.

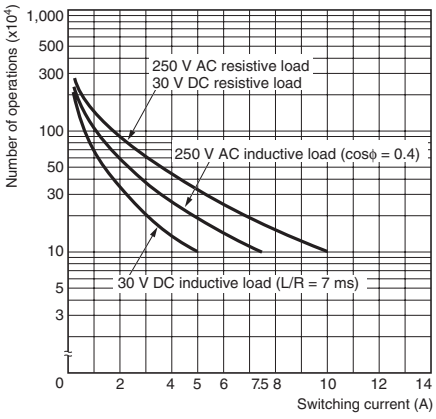
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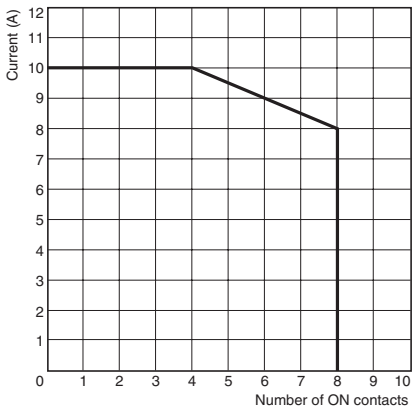
Model		G70R-SOC08
Item		**Relay outputs**
Contact form		8 points (SPST-NO × 8)
Contact mechanism		Single
Contact resistance (See note 1.)		30 mΩ max.
Must-operate time (See note 2.)		15 ms max.
Release time (See note 3.)		15 ms max.
Max. switching frequency	Mechanical	18,000 operations/hr
	Rated load	1,800 operations/hr
Insulation resistance		100 MΩ min. (at 500 V DC)
Dielectric strength	Between coil and contact	2,000 V AC for 1 min
	Between contacts of same polarity	750 V AC for 1 min
	Between contacts of different polarity	1,500 V AC for 1 min
Vibration resistance	Destruction	10 to 55 to 10 Hz, 0.5-mm amplitude (1.0-mm double)
	Malfunction	10 to 55 to 10 Hz, 0.5-mm amplitude (1.0-mm double)
Shock resistance	Destruction	300 m/s^2
	Malfunction	100 m/s^2
Noise immunity	Power input (normal mode)	600 V for 10 min with a pulse width of 100 ns to 1 μs
	Power input (common mode)	1.5 kV for 10 min with a pulse width of 100 ns to 1 μs
	Input cable (coiling)	1.5 kV for 10 min with a pulse width of 100 ns to 1 μs
	Unit body (coiling)	600 V for 10 min with a pulse width of 100 ns to 1 μs
Allowable power supply voltage fluctuation		24 V DC +10%/–15%
Current consumption (See note 3.)		Approx. 185 mA at 24 V DC
Cable length	Between block and controller	5 m max. (reference value for AWG 28)
	Between block and external device	Determine appropriate length for the connected load.
Coil surge absorber		Diode
Ambient operating temperature		–10 to 55°C
Ambient operating humidity		35% to 85%
Ambient storage temperature		–20 to 65°C
Mounting strength		No damage when 49 N pull load was applied for 1 s in all directions (except for 9.8 N min. in direction of track)
Terminal strength	Tightening torque	0.98 N·m
	Pull strength	49 N for 1 min
Weight		Approx. 350 g

Note: 1. These values are initial values.
2. Measurement conditions: 1 A at 5 V DC
3. Ambient temperature: 23°C
4. The current consumption is the value when all points are ON and includes the G2R Relay coil current.

Engineering Data

Life expectancyMaximum switching capacity



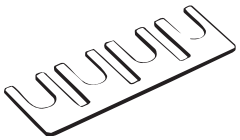


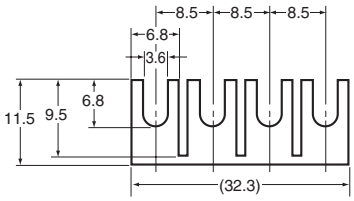
- When using with a carry current of 10 A, no more than 4 contacts may be ON.
- The carry current is 8 A when all contacts are ON.

Note: The data shown in these graphs is based on actual values sampled from a production line; please use this data for reference only. As a general rule, allow for slight variations in the Relays because the Relays are mass produced.

Accessories for the G70R-SOC08 (Order Separately)

Shorting Bar





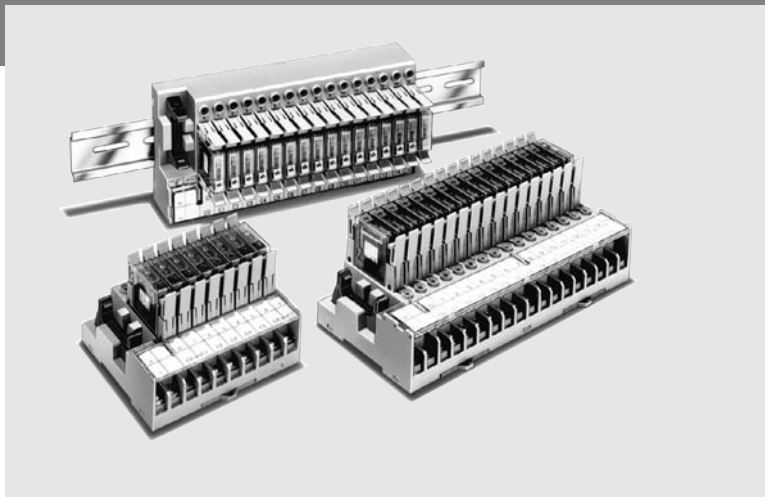
Applicable Output Block	Model
G70R-SOC08	G6B-4-SB

Replacement Relays

Applicable Output Block	Rated voltage	Model
G70R-SOC08	24 V DC	G2R-1-S
		G2R-1-SN

G7TC

Relay I/O terminal blocks



Unify PLC Wiring to a Single Cable to Reduce Wiring in the Control Panel and Save Space

- The 16-point Input and Output Blocks are just 182 × 85 × 68 mm (W × D × H) and the 8-point Output Block is just 102 × 85 × 68 mm (W × D × H).
- Also connects to an SBC with a simple snap-in connector.
- Surge suppressor circuit built-in.
- Operation indicators show each I/O signal's ON/OFF status at a glance.
- Mount to DIN rail.
- The G7TC-OC16 and G7TC-OC08 can be combined with a DRT1-OD32ML I/O Terminal for DeviceNet connectivity or an SRT2-VOD16ML Connector Terminal for CompoBus/S connectivity.
- G3TA I/O Solid-state Relays can be mounted.
- Conforms to UL and CSA standards.

Ordering Information

I/O classification	I/O points	Internal I/O circuit common	Rated voltage	Model
Input	16	NPN compatible (– common)	12 V DC	G7TC-ID16*
			24 V DC	
			100/110 V DC	
			100/110 V AC	G7TC-IA16*
			200/220 V AC	
Output	16	NPN compatible (+ common)	12 V DC	G7TC-OC16
			24 V DC	
		PNP compatible (– common)	12 V DC	G7TC-OC16-1*
			24 V DC	
	8	NPN compatible (+ common)	12 V DC	G7TC-OC08*
			24 V DC	
		PNP compatible (+ common)	24 V DC	G7TC-OC08-1*
		PNP compatible (- common)	24 V DC	

* This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

Specifications

Coil Ratings (Common to Input/Output per Relay)

Item		Rated current (mA)		Coil resistance (Ω)	Must operate	Must release	Maximum voltage	Power consumption	
Rated voltage (V)		50 Hz	60 Hz		of rated voltage			per Relay	per 16 Relays
AC	100/110 200/220	8.2 4.1	7/7.7 3.5/3.88	8,700 33,300	80% max.	30% min.	105%	0.7 VA	11 VA
DC	12 24 100/110	42 21 5		290 1,150 20,000	80% max.	10% min.	105%	0.5 W	8 W

Note: 1. The rated current and coil resistance are measured at a coil temperature of +23°C with a tolerance of +15%/–20% for AC rated current and ±15% for coil resistance.

2. The operating characteristics are measured at a coil temperature of +23°C.

3. The value for maximum voltage is the maximum value within the allowable voltage fluctuation range for the relay coil's operating power supply. Continuous operation at this voltage is not within product specifications.

4. Approx. 4 mA flows into each LED indicator. To calculate the power supply capacity, add the current value of each LED indicator.

Contact Ratings (G7T I/O Relay)

Classification Item	For input		For output	
	Resistive load (cosϕ=1)	Inductive load (cosϕ=0.4 L/R=7 ms)	Resistive load (cosϕ=1)	Inductive load (cosϕ=0.4 L/R=7 ms)
Rated load	1 A at 24 V DC	0.5 A at 24 V DC	5 A at 24 V DC 2 A at 220 V AC	2 A at 24 V DC 1 A at 220 V AC
Rated carry current	1 A		5 A	
Max. switching voltage	250 V AC, 125 V DC			
Max. switching current	1 A	0.5 A	5 A	2 A
Min. permissible load (reference value) (See note.)	100 μA at 1 V		10 mA at 5 V	
Electrical life expectancy	10,000,000 operations (at 10 mA) 50,000 operations (at 1 A)	2,500,000 operations (at 10 mA) 20,000 operations (at 1 A)	1,000,000 operations (under rated load)	
Mechanical life expectancy	50,000,000 operations			

Note: The above values are for a switching frequency of 120 operations/min.

Characteristics

Model Item		G7TC-IA16 (Input, AC coil)	G7TC-ID16 (Input, DC coil)	G7TC-OC16 (-1) (output, DC coil)	G7TC-OC08(-1) (output, DC coil)
Contact form		SPST-NO × 16			SPST-NO × 8
Contact mechanism		Bifurcated crossbar contact		Single contact	
Contact material		Au cladding + Ag		AgInSn	
Contact resistance (See note 2.)		50 mΩ max.			
Must Operate time (See note 3.)		15 ms max.			
Release time (See note 3.)		15 ms max.			
Max. switching frequency	Mechanical limit	18,000 operations/hour			
	At rated load	1,800 operations/hour			
Insulation resistance		100 MΩ (at 500 V DC)			
Dielectric strength	Between coil and contact	2,000 V AC, 50/60 Hz for 1 minute			
	Between same polarity contacts	1,000 V AC, 50/60 Hz for 1 minute			
	Between paired connectors	250 V AC, 50/60 Hz for 1 minute			
Vibration resistance		10 to 55 to 10 Hz with 0.5-mm single amplitude (1.0-mm double amplitude)			
Shock resistance		200 m/s^2			
Noise immunity		Noise level: 1.5 kV; pulse width: 100 ns to 1 μs			
Rated voltage between positive and negative terminal blocks		Rated voltage of controller's (PLC or other) input circuit		12 V DC ± 5% (See note 5.) 24 V DC ± 5%	
Rated current between positive and negative terminal blocks		Input circuit current of controller (PLC or other) × number of ON points		12 V DC: 46 mA × number of ON points 24 V DC: 25 mA × number of ON points	
Cable length (See note 4.)	To controller	5 m max. (reference value)			
	To I/O devices	50 m max. (reference value, for 2-mm^2 CVV cable)		Dependent on load	
Ambient operating temperature		0 to 55°C			
Ambient operating humidity		35% to 85% (with no icing or condensation)			
Tightening torque for external connections		0.78 to 1.18 N·m			
Tensile strength		No damage when a tensile force of 49 N is applied in each direction. In the direction of the track, the tensile strength is 9.8 N min.			
I/O terminal tightening torque		Tightening strength: 0.98 N·m; Tensile strength 49 N for 1 minute			
LED color		Red	Green		
Case color		Transparent red	Transparent green	Transparent	
Coil surge absorber		Varistor	Diode (1 A, 400 V)		
Weight		Approx. 640 g	Approx. 630 g	Approx. 670 g	Approx. 350 g

Note: 1. These are initial values.

2. Measurement condition: 1 A at 5 V DC.

3. Ambient temperature: 23°C.

4. Connecting cables up to 5 m are available as standard products. (See page 401.) For longer cables, enquire separately.

5. G7TC-OC08-01 is not available in 12 V DC type.

Accessories (Order Separately)

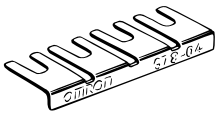
G79 Connecting Cables

Cable Type	Model
Cable with Loose Wire and Crimp Terminals	G79-Y□C
Cable with Loose Wires	G79-A□C
Cable with Three Connectors (1:3)	G79-□C-□-□
Cable with Two Connectors (1:2)	G79-□C-□
Cable with One Connector (1:1)	G79-□C

Note: See page 401 for more details.

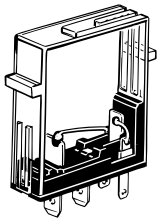
G78-04 Shorting Bar

Use this piece to short-circuit adjacent terminals.
Max. current flow: 20 A



G77-S Output Short-Circuit Module

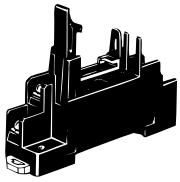
A G77-S Output Short-Circuit Module can be used to output directly without a relay. The G77-S Output Short-Circuit Module cannot be used for inputs.



P7TF-05 Socket

The G7T (SPST-NO, SPST-NC, and SPDT types) and the G3TA I/O Relays can be mounted on the P7TF-05 Socket.

The P7TF-05 can be used for applications involving sequences that require slim relays, or to enable use of SPDT relays with the I/O Block. To use part of the I/O Block with SPDT specifications, insert an Output Short-Circuit Module into the I/O Block, and use the P7TF-05 Socket in combination with an SPDT Relay for the Module's output.

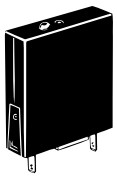


Specifications

Contact resistance	10 mΩ max. (measured at 5 V DC, 1 A)
Dielectric strength	2,000 V AC for 1 minute
Insulation resistance	100 MΩ (at 500 V)
Vibration resistance	10 to 55 to 10 Hz with 0.5-mm single amplitude (1.0-mm double amplitude)
Shock resistance	200 m/s^2
Ambient temperature	Operating: 0 to 55°C
Ambient humidity	35% to 85%
Weight	Approx. 28 g

P70 Indicator Module and Surge Suppressor

Remove the transparent style strip of the P7TF-05 socket and mount this module and it will function as an operation indicator and surge suppressor.



Ordering Information

Model		Applicable relay coil voltage	Remarks
For AC relay	P70A	100 (110) V AC	Varistor surge suppression
		200 (220) V AC	
For DC relay	P70D	12/24 V DC	Diode surge suppression

Note: 1. Order the indicator module suitable for the relay coil voltage.
2. The indicator module for DC relays can be used with a 12-V or 2- V DC power supply.

Precautions

General

I/O Relays and I/O Block Bases can be combined as follows to form I/O Blocks:

	Combinations (See note.)	Block Base	I/O Relay	I/O SSR	
DC output	G7TC-OC16 G7TC-OC16-1 G7TC-OC08 G7TC-OC08-1	P7TF-OS16 P7TF-OS16-1 P7TF-OS08 P7TF-OS08-1	G7T-1112S	AC	G3TA-OA202SZ G3TA-OA202SL
				DC	G3TA-ODX02S G3TA-OD201S
DC input	G7TC-ID16	P7TF-IS16 (DC type)	G7T-1122S	DC	G3TA-IDZR02S (M)
AC input	G7TC-IA16	P7TF-IS16 (AC type)		AC	G3TA-IAZR02S

Note: The model numbers given under "Combinations" are for combinations with I/O Relays. To use I/O SSRs, either replace an I/O Relay with the SSR, or purchase an I/O Terminal (Block Base) and an I/O SSR (i.e., not the combined Unit).

- AC Input Relays/SSRs and DC Input Relays/SSRs cannot be used together in the same Terminal because of the specifications for coil surge suppression elements are different.

  Furthermore, Relays/SSRs with different voltage specifications cannot be used together in the same Terminal because the specifications of operation indicator circuits are different. (For example, a 100-V AC Input Relay and a 200-V AC Input Relay, or a 12-V DC Output Relay and a 24-V DC Output Relay cannot be used in the same Terminal.)

- Only use I/O Terminals, I/O Relays, and I/O SSRs with the same specifications for rated voltage.

G79

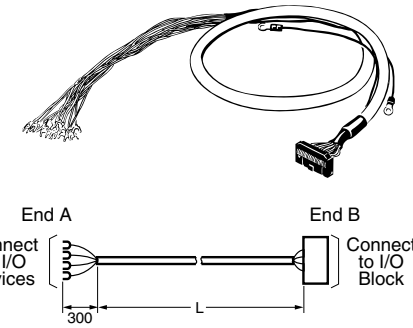
I/O Block Connecting Cables

G79 Connecting Cables

Connecting Cables with Crimp Terminals (G79-Y□C)

This Cable is convenient for connecting I/O Blocks to devices equipped with screw terminals.

Length (ℓ)	Model
1,000 mm	G79-Y100C*
1,500 mm	G79-Y150C*
2,000 mm	G79-Y200C*
3,000 mm	G79-Y300C*
5,000 mm	G79-Y500C*



Note: 1. The power line capacity is 50 mA max. per I/O point. Also, always check the driver capacity and I/O relay power consumption when using an Output Block.

2. The crimp terminals are labeled with the corresponding connector pin numbers in parentheses.

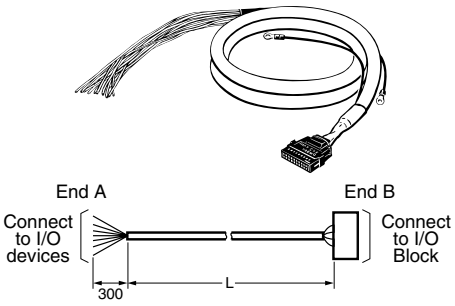
3. Connect terminals 9 and 19 and terminals 10 and 20 together when using the G7TC-OC08.

4. The wire gauge of the wires in the cable is 28 AWG (10/0.38).

Loose-wire Connecting Cables (G79A□C)

This Cable has loose wires at the device end.

Length (ℓ)	Model
2,000 mm	G79-A200C*
5,000 mm	G79-A500C*



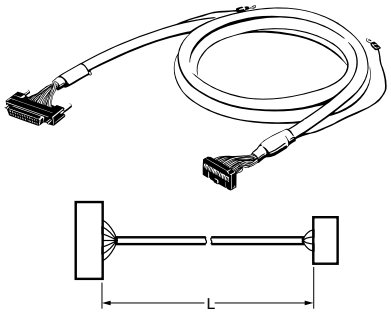
Note: 1. The wire gauge of the wires in the cable is 24 AWG (7/0.203).

2. Connect terminals 9 and 19 and terminals 10 and 20 together when using the G7TC-OC08.

Connecting Cables with One Connector (G79-□C)

This Cable is convenient for connecting an I/O Block to a single device equipped with one connector socket.

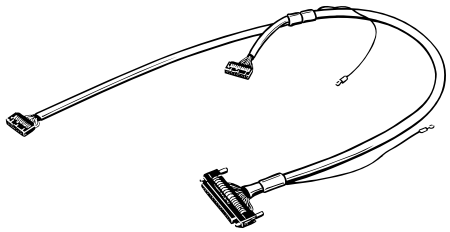
Length (ℓ)	Model
1,000 mm	G79-100C*
1,500 mm	G79-150C*
2,000 mm	G79-200C*
3,000 mm	G79-300C*
5,000 mm	G79-500C*



Connecting Cables with Two Connectors (G79-O□C-□ and G79-I□C-□)

Cables for both Output Blocks (for connection to SYSMAC I/O Units; tape color: red) and Input Blocks (for connection to SYSMAC I/O Units; tape color: yellow) are available.

Length		Cables for Input Blocks	Cables for Output Blocks
A	B		
1,000 mm	750 mm	G79-I100C-75*	G79-O100C-75*
1,500 mm	1,250 mm	G79-I150C-125*	G79-O150C-125*
2,000 mm	1,750 mm	G79-I200C-175*	G79-O200C-175
3,000 mm	2,750 mm	G79-I300C-275*	G79-O300C-275*
5,000 mm	4,750 mm	G79-I500C-475*	G79-O500C-475*



Note: The 32-point card-type connectors for the Input Block Cables and and Output Block Cables have different pin arrangements.

* This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

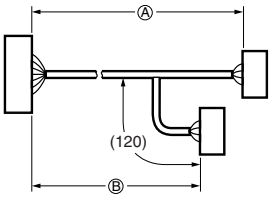
Connecting Cables for Mitsubishi PLCs

The following cables can be used to connect a Mitsubishi PLC (with a 32-point connector) to I/O Blocks.

Length		Model	Model
A	B		
1,000 mm	750 mm	G79-I100C-75-MN (See note.)	G79-O100C-75-MN
1,500 mm	1,250 mm	G79-I150C-125-MN (See note.)	G79-O150C-125-MN
2,000 mm	1,750 mm	G79-I200C-175-MN	G79-O200C-175-MN
3,000 mm	2,750 mm	G79-I300C-275-MN	G79-O300C-275-MN

These are all non-standard model and require a special order. Contact your OMRON representative for details on availability.

Note: 1. Applicable Mitsubishi PLC models
Inputs: AX42, A1SX41, and A1SX42
Outputs: AY42, A1SY41, and A1SY42

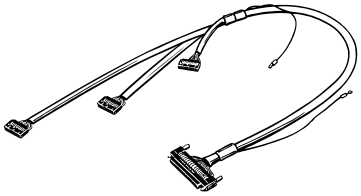


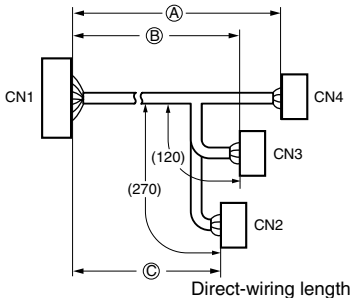
Direct-wiring length (without bends)

Connecting Cables with Three Connectors (G79-□C-□-□)

Length			Model
A	B	C	
1,500 mm	1,250 mm	1,000 mm	G79-150C-125-100
2,000 mm	1,750 mm	1,500 mm	G79-200C-175-150
3,000 mm	2,750 mm	2,500 mm	G79-300C-275-250

These are all non-standard model and require a special order. Contact your OMRON representative for details on availability.





Direct-wiring length (without bends)

XW2□

I/O terminal blocks and cables

Ideal for Reducing Wiring to PLCs and Other Equipment in the Control Panel

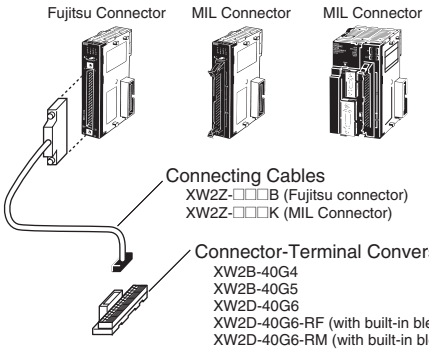
Connecting Components (PLC Units, Connector-Terminal Conversion Units, and Cables)

Use the XW2D for Connections to Controllers

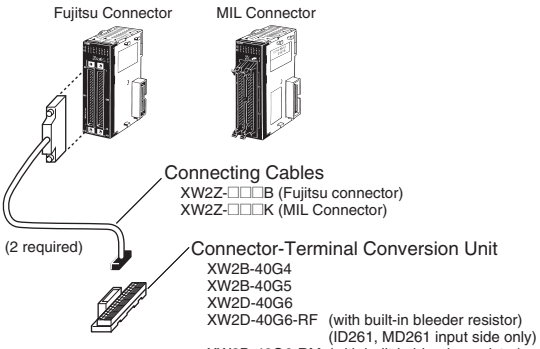
CJ1 Basic I/O Units

CJ Basic I/O Units with 32-point connectors
- CJ1W-ID231 (Fujitsu Connector/Input Unit)
- CJ1W-OD231 (Fujitsu Connector/Output Unit)
- CJ1W-ID232 (MIL Connector/Input Unit)
- CJ1W-OD232/OD233 (MIL Connector/Output Unit)

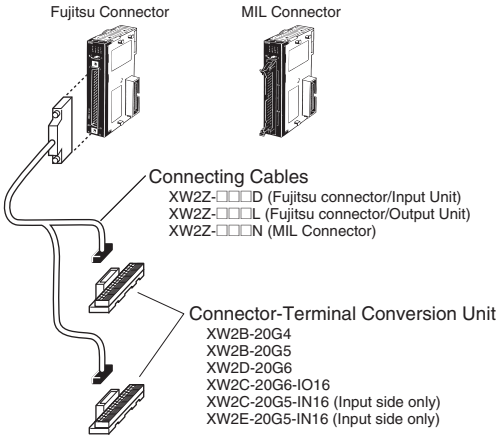
CJ1M CPU Unit
- CJ1M-CPU22/CPU23 (MIL Connector/Built-in I/O)



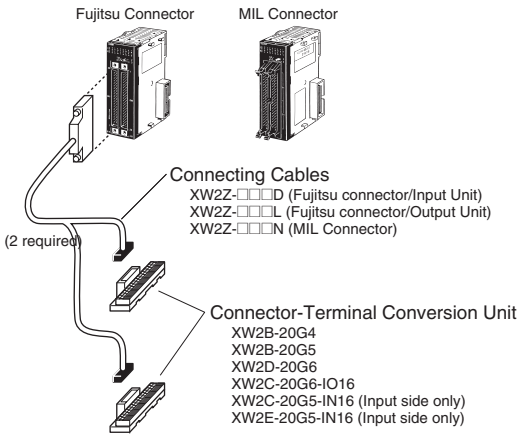
CJ Basic I/O Units with 64-point connectors
- CJ1W-ID261 (Fujitsu connector/Input Unit)
- CJ1W-OD261 (Fujitsu connector/Output Unit)
- CJ1W-MD261 (Fujitsu connector/I/O Unit)
- CJ1W-ID262 (MIL Connector/Input Unit)
- CJ1W-OD263 (MIL Connector/Output Unit)
- CJ1W-MD263 (MIL Connector/I/O Unit)
- CJ1W-MD563 (MIL Connector/I/O Unit)



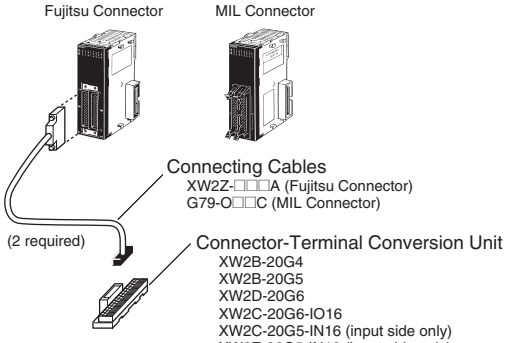
CJ Basic I/O Unit with 32-point Connectors
- CJ1W-ID231 (Fujitsu Connector/Input Unit)
- CJ1W-OD231 (Fujitsu Connector/Output Unit)
- CJ1W-ID232 (MIL Connector/Input Unit)
- CJ1W-OD232/OD233 (MIL Connector/Output Unit)



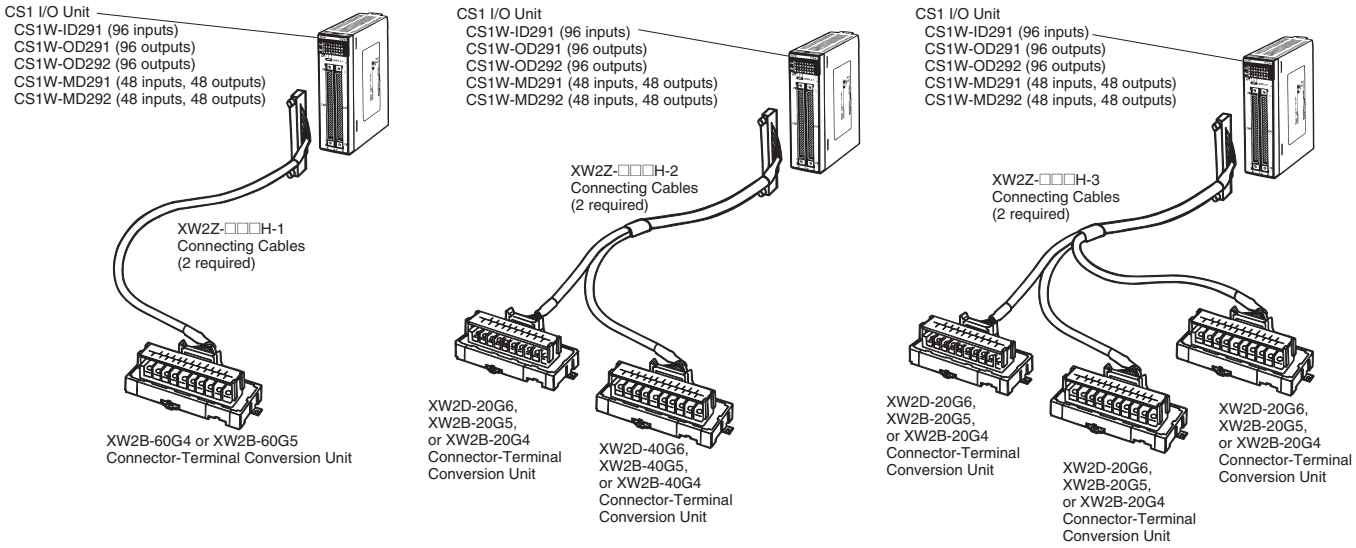
CJ Basic I/O Unit with 64-point Connectors
- CJ1W-ID261 (Fujitsu Connector/Input Unit)
- CJ1W-OD261 (Fujitsu Connector/Output Unit)
- CJ1W-MD261 (Fujitsu Connector/I/O Unit)
- CJ1W-ID262 (MIL Connector/Input Unit)
- CJ1W-OD263 (MIL Connector/Output Unit)
- CJ1W-MD263 (MIL Connector/I/O Unit)
- CJ1W-MD563 (MIL Connector/I/O Unit)



CJ Basic I/O Unit with 32-point Connectors
CJ1W-MD231 (Fujitsu Connector/Input Unit)
CJ1W-MD233 (MIL Connector/I/O Unit)



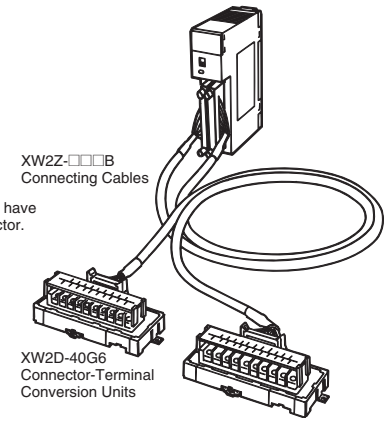
CS1 Basic I/O Units with 96-point and Two 48-point Connectors



I/O Units with 32-point Connectors (Group-2) I/O Units with 64-point Connectors

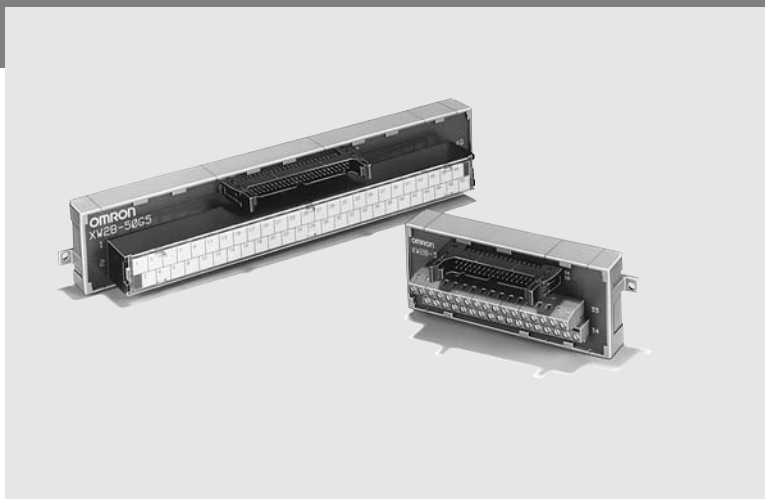
CS1W-ID231*
CS1W-OD231*
CS1W-OD232*
CS1W-ID261
CS1W-OD261
CS1W-OD262
CS1W-MD261
CS1W-MD262
CJ1W-ID231*
CJ1W-OD231*
CJ1W-ID261
CJ1W-OD261

*These I/O Units have just one connector.



XW2B

I/O terminal block



Easily wire connectors to Terminal Blocks and Reduce Control Panel Wiring

- Can be mounted with screws or snapped onto DIN rail.
- Standard models are available with MIL flat cable connectors and multipole rectangular connectors.
- Terminal Blocks are available with M2.5 or M3.5 screws.
- Cables are available for OMRON PLC connectors.

Ordering Information

Poles	Model
20	XW2B-20G5
34	XW2B-34G5*
40	XW2B-40G5
50	XW2B-50G5*
60	XW2B-60G5*
20	XW2B-20G4
34	XW2B-34G4*
40	XW2B-40G4
50	XW2B-50G4*
60	XW2B-60G4*

* This is a non-standard model and requires a special order.
Contact your OMRON representative for details on availability.

Specifications

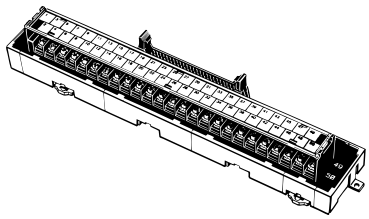
Ratings/Characteristics

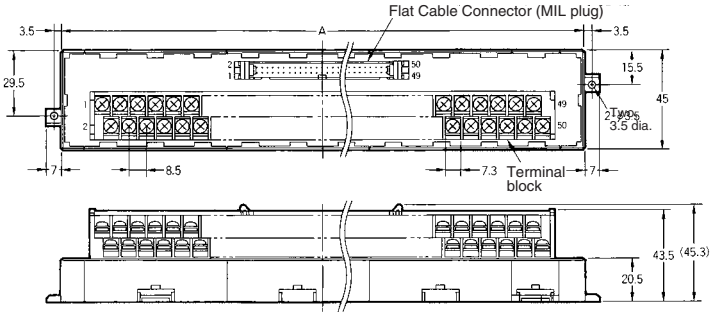
Rated current	1 A
Rated voltage	125 V AC
Insulation resistance	100 MΩ min. (at 500 V DC)
Dielectric strength	500 V AC for 1 min (with a leakage current of 1 mA max.)
Ambient temperature	Operating: –25 to 80 °C

Dimensions

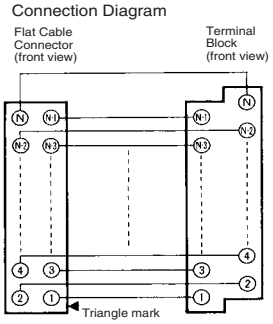
Note: All dimensions are in mm.

XW2B-□□G5
(M3.5 Screws)

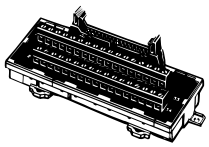


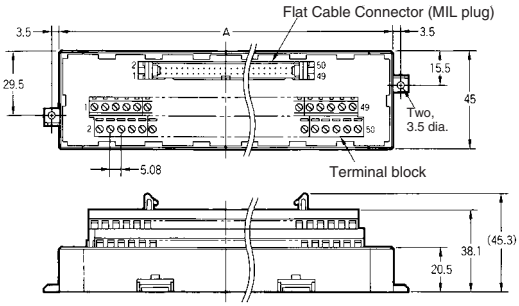


Connection Diagram

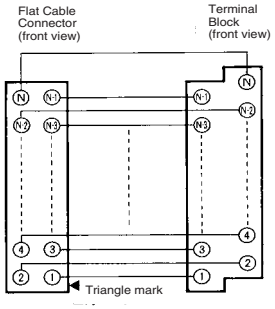


XW2B-□□G4
(M2.5 Screws)





Connection Diagram



Dimensions

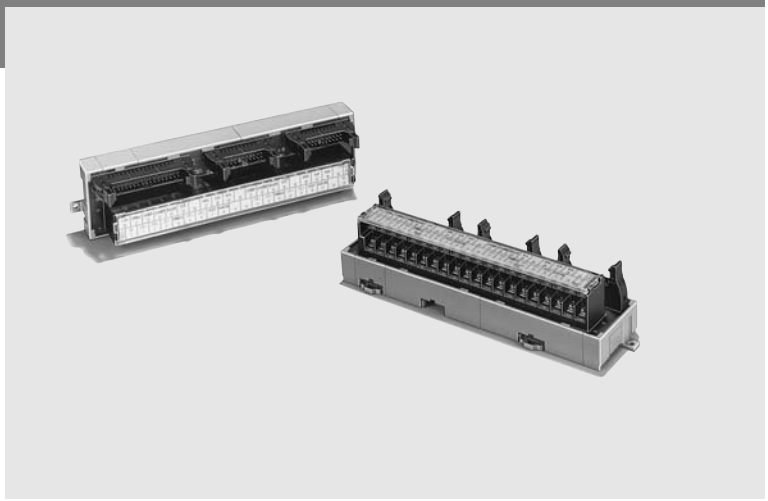
Model	Poles	Dimension A (mm)
XW2B-20G5	20	112.5
XW2B-34G5	34	180.0
XW2B-40G5	40	202.5
XW2B-50G5	50	247.5
XW2B-60G5	60	292.5

Dimensions

Model	Poles	Dimension A (mm)
XW2B-20G4	20	67.5
XW2B-34G4	34	112.5
XW2B-40G4	40	135.0
XW2B-50G4	50	157.5
XW2B-60G4	60	180.0

XW2B

Servo I/O terminal block



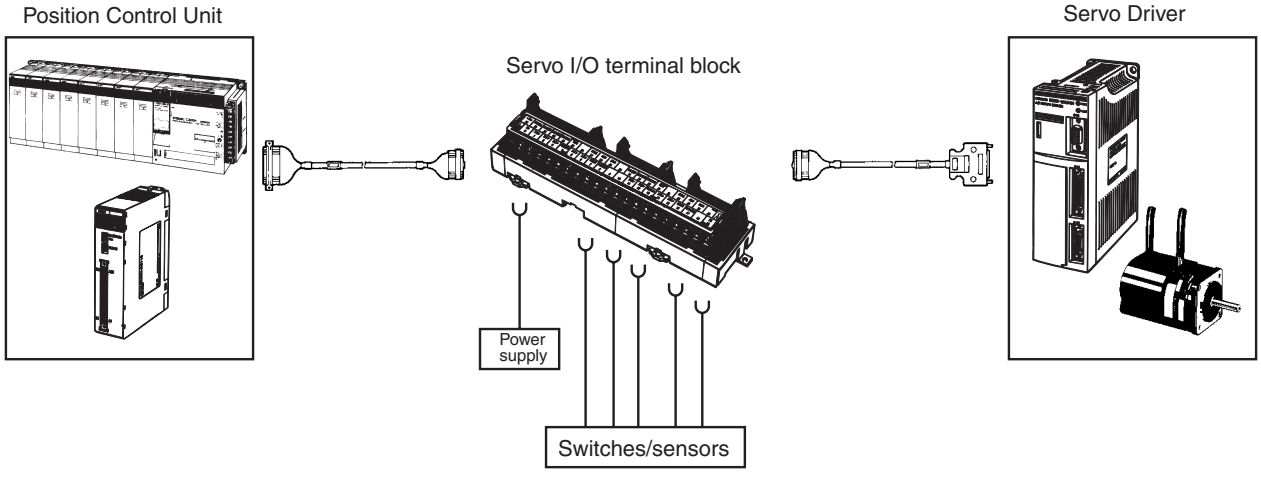
Combines Connectors and the Terminal Block to Reduce Wiring between Servo Drivers and Position Control Units

- Allows simple terminal block wiring of control signals between a Servo Driver and a Position Control Unit or CQM1 PLC (with built-in pulse I/O function).
- No need to solder connections; all you need is a screwdriver.
- Special cables are available to connect various Units.
- Only a 24-V DC power supply is required for control signals.
- Space-saving terminal blocks use M3.0 screws.
- Can be mounted with screws or snapped onto DIN rail.

Ordering Information

Compatible Servo Drivers	Compatible Position Control Units	Model number
SMARTSTEP Series: R7D-AP□□□ W Series: R88D-WT□□□□ U Series: R88D-UP□□□ R88D-UT□□□ R88D-UEP□□□ M Series: R88D-MT□□□ H Series: R88D-H□□□	NC Units (Communications functions are not supported.) CS1W-NC113/133CJ1W-NC113/133 C200HW-NC113 C200H-NC112 3F88M-DRT141	XW2B-20J6-1B
	NC Units (Communications functions are not supported.) CS1W-NC213/233/413/433 CJ1W-NC213/233/413/433 C200HW-NC213/413 C200H-NC211	XW2B-40J6-2B
	Other Units (Communications functions are not supported.) CS1W-HCP22 CQM1H-PLB21 CQM1-CPU43-V1	XW2B-20J6-3B
	NC Units (Communications functions are supported.) CS1W-NC213/233/413/433 CJ1W-NC213/233/413/433	XW2B-40J6-4A
	CPU units (Communications functions are not supported) CJ1M-CPU22/23	XW2B-20J6-8A (one axis)
	CPU units (Communications functions are not supported) CJ1M-CPU22/23	WX2B-20J6-9A (two axis)

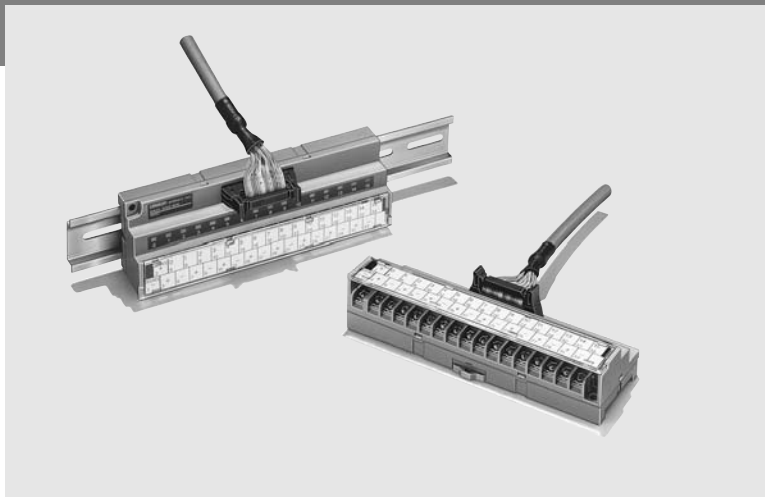
Connection Example



- Simple terminal block wiring of control signals between Servo Driver and Position Control Unit.

XW2C

Input terminal block



Equipped with Power Supply Common and Operation Indicators and Reduces Control Panel Wiring to Input Devices

- Equipped with a power supply common for input devices.
- Operation indicators show each I/O signal's ON/OFF status at a glance.
- Can be mounted on DIN rail or screw-mounted.
- Compatible Connecting Cables are available (sold separately.)

Ordering Information

Points	Internal I/O circuit common	Model
16 inputs	NPN compatible (+ common)	XW2C-20G5-IN16

This is a non-standard model and requires a special order.
Contact your OMRON representative for details on availability.

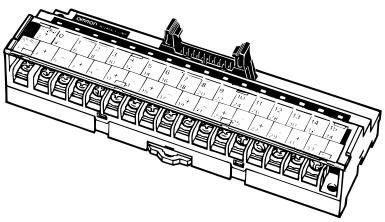
Specifications

Ratings/Characteristics

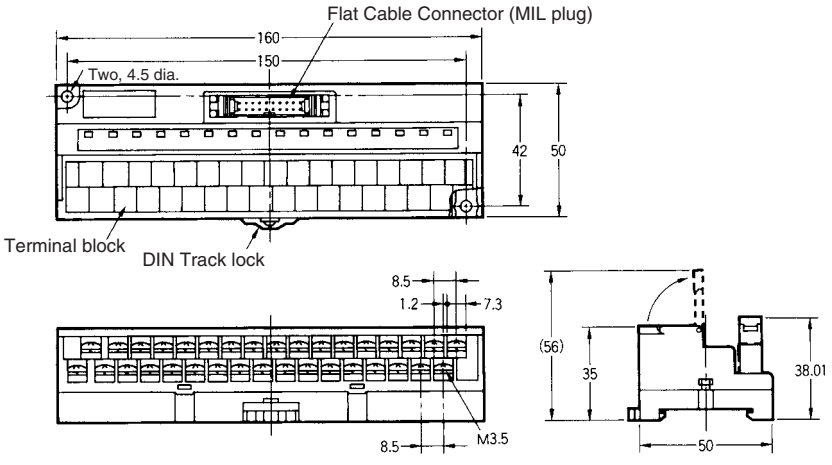
Rated current	1 A/common
Rated voltage	12 to 24 V DC
Number of circuits	16 points
Input display	LED indicators (orange)
Power supply voltage range	12 to 24 V DC ±5%
LED indicator current	10 mA/input max. at 24 V DC
Insulation resistance	50 MΩ min. (at 500 V DC)
Dielectric strength	500 V AC for 1 min
Ambient temperature	Operating: 0 to 55 °C

Dimensions

Note: All dimensions are in mm.

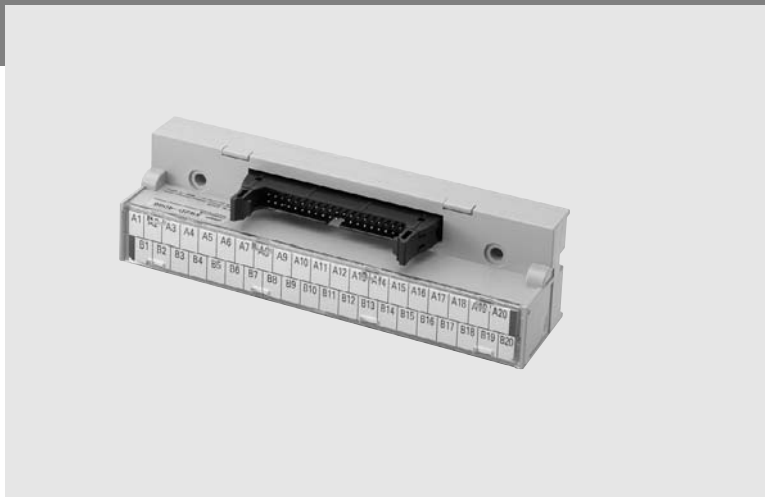


XW2C-20G5-IN16



XW2D

Slim Input terminal block



Introducing the XW2D Series, a Slim Version of the I/O terminal block

- Required mounting area reduced by 35% (compared to OMRON's 40-pole XW2B Unit), allowing for smaller control panels and automatic equipment.
- Terminal screw mechanism prevents lost terminal screws.
- Use either round or forked crimp terminals.
- Mount via DIN rail or screws. Unique DIN rail lock to mount or remove Units from DIN rail while open.
- Terminal cover can be fixed in the open position.
- Easy-count terminal numbers with different colors every five terminals.

Ordering Information

Mounted connector	Poles	Model	Dimension A	Dimension B	Mounted connector model	Cable connector model
MIL, XG4A	20	XW2D-20G6	79	57	XG4A-2031	XG4M-2030-T
	34	XW2D-34G6*	128	100	XG4A-3431	XG4M-3430-T
	40	XW2D-40G6	149	110	XG4A-4031	XG4M-4030-T
		XW2D-40G6-RF* (See note 1.)	149	110	XG4A-4031	XG4M-4030-T
		XW2D-40G6-RM* (See note 2.)	149	110	XG4A-4031	XG4M-4030-T
	50	XW2D-50G6*	184	144	XG4A-5031	XG4M-5030-T
MIL, XG4C	20	XW2D-20C6*	79	57	XG4C-2031	XG4M-2030-U
	34	XW2D-34C6*	128	100	XG4C-3431	XG4M-3430-U
	40	XW2D-40C6*	149	110	XG4C-4031	XG4M-4030-U
	50	XW2D-50C6*	184	144	XG4C-5031	XG4M-5030-U
MR Socket (See note 3.)	20	XW2D-20X6*	79	57	MR-20RFD2	MR-20M
	34	XW2D-34X6*	128	100	MR-34RFD2	MR-34M
	50	XW2D-50X6*	184	144	MR-50RFD2	MR-50M
MR Plug (See note 3.)	20	XW2D-20Y6*	79	57	MR-20RMD2	MR-20F
	34	XW2D-34Y6*	128	100	MR-34RMD2	MR-34F
	50	XW2D-50Y6*	184	144	MR-50RMD2	MR-50F

Note: 1. Has a built-in bleeder resistor and is for the CJ1W-ID231/ID261. External dimensions are the same as the XW2D-40G6.

2. Has a built-in bleeder resistor and is for the CJ1W-ID232. External dimensions are the same as the XW2D-40G6.

3. The MR Connectors are manufactured by Honda Tsushin Kogyou Co., Ltd.

Specifications

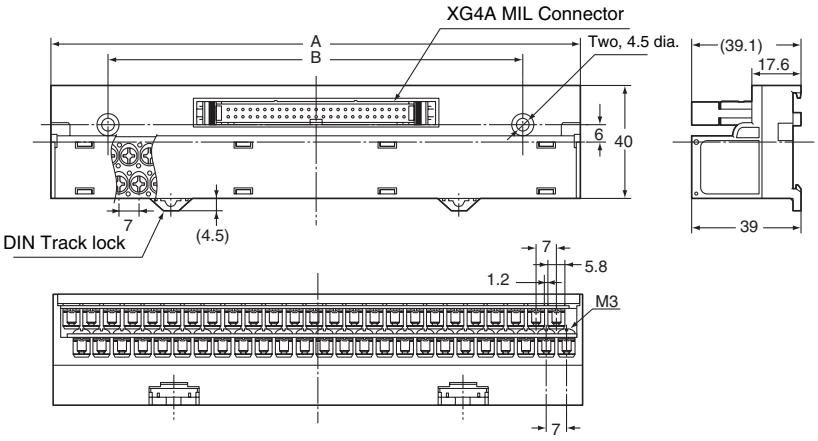
Ratings /Characteristics

Rated current	1 A
Rated voltage	125 V AC, 24 V DC
Insulation resistance	100 MΩ max. (at 500 V DC)
Dielectric strength	500 V AC for 1 min (with a leakage current of 1 mA max.)
Ambient temperature	Operating: 0 to 55 °C

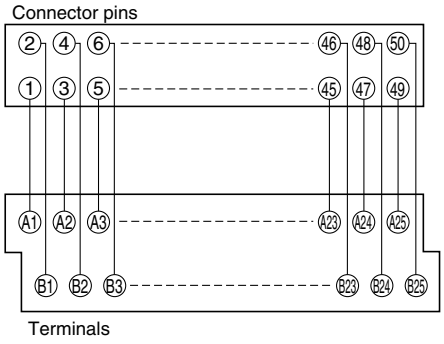
Dimensions

XW2D-□□G6 with XG4A MIL Connector

Note: In the 20-pole models, there is just one DIN rail lock located at the bottom-center of the Unit.



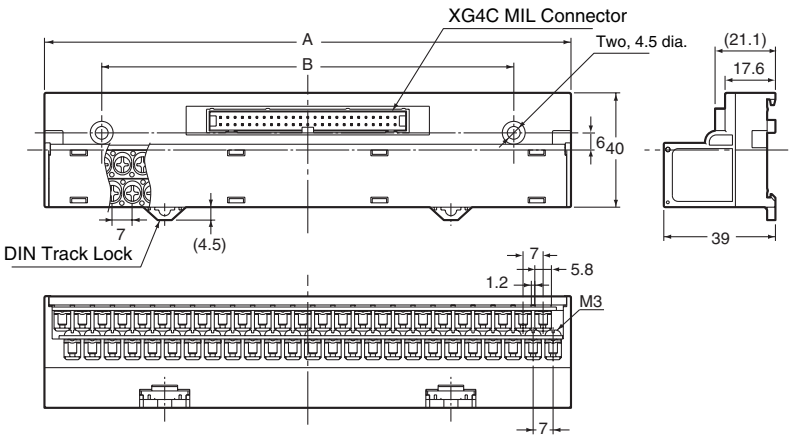
Connection Diagram (50-pole model)



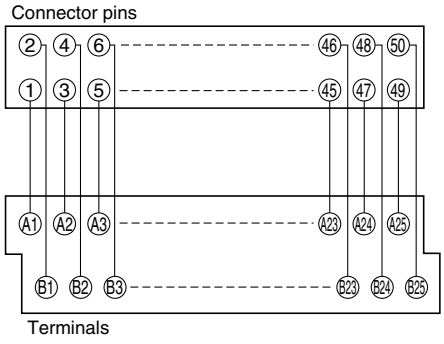
Note: The connector's odd-numbered poles connect to the "A" terminals and the connector's even-numbered poles connect to the "B" terminals.

XW2D-□□C6 with XG4C MIL Connector

Note: In the 20-pole models, there is just one DIN rail lock located at the bottom-center of the Unit.



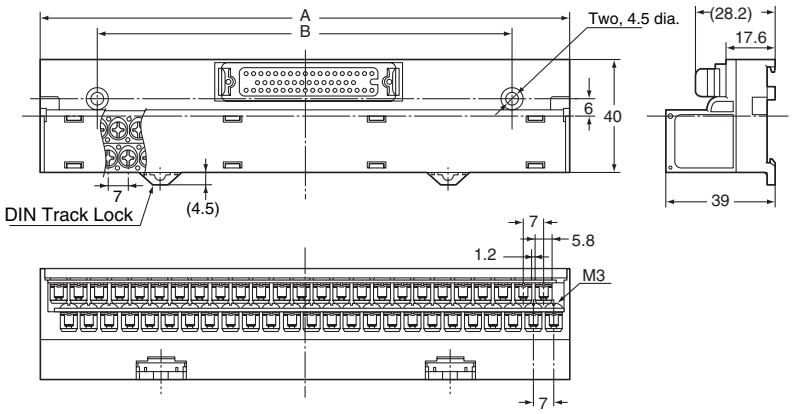
Connection Diagram (50-pole model)



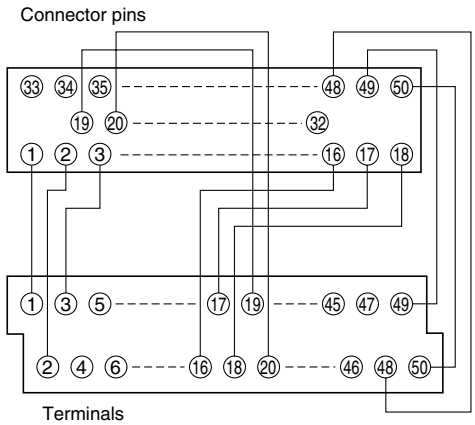
Note: The connector's odd-numbered poles connect to the "A" terminals and the connector's even-numbered poles connect to the "B" terminals.

XW2D-□□X6 with MR Socket Connector

Note: In the 20-pole models, there is just one DIN rail lock located at the bottom-center of the Unit.



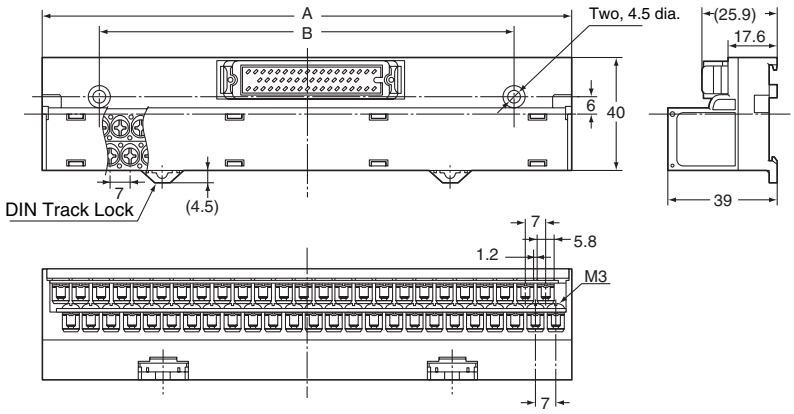
Connection Diagram (50-pole model)



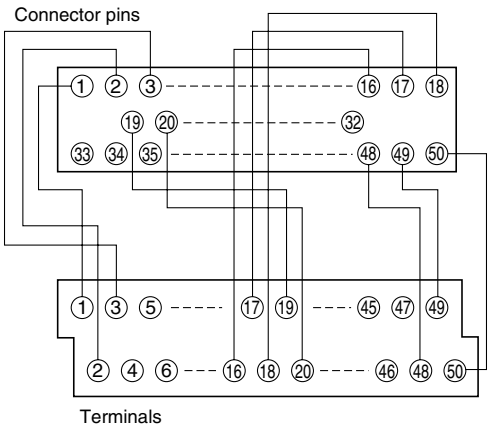
Note: The connector's poles connect to the MR socket terminals with the same number.

XW2D-□□Y6 with MR Plug Connector

Note: In the 20-pole models, there is just one DIN rail lock located at the bottom-center of the Unit.



Connection Diagram (50-pole model)



Note: The pin numbers on the connector correspond directly to the terminal numbers on the terminal block.

XW2Z

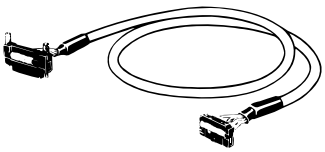
Connecting Cables for I/O terminal blocks

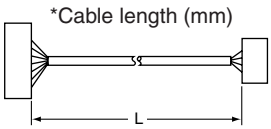
• Refer to page 416 for connection details.

XW2Z-□□□A Cables for PLC Units with 32-point Connectors

Ordering Information

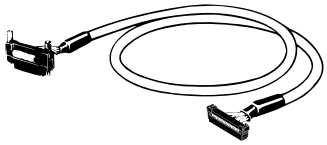
XW2Z-□□□A

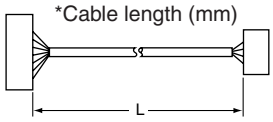




*Cable length L (mm)	Model
500 mm	XW2Z-050A
1,000 mm	XW2Z-100A
1,500 mm	XW2Z-150A*
2,000 mm	XW2Z-200A
3,000 mm	XW2Z-300A*
5,000 mm	XW2Z-500A*

XW2Z-□□□AU (See note.)

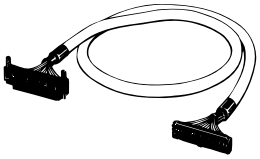


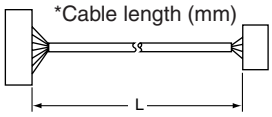


*Cable length L (mm)	Model
500 mm	XW2Z-050AU*
1,000 mm	XW2Z-100AU*
1,500 mm	XW2Z-150AU*
2,000 mm	XW2Z-200AU*
3,000 mm	XW2Z-300AU*
5,000 mm	XW2Z-500AU*

XW2Z-□□□B Cables for Group-2 PLC I/O Units with 32-point Connectors and PLC I/O Units with 64-point Connectors

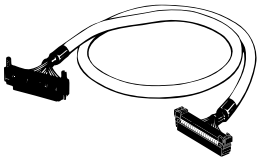
XW2Z-□□□B

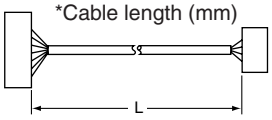




Wiring	*Cable length L (mm)	Model
Normal wiring	500 mm	XW2Z-050B
	1,000 mm	XW2Z-100B
	1,500 mm	XW2Z-150B*
	2,000 mm	XW2Z-200B
	3,000 mm	XW2Z-300B
	5,000 mm	XW2Z-500B

XW2Z-□□□BU (See note.)





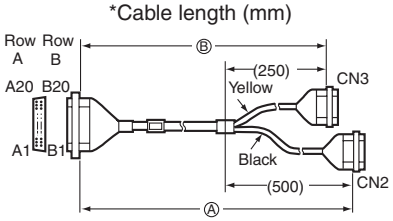
Wiring	*Cable length L (mm)	Model
Normal wiring	500 mm	XW2Z-050BU*
	1,000 mm	XW2Z-100BU*
	1,500 mm	XW2Z-150BU*
	2,000 mm	XW2Z-200BU*
	3,000 mm	XW2Z-300BU*
	5,000 mm	XW2Z-500BU*

XW2Z-□□□D Cables for Group-2 PLC Input Units with 32-point Connectors and PLC Input Units with 64-point Connectors

XW2Z-□□□D



Note:
The wiring of the G79-I□C-□ cables (for the G7TC) is different, so these cables cannot be used with the XW2C.



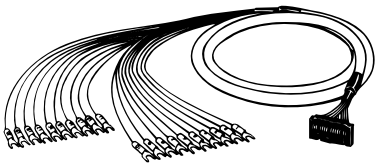
The pins in CN2 (yellow) connect to row A of CN1 and the pins in CN3 (black) connect to row B of CN1.

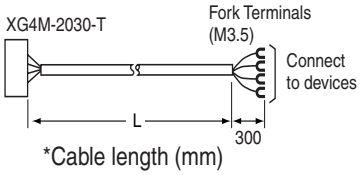
*Cable lengths (mm)		Model
A	B	
1,000 mm	750 mm	XW2Z-100D*
1,500 mm	1,250 mm	XW2Z-150D*
2,000 mm	1,750 mm	XW2Z-200D*
3,000 mm	2,750 mm	XW2Z-300D*
5,000 mm	4.750 mm	XW2Z-500D*

* This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

XW2Z-□□□F Cables with Crimp Terminals (20 poles)

XW2Z-□□□F



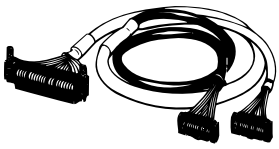


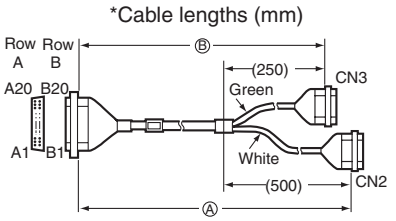
*Cable length L (mm)	Model
1,000 mm	XW2Z-100F
1,500 mm	XW2Z-150F
2,000 mm	XW2Z-200F
3,000 mm	XW2Z-300F
5,000 mm	XW2Z-500F

These are all non-standard model and require a special order.
Contact your OMRON representative for details on availability.

XW2Z-□□□L Cables for Group-2 PLC Output Units with 32-point Connectors and PLC Output Units with 64-point Connectors

XW2Z-□□□L





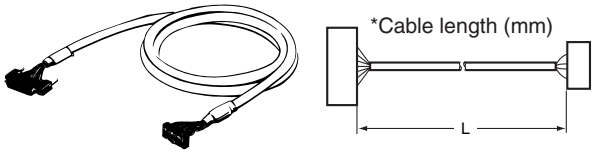
The pins in CN2 (white) connect to row A of CN1 and the pins in CN3 (green) connect to row B of CN1.

*Cable lengths (mm)		Model
A	B	
1,000 mm	750 mm	XW2Z-100L
1,500 mm	1,250 mm	XW2Z-150L
2,000 mm	1,750 mm	XW2Z-200L
3,000 mm	2,750 mm	XW2Z-300L
5,000 mm	4.750 mm	XW2Z-500L

These are all non-standard model and require a special order.
Contact your OMRON representative for details on availability.

XW2Z-□□□H Cables for PLC I/O Units with 96-point Connectors

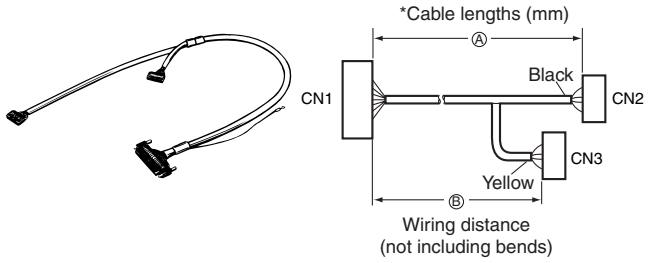
XW2Z-□□□H-1



Cable length (mm)	Model
500 mm	XW2Z-050H-1
1,000 mm	XW2Z-100H-1
1,500 mm	XW2Z-150H-1
2,000 mm	XW2Z-200H-1
3,000 mm	XW2Z-300H-1
5,000 mm	XW2Z-500H-1
7,000 mm	XW2Z-700H-1
10,000 mm	XW2Z-010H-1

These are all non-standard model and require a special order.
Contact your OMRON representative for details on availability.

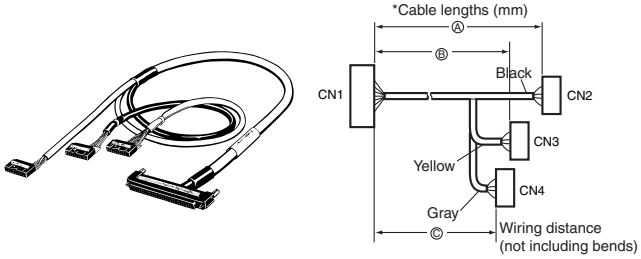
XW2Z-□□□H-2



Cable lengths (mm)		Model
A	B	
1,000 mm	750 mm	XW2Z-100H-2
1,500 mm	1,250 mm	XW2Z-150H-2
2,000 mm	1,750 mm	XW2Z-200H-2
3,000 mm	2,750 mm	XW2Z-300H-2
5,000 mm	4.750 mm	XW2Z-500H-2
10,000 mm	9,750 mm	XW2Z-010H-2

These are all non-standard model and require a special order.
Contact your OMRON representative for details on availability.

XW2Z-□□□H-3

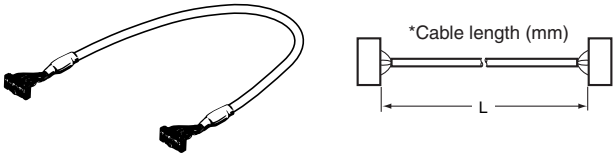


Cable lengths (mm)			Model
A	B	C	
1,000 mm	750 mm	1,000 mm	XW2Z-100H-3
1,500 mm	1,250 mm	1,500 mm	XW2Z-150H-3
2,000 mm	1,750 mm	2,000 mm	XW2Z-200H-3
3,000 mm	2,750 mm	3,000 mm	XW2Z-300H-3
5,000 mm	4.750 mm	5,000 mm	XW2Z-500H-3
10,000 mm	9,750 mm	10,000 mm	XW2Z-010H-3

These are all non-standard model and require a special order.
Contact your OMRON representative for details on availability.

XW2Z-□□□K/N Cables for PLC I/O Units with 32-point MIL Connectors

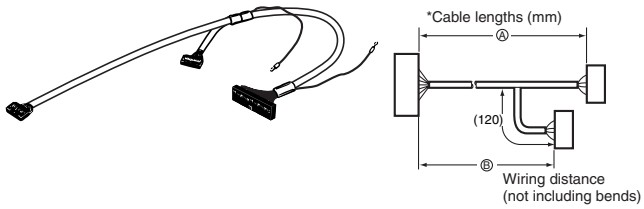
XW2Z-□□□K



Cable length (mm)	Model (See note.)
1,000 mm	XW2Z-100K
1,500 mm	XW2Z-150K*
2,000 mm	XW2Z-200K
3,000 mm	XW2Z-300K*
5,000 mm	XW2Z-500K*

* This is a non-standard model and requires a special order.
Contact your OMRON representative for details on availability.

XW2Z-□□□N



Cable lengths (mm)		Model
A	B	
1,000 mm	750 mm	XW2Z-100N
1,500 mm	1,250 mm	XW2Z-150N
2,000 mm	1,750 mm	XW2Z-200N
3,000 mm	2,750 mm	XW2Z-300N
5,000 mm	4.750 mm	XW2Z-500N

These are all non-standard model and require a special order.
Contact your OMRON representative for details on availability.

XW2Z

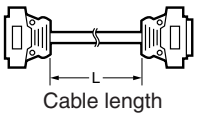
Host Link Cables

PLC-compatible RS-232C Cables Ideal for Host Link Connections between a PLC and Host Computer or other Device

Ordering Information

SYSMAC PLC end	XW2Z Host Link Cable (PLC-compatible RS-232C cable)			Host device end
	Wiring configuration	Cable length L (See note 1.)	Model number	
CS1□-CPU□□ CJ1□-CPU□□ CPM2A-CPU□□	9-pin D-Sub Plug / 9-pin D-Sub Socket Shield PLC end: Connector hood FG, ---, SD, RD, RS, CS, ---, ---, ---, SG (1–9) Host end: Connector hood FG, ---, RD, SD, ER, SG, DR, RS, CS, --- (1–9)	2 m	XW2Z-200S-V	Personal Computer
		5 m	XW2Z-500S-V*	
	9-pin D-Sub Plug / 9-pin D-Sub Socket Shield PLC end: Connector hood FG, FG, SD, RD, RS, CS, ---, DR, ER, SG (1–9) Host end: Connector hood FG, ---, RD, SD, ER, SG, DR, RS, CS, --- (1–9) ESD-preventive connectors are used.	2 m	XW2Z-200S-CV*	
		5 m	XW2Z-500S-CV*	
CS1□-CPU□□ CJ1□-CPU□□ CPM2A-CPU□□	9-pin D-Sub Plug / 9-pin D-Sub Plug Shield PLC end: Connector hood FG, ---, SD, RD, RS, CS, SG (1–9) Host end: Connector hood FG, ---, SD, RD, RS, CS, SG (1–9)	2 m	XW2Z-200T	Programmable Terminal: NT20S, NT600S, NT620S, NT620C, NT30, or NT30C NT31, or NT31C, NT631, or NT 631 C, NS-series
		5 m	XW2Z-500T	

Note: 1. The cable length does not include the connectors, as shown in the following diagram.



* This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

I/O Connecting Cable Selection guide

Connecting to CS1 I/O Units

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CS1W-ID291 (48 points x 2)	XW2B-60G5 XW2B-60G4	1:1	0.5	XW2Z-050H-1	413
			1	XW2Z-100H-1	
			1.5	XW2Z-150H-1	
			2	XW2Z-200H-1	
			3	XW2Z-300H-1	
			5	XW2Z-500H-1	
			7	XW2Z-700H-1	
			10	XW2Z-010H-1	
	XW2D-20G6 + XW2D-40G6 XW2B-20G5 + XW2B-40G5 XW2B-20G4 + XW2B-40G4	1:2	1	XW2Z-100H-2	
			1.5	XW2Z-150H-2	
			2	XW2Z-200H-2	
			3	XW2Z-300H-2	
			5	XW2Z-500H-2	
			10	XW2Z-010H-2	
	XW2D-20G6 (3 Units) XW2B-20G5 (3 Units) XW2B-20G4 (3 Units)	1:3	1	XW2Z-100H-3	
			1.5	XW2Z-150H-3	
			2	XW2Z-200H-3	
			3	XW2Z-300H-3	
			5	XW2Z-500H-3	
			10	XW2Z-010H-3	
	G7TC-IA16/ID16	1:3	1.5	G79-150C-125-100	402
			2	G79-200C-175-150	
			3	G79-300C-275-250	
CS1W-OD291 (48 points × 2)	XW2B-60G5 XW2B-60G4	1:1	0.5	XW2Z-050H-1	413
			1	XW2Z-100H-1	
			1.5	XW2Z-150H-1	
			2	XW2Z-200H-1	
			3	XW2Z-300H-1	
			5	XW2Z-500H-1	
			7	XW2Z-700H-1	
			10	XW2Z-010H-1	
	XW2D-20G6 + XW2D-40G6 XW2B-20G5 + XW2B-40G5 XW2B-20G4 + XW2B-40G4	1:2	1	XW2Z-100H-2	
			1.5	XW2Z-150H-2	
			2	XW2Z-200H-2	
			3	XW2Z-300H-2	
			5	XW2Z-500H-2	
			10	XW2Z-010H-2	
	XW2D-20G6 (3 Units) XW2B-20G5 (3 Units) XW2B-20G4 (3 Units)	1:3	1	XW2Z-100H-3	
			1.5	XW2Z-150H-3	
			2	XW2Z-200H-3	
			3	XW2Z-300H-3	
			5	XW2Z-500H-3	
			10	XW2Z-010H-3	
	G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:3	1.5	G79-150C-125-100	402
			2	G79-200C-175-150	
			3	G79-300C-275-250	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CS1W-OD292 (48 points × 2)	XW2B-60G5 XW2B-60G4	1:1	0.5	XW2Z-050H-1	413
			1	XW2Z-100H-1	
			1.5	XW2Z-150H-1	
			2	XW2Z-200H-1	
			3	XW2Z-300H-1	
			5	XW2Z-500H-1	
			7	XW2Z-700H-1	
			10	XW2Z-010H-1	
	XW2D-20G6 + XW2D-40G6 XW2B-20G5 + XW2B-40G5 XW2B-20G4 + XW2B-40G4	1:2	1	XW2Z-100H-2	
			1.5	XW2Z-150H-2	
			2	XW2Z-200H-2	
			3	XW2Z-300H-2	
			5	XW2Z-500H-2	
			10	XW2Z-010H-2	
	XW2D-20G6 (3 Units) XW2B-20G5 (3 Units) XW2B-20G4 (3 Units)	1:3	1	XW2Z-100H-3	
			1.5	XW2Z-150H-3	
			2	XW2Z-200H-3	
			3	XW2Z-300H-3	
			5	XW2Z-500H-3	
			10	XW2Z-010H-3	
	G7TC-OC16-1	1:3	1.5	G79-150C-125-100	402
			2	G79-200C-175-150	
			3	G79-300C-275-250	
CS1W-MD291 (48 inputs) (48 outputs)	XW2B-60G5 XW2B-60G4	1:1	0.5	XW2Z-050H-1	413
			1	XW2Z-100H-1	
			1.5	XW2Z-150H-1	
			2	XW2Z-200H-1	
			3	XW2Z-300H-1	
			5	XW2Z-500H-1	
			7	XW2Z-700H-1	
			10	XW2Z-010H-1	
	XW2D-20G6 + XW2D-40G6 XW2B-20G5 + XW2B-40G5 XW2B-20G4 + XW2B-40G4	1:2	1	XW2Z-100H-2	
			1.5	XW2Z-150H-2	
			2	XW2Z-200H-2	
			3	XW2Z-300H-2	
			5	XW2Z-500H-2	
			10	XW2Z-010H-2	
	XW2D-20G6 (3 Units) XW2B-20G5 (3 Units) XW2B-20G4 (3 Units)	1:3	1	XW2Z-100H-3	
			1.5	XW2Z-150H-3	
			2	XW2Z-200H-3	
			3	XW2Z-300H-3	
			5	XW2Z-500H-3	
			10	XW2Z-010H-3	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:3	1.5	G79-150C-125-100	402
			2	G79-200C-175-150	
			3	G79-300C-275-250	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CS1W-MD292 (48 inputs) (48 outputs)	XW2B-60G5 XW2B-60G4	1:1	0.5	XW2Z-050H-1	413
			1	XW2Z-100H-1	
			1.5	XW2Z-150H-1	
			2	XW2Z-200H-1	
			3	XW2Z-300H-1	
			5	XW2Z-500H-1	
			7	XW2Z-700H-1	
			10	XW2Z-010H-1	
	XW2D-20G6 + XW2D-40G6 XW2B-20G5 + XW2B-40G5 XW2B-20G4 + XW2B-40G4	1:2	1	XW2Z-100H-2	
			1.5	XW2Z-150H-2	
			2	XW2Z-200H-2	
			3	XW2Z-300H-2	
			5	XW2Z-500H-2	
			10	XW2Z-010H-2	
	XW2D-20G6 (3 Units) XW2B-20G5 (3 Units) XW2B-20G4 (3 Units)	1:3	1	XW2Z-100H-3	
			1.5	XW2Z-150H-3	
			2	XW2Z-200H-3	
			3	XW2Z-300H-3	
			5	XW2Z-500H-3	
			10	XW2Z-010H-3	
	G7TC-IA16/ID16 G7TC-OC16-1	1:3	1.5	G79-150C-125-100	402
			2	G79-200C-175-150	
			3	G79-300C-275-250	
CS1W-ID231 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100D	
			1.5	XW2Z-150D	
			2	XW2Z-200D	
			3	XW2Z-300D	
			5	XW2Z-500D	
CS1W-OD231 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CS1W-OD232 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	
CS1W-ID261 (32 points × 2)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100D	
			1.5	XW2Z-150D	
			2	XW2Z-200D	
			3	XW2Z-300D	
			5	XW2Z-500D	
CS1W-OD261 (32 points × 2)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	412
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	
CS1W-OD262 (32 points × 2)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	413
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CS1W-MD261 (32 inputs)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100D	
			1.5	XW2Z-150D	
			2	XW2Z-200D	
			3	XW2Z-300D	
			5	XW2Z-500D	
CS1W-MD261 (32 outputs)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	
CS1W-MD262 (32 inputs)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100D	
			1.5	XW2Z-150D	
			2	XW2Z-200D	
			3	XW2Z-300D	
			5	XW2Z-500D	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CS1W-MD262 (32 outputs)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	

Connecting to CJ1 I/O Units

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CJ1W-ID231 (32 points)	XW2D-40G6 XW2D-40G6-RF XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100D	
			1.5	XW2Z-150D	
			2	XW2Z-200D	
			3	XW2Z-300D	
			5	XW2Z-500D	
	G7TC-IA16/ID16	1:2	1	G79-I100C-75	401
			1.5	G79-I150C-125	
			2	G79-I200C-175	
			3	G79-I300C-275	
			5	G79-I500C-475	
CJ1W-OD231 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	
	G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:2	1	G79-O100C-75	401
			1.5	G79-O150C-125	
			2	G79-O200C-175	
			3	G79-O300C-275	
			5	G79-O500C-475	
CJ1W-ID232 (32 points)	XW2D-40G6 XW2D-40G6-RM XW2B-40G5 XW2B-40G4	1:1	1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100N	
			1.5	XW2Z-150N	
			2	XW2Z-200N	
			3	XW2Z-300N	
			5	XW2Z-500N	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CJ1W-OD232 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100N	
			1.5	XW2Z-150N	
			2	XW2Z-200N	
			3	XW2Z-300N	
			5	XW2Z-500N	
CJ1W-OD233 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	1	XW2Z-100K	414
			1,5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units) XW2B-20G5 (2 units) XW2B-20G4 (2units) XW2B-40G5-T XW2C-20G6-IO16 (2 units)	1:2	1	XW2Z-100N	414
			1,5	XW2Z-150N	
			2	XW2Z-200N	
			3	XW2Z-300N	
			5	XW2Z-500N	
CJ1W-MD231 (16 inputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16 XW2C-20G5-IN16 XW2E-20G5-IN16	1:1	0,5	XW2Z-050A	412
			1	XW2Z-100A	
			1,5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0,5	XW2Z-050AU	412
			1	XW2Z-100AU	
			1,5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CJ1W-MD231 (16 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16	1:1	0,5	XW2Z-050A	412
			1	XW2Z-100A	
			1,5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0,5	XW2Z-050AU	412
			1	XW2Z-100AU	
			1,5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CJ1W-MD233 (16 inputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16 XW2C-20G5-IN16 XW2E-20G5-IN16	1:1	0,25	G79-O25C	401
			0,5	G79-O50C	
CJ1W-MD233 (16 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16	1:1	0,25	G79-O25C	401
			0,5	G79-O50C	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CJ1W-ID261 (32 points × 2)	XW2D-40G6 XW2D-40G6-RF XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units) XW2C-20G5-IN16 (2 Units) XW2E-20G5-IN16 (2 Units)	1:2	1	XW2Z-100D	
			1.5	XW2Z-150D	
			2	XW2Z-200D	
			3	XW2Z-300D	
			5	XW2Z-500D	
	G7TC-IA16/ID16	1:2	1	G79-I100C-75	401
			1.5	G79-I150C-125	
			2	G79-I200C-175	
			3	G79-I300C-275	
			5	G79-I500C-475	
CJ1W-OD261 (32 points × 2)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 Units) XW2B-20G5 (2 Units) XW2B-20G4 (2 Units) XW2B-40G5-T XW2C-20G6-IO16 (2 Units)	1:2	1	XW2Z-100L	413
			1.5	XW2Z-150L	
			2	XW2Z-200L	
			3	XW2Z-300L	
			5	XW2Z-500L	
	G7TC-OC16/08 G70D-SOC16/ VSOC16 G70A-ZOC16-3	1:2	1	G79-O100C-75	401
			1.5	G79-O150C-125	
			2	G79-O200C-175	
			3	G79-O300C-275	
			5	G79-O500C-475	
CJ1W-OD263 (32 points x 2)	XW2D-40G6	1:1	1	XW2Z-100K	414
	XW2B-40G5		1,5	XW2Z-150K	
	XW2B-40G4		2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100N	414
	XW2B-20G5 (2 units)		1,5	XW2Z-150N	
	XW2B-20G4 (2units)		2	XW2Z-200N	
	XW2B-40G5-T		3	XW2Z-300N	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500N	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CJ1W-ID262 (32 points x 2)	XW2D-40G6	1:1	1	XW2Z-100K	414
	XW2D-40G6-RM		1,5	XW2Z-150K	
	XW2B-40G5		2	XW2Z-200K	
	XW2B-40G4		3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100N	414
	XW2B-20G5 (2 units)		1,5	XW2Z-150N	
	XW2B-20G4 (2units)		2	XW2Z-200N	
	XW2B-40G5-T		3	XW2Z-300N	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500N	
	XW2C-20G5-IN16 (2 units)				
	XW2E-20G5-IN16 (2 units)				
CJ1W-MD261 (32 Inputs)	XW2D-40G6	1:1	0,5	XW2Z-050B	412
	XW2D-40G6-RF		1	XW2Z-100B	
	XW2B-40G5		1,5	XW2Z-150B	
	XW2B-40G4		2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0,5	XW2Z-050BU	412
			1	XW2Z-100BU	
			1,5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100D	412
	XW2B-20G5 (2 units)		1,5	XW2Z-150D	
	XW2B-20G4 (2units)		2	XW2Z-200D	
	XW2B-40G5-T		3	XW2Z-300D	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500D	
	XW2C-20G5-IN16 (2 units)				
	XW2E-20G5-IN16 (2 units)				
CJ1W-MD261 (32 Outputs)	XW2D-40G6	1:1	0,5	XW2Z-050B	412
	XW2B-40G5		1	XW2Z-100B	
	XW2B-40G4		1,5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0,5	XW2Z-050BU	412
			1	XW2Z-100BU	
			1,5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100L	413
	XW2B-20G5 (2 units)		1,5	XW2Z-150L	
	XW2B-20G4 (2units)		2	XW2Z-200L	
	XW2B-40G5-T		3	XW2Z-300L	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500L	
CJ1W-MD263 (32 Inputs)	XW2D-40G6	1:1	1	XW2Z-100K	414
	XW2D-40G6-RM		1,5	XW2Z-150K	
	XW2B-40G5		2	XW2Z-200K	
	XW2B-40G4		3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100N	414
	XW2B-20G5 (2 units)		1,5	XW2Z-150N	
	XW2B-20G4 (2units)		2	XW2Z-200N	
	XW2B-40G5-T		3	XW2Z-300N	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500N	
	XW2C-20G5-IN16 (2 units)				
	XW2E-20G5-IN16 (2 units)				

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CJ1W-MD263 (32 Outputs)	XW2D-40G6	1:1	1	XW2Z-100K	414
	XW2B-40G5		1,5	XW2Z-150K	
	XW2B-40G4		2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100N	414
	XW2B-20G5 (2 units)		1,5	XW2Z-150N	
	XW2B-20G4 (2units)		2	XW2Z-200N	
	XW2B-40G5-T		3	XW2Z-300N	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500N	
CJ1W-MD563 (32 Inputs)	XW2D-40G6	1:1	1	XW2Z-100K	414
	XW2D-40G6-RM		1,5	XW2Z-150K	
	XW2B-40G5		2	XW2Z-200K	
	XW2B-40G4		3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100N	414
	XW2B-20G5 (2 units)		1,5	XW2Z-150N	
	XW2B-20G4 (2units)		2	XW2Z-200N	
	XW2B-40G5-T		3	XW2Z-300N	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500N	
	XW2C-20G5-IN16 (2 units)				
	XW2E-20G5-IN16 (2 units)				
CJ1W-MD563 (32 Outputs)	XW2D-40G6	1:1	1	XW2Z-100K	414
	XW2B-40G5		1,5	XW2Z-150K	
	XW2B-40G4		2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	XW2D-20G6 (2 units)	1:2	1	XW2Z-100N	414
	XW2B-20G5 (2 units)		1,5	XW2Z-150N	
	XW2B-20G4 (2units)		2	XW2Z-200N	
	XW2B-40G5-T		3	XW2Z-300N	
	XW2C-20G6-IO16 (2 units)		5	XW2Z-500N	

Connecting to CPM2C I/O Units

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CPM2C-10CDTC-D (6 inputs) (4 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CPM2C-10C1DTC-D (6 inputs) (4 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CPM2C-10CDT1C-D (6 inputs) (4 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-OC16-1	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
CPM2C-10C1DT1C-D (6 inputs) (4 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-OC16-1	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
CPM2C-20CDTC-D (12 inputs) (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
CPM2C-20C1DTC-D (12 inputs) (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CPM2C-20CDT1C-D (12 inputs) (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-OC16-1	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
CPM2C-20C1DT1C-D (12 inputs) (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-OC16-1	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
CPM2C-8EDC (8 inputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CPM2C-16EDC (16 inputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CPM2C-8ETC (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
CPM2C-8ET1C (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CPM2C-16ETC (16 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CPM2C-16ET1C (16 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
CPM2C-24EDTC (16 inputs) (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
CPM2C-24EDT1C (16 inputs) (8 outputs)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-OC16-1	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	

Connecting to DeviceNet I/O Terminals

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
GT1-ID32ML (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	412
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	G7TC-IA16/ID16	1:1	0.25	G79-I25C	---
			0.5	G79-I50C	
GT1-ID32ML-1 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	412
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
GT1-OD32ML (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	412
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
	G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	0.25	G79-O25C	---
			0.5	G79-O50C	
GT1-OD32ML-1 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.5	XW2Z-050B	412
			1	XW2Z-100B	
			1.5	XW2Z-150B	
			2	XW2Z-200B	
			3	XW2Z-300B	
			5	XW2Z-500B	
	XW2D-40C6	1:1	0.5	XW2Z-050BU	412
			1	XW2Z-100BU	
			1.5	XW2Z-150BU	
			2	XW2Z-200BU	
			3	XW2Z-300BU	
			5	XW2Z-500BU	
GT1-ID16ML (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	412
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-IA16/ID16	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
GT1-ID16ML-1 (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	412
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
GT1-OD16ML (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	412
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	
	G7TC-OC16/08 G70D-SOC16/VSOC16 G70A-ZOC16-3	1:1	1	G79-100C	401
			1.5	G79-150C	
			2	G79-200C	
			3	G79-300C	
			5	G79-500C	
GT1-OD16ML-1 (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4	1:1	0.5	XW2Z-050A	412
			1	XW2Z-100A	
			1.5	XW2Z-150A	
			2	XW2Z-200A	
			3	XW2Z-300A	
			5	XW2Z-500A	
	XW2D-20C6	1:1	0.5	XW2Z-050AU	412
			1	XW2Z-100AU	
			1.5	XW2Z-150AU	
			2	XW2Z-200AU	
			3	XW2Z-300AU	
			5	XW2Z-500AU	

Connecting to CompoBus/S I/O Terminals

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
SRT2-VID16ML (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16 XW2C-20G5-IN16 XW2E-20G5-IN16	1:1	0.25	G79-O25C	---
			0.5	G79-O50C	
	G7TC-IA16/ID16	1:1	0.25	G79-I25C	
			0.5	G79-I50C	
SRT2-VID16ML-1 (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16 XW2C-20G5-IN16 XW2E-20G5-IN16	1:1	0.25	G79-O25C	---
			0.5	G79-O50C	
SRT2-VOD16ML (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16 XW2C-20G5-IN16 XW2E-20G5-IN16	1:1	0.25	G79-O25C	---
			0.5	G79-O50C	
	G7TC-OC16/08 G70D-SOC16/ VSOC16 G70A-ZOC16-3	1:1	0.25	G79-O25C	
			0.5	G79-O50C	
SRT2-VOD16ML-1 (16 points)	XW2D-20G6 XW2B-20G5 XW2B-20G4 XW2C-20G6-IO16 XW2C-20G5-IN16 XW2E-20G5-IN16	1:1	0.25	G79-O25C	---
			0.5	G79-O50C	
	G70A-ZOC16-4	1:1	0.25	G79-O25C	
			0.5	G79-O50C	
SRT2-ID32ML (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.25	XW2Z-C25K	---
			0.5	XW2Z-C50K	
			1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	G7TC-IA16/ID16	1:2	0.5	G79-I50-25-D1	---
			0.75	G79-I75-50-D1	
SRT2-ID32ML-1 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.25	XW2Z-C25K	---
			0.5	XW2Z-C50K	
			1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
SRT2-OD32ML (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.25	XW2Z-C25K	---
			0.5	XW2Z-C50K	
			1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	G7TC-OC16/08 G70D-SOC16/ VSOC16 G70A-ZOC16-3	1:2	0.5	G79-O50-25-D1	---
			0.75	G79-O75-50-D1	
SRT2-OD32ML-1 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.25	XW2Z-C25K	---
			0.5	XW2Z-C50K	
			1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	G70A-ZOC16-4	1:2	0.5	G79-M50-25-D1	---
			0.75	G79-M75-50-D1	

I/O Unit model	Connector-Terminal Conversion Unit or I/O Block model	Connecting Cable			
		Branching	Length (m)	Model	Page
SRT2-MD32ML (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.25	XW2Z-C25K	---
			0.5	XW2Z-C50K	
			1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	G7TC-IA16/ID16 G7TC-OC16/08 G70D-SOC16/ VSOC16 G70A-ZOC16-3	1:2	0.5	G79-M50-25-D1	---
			0.75	G79-M75-50-D1	
SRT2-MD32ML-1 (32 points)	XW2D-40G6 XW2B-40G5 XW2B-40G4	1:1	0.25	XW2Z-C25K	---
			0.5	XW2Z-C50K	
			1	XW2Z-100K	414
			1.5	XW2Z-150K	
			2	XW2Z-200K	
			3	XW2Z-300K	
			5	XW2Z-500K	
	G70A-ZOC16-4	1:2	0.5	G79-M50-25-D1	---
			0.75	G79-M75-50-D1	

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P10E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

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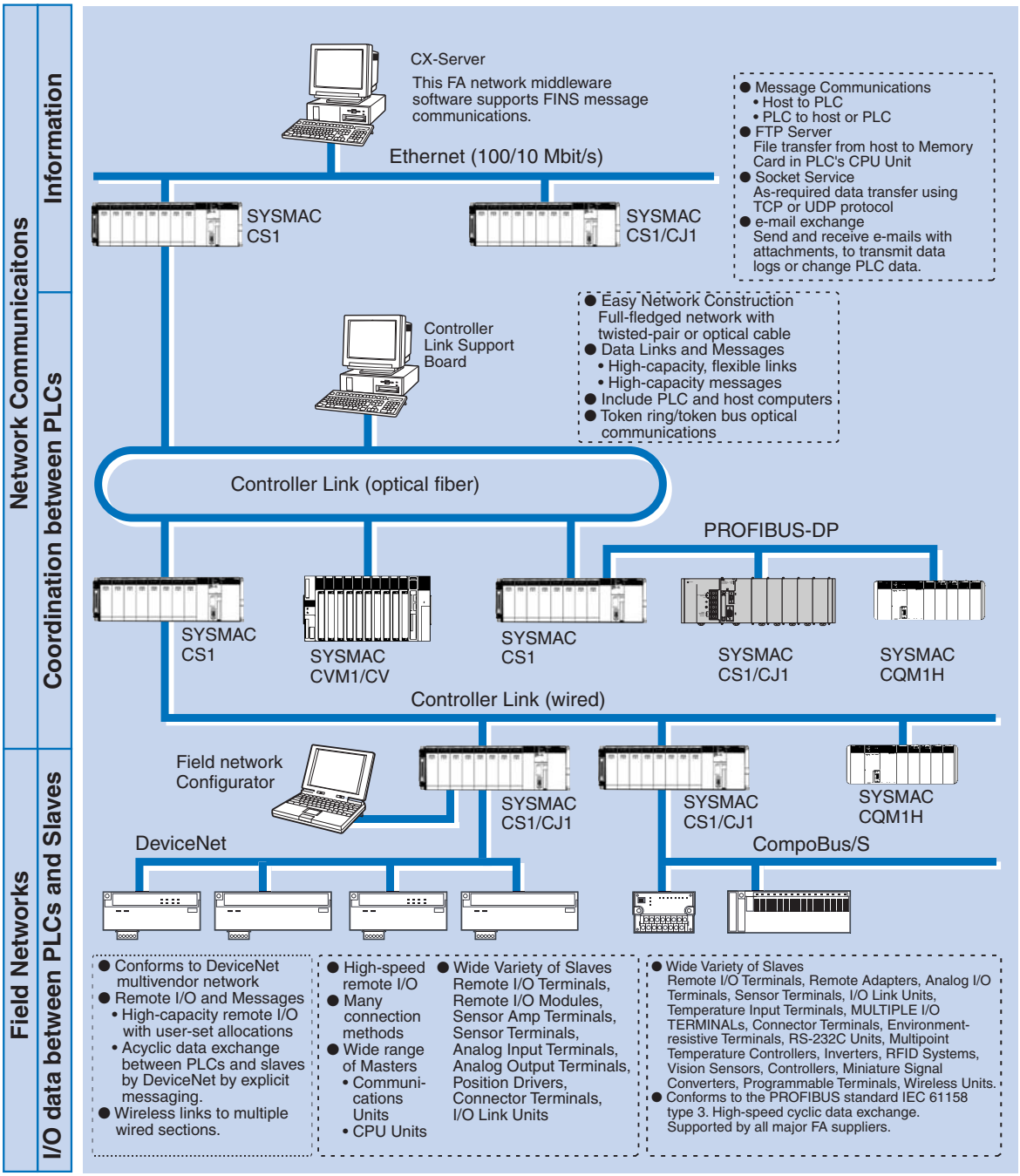
Industrial Communication

Overview

Seamlessly connect control networks to information

Omron has pioneered seamless communication through multiple network levels. The FINS (Factory Information Network System) protocol was designed to be used over open standard networks like Ethernet and DeviceNet, as well as proprietary networks like Controller Link.

On fieldbus level, multi-vendor field networks are supported with DeviceNet and PROFIBUS-DP, whereas Omron's fast CompoBus/S system offers a simple and cost-effective remote I/O solution.



Communications Network Overview

Network type		Network name	Connections	Communications	Applicable PLCs
Communi-cations networks	Information	Ethernet	Host to PLC	FINS message communications	CJ1, CS1: Ethernet Unit C200HX/HG/HE(-Z):PC Card Unit (Ethernet Card)
			PLC to PLC		
			Host to Memory Card in CPU Unit	FTP server	
			Unix computer or other node with socket service to PLC	Socket service	
			PLC to Host	Mail transmissions (CS1/CJ1 Ethernet Unit only)	
			Host to PLC		
	Port-to-port PLC control networks	Controller Link	Network-connected computer and PLC	FINS message communications	CJ1, CS1, C200HX/HG/HE(-Z), CQM1H: Controller Link Unit
				Data links (Offset designation and easy setting possible.)	
		Controller Link	PLC to PLC	FINS message communications	
				Data links (Offset designation and easy setting possible.)	
Field networks	PLC-to-slave control networks	DeviceNet	PLC to PLC	Explicit and FINS communications on open network. With the CS1W-DRM21, communications are possible with upper-level networks.	Master: CJ1, CS1, C200HX/HG/HE(-Z), Open Network Controller, VME Board Slaves:CJ1, CS1, C200HX/HG/HE(-Z), CQM1H, CPM, PC Board
		DeviceNet	PLC to slaves (components)	Large-volume remote I/O on open network (automatic or user-specified allocations)	
		PROFIBUS-DP			Master: CS1, C200H-series, CJ1 Slave: CS1, C200H-series, CJ1, CQM1H, CPM2A, CPM1A
		CompoBus/S		High-speed remote I/O (fixed allocations) on special OMRON network	Master:CJ1, CS1, C200HX/HG/HE(-Z), CQM1H, SRM1, CPM2C-S, SYSMAC Board Slaves:CPM1A, CPM2A, CPM2C
Motion Network	PLC to Servo control network	MechatroLink	CS1 PLC and Sigma II servo drives	Co-ordinating motion. Up to 30 axes.	CS1

Basic Specifications Communication Networks

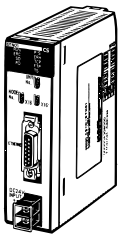
Item		Ethernet	Controller Link
Communications	Messages	Supported	Supported
	Automatic Data links	Not supported	Supported
Other functions		• Socket service • FTP server • Mail notification	---
Maximum baud rate		100 Mbps (CS1, CJ1)	2 Mbps, Communications cycle time: approx 34 ms (for wired network with 32 nodes and data links of 2 Kbits + 2 kWords)
Maximum communications distance		2.5 km	Twisted-pair: 1 km* H-PCF optical fiber: 20 km GI optical fiber: 30 km *At 500 Kbps
Maximum number of nodes		254 nodes	Wired: 32 nodes, 64 with repeaters Optical: 62 nodes
Communications media		Coaxial cable (10Base-5) or twisted-pair cable (10Base-T, 100Base-Tx)	Twisted-pair or optical fiber cable
Data link capacity of network		---	32,000 words
Remote I/O		---	---
Applicable PLCs		CJ Series, CS Series, C200HX/HG/HE(-Z)	CJ Series, CS Series, C200HX/HG/HE(-Z)* *: Twisted-pair cable only

Ethernet

Unite Factory Controls and Office Information



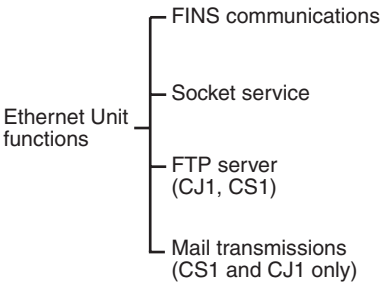
CJ1W-ETN11/21
for CJ1
Modular PLC



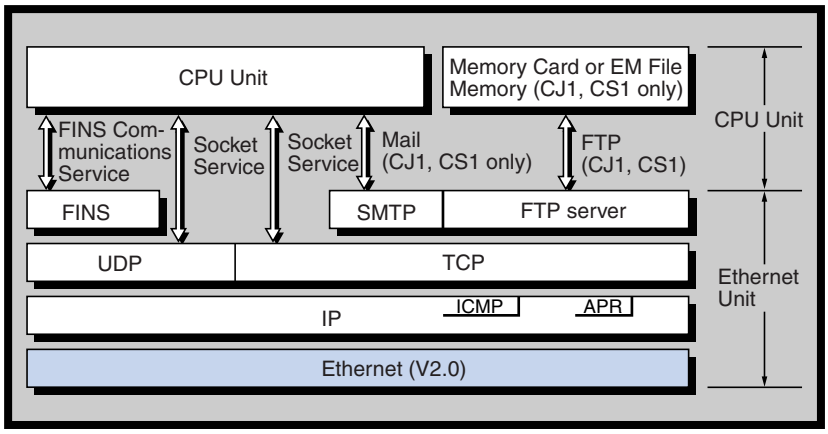
CS1W-ETN01/11/21
for CS1 Rack PLCs

Outline

- Use the socket service to send and receive the required data using TCP/IP or UDP/IP.
- Execute FINS commands using any of the standard protocols provided by OMRON.
- Send files via FTP.
- Send mail to provide information using SMTP, POP3.
- All of this is supported using Ethernet. Communications services can be selected based on the need at hand to flexibly merge PLCs into the Ethernet information network.



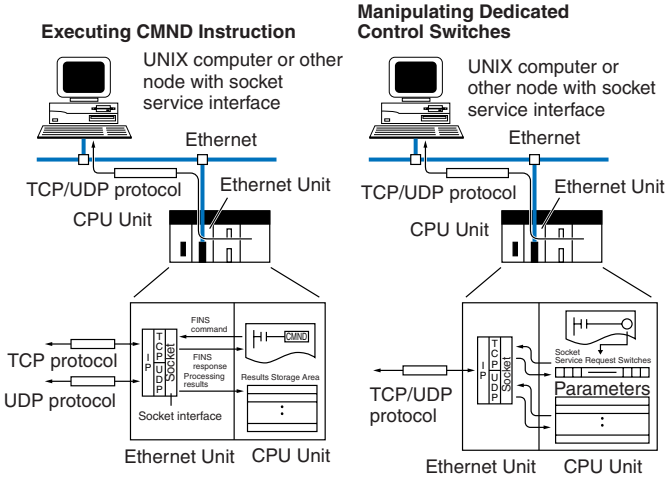
Software Configuration



Features

Socket Service Using UDP/IP or TCP/IP

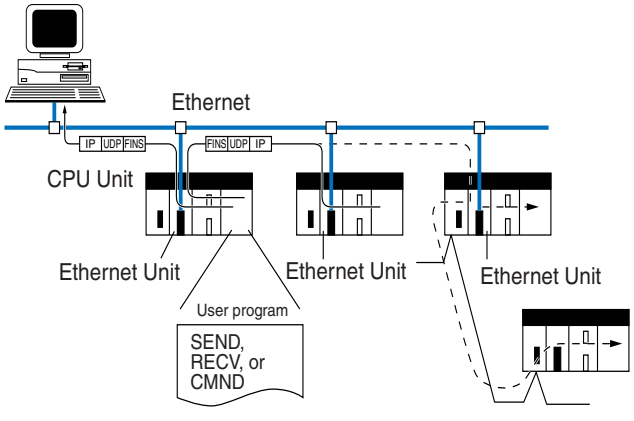
The socket service enables sending and receiving various data with UDP/IP or TCP/IP using standard protocols for Ethernet. This enables communications with a wide range of devices that support Ethernet communications, including control devices, workstations, personal computers, and Ethernet Units from other manufacturers.



FINS Message Communications

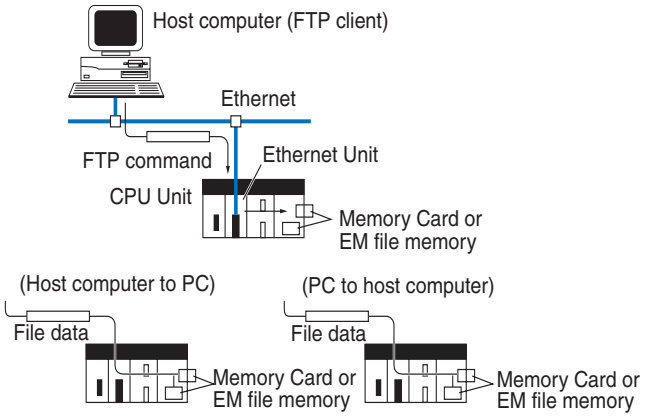
FINS commands, a special communications services from OMRON, can be sent to or received from other PLCs or computers on the same Ethernet network by executing SEND, RECV, or CMND instructions in the ladder-diagram program.

The FINS gateway function allows access not only to PLCs on the same Ethernet network, but also to PLCs on other networks such as SYSMAC LINK or Controller Link.



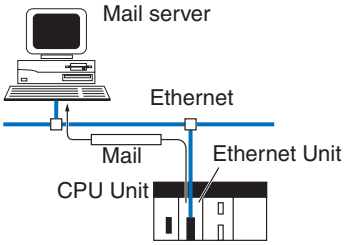
FTP Server (CS1, CJ1, and CVM1/CV Series Only)

The Ethernet Unit has a built-in FTP server function, so that workstations and other computers on the Ethernet with FTP client functions can read or write individual files with PLCs. This enables the client to download large quantities of data without any programming in the ladder program in the PLC.



Mail (CS1 and CJ1 Series Only)

Data such as user-created messages, Ethernet Unit error log information, data and status information can be sent as e-mail to a host computer. This enables on-site information to be sent from the PLC to the host computer in a single e-mail message. With the CS1W- and CJ1W-ETN21 Units, it is possible to send/receive e-mails with attachments, transfer programs and data to the PLC CPU by e-mail, and send FINS commands to the PLC CPU.



Connect Networks to the Controller Link Network

FINS message communications can be used to communicate between information networks and the Controller Link control network. A host computer can thus communicate through a PLC on Ethernet to monitor PLCs on the Controller Link FA network. Also, PLCs on the Controller Link Network can send and receive data with the host computer on Ethernet by communicating through a PLC on Ethernet.

Network Troubleshooting Functions

A wealth of RAS functions are provided for rapid troubleshooting.

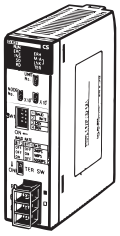
- Self-diagnosis functions at startup
- PING command support to confirm connections to other nodes
- Internode echo tests to confirm connections to other nodes
- Error logs to record realtime error information
- Error notification via e-mail

Ethernet Unit Comparison

Item		CJ1W-ETN11 CJ-series Ethernet Unit	CS1W-ETN01/ETN11 CS-series Ethernet Unit	CJ1W-ETN21, CS1W-ETN21 CJ-, CS1series PLCs
Applicable PLCs		CJ-series PLCs		
Transmission media (connections)		CS1W-ETN01:10Base-5 Others:10Base-T		100Base-Tx
FINS service	FINS commands	Implemented with CMND (COMMAND) instructions		
	Command reception	FINS commands can be received simultaneously from multiple nodes.		FINS commands can also be received by e-mail.
Socket service	Number of TCP/IP sockets	8 sockets		
	Number of UDP/IP sockets	8 sockets		
	Methods	Implemented with CMND (COMMAND) instructions		
		Implemented by manipulating specific bits.		
FTP server functions (file transfer)		Supported		
e-mail functions		Possible only when manipulating specific bits.	Transmit pre-defined e-mails by command bits.	Transmit and receive e-mail (SMTP, POP3) with attachments. Exchange data files and receive FINS commands.
Programming Device connections through gateway from serial to Ethernet communications		Supported		

Controller Link

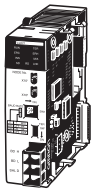
A main FA network supporting data links and message communications.
Select from wired, optical, and optical ring models.



CS1W-CLK21-V1
(wired) for
CS1 PLCs



CS1\
CS1\
(optic
CS1



CQM1H-CLK21
(wired) for CQM1-
Series PLCs



CJ1\
(wire
Serie





Outline

These Units connect to the Controller Link FA network to enable data links (shared memory areas) between PLCs and between PLCs and FA computers. They also enable message communications between PLCs and between PLCs and FA computers to enable sending required data only when needed.

What is Controller Link?

Controller Link is an FA network that can send and receive large data packets flexibly and easily among the OMRON C200HX/HG/HE Programmable Controllers (PLCs), CS-series PLCs, CVM1 PLCs, CV-series PLCs, and IBM PC/AT or compatible computers.

The Controller Link supports data links that enable data sharing and a message service that enables sending and receiving data when required. Data link areas can be freely set to create a flexible data link system and effectively use data areas.

A Controller Link Network can be connected by either shielded twisted-pair cable or optical fiber cable, including optical ring connections. Large quantities of data can be sent and received at high speeds to enable easy creation of a wide-range network encompassing both lower and higher network levels.

Repeaters can be used to extend a Controller Link network up to 62 nodes, to extend a wired network up to 3 km, and to bridge distances up to 2 km by an optical fiber link.

Controller Link Features

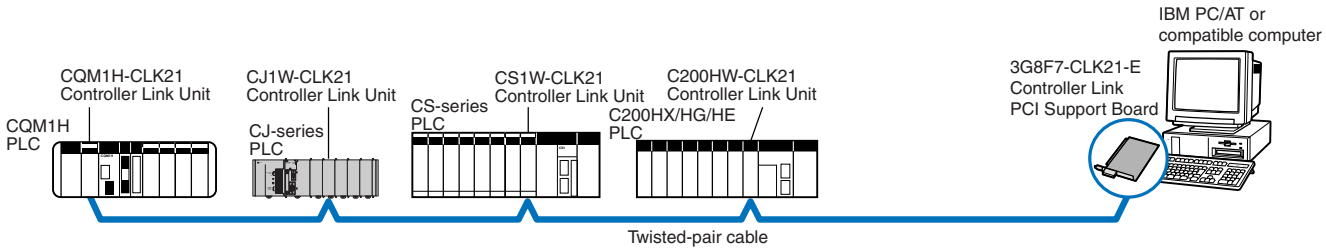
- Controller Link
  - Data links
    - Manual settings
    - Automatic settings
  - Message communications
    - SEND/RECV instructions
    - CMND instructions
  - RAS functions
    - Status area
    - Error log
    - Polling node backup
    - Node bypass
    - Transmission path duplication*
    - Disconnect detection and notification*
    - Node connection configuration readout*

*Only for Optical Ring models in token ring mode.

System Configuration

Wired System (Twisted-pair Cable)

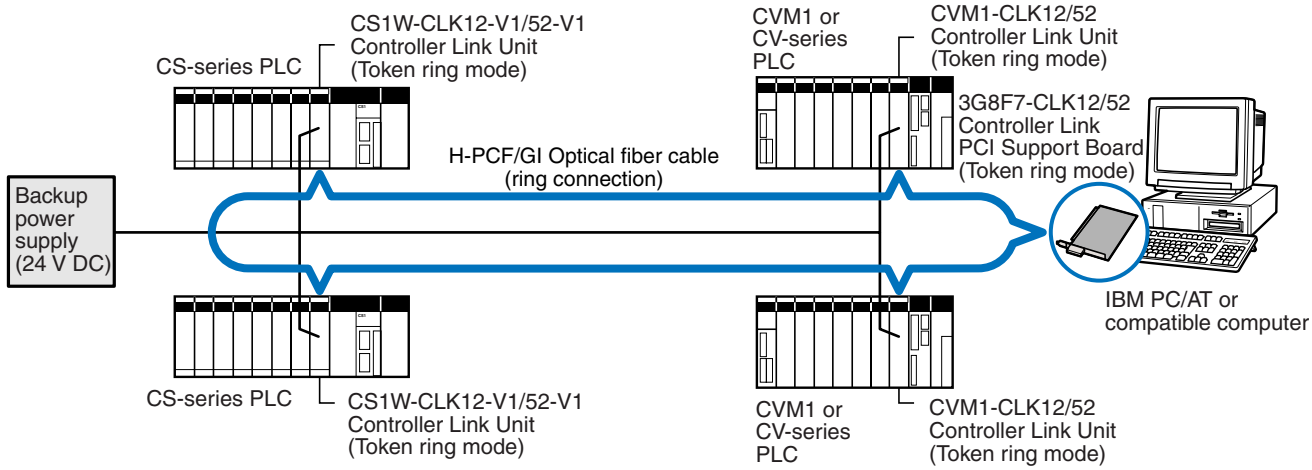
Wired Systems are supported by CJ-series, CS-series, C200HX/HG/HE(-Z), CQM1H, CVM1, and CV-series PLCs.



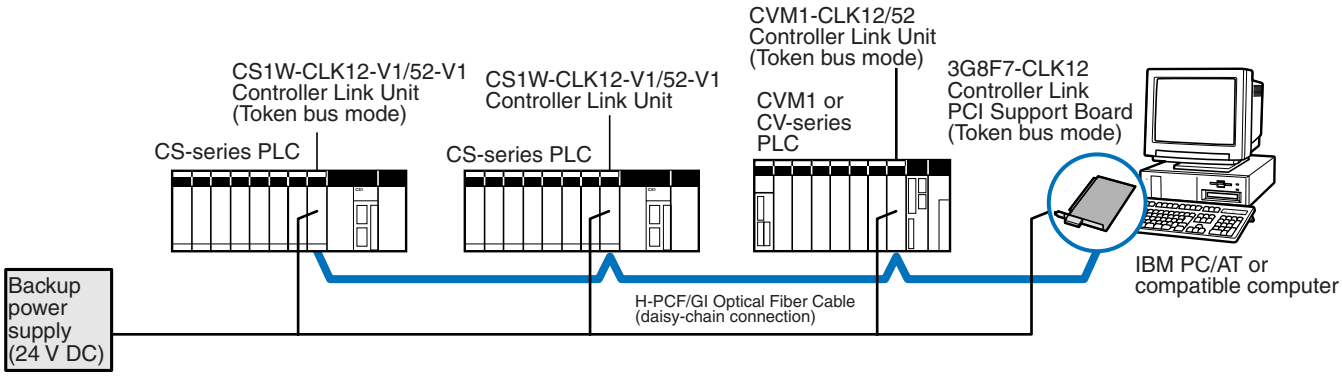
Optical Bus or Optical Ring System (H-PCF or GI Cable)

Optical Systems are supported by CS-series, CVM1, and CV-series PLCs.

Token Ring Mode



Token Bus Mode



Features

Data Links

Data links allow the constant sharing of data in predetermined data areas between nodes, between PLCs, or between a PLC and an IBM PC/AT or compatible computer on the network. Data links do not require the use of communications programs on the PLC (CPU Unit) or IBM PC/AT or compatible computer. Data written in the send area of the local node will be automatically sent to the receive area of other nodes.

The I/O area (CIO area), data link area (LR area), data memory area (DM area), and extended data memory area (EM area) can be freely set in the send or receive area.

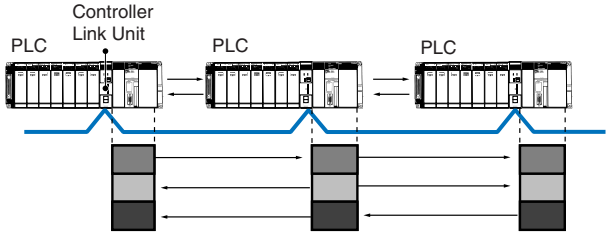
- Number of send words per node: 1,000 words max.
- Number of send and receive words per node:
  CS/CJ-series PLCs: 12,000 words max.
  C200HX/HG/HE(-Z)/CVM1/CV-series PLCs: 8,000 words max.
  Computer nodes: 32,000 words max.

The data link areas can be set automatically or manually.

Automatic Setting

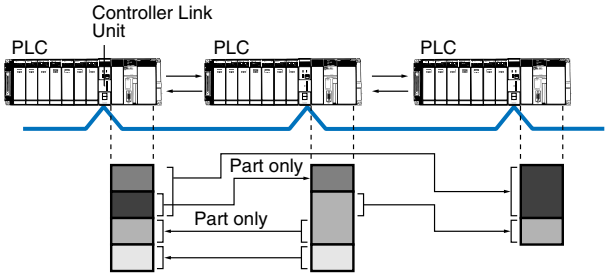
Used for simple data link processing. Data link can be performed by simply setting parameters in the DM area of the PLC.

Various predefined communication modes can be selected (equal size areas, master-slave type, chain link type) using -V1 models.



Manual Setting
Used for flexible data link processing depending on each system.

Using the Controller Link Support Software, individual data link tables can be set for each node and the data link area can be freely allocated for each node. Send data size per node can be freely set. It is possible to set nodes for only send or receive data. With the Controller Link Unit, the data link can be set to receive only a part of the data link area of other nodes.



Message Service

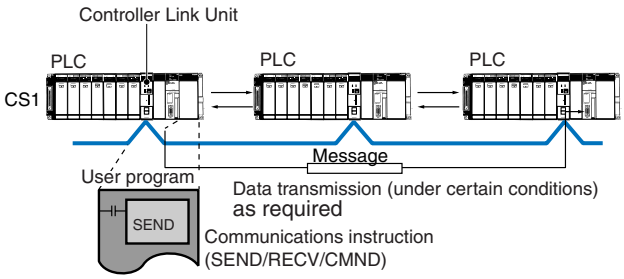
The message service can be used to control data transmission with particular nodes, reading or writing of status data, changing of operation modes, etc., by executing communications instructions in the user program. The communications instructions include SEND and RECV instructions for data transmission and CMND instructions for sending various commands.

SEND/RECV
The SEND and RECV instructions sends and receives data in an area of a particular node.

The SEND instruction sends data from an area of the local node and writes to an area in the designated node.

The RECV instruction requests the designated node to send area data and writes the data to the local node.

CMND
The CMND instruction sends commands such as those to read or write data at other nodes, perform control operations, or read error logs. With the Controller LInk Unit, OMRON's command protocol called FINS is used.



Twisted-pair Cable or Optical Fiber Cable Connections

The Controller Link Units can be connected to the network using either shielded twisted-pair cable, H-PCF fiber-optic cable, or GI fiber-optic cable. Select the system that suits your application.

Features of Twisted-pair Cable
Twisted-pair cable is easy to connect and maintain. The cable can be processed much more easily than coaxial or fiber-optic cable, thereby reducing the cost of tools and assembly time.

Connections are made to a terminal block on the Controller Link Unit and to a special connector on the Controller Link Support Board for easy system assembly and modification.

The network is equipped with the required terminating resistance built into the Units allowing the terminating resistance to be easily set at both ends of the network using a simple switch.

Features of Optical Fiber Cable
Optical Fiber Cable has superior noise resistance, so this system can provide highly reliable communications even in very noisy conditions. The fiber-optic cable allows long-distance and large-scale networks.

With H-PCF fiber-optic cable, the communications distance can be up to 20 km in total, enabling a wider range of system size and network scale.

Compatibility with Different Node Configurations

The following Controller Link Units and Controller Link Boards are available for communications between different models. Wired Units and Optical/Optical Ring Units, however, cannot be combined on the same network.

Wired System
- Units for CQM1H, CJ-series, CS-series, C200HX/HG/HE(-Z), and CVM1/CV-series PLCs and Support Board interfaces for computers with a PCI bus

Optical Ring System (H-PCF or GI Cable)
- Units for CS-series and CVM1/CV-series PLCs and Support Board interfaces for computers with a PCI bus

Flexible Inter-network Connections

The Controller Link Network can connect to other networks (Ethernet, SYSMAC NET, SYSMAC LINK, and another Controller Link network) via CVM1/CV-series or CS-series PLCs. By installing a Communications Unit for the Ethernet, SYSMAC NET or SYSMAC LINK on the same CS-series or CV series-PLC as a Controller Link Unit, a message service can be created with nodes in interconnected networks through the PLC. Communications are possible across up to three network levels.

The programming and monitoring of other PLCs on the network can be conducted from Programming Devices connected to the PLC's CPU Unit. Inter-network connections are possible in this case also and can cover up to three network levels.

RAS Functions

RAS performs real-time monitoring of the network status. If an error occurs in the network, RAS records and displays the time and contents of the error.

Status Area

Data Link Status Area
When the data link function is used, the data link status is reflected in the data link status area of the PLCs.

Network Status Area Other than the Data Link
The network status such as the state of node participation is reflected in the status area of the PLCs.

Error Log

The error log function records contents (codes) and times of errors that occur in the network into the RAM or EEPROM, up to the maximum of 39 errors.

The recorded errors can be read using the Controller Link Support Software or the message service function.

Node Bypass

Data communications can be continued by bypassing the node, even when a node in the communications line malfunctions or the PLC or IBM PC/AT or compatible computer power supply is turned OFF. This prevents the whole network system from being affected by a node malfunction or power interruption.

To use the bypass node function, a 24-V DC backup power must be supplied to the Controller Link Unit/Support Board.

Transmission Path Duplication

In the token-ring mode in an Optical Ring System (H-PCF cable), data transmission will be unaffected even by a cable or connector break at one location in the ring connection. With the fiber-optic cable wired in a ring shape, a break at one point will simply cause the transmission to be routed in the other path.

Disconnect Detection and Notification

Even with transmission path duplication, the network will be broken if disconnections occur in two or more places. In the token-ring mode in an Optical Ring System (H-PCF cable), the location of a disconnection can be detected and can be identified by means of the status display for all nodes. This function can be used to prevent system crashes in advance, by performing maintenance when a disconnection occurs at one place.

Node Connection Configuration Data Reading

In the token-ring mode in an Optical Ring System (H-PCF cable), connection data can be read for all of the nodes configured in the network. The information that can be read includes the order in which the nodes are connected and which of two optical connectors is connected to which node. Special support software (Controller Link Support Soft-

ware, Ver. 2.00 or later) is required in order to read the node connection configuration data.

Data Link Settings with CX-Programmer

With the CS-series Controller Link Unit, the CX-Programmer programming software can be used to set data links freely or monitor data link status. (The Controller Link Support Software cannot be used connected directly to the RS-232C port on a CS-series PLC.)

Communications Specifications

Items		Wired	Optical Ring, H-PCF cable (See note 1.)	Optical Ring, GI cable
Baud rate		2 Mbps, 1 Mbps, or 500 kbps	2 Mbps	2 Mbps
Data Link cycle time (2 kWords + 2 Kbits for 32 nodes)		35 ms (2 bps)	37 ms	37 ms
Maximum transmission distance		500 m, 800 m, 1 km	20 km	30 km
Maximum distance between nodes		500 m, 800 m, 1 km	Crimp cut: 800 m Adhesive: 1 km	62.5/124 μm: 2 km 50/125 μm: 1 km
Transmission medium (cable)		Shielded twisted-pair cable (special cable)	H-PCF cable (200/230 μm)	GI cable (62.5/125 μm or 50/125 μm)
Node connection method		Terminal block (M3 crimp terminals)	Connected via special 2-carrier optical cable (JIS-F07)	Connected via ST connectors (IEC-874-10)
Transmission path format		Multidrop connections (token-bus mode)	Ring method (token-ring mode) Daisy-chain method (token-bus mode)	Ring method (token-ring mode) Daisy-chain method (token-bus mode)
Maximum number of nodes		32 nodes	62 nodes (See note 2.)	62 nodes (See note 2.)
Number of network levels		8 (via FINS communications)	8 (via FINS communications)	8 (via FINS communications)
Number of data link words	Per network	32,000 words	64,000 words	64,000 words
	Per node	Send:1,000 words max. Receive: 20,000 (See note 3.) (Computer with Support Board: 32,000 words)	Send:1,000 words max. Receive: 20,000 (See note 3.) (Computer with Support Board: 62,000 words)	Send:1,000 words max. Receive: 20,000 (See note 3.) (Computer with Support Board: 62,000 words)
Message length		2,012 bytes max. (including the header)	2,012 bytes max. (including the header)	2,012 bytes max. (including the header)
International standards		EC, UL/CSA	EC, UL/CSA	EC, UL/CSA
RAS functions		Node bypass Error detection Polling node backup Self-diagnosis function (hardware checking at startup) Watchdog timer Broadcast test Error log function	Node bypass Error detection Polling node backup Self-diagnosis function (hardware checking at startup) Watchdog timer Broadcast test Error log function Loop bypass power supply Loopback functionality (token ring mode)	Node bypass Error detection Polling node backup Self-diagnosis function (hardware checking at startup) Watchdog timer Broadcast test Error log function Loop bypass power supply Loopback functionality (token ring mode)
Models	For PLCs	CS1W-CLK21-V1, CJ1W-CLK21-V1, CQM1H-CLK21	CS1W-CLK12-V1	CS1W-CLK52-V1
	For computers	3G8F7-CLK21 (PCI bus)	3G8F7-CLK12-V1 (PCI bus)	3G8F7-CLK52-V1 (PCI bus)

Note: 1. Optical Ring Units in token bus mode can be used on the same network as Optical Bus Units/Boards (CS1W-CLK11 and 3G8F5-CLK11).

2. With the token-bus method, the maximum number of nodes in an Optical Bus System with optical bus nodes (i.e., model numbers ending in CLK11) is 32 (node addresses 1 to 32). The total number of words that can be transmitted in a data link is 32,000 words max. CX-Net in CX-Programmer can be used in systems with up to 32 nodes (node addresses 1 to 32). Use Controller Link Support Software (Ver. 2.00 or later) for systems with up to 62 nodes (node addresses 1 to 62).

3. For CS1/CSJ. C200HX/HG/HE, CVM1/CV-series, and CQM1H PLCs: 8,000 words.

Data Link Specifications

Item		Automatically set links		User-set links	
Number of data link nodes		32 nodes max. (2 nodes min.)			
Number of data link words	Send/receive words per node (total of areas 1 and 2)	CS/CJ Series: 20,000 words max. CVM1/CV Series, C200HX/HG/HE, CQM1H: 8,000 words Personal computers: 32,000 words			
Data link areas	Area 1	CIO/IR area (I/O bits, works bits, etc., including data link bits)		CIO/IR area (I/O bits, works bits, etc., including data link bits), DM area, EM area	
	Area 2	DM area, EM area		CIO/IR area (I/O bits, works bits, etc., including data link bits), DM area, EM area	
Number of send words per node	Area 1	0 to 1,000 words (same number for each node)	Max. total for area 1 and area 2: 1,000 words	0 to 1,000 words (may be different for each node)	Max. total for area 1 and area 2: 1,000 words
	Area 2	0 to 1,000 words (same number for each node)		0 to 1,000 words (may be different for each node)	
Data reception	Area 1	All of the data sent by the other nodes is received. It is not possible to receive only part of the data.		Settings can be made to receive all, none, or part of the data from any specific node.	
	Area 2				
Offset setting	Area 1	Not supported		Supported (Settings can be made to receive a specified number of words from a specified word offset from the first word.)	
	Area 2				
Send node order	Area 1	The order is the same as the node addresses.		Any order	The same order must be used for areas 1 and 2.
	Area 2			Any order	

Message Communications Specifications

Item		SEND/RECV	CMND
Application		Sending and receiving data	Reading and writing data at other nodes (e.g., file memory), changing the operating mode and other control operations, reading error logs, etc.
Message contents		Sending commands to send or receive data	Sending any FINS command
Local node to remote node	PLC to PLC	Supported.	Supported.
	PLC to computer	Supported, but programming is required on the computer to return a response)	Supported, but programming is required on the computer to return a response)
	Computer to PLC	Supported, but programming is required on the computer to receive a response)	Supported, but programming is required on the computer to receive a response)
Local node: Remote nodes		SEND: 1:1 or 1:N (broadcasting) RECV: 1:1	1:1 or 1:N (broadcasting)
Data length		1,980 bytes (990 words) max.	1,990 bytes max.

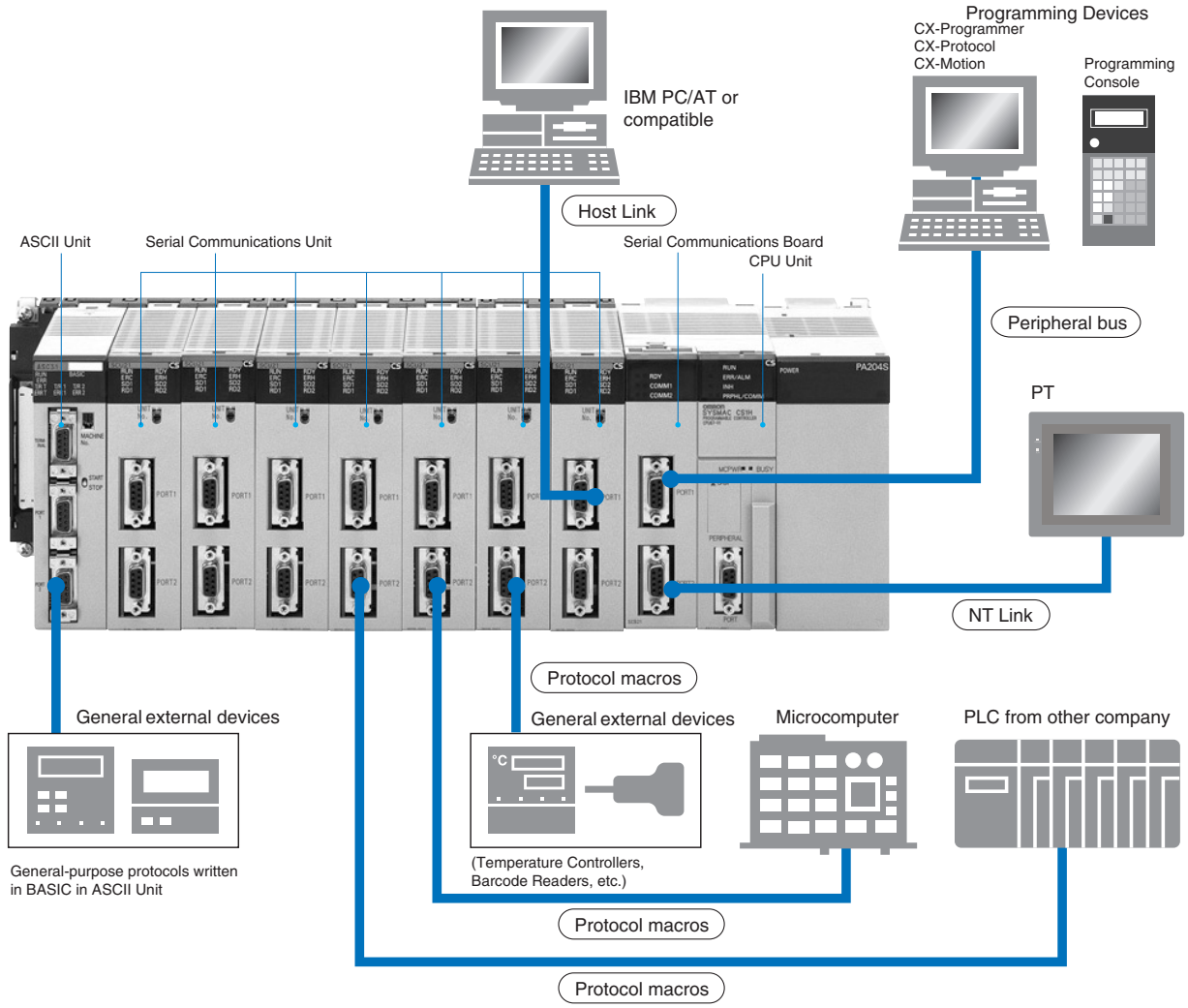
Conversion guide from SYSMAC LINK to Controller Link

Item				SYSMAC LINK		Controller Link
Transmission path				Coaxial cable (5C-2V) or optical fiber cable (optical bus)		Twisted-pair cable or optical fiber cable (optical ring or optical bus)
Transmission distance				Coaxial cable: 1km max. Optical fiber cable: 10 km max		Twisted-pair cable: 1km max. at 500 kbps, 500 m max. at 2 Mbps Optical fiber cable: 20 km max
Baud rate				Coaxial: 2 Mbps (fixed) Optical fiber cable: 2 Mbps (fixed)		Twisted-pair cable: 2 Mbps, 1 Mbps, 500 kpbs Optical fiber cable: 2 Mbps (fixed)
Maximum number of nodes				62 nodes		Twisted-pair cable: 32 nodes Optical fiber cable: 62 nodes (See note.)
Data links	Automatically set	No. of send/receive data link words per node		CS Series: 2,966 words max.		CS Series: 20,000 words max. CVM1/CV Series, C200HX/HG/HE(-Z), CQM1H: 8,000 words max.
		Link areas	Area 1	Data Link Area in CIO Area, fixed first word: CIO 1000 (or LR 00)	Automatic setting in LR area only, DM area only, or both LR and DM areas.	CIO/IR area, user-specified first word
			Area 2	DM Area, fixed first word: DM 0000		DM or EM area, user-specified first word
		No. of send words per node (same for each node)		4, 8, 16, or 32 words		1 to 1,000 words, user specified
	User-set	Node order		User-set		
		Send size		Can be set		
		Receive-only nodes		Not supported (Send area size can be set to 0.)		Supported
		Send-only nodes		Supported		
		Data areas		Fixed (Area 1: CIO, Area 2: DM)		Can be set
		Receive size		All or nothing		Can be set
		Receive offset (from first word)		Cannot be set (must receive from beginning)		Can be set
Communications cycle time				Can be set		Cannot be set

Note: With the token-bus method, the maximum number of nodes in an Optical Bus System with optical bus nodes (i.e., model numbers ending in CLK11) is 32 (node addresses 1 to 32). The total number of words that can be transmitted in a data link is 32,000 words max. CX-Net in CX-Programmer can be used in systems with up to 32 nodes (node addresses 1 to 32). Use Controller Link Support Software (Ver. 2.00 or later) for systems with up to 62 nodes (node addresses 1 to 62).

Serial Communication

Serial Communications Connections Examples



Serial Communications Support

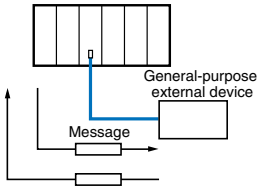
PLC	Unit name	Port	Serial communications mode							
			Protocol macro	Host Link	1:N NT Link	1:1 NT Link	No-protocol	1:1 link	Peripheral bus	Programming Console bus
			General purpose	Host computer	OMRON PTs	OMRON PTs	General purpose	C-series PLCs	Programming Devices	Programming Console
CS1/CJ1	CPU Unit	Peripheral	---	Supported	Supported	---	---	---	Supported	Supported
		RS-232C	---	Supported	Supported	---	Supported	---	Supported	---
C200HX/HG/HE(-Z)		Peripheral	---	Supported	---	---	Supported	---	Supported	Supported
		RS-232C	---	Supported	Supported	Supported	Supported	Supported	---	---
CVM1/CV		Peripheral	---	---	---	---	---	---	Supported	Supported
		RS-232C	---	Supported (DIP switch setting)	---	Supported (DIP switch setting)	---	---	---	---
CQM1H		Peripheral	---	Supported	---	---	Supported	---	Supported	Supported
		RS-232C	---	Supported	---	Supported	Supported	Supported	---	---
CPM2A/ CPM2C		Peripheral	---	Supported	---	---	Supported	---	Supported	Supported
		RS-232C	---	Supported	Supported (-V2 only)	Supported	Supported	Supported	---	---
SRM1(-V2)		Peripheral	---	Supported	---	---	Supported	---	Supported	Supported
		RS-232C	---	Supported	---	Supported	Supported	Supported	---	---
C200HX/HG/HE(-Z)	C200H Communications Board	RS232C, RS422A/485	Supported	Supported	Supported	Supported	Supported	Supported	---	---
CQM1H	CQM1H Serial Communications Board	RS232C, RS422A/485	Supported	Supported	Supported	Supported	Supported	Supported	---	---

PLC	Unit name	Port	Serial communications mode							
			Protocol macro	Host Link	1:N NT Link	1:1 NT Link	No-protocol	1:1 link	Peripheral bus	Programming Console bus
			General purpose	Host computer	OMRON PTs	OMRON PTs	General purpose	C-series PLCs	Programming Devices	Programming Console
C200H, C200HS, C200HX/HG/HE(-Z)	Host Link Unit	RS232C, RS422A/485	---	Supported	---	---	---	---	---	---
CS1	Serial Communications Board	RS232C, RS422A/485	Supported	Supported	Supported	---	Supported	---	---	---
	Serial Communications Unit	RS232C	Supported	Supported	Supported	---	Supported	---	---	---
CJ1	Serial Communications Unit	RS232C, RS422A/485	Supported	Supported	Supported	---	Supported	---	---	---

Protocol Macros

Data communications procedures called protocols can be created on the CX-Protocol to match the communications specifications of an external devices with an RS-232C or RS-422A/485 port. (Communications, however, must be half-duplex or full-duplex and use start-stop synchronization.) The protocols are transferred to Serial Communications Board or Units to then enable data communications with the external devices merely by executing the PMCR instruction in the CPU Unit.

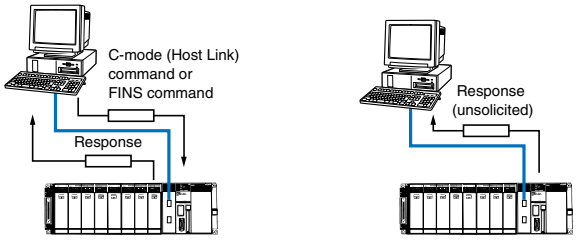
Standard protocols for OMRON components (Temperature Controllers, Panel Meters, Bar Code Readers, Modems, etc.) are provided as a standard feature. The standard protocols can be modified according to application needs and easily used.



Host Links

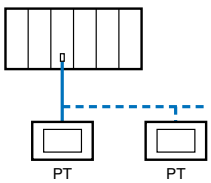
C-mode (Host Link) commands or FINS command wrapped in Host Link headers and terminators can be sent from a host computer (e.g., a personal computer or PT) to perform many operations, such as reading and writing I/O memory or controlling the operating mode of the PLC.

Unsolicited commands can be sent from the PLCs to the host computers. FINS commands are wrapped in Host Link headers and terminators automatically when SEND, RECV, or CMND instructions are executed.



1:N NT Links

A PLC can be linked to PTs (Programmable Terminals) from an RS-232C or RS-422A/485 port so that I/O memory in the PLC can be allocated for PT control areas, PT status areas, and objects, such as touch switches, lamps, and memory tables. One PLC can be linked to from 1 to 8 PTs.



Note: 1. There are two types of NT Links: 1:1 and 1:N. These are completely different communications modes and are not compatible with each other. Always set the PT for the 1:N mode. Communications will not be possible if it is set to 1:1.

2. The NT-AL001 Adapter Unit is required to connect the RS-232C port on the NT30/NT30C PTs in a 1:N NT Link.

3. The PT's Programming Console functionality is not supported with 1:N NT Links.

Protocol Macro Features

Support a Wide-range of Protocols

With both RS-232C and RS-422A/485 ports, essentially any device that supports full or half duplex communications and start-stop synchronization can be connected. Send and receive frames can be created as required to meet communications frame specifications, Essentially all send frames (e.g., command + data) and expected receive frames (e.g., responses) can be matched to the communications frames (messages) of the external device.

Use Processing Functions for Communications

Error check code calculations, send frame length calculations, and numeric conversions between ASCII and hexadecimal are all supported.

Monitor Communications Time

Response wait monitoring, response completion monitoring, and send completion monitoring are all supported, and ending or retrying communications can be set for when monitor times are exceeded.

Retry Processing

Just set the number of retries to execute retry processing when something happens to cause an error.

Include PLC Read/Write Variables in Send and Receive (Expected) Frames

Read/write variables for I/O memory in the PLC can be included in the send frames (messages). PLC data will be read when sending and used as the destination address or data. Read/write variables for I/O memory in the PLC can also be included in the receive frames. PLC data will be written as the source address or data when response is received.

Repeat Variables to Switch Write Destinations for 1:N Communications

Repeat counters for send/receive processing can be included in variables so that, for example, the same data can be sent to up to 32 different destinations by switching the destination address. (The limit of 32 is imposed by the physical layer.) When receiving data, the write address can be easily switched when receiving data for I/O memory in the PLC.

PLC Interrupt Processing at Data Reception

Interrupts to the PLC's CPU Unit can be generated when data is received to execute an interrupt program. (Interrupts are supported only by Serial Communications Boards, and not by Serial Communications Units.)

Next Processing Switches in Receive Data

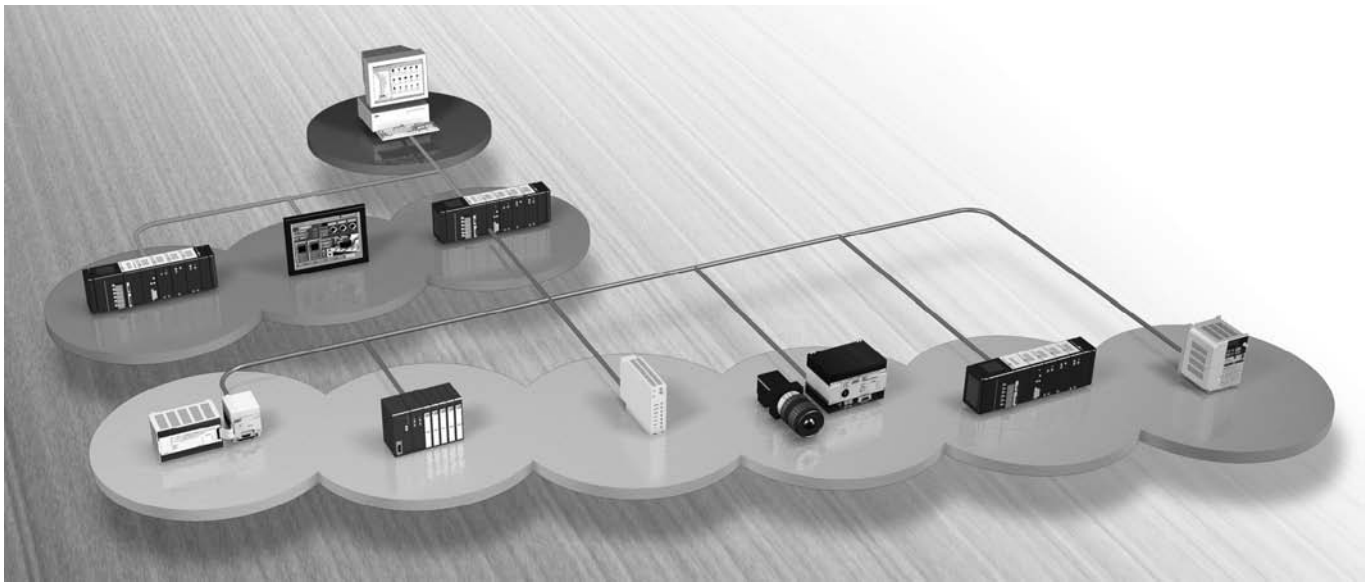
The received data can be compared to up two 15 expected reception messages that have been registered in advance and the results of comparison can be used to switch the next process to be executed.

Field Networks

Field Network Specifications

Item		PROFIBUS-DP	DeviceNet	CompoBus/S
Communications supported	Remote I/O	Yes	Yes	Yes
	Messages	Limited (DPV1 specification)	Yes	---
Maximum baud rate		12 Mbps	500 kpbs Communications cycle time: Approx. 5 ms (with 128 inputs, 128 outputs)	750 kbps (in high-speed mode) Communications cycle time: 0.8 ms max. (with 128 inputs, 128 outputs in high-speed mode)
Maximum communications distance		1200 m up to 93.75 kbit/s to 100 m at 12 Mbps	500 m (at 125 kbps) This value is when Thick Cable is used for the trunk line. The value is 100 m for Thin Cable.	2-conductor cable Main line length:100 m max. in high-speed mode, 500 m in long-distance mode Special Flat Cable or 4-conductor cable: Total line length: 200 m max. total with no other specific restrictions for main or branch line lengths
Maximum number of slaves		125 slaves	63 slaves	32 slaves
Communications media		Special PROFIBUS cable	Special DeviceNet cable	2-conductor or 4-conductor cable, or special flat cable
Maximum number of remote I/O points		C200HW-PRM21: 300 words = 4800 points CJ1W-PRM21, CS1W-PRM21: 7000 words = 112000 points	• CS1: 2,048 points (Allocated using DM area settings: 16,000 points, allocated using Configurator: 32,000 points.) • C200HX/HG/HE(-Z): 1,600 points (allocated using Configurator: 4,800 points.) • C200HS: 1,024 points (allocated using Configurator: 1,280 points.) • CVM1/CV: 2,048 points (allocated using Configurator: 6,400 points.)	• CS1, C200HX/HG/HE(-Z), SYSMAC Board, C200HS, SRM1, CPM2C-S: 256 points • CQM1H: 128 points
Masters	PLCs	CJ series, CS series, C200H series (Master Unit is classified as a CPU Bus Unit.)	CJ Series, CS Series, CVM1/CV Series, C200HX/HG/HE(-Z), C200HS	CJ Series, CS Series, C200HX/HG/HE(-Z), C200HS, CQM1, SRM1, CPM2C-S
	Other	None	Open Network Controllers, VME Boards	SYSMAC Boards, VME Boards
Remote I/O slaves		GT1 I/O terminals, C200H I/O Link Unit, CJ1 I/O Link Unit, CQM1 I/O Link Unit, CPM I/O Link Unit, Inverter communication interface, F150 vision sytem	DRT1 and DRT2 sensor terminals, GT1 terminals, RS-232C Units, E5EK Digital Controller, 3G3MV Multifunction Miniature Inverters, 3G3FV Advanced General-purpose Inverters, V600 Intelligent Flags (ID system), F150 Vision Sensors, NT-DRT21 Programmable Terminal Interface Unit, WD30 Wireless Units, CS1 DeviceNet Unit, CJ1 DeviceNet Unit, C200H I/O Link Unit, CQM1 I/O Link Unit, CPM I/O Link	Remote I/O Terminals, Connector Terminals, Water-resistive Terminals, Sensor Terminals, Analog Analog Output Terminals, Remote I/O Modules, CPM2C I/O Link Unit, CPM1A/CPM2A I/O Link Unit

PROFIBUS-DP



PROFIBUS-DP introduction

PROFIBUS is a vendor-independent, open fieldbus standard for a wide range of applications in manufacturing-, process- and building automation. The PROFIBUS standards are set and maintained by the PROFIBUS Nutzer Organisation (PNO) since 1990. Over the years PROFIBUS has become one of the most favoured industry standards for accomplishing a wide variety of process automation tasks.

The importance of this common ground for engineers and process automation specialists was immediately recognised by the OMRON company. OMRON became a member of PNO in 1991. Vendor independence and openness are guaranteed by the PROFIBUS standard IEC 61158 Type 3. With PROFIBUS, devices of different manufacturers can communicate without special interface adjustments.

DP stands for Decentralised Peripherals. It is optimised for high speed and low-cost interfacing, especially designed for communication between automation control systems and distributed I/O at the device level.

Protocol architecture

The PROFIBUS protocol architecture is oriented on the Open System Interconnection (OSI) reference model in accordance with the international standard ISO 7498. PROFIBUS-DP uses layers 1 and 2, and the user interface. Layers 3 to 7 are not defined.

Layer 1 (physical layer) defines the physical transmission characteristics.

Layer 2 (data link layer) defines the bus access control.

This streamlined architecture ensures fast and efficient data transmission. The application functions which are availible to the user, as well as the system and device behaviour of the various PROFIBUS-DP device-types are specified in the user interface.

Transmission medium

RS-485 transmission technology or fibre optics are defined as transmission media. RS-485 transmission is the most frequently used transmission technology. Its application includes all areas in which high transmission speed and simple inexpensive installation are required. Twisted pair shielded copper cable with one conductor pair is used.

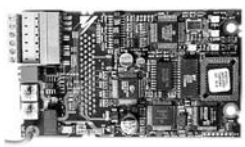
Easy installation

The RS-485 transmission technology is very easy to handle. Installation of the twisted pair cable does not require expert knowledge. The bus structure permits addition and removal of stations or step-by-step commissioning of the system without influencing the other stations. Later expansions have no effect on stations which are already in operation.

Various transmission speeds between 9.6 kbit/s and 12 Mbit/s can be selected. One unique transmission speed is selected for all devices on the bus when the system is commissioned.

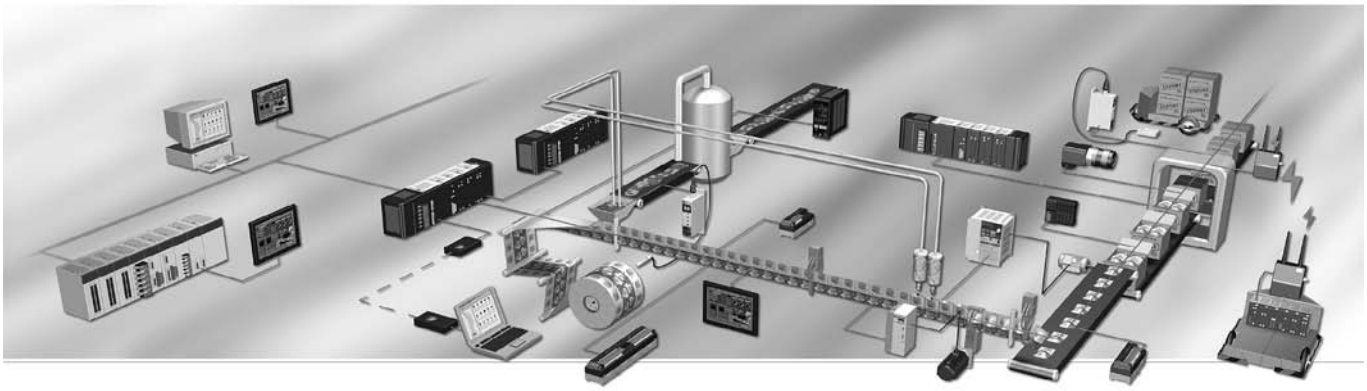
Cable length

The maximum cable length depends on the transmission speed. The specified cable lengths are based on type-A cable. The length can be increased by the use of repeaters. The use of more than 3 repeaters in series is not recommended.

Product	Appearance	Model	Specifications	Page
PLC masters		CS1W-PRM21	- PROFIBUS-DP master class one with support of DP-V1 data types - 7k word I/O - Simple configuration - Handles data independently, thus reduces CPU load	361
		CJ1W-PRM21	- PROFIBUS-DP master class one with support of DP-V1 data types - 7k word I/O - Simple configuration - Handles data independently, thus reduces CPU load	236
Configurator		CX-PROFIBUS	Advanced configuration tool that uses FDT/DTM (Field Device Tool and Device Type Manager) Technology - The PROFIBUS-DP network topology and system characteristics are defined and then downloaded in the OMRON PROFIBUS Master Unit - Configuration can be done remotely, via other networks as Ethernet or ControllerLink	647
PLC slave units		CJ1W-PRT21	PROFIBUS-DP I/O Link - Data link to any PLC data area - Simple configuration using - Max. data input 100 words - Max. data output 100 words	237
		C200HW-PRT21	Can be used on C200HS/HE/HG/HX and CS1G/H - Default 2 words in + 2 words out, maximum 100 words in and 100 words out - Simple PROFIBUS-DP node address setting by rotary switches - Supports SYNC/FREEZE and Fail/ Safe functions	362
		CQM1-PRT21	- Auto-detects all PROFIBUS-DP baudrates from 9.6 kbits/s to 12 Mbits/s - Support and indication of PROFIBUS-DP broadcast functions (Sync/Freeze/Clear) - Communication status available externally via relay output - Configurable for 2, 4, 6 or 8 words	For more information please contact your local OMRON representative
		CPM1A-PRT21	PROFIBUS I/O link for CPM1A/CPM2A - LED status display - Max. data input 16 bits and 16 output bits	74
Inverter PROFIBUS Option		SI-P1	PROFIBUS-DP slave for E7(PV), F7(RV), G5(FV) Inverters	For more information please contact your local OMRON representative
		SI-P1/V7	PROFIBUS-DP slave for 3G3MV Inverters	For more information please contact your local OMRON representative
Servo Drive PROFIBUS Option		JUSP-NS500	PROFIBUS option unit for Sigma-II (W-Series) Servo Drives	For more information please contact your local OMRON representative

Product	Appearance	Model	Specifications	Page
XtraDrive with PROFIBUS		XD-□□-□□DO	Intelligent Servo Drive with Embedded PROFIBUS	For more information please contact your local OMRON representative
F150 Vision system		F150-C15E-3-PRT	Number of connected camers: 1 unit / 2 units (using the F150-A20) Processing resolution: 512 (H) x 484 (V) Number of scenes: 16 scenes (can be saved to a computer through the RS-232C) Image memory function: Up to 23 scdreebs can be saved) Processing method: Dark-light/2-value method	For more information please contact your local OMRON representative
Temperature Controllers		E5ZN	A dedicated gateway is available.	For more information please contact your local OMRON representative
PROFIBUS Gateway		PRT-SCU11	PROFIBUS-DP Gateway to HostLink and Compoway-F for MCW151-E for E5□N, E5□R, E5□K	

DeviceNet



DeviceNet: Optimising industrial networking

DeviceNet is an innovative industrial network system that enables a wide range of devices to be easily networked and managed remotely. Everything - from PLCs and remote I/O, to fibre optic sensors, vision systems controllers, servos and inverters - can be seamlessly integrated into DeviceNet, making it one of the best industrial field busses around. As a founding member of ODVA, Omron is one of the companies that integrates DeviceNet interfaces into its many core products.

All of Omron's products are optimised for seamless integration into a DeviceNet system. You can configure Omron's devices over the network on-the-fly, and add a device or machine to a production line without powering down. DeviceNet is a flexible network, designed to accommodate your growing needs.

Easy to use software

Omron's DeviceNet configuration software is specially developed to integrate products in a more user-friendly way than in other bus systems. Omron's DeviceNet units have a default mode that enables you to set the addresses, plug the products in and watch everything run. The configuration software allows you to monitor and fine-tune the DeviceNet products in your network for optimum operation. The products are literally plug-and-play, and the software is drag-and-drop. Nothing could be easier.

ODVA and Omron –setting the standards

DeviceNet is based on open standards and specifications defined by the Open DeviceNet Vendors Association (ODVA), a consortium whose main task is to promote DeviceNet

world-wide. Omron is a founding member of ODVA and a leading player in promoting DeviceNet, and is dedicated to producing and improving products that work with DeviceNet. All Omron products are ODVA certified, making them fully DeviceNet compatible. Thanks to ODVA's strong conformance testing policies, DeviceNet also ensures the interchangeability and interoperability of control devices from hundreds of manufacturers world-wide.

Overview of DeviceNet

Two types of communications are supported:
1) Remote I/O communications that automatically transfer I/O between slaves and the CPU Unit to which a DeviceNet Unit is mounted without any special programming in the CPU Unit.
2) Message communications that read/write messages, control operation, or perform other functions for other CPU Units to which a DeviceNet Unit is mounted and slaves. Message communications are achieved by executing specific instructions (CMND) from the program in the CPU Unit to which the DeviceNet Unit is mounted.

The following functions are supported by a CS/CJ-series DeviceNet Unit.

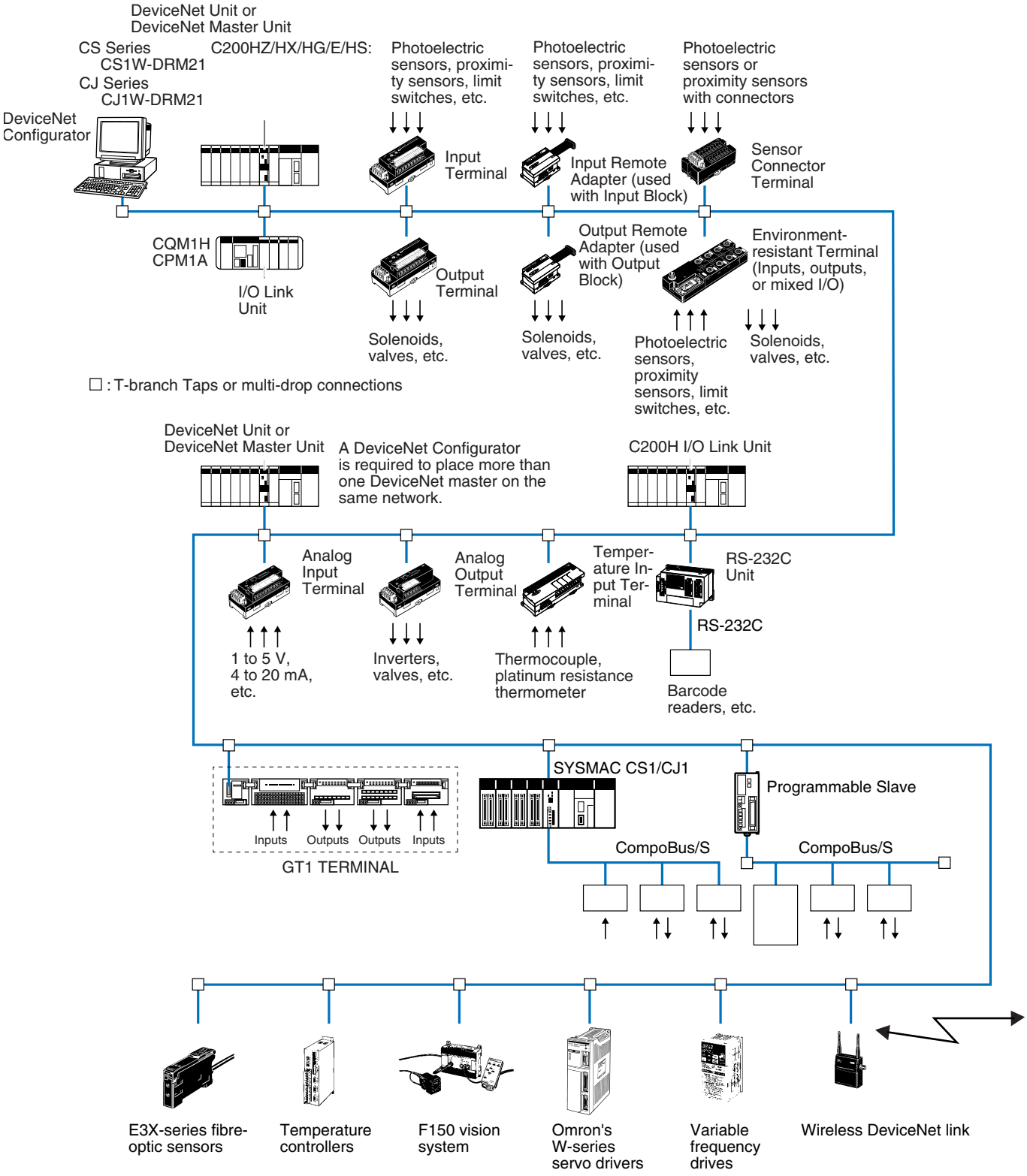
- I/O area words can be flexibly allocated for remote I/O Master and Slave communication.
- Multiple DeviceNet Units can be mounted on a single PLC. Fixed (automatic) allocations are possible for up to three DeviceNet Units.
- More than one DeviceNet master unit can be connected to a single network. With the DeviceNet Configurator, remote I/O can be allocated in any order, i.e., not necessarily in the order of node addresses.

Note: When the DeviceNet configurator is connected through a dedicated Board or Card it uses one node address in the DeviceNet network. It does not use a node address if it is connected throuogh the serial port of the PLC.

A CS/CJ-series DeviceNet Unit can function as either a master or slave in remote I/O communication. Both can be used simultaneously.

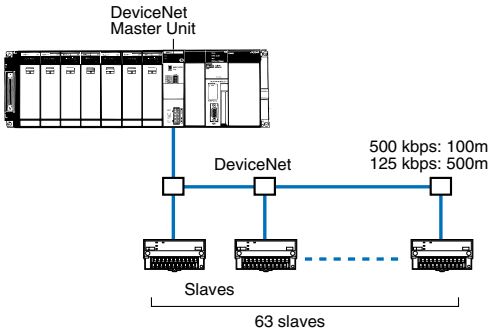
With a CS/CJ-series DeviceNet Unit, the DeviceNet network can be treated exactly like a Controller Link, Ethernet, or other network for message communications or remote programming and monitoring by a CX-Programmer.

Overall System Configuration

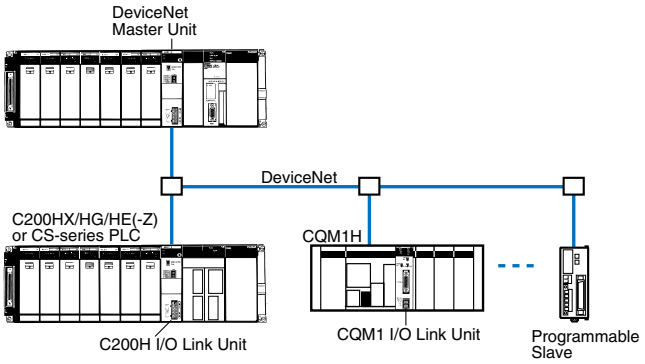


System Configuration Examples

I/O Terminals Connected as Slaves



Other PLCs Connected as Slaves



Masters

PLC	Model	Mountable position	Master/Slave function	Maximum number of mountable units	
				With Configurator	Without Configurator
CJ Series	CJ1W-DRM21 DeviceNet Unit	CPU or Expansion CPU Rack (Classified as CPU Bus Units)	Master and Slave	3	16
CS Series	CS1W-DRM21 DeviceNet Unit				
CS Series	C200HW-DRM21-V1 DeviceNet Master Unit	CPU Rack or Expansion I/O Rack (Classified as Special I/O Units)	Master only	16	1
C200HX/HG/HE				10 or 16	
C200HS				10	

Remote I/O Master Functions

Item	Master	Model	Without Configurator	With Configurator
Max. No. of Slave nodes per Master	CJ Series	CJ1W-DRM21	63 nodes	
	CS Series	CS1W-DRM21		
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	50 nodes	63 nodes
	C200HS		32 nodes	63 nodes
Max. No. of control points per Master	CJ Series	CJ1W-DRM21	2,048 pts (64 input /64 output words) or 16,000 pts (500 input/500 output words)	32,000 pts (500 words x 4 blocks)
	CS Series	CS1W-DRM21		
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	1,600 pts (50 input/50 output words)	Without messages: 4,800 pts With messages: 1,600 pts
	C200HS		1,024 pts (32 input/32 output words)	1,280
Max. No. of I/O points per Slave controllable by Master	CJ Series	CJ1W-DRM21	100 input/100 output words	
	CS Series	CS1W-DRM21		
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	32 input/32 output words	
	C200HS			
Remote I/O allocation areas	CJ Series	CJ1W-DRM21	DeviceNet Area in CIO Area, and user-allocated words in CIO Area, DM Area, and other areas.	User-allocated words in CIO Area, DM Area, and other areas.
	CS Series	CS1W-DRM21		
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	DeviceNet Area C200H DeviceNet words in CIO Area (including dedicated words/ bits)	User-allocated words in CIO Area, DM Area, and other areas.
	C200HS			

Remote I/O Slave (only Units Mounted in a PLC)

Item	CPU Unit to which a Slave is mounted	Unit Model	Without the Configurator	With the Configurator
Max. No. of I/O pts per Slave	CJ Series	CJ1W-DRM21	32 pts (1 input/ 1 output word) or 3,200 pts (100 input/100 output words)	4,800 pts (100 input words x 2/100 output words x 1)
	CS Series	CS1W-DRM21		
	CS Series, C200HX/HG/HE	C200HW-DRT21	1,024 pts (32 input/32 output words)	
	CQM1H, CQM1 Series	CQM1-DRT21	32 pts (1 input/1 output word)	
Allocation areas in the CPU Unit to which this Slave is mounted	CJ Series	CJ1W-DRM21	CIO, WR, DM, EM, HR	
	CS Series	CS1W-DRM21		
	CS Series, C200HX/HG/HE	C200HW-DRT21	CIO, DM, EM, AR, LR, T/C	
	CQM1H, CQM1 Series	CQM1-DRT21	CIO	

Message Communications

Master	Unit model	Send	Receive	FINS commands
CJ Series	CJ1W-DRM21	SEND	RECV	CMND
CS Series	CS1W-DRM21			
CS Series, C200HX/HG/HE	C200HW-DRM21-V1	None	None	IOWR
C200HS		Not supported		

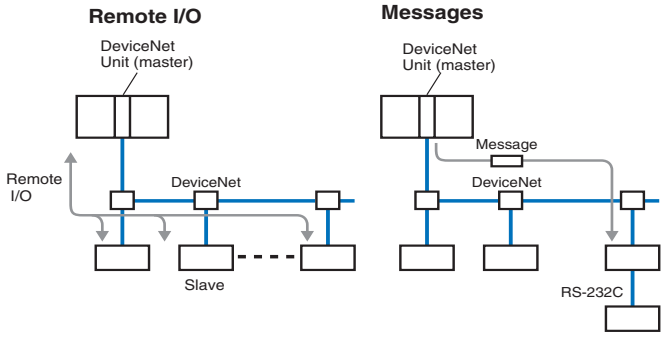
Item	Master model	Model	Capacity
Max. No. of nodes per Master for message communications using FINS commands	CJ Series	CJ1W-DRM21	63 nodes
	CS Series	CS1W-DRM21	
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	8 nodes
	C200HS		Not supported
Max. No. of nodes per Master for message communications using explicit messages	CJ Series	CJ1W-DRM21	63 nodes
	CS Series	CS1W-DRM21	
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	63 nodes
	C200HS		Not supported
Max. message length	CJ Series	CJ1W-DRM21	SEND:267 words RECV:269 words CMND:542 bytes (starting with command code)
	CS Series	CS1W-DRM21	
	CS Series, C200HX/HG/HE	C200HW-DRM21-V1	IOWR: 160 bytes (starting with command code)

Features of DeviceNet

Simultaneous Remote I/O Communications and Message Services

Remote I/O communications that constantly transfer I/O between a DeviceNet Unit and slaves as well as message communications where the DeviceNet Unit sends and receives data as needed can both be executed simultaneously. When a DeviceNet network is constructed, this feature ensures the network will be able to handle applications that require the free flow back and forth of bit data and message data. FINS commands can be executed along with DeviceNet explicit messages in message communications.

Remote I/O Communications



Various Connection Methods

Normal multi-drop, T-branch multi-drop, and daisy-chain line connections are available. These methods can be combined to construct a flexible system that suits the floor layout.

Maximum Network Length of 500 m

A maximum network length of 500 m is possible with a baud rate of 125 Kbps using thick cable.

Large Slave and I/O Capacities

A network can connect up to 63 Slaves and can handle remote I/O communications of up to 2,048 points (without a DeviceNet configurator) per Master Unit.

High-speed Communications

High-speed communications are possible at up to 500 Kbps for a trunk line length of 100 m.

Multiple PLCs in a Single Network

With the CS1W-DRM21 and CJ1W-DRM21, Multiple DeviceNet Units can be connected in a single network without using a DeviceNet configurator. With the C200HW-DRM21-V1, multiple PLCs are possible if a DeviceNet configurator (sold separately) is used. This enables message communications between PLCs as well as for remote I/O communications between PLCs and slaves in multiple groups. This feature allows a DeviceNet to be used as a common bus that can integrate all types of control with less wiring.

Multiple Master Units on a Single PLC

If a DeviceNet configurator (sold separately) is used, more than one Master Unit can be mounted to a single PLC. This feature enables greater DeviceNet remote I/O control capacity and ensures that DeviceNet can easily handle line expansion as well as other applications.

Application-specific Remote I/O Allocations

With the CS1W-DRM21 and CJ1W-DRM21, word allocations can be set for any area and in any node order without using a DeviceNet configurator. With the C200HW-DRM21-V1 user-specified allocations are possible if a DeviceNet configurator (sold separately) is used. By making allocations application-specific, programming can be structure more logically and coded much more efficiently.

Compatibility with Slow Slaves

With the CS1W-DRM21 and CJ1W-DRM21, the communications cycle time can be set even without a DeviceNet configurator so slaves with slow response times can be used. With the C200HW-DRM21-V1, I/O this same feature is supported by using a DeviceNet configurator (sold separately).

A Wide Variety of Slaves

A wide variety of I/O devices can be used as slaves, such as Remote I/O Terminals, Environment-resistant Terminals, Water-resistant Terminals, Remote Adapters, Sensor Terminals, Temperature Input Terminals, CQM1 I/O Link Units, Analog I/O Terminals, C200H I/O Link Units, RS-232C Units, GT1 I/O TERMINALs, Temperature Controllers, Inverters, and Intelligent Flags.

Constant Data Exchange with Slave CPU Units

With C200H I/O Link Units, Programmable Terminals, and other products, up to 32 input words and 32 output words can be constantly exchanged in the specified area of I/O memory in a slave CPU Unit. The CPU Unit where the Master Unit is mounted can thus control the Programmable Slave or the CPU Unit of the I/O Link Unit as a high-function slave.

Communications Specifications

Item	Specification			
Communications protocol	DeviceNet			
Connections	Multidrop or T-branch (See note 1.)			
Baud rate	125, 250, or 500 kbps (set via switch)			
Communications media	Special 5-conductor cable (2 signal lines, 2 power supply lines, 1 shield)			
Communications distance	**Baud rate**	**Overall network length (See note 2.)**	**Branch length**	**Total branch length**
	500 kbps	100 m max. (See note 3.)	6 m max.	39 m max.
	250 kbps	250 m max. (See note 3.)	6 m max.	78 m max.
	125 kbps	500 m max. (See note 3.)	6 m max.	156 m max.
Maximum number of nodes	64 nodes (Including master, maximum number of slaves: 63)			
Maximum number of slaves	CS1W-DRM21 and CJ1W-DRM21: 63 (even without a DeviceNet configurator) C200HW-DRM21-V1: without DeviceNet configurator: 1 with DeviceNet configurator: 63			
Error control checks	CRC errors, node address redundancy check, scan list verification			

Note: 1. Terminating resistance must be connected to both ends of the trunk line.
2. The distance between the two most separated nodes.
3. With Thin Cable, the overall network length must be 100 m or less at any baud rate.

OMRON

DeviceNet product overview

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- **Other Intelligent Slaves** 453

International Standards and EC Directives

- The abbreviations used in the “Standards” column in the following tables indicate the following international standards.
  U: UL, C:CSA, UC: cULus, CU: cUL, N: NK, L: Lloyd, CE: EC Directives
  See OMRON sales representatives for conditions under which UL, CSA, cULus, cUL, NK, LLOYD, and CE standards were met. The information on standards is current as of August 2002.

EC Directives

The EC Directives applicable to PLCs include the EMC Directives and the Low Voltage Directive. OMRON complies with these directives as described below.

EMC Directives

Applicable Standards

EMI:EN50081-2

EMS:EN61131-2 and EN61000-6-2 (See note.)

PLCs are electrical devices that are incorporated in machines and manufacturing installations. OMRON PLCs conform to the related EMC standards so that the devices and machines into which they are built can more easily conform to EMC standards. The actual PLCs have been checked for conformity to EMC standards. Whether these standards are satisfied for the actual system, however, must be checked by the customer.

EMC-related performance will vary depending on the configuration, wiring, and other conditions of the equipment or control panel in which the PLC is installed. The customer must, therefore, perform final checks to confirm that the overall machine or device conforms to EMC standards.

Note: The applicable EMI standard depends on the product.

Low Voltage Directive

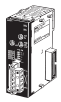
Applicable Standard

EN61131-2

Devices that operate at voltages from 50 to 1,000 V AC or 75 to 150 V DC must satisfy the appropriate safety requirements. With PLCs, this applies to Power Supply Units and I/O Units that operate in these voltage ranges.

These Units have been designed to conform to EN61131-2, which is the applicable standard for PLCs.

Masters

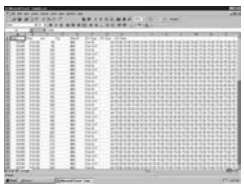
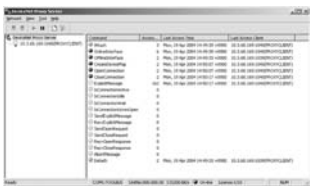
Product	Appearance	Model	Specifications	Standards	Page
DeviceNet Unit		CJ1W-DRM21	For CJ Series Functions as either a master or a slave. 2,048 I/O points	U, C, N, CE	233
		CS1W-DRM21-V1	For CS1 Series • Unit can be used either as master, or as slave. Master and slave functionality can be used simultaneously. • Up to 2,048 I/O points • By means of a pre-set allocations, the need for configuration software is optional * Supports the same seamless transparency as Controller Link and Ethernet, by using FINS message communications		363

Note: Refer to the CS1 catalog (Cat. No. P047) for details on SYSMAC CS1-series PLCs and to the C200HX/HG/HE catalog (Cat. No. P036) for details on SYSMAC C200HX/HG/HE PLCs.

Configurator

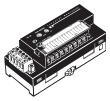
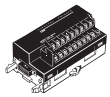
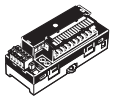
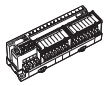
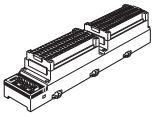
Product	Appearance	Model	Specifications	Standards
DeviceNet Configurator		WS02-CFDC1-E	DeviceNet Configurator Software (Windows 95, 98, NT4.0, 2000, or XP)	---
		3G8E2-DRM21-EV1	PC Card (provided with software running on Windows 95, 98, Me, 2000, or XP)	

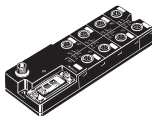
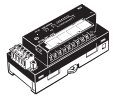
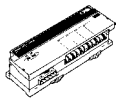
Software

Product	Appearance	Model	Specifications	Standards
NX-Server		WS02-NXD1-E	DDE Edition (Windows 95, 98, NT4.0, ME, 2000, or XP)	---
DeviceNet Proxy Server		WS02-PEDC1-E	Software (Windows 95, 98, NT4.0, 2000, or XP)	---

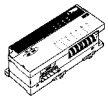
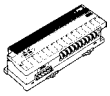
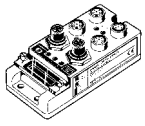
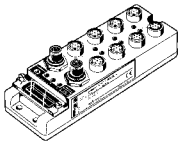
Slaves

Smart Slaves

Product	Appearance	Model	Specifications	Standards
Remote I/O Terminals with Transistors		DRT2-ID16	16 inputs with NPN, ⊕ common	UC, CE
		DRT2-ID16-1	16 inputs with PNP, ⊖ common	
		DRT2-OD16	16 outputs with NPN, ⊖ common	
		DRT2-OD16-1	16 outputs with PNP, ⊕ common	
Remote I/O Terminal Expansion Units with Transistors		XWT-ID08	8 inputs with NPN, ⊕ common	UC, CE
		XWT-ID08-1	8 inputs with PNP, ⊖ common	
		XWT-OD08	8 outputs with NPN, ⊖ common	
		XWT-OD08-1	8 outputs with PNP, ⊕ common	
		XWT-ID16	16 inputs with NPN, ⊕ common	
		XWT-ID16-1	16 inputs with PNP, ⊖ common	
		XWT-OD16	16 outputs with NPN, ⊖ common	
		XWT-OD16-1	16 outputs with PNP, ⊕ common	
Remote I/O Terminal with Relays		DRT2-ROS16	16 outputs	UR, CE
Remote I/O Terminals with 3-tier Terminal Blocks and Transistors		DRT2-ID16TA	16 inputs with NPN, ⊕ common	UC, CE
		DRT2-ID16TA-1	16 inputs with PNP, ⊖ common	
		DRT2-OD16TA	16 outputs with NPN, ⊖ common	
		DRT2-OD16TA-1	16 outputs with PNP, ⊕ common	
		DRT2-MD16TA	8 inputs/8 outputs with NPN, ⊕ common for inputs, ⊖ common for outputs	
		DRT2-MD16TA-1	8 inputs/8 outputs with PNP, ⊖ common for inputs, ⊕ common for outputs	
Sensor Connector Terminals with Transistors and Connectors		DRT2-ID16S	16 inputs with NPN, ⊕ common	UC, CE
		DRT2-ID16S-1	16 inputs with PNP, ⊖ common	
		DRT2-MD16S	8 inputs/8 outputs with NPN, ⊕ common for inputs, ⊖ common for outputs	
		DRT2-MD16S-1	8 inputs/8 outputs with PNP, ⊖ common for inputs, ⊕ common for outputs	
Screw-less Clamp Terminals with Transistors		DRT2-ID32SLH	32 inputs with NPN, ⊕ common, with detection functions	UC, CE
		DRT2-ID32SLH-1	32 inputs with PNP, ⊖ common, with detection functions	
		DRT2-OD32SLH	32 outputs with NPN, ⊖ common, with detection functions	
		DRT2-OD32SLH-1	32 outputs with PNP, ⊕ common, with detection functions	
		DRT2-MD32SLH	16 inputs/16 outputs with NPN, ⊕ common for inputs, ⊖ common for outputs, with detection functions	
		DRT2-MD32SLH-1	16 inputs/16 outputs with PNP, ⊖ common for inputs, ⊕ common for outputs, with detection functions	
		DRT2-ID32SL	32 inputs with NPN, ⊕ common, without detection functions	
		DRT2-ID32SL-1	32 inputs with PNP, ⊖ common, without detection functions	
		DRT2-OD32SL	32 outputs with NPN, ⊖ common, without detection functions	
		DRT2-OD32SL-1	32 outputs with PNP, ⊕ common, without detection functions	
		DRT2-MD32SL	16 inputs/16 outputs with NPN, ⊕ common for inputs, ⊖ common for outputs, without detection functions	
		DRT2-MD32SL-1	16 inputs/16 outputs with PNP, ⊖ common for inputs, ⊕ common for outputs, without detection functions	

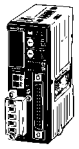
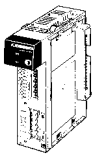
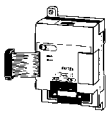
Product	Appearance	Model	Specifications		Standards
Environment-resistive Terminals with Transistors		DRT2-ID08C	8 inputs with NPN, ⊕ common		UC, CE
		DRT2-ID08C-1	8 inputs with PNP, ⊖ common		
		DRT2-OD08C	8 outputs with NPN, ⊖ common		
		DRT2-OD08C-1	8 outputs with PNP, ⊕ common		
		DRT2-HD16C	16 inputs with NPN, ⊕ common		
		DRT2-HD16C-1	16 inputs with PNP, ⊖ common		
Analog Input Terminals		DRT2-AD04	4 inputs		UC, CE
Analog Output Terminal		DRT2-DA02	2 outputs		
Temperature Input Terminals		DRT2-TS04T	4 input points (Allocated 4 input words at the master)	Input types: R, S, K1, K2, J1, J2, T, E, B, N, L1, L2, U, W, PLII	U, CE
		DRT2-TS04P		Input types: Pt100, JPt100	

General-purpose Slaves, DR1 Series

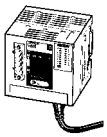
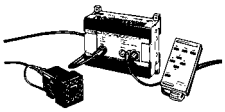
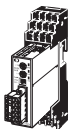
Product	Appearance	Model	Specifications	Standards
Remote I/O Terminals with Transistors	 	DRT1-ID08	8 inputs with NPN, ⊕ common	U, C, CE
		DRT1-ID08-1	8 inputs with PNP, ⊖ common	
		DRT1-ID16	16 inputs with NPN, ⊕ common	
		DRT1-ID16-1	16 inputs with PNP, ⊖ common	
		DRT1-OD08	8 outputs with PNP, ⊖ common	
		DRT1-OD08-1	8 outputs with NPN, ⊕ common	
		DRT1-OD16	16 outputs with PNP, ⊖ common	
		DRT1-OD16-1	16 outputs with NPN, ⊕ common	
Waterproof Terminals (with Transistors)		DRT1-ID04CL	4 transistor inputs, NPN (⊕ common)	UC, CE, L
		DRT1-ID04CL-1	4 transistor inputs, PNP (⊖ common)	
		DRT1-OD04CL	4 transistor outputs, NPN (⊖ common)	
		DRT1-OD04CL-1	4 transistor outputs, PNP (⊕ common)	
		DRT1-ID08CL	8 transistor inputs, NPN (⊕ common)	
		DRT1-ID08CL-1	8 transistor inputs, PNP (⊖ common)	
		DRT1-OD08CL	8 transistor outputs, NPN (⊖ common)	
		DRT1-OD08CL-1	8 transistor outputs, PNP (⊕ common)	
Environment-resistive Transistor Terminals		DRT1-ID08C	8 inputs, NPN (⊕ common)	U, C, CE
		DRT1-HD16C	16 inputs, NPN (⊕ common)	
		DRT1-HD16C-1	16 inputs, PNP (⊖ common)	U, C
		DRT1-OD08C	8 outputs, NPN (⊖ common)	U, C, CE
		DRT1-WD16C	16 outputs, NPN (⊖ common)	
		DRT1-WD16C-1	16 outputs, PNP (⊕ common)	U, C
		DRT1-MD16C	8 inputs, NPN (⊕ common) 8 outputs, NPN (⊖ common)	U, C, CE
		DRT1-MD16C-1	8 inputs, PNP (⊖ common) 8 outputs, PNP (⊕ common)	U, C

Note: Orders are accepted in units of 10 Connectors.

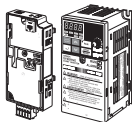
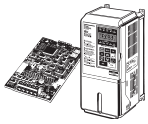
Intelligent Slaves Operating as PLC Units

Product	Appearance	Model	Specifications		Standards
Programmable Slaves		CPM2C-S100C-DRT	Slave equipped with CPM2C CPU Unit functions 1,024 points max. for Remote I/O Links Includes CompoBus/s Master.	4 transistor outputs (sinking)	U, C, CE
		CPM2C-S110C-DRT		4 transistor outputs (sourcing)	
I/O Link Units		C200HW-DRT21	For CS1, C200HX/HG/HE 512 input points max. 512 output points max.		U, C, N, CE
		CQM1-DRT21	For CQM1H/CQM1 16 input points 16 output points		U, C, CE
		CPM1A-DRT21	For CPM1A/CPM2A 32 input points 32 output points		

Other Intelligent Slaves

Product	Appearance	Model	Specifications		Standards
RS-232C Unit		DRT1-232C2	2 RS-232C ports 16 input points (communications status)		U, C, CE
Fiber Amplifier DeviceNet Communications Unit		E3X-DRT21	Up to 16 E3X-DA-N Fiber Amplifiers can be connected.		---
	---	E3X-DA6-P (See note.)	Fiber Amplifier		
		E3X-CN02 (See note.)	Reduced-wiring Connector		
		E39-TM1	Terminal Block Unit		
Intelligent Flag III		V600-HAM42-DRT	ID system for DeviceNet		CE
Vision Sensor Controller		F150-C10E-3-DRT	Vision Sensor for DeviceNet		CE
DeviceNet-compliant Indicators		K3HB-XVD-A-DRT1	Voltage	DeviceNet-compliant Process Indicator DC input	UC, CE
		K3HB-XAD-A-DRT1	Current		
		K3HB-XVA-DRT1	Voltage	DeviceNet-compliant Process Indicator AC input	
		K3HB-XAA-DRT1	Current		
		K3HB-VLC-B-DRT1	DeviceNet-compliant Weighing Indicator		
		K3HB-HTA-DRT1	DeviceNet-compliant Temperature Indicator		
		K3HB-SSD-A-DRT1	DeviceNet-compliant Linear Sensor Indicators		
DeviceNet-compliant Digital Controllers		E5AR-Q4B-DRT	Basic Type (1 input)		CU, CE
		E5AR-C4B-DRT			
		E5AR-QC4B-DRT			
		E5AR-QQ4W-DRT	2-input Type		
		E5AR-CC4WW-DRT	4-input Type		
		E5AR-PR4F-DRT	Control Valve Control Type (1 input)		
		E5AR-PRQ4F-DRT			
		E5ER-QTB-DRT	Basic Type (1 input)		
		E5ER-CTB-DRT			
		E5ER-QTW-DRT	2-input Type		
		E5ER-CTW-DRT			
		E5ER-PRTF-DRT	Control Valve Control Type (1 input)		
Digital Controller		E5EK-AA2-DRT-500	Digital Controller for DeviceNet		---
Modular Temperature Controller		E5ZN-DRT	E5ZN DeviceNet Communications Unit		---
		E5ZN-SCT24S	Terminal Unit		
	---	E3ZN-SDL	Setting/Display Device		

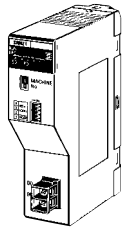
Note: Order the Fiber Amplifier and Reduced-wiring Connector together.

Product	Appearance	Model	Specifications		Standards
High-density Temperature Controllers		E5ZE-8AQHD1-TCB-V2	Thermocouple	Heating control, voltage output	---
		E5ZE-8ACAD1-TCB-V2		Heating control, current output	
		E5ZE-8VQHD1-TCB-V2		Heating/cooling control, voltage output	
		E5ZE-8VCAD1-TCB-V2		Heating/cooling control, current output	
		E5ZE-8AQHD1-TPB-V2	Platinum-resistance thermometer	Heating control, voltage output	
		E5ZE-8ACAD1-TPB-V2		Heating control, current output	
		E5ZE-8VQHD1-TPB-V2		Heating/cooling control, voltage output	
		E5ZE-8VCAD1-TPB-V2		Heating/cooling control, current output	
AC Servo Drivers		R88A-NCW152-DRT	DeviceNet Option Unit for OMNUC W-series AC Servo Drivers		CE
	---	R88A-CNU01R	External I/O Connector		---
		R88A-CCW002P4	Cable for Setup Tool (IBM PC/AT or compatible, 2 m)		
Multi-function Compact Inverter		3G3MV-PDRT2	DeviceNet Communications Unit for 3G3MV		U, CE
High-function General-purpose Inverter		3G3RV-PDRT2	DeviceNet Communications Card for 3G3RV/3G3FV Inverters		U, CE
Programmable Terminals		NT-DRT21	DeviceNet Interface Unit for NT31/NT631 Programmable Terminals		U, CE
DeviceNet Wireless Units		WD30-ME	DeviceNet Wireless Master Station	Pencil-type antenna	---
		WD30-ME01		Magnetic Base Antenna	
		WD30-SE	DeviceNet Wireless Slave Station	Pencil-type antenna	
		WD30-SE01		Magnetic Base Antenna	
		WT30-M01-FLK	Wireless Serial Master : RS-232C		CE
		WT30-SID16	Wireless Screw-less Terminals: 16 Input (NPN/PNP)		
		WT30-SMD16	Wireless Screw-less Terminals: 8 Input + 8 Output (NPN)		
		WT30-SMD16-1	Wireless Screw-less Terminals: 8 Input + 8 Output (PNP)		

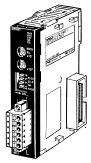
Note: Order the Fiber Amplifier and Reduced-wiring Connector together.

CompoBus/S

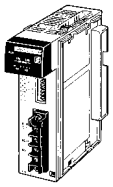
A High-speed I/O Bus Ideal for Distributed Machine Control and Reducing Wiring



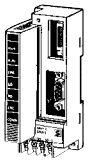
C200HW-SRM21-V1
for C200HX/HG/HE(-Z)
Medium-size PLCs



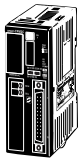
CJ1W-SRM21 for
CJ1 Small PLCs



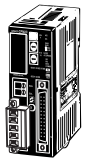
CQM1-SRM21-V1
for CQM1H/CQM1
Small PLCs



SRM1-C□-V2
Master Control Unit



CPM2C-S1□C
Master Unit



CPM2C-S1□C-DRT
Programmable Slave

Outline

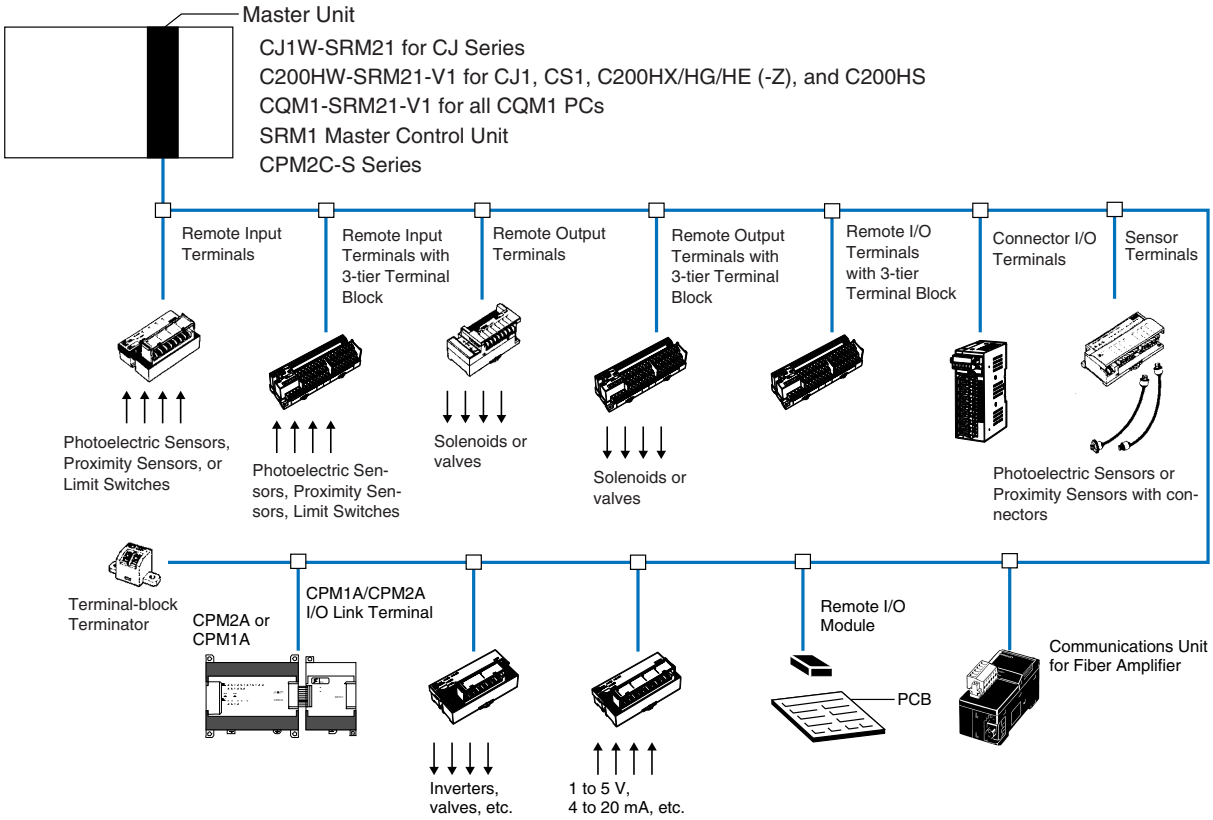
The CompoBus/S high-speed, wire-reduction bus is ideal for machine control. Reduce wiring both within devices and within the overall machine system. I/O data is transferred between the slaves and the CPU Unit of the PLC without any special programming.

In high-speed mode, a communications cycle time of 1 ms max. for 256 I/O points enables fast processing of remote I/O. In long-distance mode, communicate over a 500-m main line.

Within a total length of 200 m, you can also branch freely to connect slaves wherever needed using a special flat cable or 4-conductor cable.

All of this means easier designing of plant-floor layout.

Basic System Configuration



Features

CompoBus/S - a high-speed fieldbus for 128 inputs and 128 outputs

CompoBus/S is a very fast, and easy to install high-speed bus for use with sensors and actuators. The amount of wiring that is required is minimal, making CompoBus/S ideal for machine control.

A complete line-up of master units and slaves

Compobus/S allows digital and anlogue I/O signals to be exchanged between a master and the distributed I/O slaves over a flat cable or standard twisted cable over max. 500 meters. It requires no special software tools making it an real I/O bus that puts the PLC I/O on a remote location, without any additional programming effort.

Communication distances up to 500 m

In Long-distance Communications Mode, communications over the main line of up to 500 m are possible to control I/O devices in a wide area using standard cable and up to 200 m if flat cable is used. In the high-speed communications mode, the main line is limited to 100 m for standard cable, and 30 m for flat cable.

High-speed Communications

In High-speed Communications Mode, up to 16 Slaves with 128 I/O. In the 100 meter high-speed mode there is a fixed communication cycle time of 0.8 msec for 256 remote I/O, providing CompoBus/S with an unprecedented performance.

Backwards compatible

Remote I/O communications are also possible in high-speed communications mode by combining these Master Units and slaves with previously released master units and slaves.

Free topology

Within a total lenght of 200 meters, you can also branch freely to connect slaves wherever needed.
Only one cable is required to connect a master to a slave or a slave to another slave.
If a special flat cable with 4 conductors is used, the communications power supply can also be drawn from the same cable to greatly reduce the amount of floor wiring.
Branching from the main line to branch lines is also greatly simplified with a special connector.
Both the T-branch and multidrop methods can be combined flexibly when wiring. This wiring feature allows a very flexible system configuration that can be adjusted to the floor layout.
There are two types of cables (VCTF cable and Special Flat Cable), and when the Special Flat Cable is used, T-branch Connectors can be installed by simply snapping the connector on.

Easy startup and maintenance

The CompoBus/S System can be started just by wiring the cables and making some simple settings, and the power up the system!
Troubleshooting is easy because the Slave's node number is shown on the master's indicators if an error occurs with a Slave. Error information is also stored in PLC memory.

Wide variety of masters

Seperate PLC master units are available, or you can use a SRM or CPM2C with an integrated Compobus/S master function in the CPU. The variety of Masters provides flexibility in configuring a system to match your application needs.

Wide variety of slaves

Units in a wide range are available as I/O Slaves for a variety of applications. The variety of Slaves provides flexibility in configuring a system to match the required application.

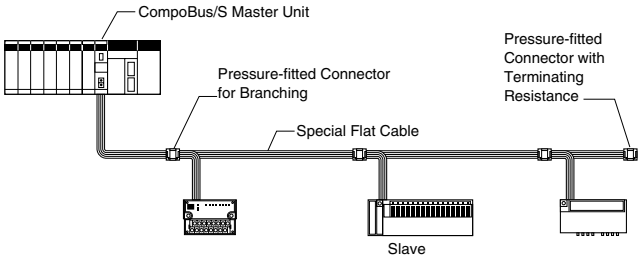
Connectability for Upgraded Terminals

Slave series	**Previous Master Units** C200HW-SRM21 CQM1-SRM21 SRM1-C01(-V1) SRM1-C02(-V1) 3G8B3-SRM00/01 C200PC-ISA02/12-SRM	**Master Units manufactured April 1999 or later** CJ1W-SRM21 C200HW-SRM21-V1 CQM1-SRM21-V1 SRM1-C01-V2 SRM1-C02-V2 TP1000-A-SRM C200PC-ISA03/13-SRM CPM2C-S100C/S110C CPM2C-S100C/S110C-DRT	
		Communications mode setting	
		High-speed	**Long-distance**
SRT1 Series FND-X□-SRT	Connectable	Connectable	---
SRT2 Series (See note 1.) CPM2C-SRT21 CPM1A-SRT21	Connectable	Connectable	Connectable
SRT2-AD04 SRT2-DA02	---	Connectable	Connectable

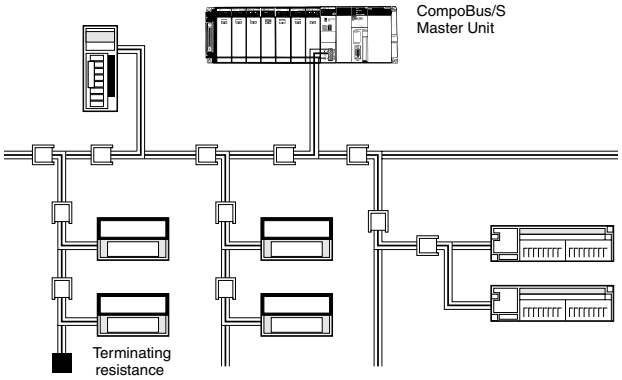
Note: 1. All of the SRT2 Series except for the SRT2-AD04 and SRT2-DA02.

CompoBus/S Network Configuration Examples

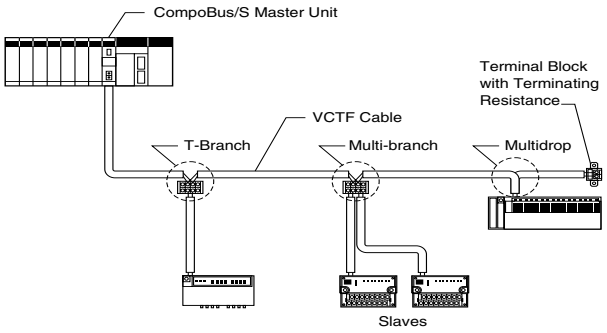
Special Flat Cable



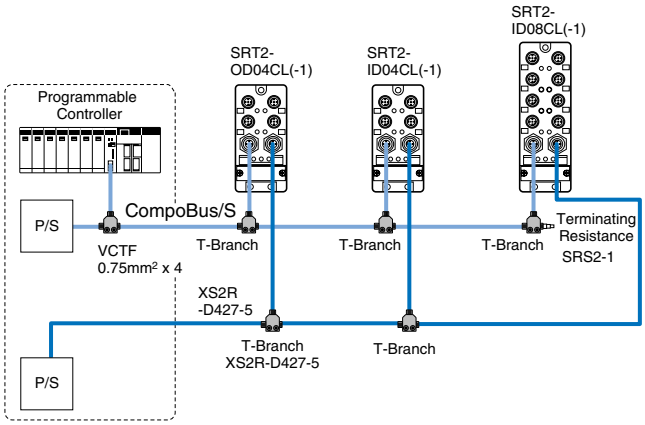
Special Flat Cable in Long-distance Mode



Standard Cable



4-Conductor Cable

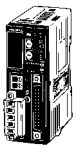
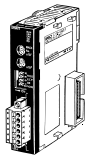
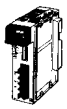


Communications Specifications

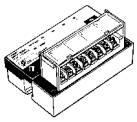
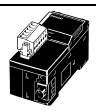
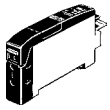
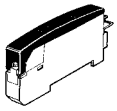
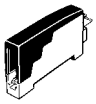
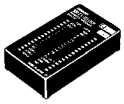
Item		Specification
Communications method		Special CompoBus/S protocol
Communications baud rate		High-speed Communications Mode: 750 kbps Long-distance Communications Mode: 93.75 kbps
Modulation method		Baseband method
Coding method		Manchester coding method
Error control checks		Manchester code check, frame length check, and parity check
Cable	VCTF cable (JIS C 3306)	Two 0.75 mm^2 conductors (2 signal wires) Four 0.75 mm^2 conductors (2 signal wires and 2 power supply wires)
	Special Flat Cable	Four 0.75 mm^2 conductors (2 signal wires and 2 power supply wires)
Communications distance	2-conductor VCTF cable	High-speed Communications ModeMain line length: 100 m max. Branch line length: 3 m max. Total branch line length: 50 m max.
		Long-distance Communications ModeMain line length: 500 m max. Branch line length: 6 m max. Total branch line length: 120 m max.
	4-conductor VCTF cable	High-speed Communications ModeMain line length: 30 m max. Branch line length: 3 m max. Total branch line length: 30 m max.
		Long-distance Communications Mode: Flexibly branched, provided that the total length of cable is a maximum of 200 m.
	Special Flat Cable	High-speed Communications ModeMain line length: 30 m max. Branch line length: 3 m max. Total branch line length: 30 m max.
		Long-distance Communications Mode: Flexibly branched, provided that the total length of cable is a maximum of 200 m.
I/O points, Slaves, usable node numbers, and communications cycle time	C200HW-SRM21-V1 Master Unit (used for CS-series, C200HX/C200HG/C200HE-(Z)E, and C200HS PLCs), CJ1W-SRM21 Master Unit (used for CJ-series PLCs), SRM1 Master Control Unit, and CPM2C-S PLC	
		Max. number of I/O points: 64 inputs/64 outputs Usable node numbers:IN0 to IN7 and OUT0 to OUT7 Communications cycle time: High-speed Communications Mode: 0.5 ms Long-distance Communications Mode:4.0 ms
		Max. number of I/O points: 128 inputs/128 outputs Usable node numbers:IN0 to IN15 and OUT0 to OUT15 Communications cycle time: High-speed Communications Mode: 0.8 ms Long-distance Communications Mode: 6.0 ms
	CQM1-SRM21-V1 Master Unit (CQM1/CQM1H PLCs)	
		Max. number of I/O points: 64 inputs/64 outputs Usable node numbers:IN0 to IN7 and OUT0 to OUT7 (8-point mode) Communications cycle time: High-speed Communications Mode: 0.5 ms Long-distance Communications Mode: 4.0 ms Usable node numbers:IN0 to IN15 and OUT0 to OUT15 (4-point mode) Communications cycle time: High-speed Communications Mode: 0.8 ms Long-distance Communications Mode: 6.0 ms
		Max. number of I/O points: 32 inputs/32 outputs Usable node numbers:IN0 to IN3 and OUT0 to OUT3 (8-point mode) IN0 to IN7 and OUT0 to OUT7 (4-point mode) Communications cycle time: High-speed Communications Mode: 0.5 ms Long-distance Communications Mode: 4.0 ms
		Max. number of I/O points: 16 inputs/16 outputs Usable node numbers:IN0 to IN1 and OUT0 to OUT1 (8-point mode) IN0 to IN3 and OUT0 to OUT3 (4-point mode) Communications cycle time: High-speed Communications Mode: 0.5 ms Long-distance Communications Mode: 4.0 ms

CompoBus/S product overview

Masters

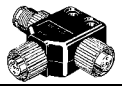
Product	Appearance	Model	Specifications	Standards	Page
CPM2C CPU Units with build-in CompoBus/S Master		CPM2C-S100C	CPM2C PLC 6 inputs and 4 outputs (sinking) build-in Three local expension units	U C CE	93
		CPM2C-S110C	CPM2C PLC 6 inputs and 4 outputs (sourcing) build-in Three local expension units		
CPM2C PLC with build-in Compobus/S master, and DeviceNet slave functionality		CPM2C-S100C-DRT	CPM2C PLC 6 inputs and 4 outputs (sinking) build-in Three local expension units	U C CE	96
		CPM2C-S110C-DRT	CPM2C PLC 6 inputs and 4 outputs (sourcing) build-in Three local expension units		
Master Units		CJ1W-SRM21	For the SYSMAC CJ Series 128 inputs and 128 outputs (256 points total)	U C CE	238
		C200HW-SRM21-V1	For CS1, C200HX/HG/HE (-ZE), and C200HS 128 inputs and 128 outputs (256 points in total) Program capacity of 4,096 word	U C CE	368
		CQM1-SRM21-V1	For CQM1 and CQM1H 64 inputs and 64 outputs (128 points in total)		-

Slaves

Product	Appearance	Model	Specifications	Standards	Page
I/O Link Units		CPM2C-SRT21	I/O Link Unit for CPM2C • Exchanges eight inputs and eight outputs with the master.	CE	107
		CPM1A-SRT21	I/O Link Unit for CPM2A/CPM1A • Exchanges eight inputs and eight outputs with the master.	U C CE	75
Transistor Remote I/O Terminals		SRT2-ID04 SRT2-ID04-1 SRT2-OD04 SRT2-OD04-1	4 NPN inputs (+ common) 4 PNP inputs (– common) 4 NPN outputs (– common) 4 PNP outputs (+ common)	U C CE	524
		SRT2-ID08 SRT2-ID08-1 SRT2-OD08 SRT2-OD08-1	8 NPN inputs (+ common) 8 PNP inputs (– common) 8 NPN outputs (– common) 8 PNP outputs (+ common)		
		SRT2-ID16 SRT2-ID16-1 SRT2-OD16 SRT2-OD16-1	16 NPN inputs (+ common) 16 PNP inputs (– common) 16 NPN outputs (– common) 16 PNP outputs (+ common)		
CompoBus/S Communications Unit for Optical Fiber Amplifiers		E3X-SRT21	Up to 14 Optical Fiber Amplifiers can be connected.	---	---
Photoelectric Sensors		E3X-NT16 E3X-NT26 E3X-NH16 E3X-DA16	1-channel general-purpose teaching 1-channel multi-functional, general-purpose teaching 1-channel long-distance, high-precision bar-display teaching 1-channel digital model	U C CE	Please refer to OMRON's Sensor & Safety Catalog for more information
		E3X-NM16	4-channel multi-functional, general-purpose teaching		
Proximity Sensors		E2CY-T16 E2C-T16	Aluminum detection Compact model with teaching function	U C	
Terminal Block Unit		E39-JID01	One input point	---	
Analog Input Terminal		SRT2-AD04	1 to 4 inputs (set with DIP switch)	U C CE	547
Analog Output Terminal		SRT2-DA02	1 or 2 outputs (set with DIP switch)		549
Remote I/O Modules		SRT2-ID16P SRT2-OD16P	16 NPN inputs (+ common) 16 NPN outputs (– common)	---	551

Peripheral Devices

VCTF Cable Products

Product	Appearance	Model	Specifications	Standards
Terminal-block Terminator		SRS1-T	100 Ω	---
T-branch Connector		XS2R-D427-5	Waterproof	
Connector Terminator (plug)		SRS2-1	Waterproof terminator	

Special Flat Cable Products

Product	Appearance	Model	Specifications	Standards
Branch Connector		SCN1-TH4	Connector for Special Flat Cable	---
Extension Connector		SCN1-TH4E		
Connector Terminator		SCN1-TH4T		
Special Flat Cable		SCA1-4F10	100 m	

Four-conductor VCTF Cable Products

Product	Appearance	Model	Specifications	Standards
Assembling Connector		XS2C-D4S7	Connector plug for 4-conductor VCTF cable communications	---
		XS2G-D4S7	Connector socket for 4-conductor VCTF cable communications	

Recommended cable types, non-Omron

Product	Specifications
Belden 9409 or compatible	Non shielded two conductor VCTF communication cable
Belden 5341UE or compatible	Non shielded four conductor VCTF communication cable

OMRON

MechatroLink II

The MechatroLink II is the perfect solution for satisfying all your complex motion application requirements, including packaging, electronics, converting, food processing, textiles – in fact any multi-axes application is solved and integrated perfectly in a complete factory line.



MechatroLink-II high-speed motion link

This high-speed interface replaces the costly discrete wiring required with traditional systems. Just one MechatroLink-II cable eliminates the need for about 15 for each axis, which simplifies wiring, and reduces the cost and time needed for installation. It also means that maintenance and troubleshooting are minimised. With a frequency of 10 Mbps, the MechatroLink-II link provides communication cycle times of 0.5 ms for 4 axes, to 4 ms for 30 axes, ensuring fast, precise motion control.

MechatroLink-II Communications cycle

Number of axes	Communications cycle (ms)
1 – 4	0.5
5 – 9	1.0
10 – 21	2.0
22 – 30	4.0

MechatroLink-II Network

Product	Appearance	Model	Specifications	Page
Motion controller over MechatroLink		CS1W-MCH71	Advanced Multi-axes Controller over MechatroLink-II	343
Servo Drive MechatroLink Option		JUSP-NS115	MechatroLink-II option unit for Sigma-II (W-Series) Servo Drives	343
MechatroLink-II related accessories		JEPMC-W6022	MechatroLink-II Terminator	343
		JEPMC-W6003-A5	MechatroLink-II Cables	
		JEPMC-W6003-01		
		JEPMC-W6003-03		
		JEPMC-W6003-05		
		JEPMC-W6003-10		
		JEPMC-W6003-20		
		JEPMC-W6003-30		
		JEPMC-IO2310	24V DC I/O Module	
		JEPMC-PL2900	Counter Module	
		JEPMC-PL2910	Pulse Output Module	

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P11E-EN-03A

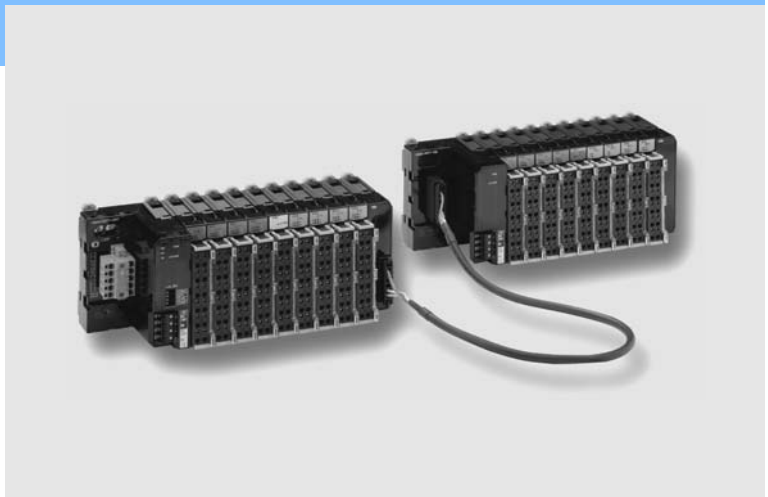
In the interest of product improvement, specifications are subject to change without notice.

Remote I/O

SmartSlice		464
DeviceNet Remote I/O		469
	Digital I/O Terminals	473
	Harsh Environment Terminals	479
	Analog I/O Terminals	486
	Temperature Input Terminals	490
	Sensor Connector Terminals	493
	Relay output Terminal	497
	Screw-less Clamp Terminals	500
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	Waterproof Terminals	515
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Peripherals		554
Wireless Communication	CompoBus/S Wiring	568
	WD30	571
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PROFIBUS-DP Gateway		577

GRT1 Modular I/O

SmartSlice

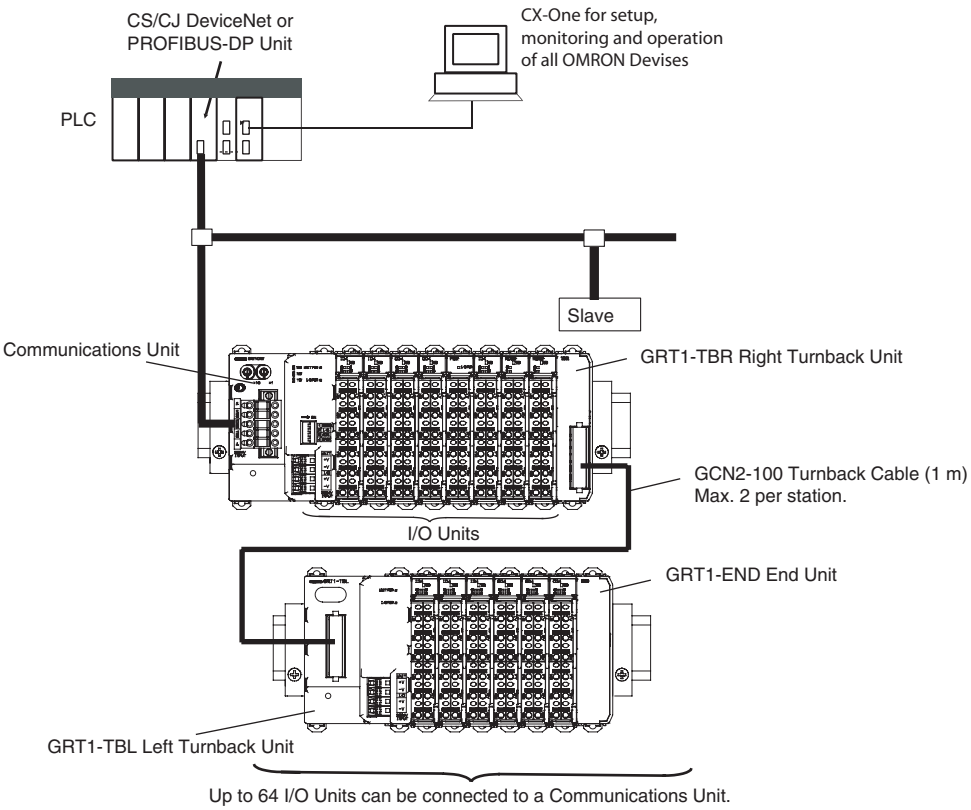


The smartest modular I/O system

OMRON's new SmartSlice I/O system is compact, intelligent and easy. When used with OMRON's CS1/CJ1 DeviceNet master units, no configuration tool is required. By using built-in functions such as pre-scaling, totalising, differentiation and alarming in analog I/O units, PLC programming can be minimised. Preventive maintenance data can be accessed using CX-Integrator software, standard PLC function blocks or NS-series Smart Active Parts.

- Most compact in the market (84 mm high)
- Easy set-up, backup and restore functions
- Diagnostics and preventive maintenance data at I/O level
- Detachable terminal blocks allow hot-swapping without re-wiring
- 3-wire connection with 'push-in' technology, no screwdriver required

System Configuration



Specifications

General Specifications

Common SmartSlice Specifications	
Unit power supply voltage	24 V DC (20.4 to 26.4 V DC)
I/O power supply voltage	24 V DC (20.4 to 26.4 V DC)
I/O connection	Screwless push-in technology
Noise immunity	Conforms to IEC61000-4-4, 2.0 kV (power supply line)
Vibration resistance	10 to 60 Hz: 0.7 mm double amplitude 60 to 150 Hz: 50 m/s^2
Shock resistance	150 m/s^2, 3 times in each direction
Dielectric strength	500 VAC (between isolated circuits)
Insulation resistance	20 MΩ min. (between isolated circuits)
Ambient operating temperature	-10 to 55°C (with no icing or condensation)
Ambient operating humidity	25% to 85%
Operating environment	No corrosive gases
Ambient storage temperature	-25 to 65°C (with no icing or condensation)
Mounting	35 mm DIN rail

Communication Units

Model name	GRT1-DRT	GRT1-PRT
Network Specification	DeviceNet	PROFIBUS-DPV1
Network connector	Open-stype DeviceNet connector, dual screwless push-in dual connections.	9-pin D-Sub
Network power supply	11 to 25 V DC, 22 mA	Internal
Number of I/O points	1,024 inputs and outputs max. (128 bytes each)	
Number of connectable Units	64 SmartSlice I/O Units max.	
I/O power supply	24 V DC, 4 A max.	
Status flags	1 word for Communications Unit status flags	
Parameter backup and restore	up to 2 KB of data per Unit.	

I/O Units

Model name	GRT1-ID4	GRT1-ID4-1
Signal type	DC input (for sinking outputs)	DC input (for sourcing outputs)
Number of points	4 inputs (3-wire connection)	
ON voltage	15 V DC min.	
ON current	6 mA max./point (at 24 V DC)	
OFF voltage	5 V DC max.	
OFF current	1 mA max.	
ON delay / OFF delay	1.5 ms max.	

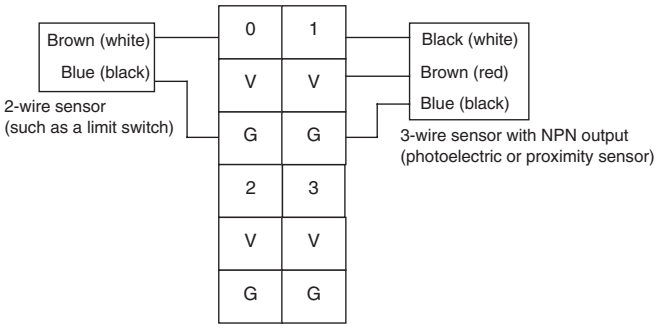
Model name	GRT1-OD4	GRT1-OD4-1	GRT1-ROS2
Signal type	Transistor output (sinking, NPN)	Transistor output (PNP, sourcing)	Relay output (normally open)
Number of points	4 outputs (2-wire connection)		2 outputs (with 2 terminals per connection)
Rated voltage	24 V DC (20.4 to 26.4 V DC)		250 V AC / 24 V DC
Rated output current	500 mA max./point		2 A (min. 1 mA @ 5 V DC)
Residual voltage	1.2 V DC max. (at 500 mA)		-
Leakage cuurent	0.1 mA max.		-
ON delay / Off delay	0.5 / 1.5 ms max.		15 ms max.
Mechanical life expectancy	-		20,000,000 times min.
Electrical life expectancy	-		100,000 times min.

Model name	GRT-AD2	GRT1-DA2V	GRT1-DA2C
Signal type	Analog Input: 0-20mA, 4-20mA, ±10V, 0-10V, 0-5V, 1-5V	Analog Output: ±10V, 0-10V, 0-5V, 1-5V	Analog Output: 0-20mA, 4-20mA,
Number of points	2 inputs	2 outputs	
Resolution	1/6000 full scale		
Conversion time	2ms / 2points		

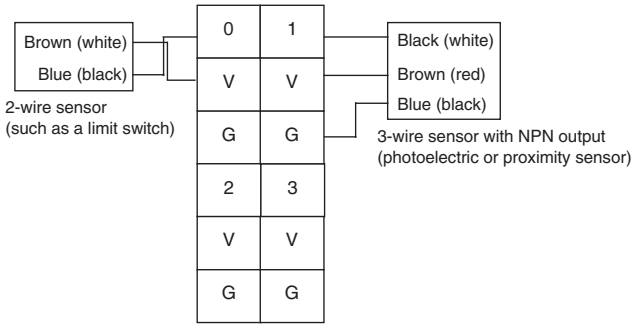
Model name	GRT1-CP1-L
Counter input	A/B/Z incremental encoder, or pulse/direction/reset
Counter signal type	24 V DC, or RS422 Line driver levels
Max. frequency	100 kHz
Counter range	32 bit double signed integer
Comparison values	2 independent ranges
Control Input	IN0, DC input (for sourcing outputs)
Control Input functions	Capture, Preset, Reset, Z enable
Control Outputs	OUT0, OUT1, Transistor Output (sourcing)
Control Output functions	Range comparison, manual override
Additional functions	On-the-fly reconfiguration, Frequency measurement

Connections

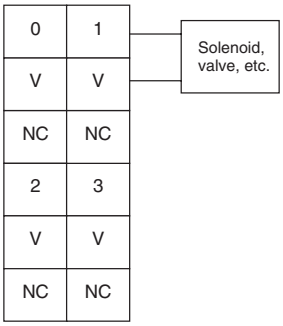
GRT1-ID4



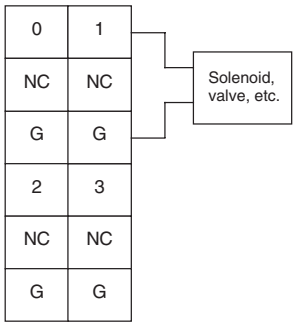
GRT1-ID4-1



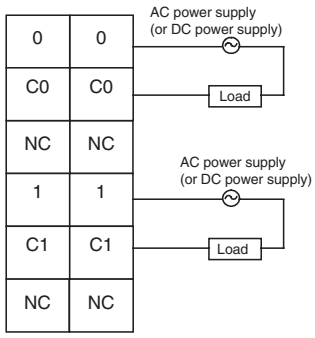
GRT1-OD4



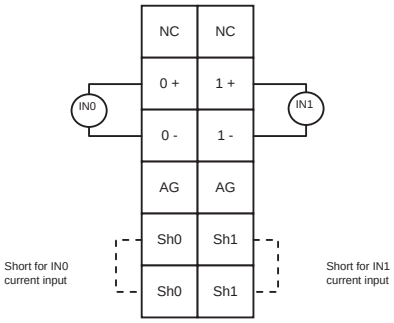
GRT1-OD4-1



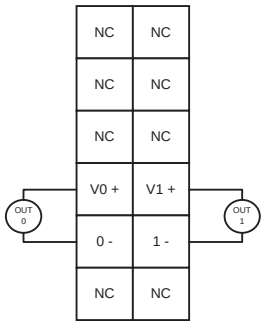
GRT1-ROS2



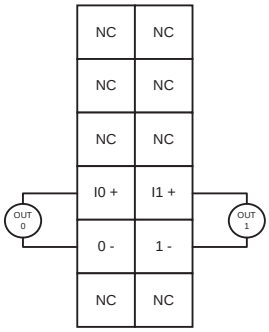
GRT-AD2



GRT1-DA2V

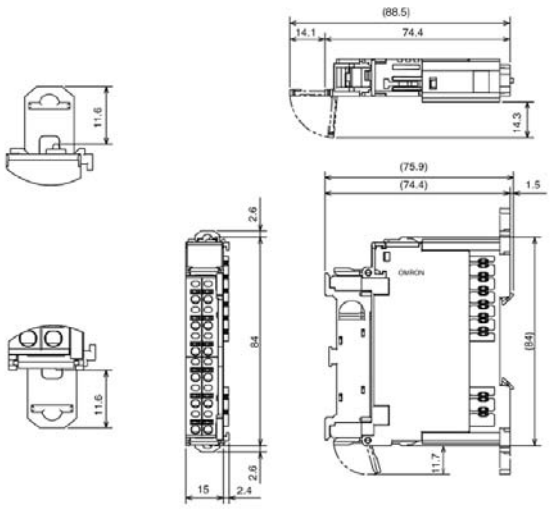


GRT1-DA2C



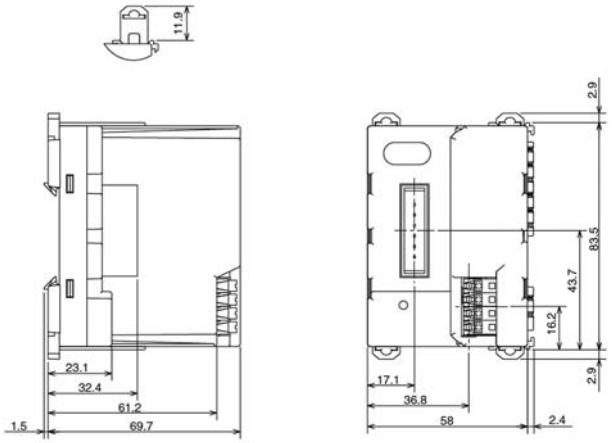
Dimensions

I/O-units



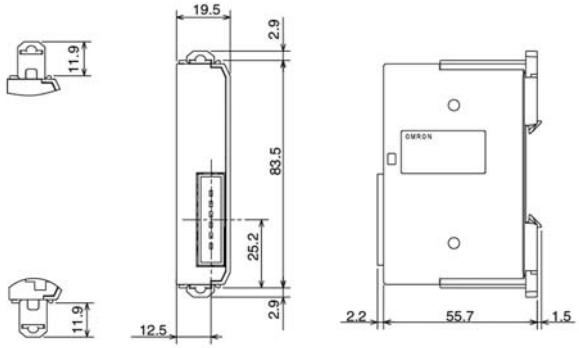
Communication Units

GRT1-DRT
GRT1-PRT
GRT1-TBL



End units

GRT1-END
GRT1-TBR



Ordering Information

Interface Units

Function	Specification	Model code
DeviceNet Interface Unit	For up to 64 I/O units	GRT1-DRT
Profibus-DP Interface Unit	For up to 64 I/O units	GRT1-PRT

I/O units

Function	Specification	Model code
4 NPN inputs	24 V DC, 7 mA, 3-wire connection	GRT1-ID4
4 PNP inputs	24 V DC, 7 mA, 3-wire connection	GRT1-ID4-1
4 NPN outputs	24 V DC, 500 mA, 2-wire connection	GRT1-OD4
4 PNP outputs	24 V DC, 500 mA, 2-wire connection	GRT1-OD4-1
2 relay outputs	240 V AC, 2A, normally-open contacts	GRT1-ROS2
100 kHz Counter / Positioner unit	A/B/Z encoder input (line driver or 24 V selectable) + 1 control input + 2 outputs (PNP-type)	GRT1-CP1-L*
2 Thermocouple inputs	Type R, S, K, J, T, L, B, U, N, W, E, and PLII selectable	GRT1-TS2T*
2 Pt100 inputs	Pt100 / JPt100 selectable	GRT1-TS2P*
2 analogue inputs, current/voltage	±10 V, 0-10 V, 0-5 V, 1-5 V, 0-20 mA, 4-20 mA	GRT1-AD2
2 analogue outputs, voltage	± 10 V, 0-10 V, 0-5 V, 1-5 V	GRT1-DA2V
2 analogue outputs, current	0-20 mA, 4-20 mA	GRT1-DA2C

Expansion

Function	Model code
I/O power feed unit, separates power supply between groups of I/O units	GRT1-PD2
Turnback Unit, right-hand side	GRT1-TBR
Turnback Unit, left-hand side	GRT1-TBL
Turnback cable, one meter	GCN1-100
End plate, one unit required per bus interface	GRT1-END

PLC Master Units

Function	Model code
DeviceNet Master Unit for CS1-series PLCs	CS1W-DRM21-V1
DeviceNet Master Unit for CJ1-series PLCs	CJ1W-DRM21
PROFIBUS-DP Master Unit for CS1-series PLCs	CS1W-PRM21
PROFIBUS-DP Master Unit for CJ1-series PLCs	CJ1W-PRM21

Software

Function	Model code
CX-One, Omron's integrated software for programming and configuration of all control system components, including PLCs, remote I/O, HMI, servo drives, inverters, temperature controllers and advanced sensors.	CX-ONE-AL□□ C-E □□ = number of licenses (01, 03, 10)

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P15E-EN-01

In the interest of product improvement, specifications are subject to change without notice.

DRT-series Smart Slaves

DeviceNet Remote I/O

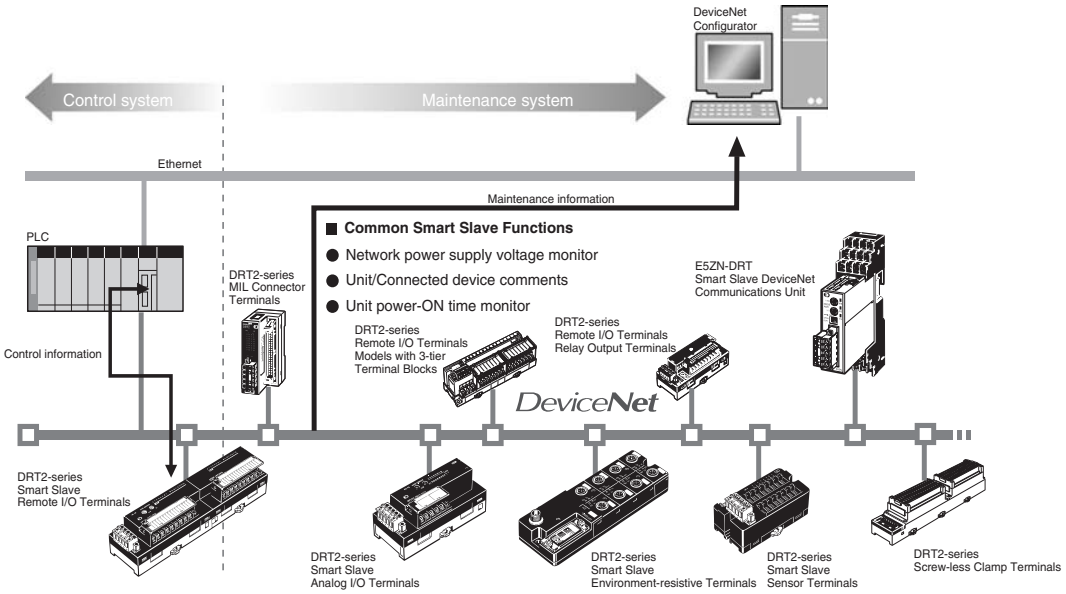
DRT2-series Smart Slaves provide you the necessary maintenance and product quality information.

DRT2-series Smart Slave Features

The DRT2-series Smart Slaves do not just handle the I/O information of field devices. They can also deliver a variety of information to improve the operating efficiency of the producion equipment. With this information a maintenance system can be fed with information to schedule preventive maintenence actions. This will reduce machine downtime caused by unscheduled repairs during production.

The control system and the maintenance system both use the same DeviceNet wiring. The benefits are:
reduced equipment setup time, reduced downtime in the event of a problem, provides preventive maintenance information.





Reduce Setup Time

- Network power supply monitor function
- Input filter function
- Power-ON inrush current protection function
- Communications speed auto-detect function
- Scaling function
- User compensation function
- Cumulative counter
- Moving average processing function
- Number of A/D conversion points (conversion cycle) setting
- Peak/bottom hold function
- Top/valley hold function
- Percentage change calculation function

Reduce Downtime

- Unit comments function
- Connected device comments function
- I/O power supply monitor function
- Sensor power supply short-circuit detection function
- External load short-circuit detection function
- Disconnected sensor detection function

Improve Maintenance

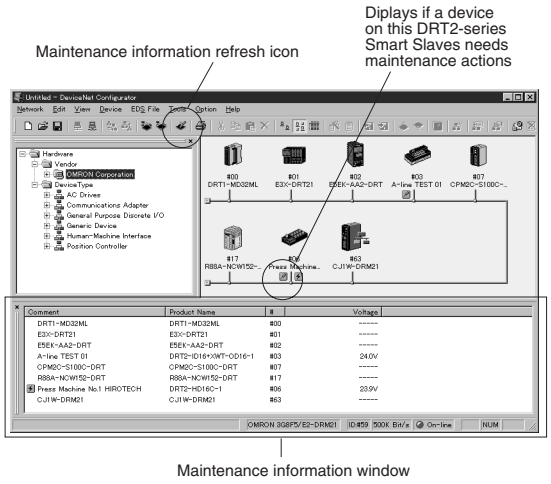
- Operation time monitor function
- Contact operations counter (See note.)
- Unit conduction time monitor function
- Total ON time monitor function (See note.)
- Network power supply voltage monitor function
- Communications error log function
- Last maintenance date
- Comparator function
- Selectable output value after error

Note: The number of contact operations monitor function and the cumulative ON time monitor function cannot be used simultaneously for the same contact.

Configurator Maintenance Window

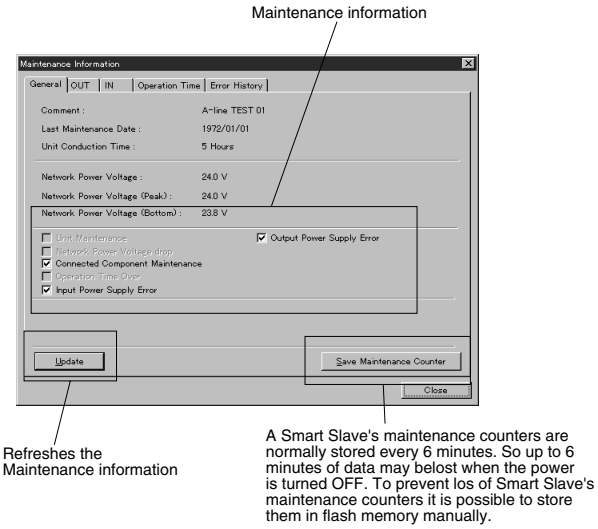
Various equipment information can be monitored from the following Configurator window throughDRT2-series Smart Slaves.

Maintenance Mode Window

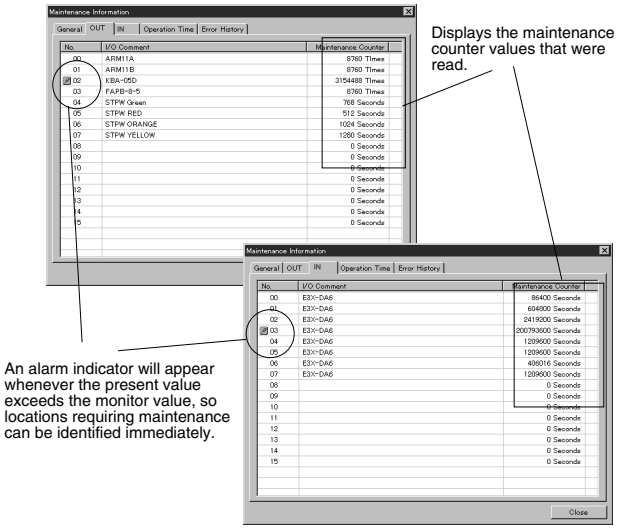


Individual Slave's Maintenance Information Window

A DRT2-series Smart Slave's maintenance information window can be opened by double-clicking the Slave's icon. If an alarm indicator appears next to the Slave's icon then equipment connected to this DRT2-series Smart Slave needs maintenance.



More details can be viewed by clicking the OUT tab, IN tab, or Operation Time tab.



Please refer to the software chapter on page 627 for more information on DeviceNet software.

Functions Supported by Smart Slaves

Group	General Slaves							
	Remote I/O Terminals						Sensor Connector Terminals	
Type	Transistors		Relays	Transistors with 3-tier terminal block			Transistors with connector	
Model	DRT2-□D16(-1)		DRT2-ROS16	DRT2-□D16TA(-1)			DRT2-□D16S(-1)	
Function	Input	Output	Output	Input	Output	I/O	Input	I/O
Operation time monitor	OK (Input+Output only)		---	OK			---	OK
Contact operation counter[1]	OK						OK	
Unit conduction time monitor	OK						OK	
Total ON time monitor[1]	OK						OK	
Unit comments	OK						OK	
Connected device comments	OK						OK	
Network power supply voltage monitor	OK						OK	
I/O power supply monitor	OK		---	OK				
Communications error log	OK						OK	
Input filter	OK	---		OK	---	OK	OK	
Power-ON inrush current protection	OK	---		OK	---	OK	OK	
Sensor power supply short-circuit detection	---						OK	
External load short-circuit detection	---						---	OK
External load disconnection detection	---						---	
Disconnected sensor detection	---						---	
Removable terminal block	OK		---				---	
Communications speed auto-detect	OK						OK	
No need to wire Unit power supply	OK						OK	
No need to wire input device power supply	---		OK	---			OK	
Expansion via Expansion I/O Units	OK			---			---	
Scaling	---						---	
User compensation	---						---	
Last maintenance date	OK						OK	
Cumulative counter	---							
Moving average processing	---						---	
Number of A/D conversion points (conversion cycle) setting	---						---	
Peak/bottom hold	---						---	
Top/valley hold	---						---	
Percentage change calculation	---						---	
Comparator	---						---	
Selectable output value after error	---						---	

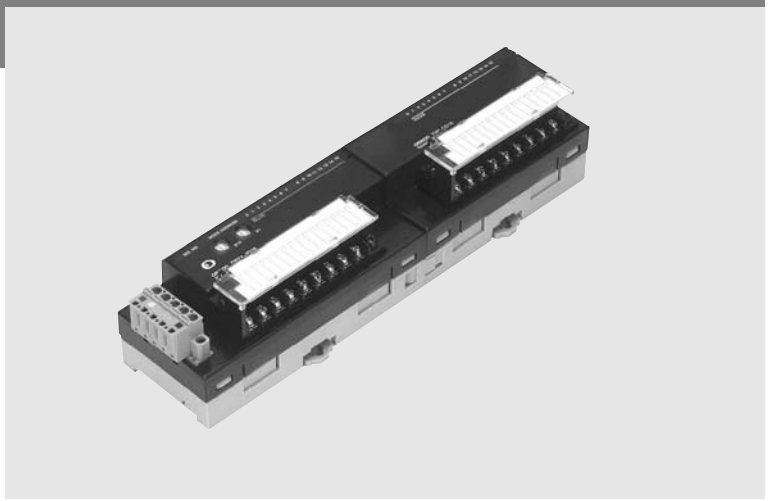
1. The contact operation counter function and the total ON time monitor function cannot be used simultaneously for the same contact.

Group	General Slaves						Environment-resistive Terminals		Analog Slave		
	Screw-less clamp terminals										
Type	Transistors						Transistors		Analog I/O Terminals		Temperature Input Terminals
	Detection function			No detection function							
Model	DRT2-□D32SL(-1)			DRT2-□D32SLH(-1)			DRT2-□D08C(-1) DRT2-HD16C(-1)		DRT2-AD04 DRT2-DA02 DRT2-AD04H		DRT2-TS04T DRT2-TS04P
Function	Input	Output	I/O	Input	Output	I/O	Input	Output	Input	Output	Input
Operation time monitor	OK						---		---		---
Contact operation counter[1]	OK						OK		---		---
Unit conduction time monitor	OK						OK		OK		OK
Total ON time monitor[1]	OK						OK		---		---
Unit comments	OK						OK		OK		OK
Connected device comments	OK						OK		OK		OK
Network power supply voltage monitor	OK						OK		OK		OK
I/O power supply monitor	OK						---	OK	---		---
Communications error log	OK						OK		OK		OK
Input filter	OK	---	OK		---	OK	OK	---	---		---
Power-ON inrush current protection	OK	---	OK		---	OK	OK	---	---		---
Sensor power supply short-circuit detection	---			OK	---	OK	OK	---	---		---
External load short-circuit detection	---						---	OK	---		---
External load disconnection detection	---				OK				---		---
Disconnected sensor detection	---			OK	---	OK	OK	---	---		---
Removable terminal block	OK						---		OK		OK
Communications speed auto-detect	OK						OK		OK		OK
No need to wire Unit power supply	OK						OK		OK		OK
No need to wire input device power supply	---						OK	---	---		---
Expansion via Expansion I/O Units	---						---		---		---
Scaling	---						---		OK		OK
User compensation	---						---		OK		OK
Last maintenance date	OK						OK		OK		OK
Cumulative counter	---						---		OK		OK
Moving average processing	---						---		OK	---	OK
Number of A/D conversion points (conversion cycle) setting	---						---		OK	---	OK
Peak/bottom hold	---						---		OK	---	OK
Top/valley hold	---						---		OK	---	OK
Percentage change calculation	---						---		OK	---	OK
Comparator	---						---		OK	---	OK
Selectable output value after error	---						---		---	OK	---
Top/valley count	---						---		---		OK
Operating time in a preset temperature range	---						---		---		OK
Temperature difference detection between input channels	---						---		---		OK

1. The contact operation counter function and the total ON time monitor function cannot be used simultaneously for the same contact.

DRT2-□D16(-1)

Digital I/O Terminals



I/O Device with DC-inputs and transistor outputs.

- Maintenance data can be collected without affecting the functionality of the control system.
- Valuable information can be collected and managed through the network, including information on the communications power supply voltage level, unit wear and tear, and equipment operating information.
- Easily locate trouble spots in the system.
- Setup has been simplified with features like auto-detection of the communication speed.

Smart Slave Functions

Compact unit

Basic Units are just 115-mm wide (just 77% of DRT1-series) and the Expansion Units are just 94-mm wide, so the overall width is 209 mm.

Detachable Terminal Block

The terminal block can be detached.

Expansion I/O Units

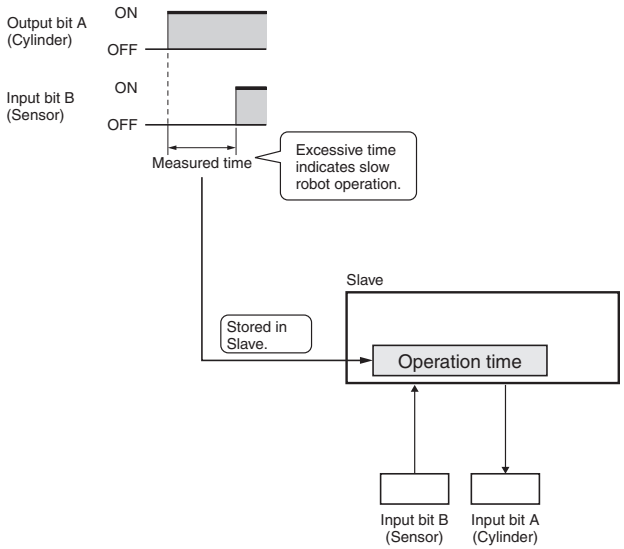
One Expansion Unit can be attached to the Basic Unit. Different I/O Terminals can be combined to suit the system requirements, for example, 16 inputs + 8 outputs or 24 inputs (16 inputs + 8 inputs.)

Operation Time Monitor Function

The device can measure the time it takes for an input to go ON after a corresponding output is set (independent of the ladder program).

If this time exceeds the value that was preset in the device the master is notified through the status bits.

Note: This function is only supported in a device that has both inputs and outputs.

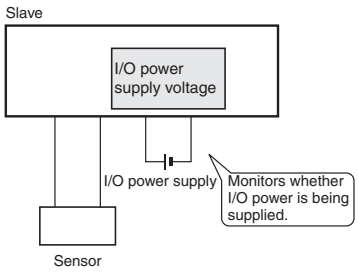


No Wiring Required for Internal Circuits

Power for the device's internal circuits is supplied from the communications power supply.

I/O Power Supply Status Monitor Function

This function checks if I/O power is being supplied. If I/O power is not present this is indicated in the status information.

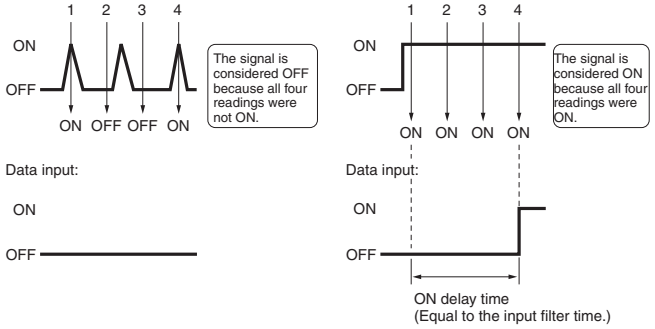


Input Filter Function

To eliminate incorrect signal interpretation due to contact bouncing or signal corruption by noise a filter is needed.

This filter is implemented by reading the input value several times within a preset period. If the input value is within the preset period for all measurements of the same state the input value is presumed to be of that state.

The input filter function can also be used to create a ON and OFF delay.



Power-ON Inrush Current Protection Function

When this function is set the inputs are not being read for 100 ms afer the I/O power supply is turned ON. This gives the power supply time to stabilize after being turned ON. The 100-ms delay is used to eliminate false inputs generated by inrush currents.

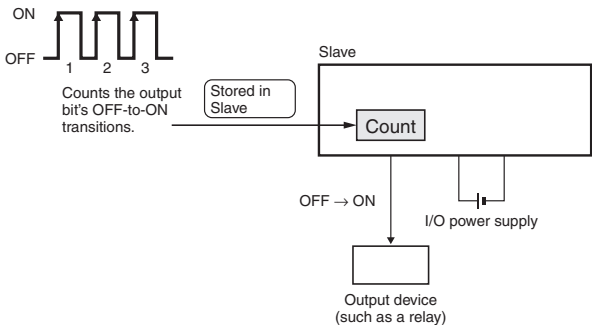
Contact Operation Counter

The number of times an input or output is switched ON is counted and stored in the device.

When the counter reaches a set value than this is indicated in the status information.

The maximum frequency that can be measured is 50 Hz.

Note: The contact operation counter function and the total ON time monitor function cannot be used simultaneously for the same contact.

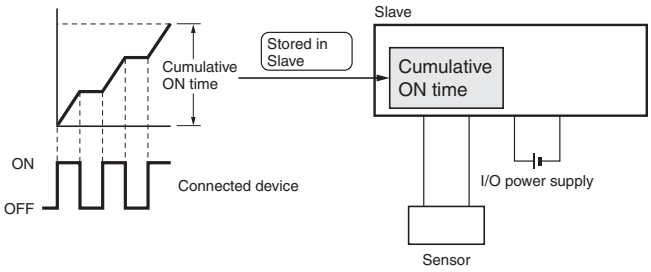


Total ON Time Monitor Function

The device keeps track of the total time an input or output is switch ON. This total On time is stored in the device.

When the counter reaches a set value than this is indicated in the status information.

Note: The contact operation counter function and the total ON time monitor function cannot be used simultaneously for the same contact.



Ordering Information

Basic Units

I/O type	Internal I/O common	Number of I/O points	I/O connections	Internal circuit power	Rated I/O power supply voltage	Model
Inputs	NPN (+ common)	16	Screw terminals	Supplied from communications connector.	24 V DC	DRT2-ID16
	PNP (– common)					DRT2-ID16-1
Outputs	NPN (– common)					DRT2-OD16
	PNP (+ common)					DRT2-OD16-1

Expansion Units

I/O type	Internal I/O common	Number of I/O points	I/O connections	Internal circuit power	Rated I/O power supply voltage	Model
Inputs	NPN (+ common)	8	Screw terminals	Supplied from Basic Unit.	24 V DC	XWT-ID08
	PNP (– common)					XWT-ID08-1
Outputs	NPN (– common)					XWT-OD08
	PNP (+ common)					XWT-OD08-1
Inputs	NPN (+ common)	16				XWT-ID16
	PNP (– common)					XWT-ID16-1
Outputs	NPN (– common)					XWT-OD16
	PNP (+ common)					XWT-OD16-1

Specifications

General Specifications

Communications power supply voltage	11 to 25 V DC
Unit power supply voltage	Not required (Supplied from the communications connector.)
I/O power supply voltage	20.4 to 26.4 V DC (24 V DC $^{+10\%}_{-15\%}$)
Current consumption	Communications:Basic Unit:60 mA max. With 16-point expansion:70 mA max. With 8-input expansion:65 mA max. With 16-output expansion:64.5 mA max.
Dielectric strength	500 V AC (between isolated circuits)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance	10 to 56 Hz, 0.7-mm double amplitude 56 to 150 Hz, 50 m/s^2
Shock resistance	150 m/s^2
Mounting method	35-mm DIN rail mounting
Screw tightening torque	M3 (power supply and I/O terminals): 0.3 to 0.5 Nm
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C
Ambient humidity	Operating:25% to 85% (with no condensation)
Weight	Basic Unit:140 g max. 16-point Expansion Unit:120 g max. 8-point Expansion Unit:80 g max.

Ratings

Inputs

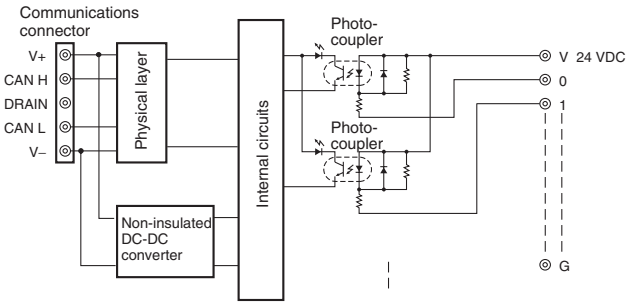
Input current		6 mA max./point (at 24 V DC)
ON delay time		1.5 ms max.
OFF delay time		1.5 ms max.
ON voltage	NPN	15 V DC min. between each input terminal and V
	PNP	15 V DC min. between each input terminal and G
OFF voltage	NPN	5 V DC max. between each input terminal and V
	PNP	5 V DC max. between each input terminal and G
OFF current		1 mA max.
Insulation method		Photocoupler
Input indicators		LED (yellow)

Outputs

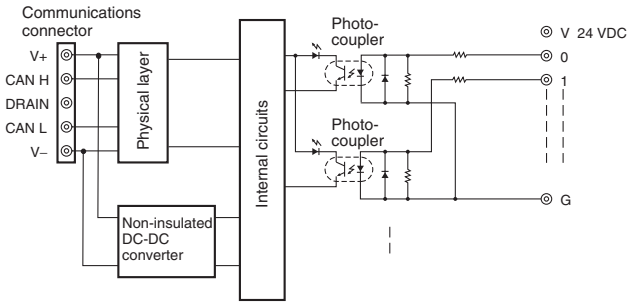
Rated output current	0.5 A/point, 4.0 A/common
ON delay time	0.5 ms max.
OFF delay time	1.5 ms max.
Residual voltage	1.2 V max.
Leakage current	0.1 ms max.
Isolation method	Photocoupler
Output indicators	LED (yellow)

Internal Circuit Configuration

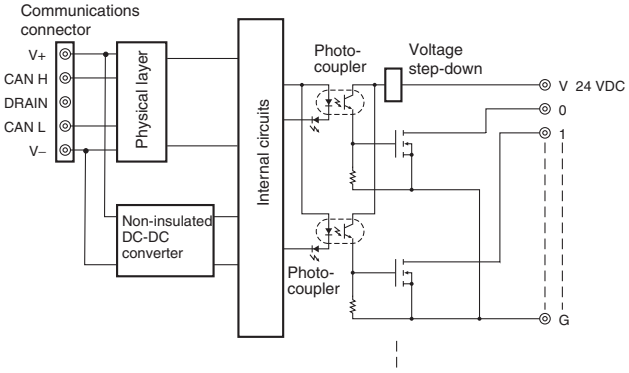
DRT2-ID16 (NPN)



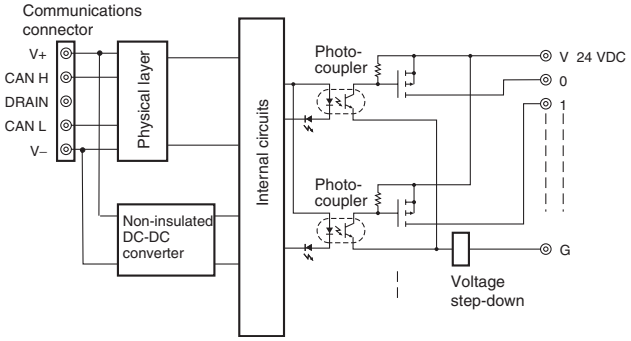
DRT2-ID16-1 (PNP)



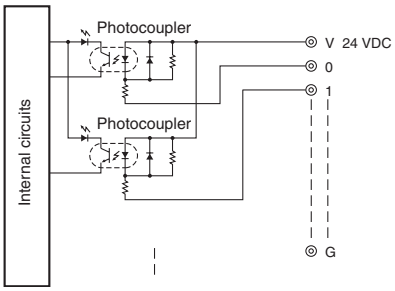
DRT2-OD16 (NPN)



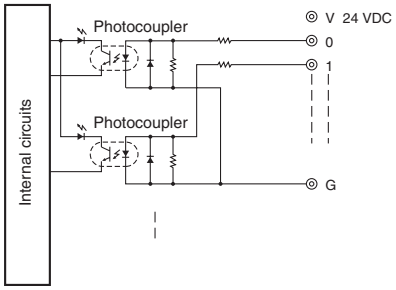
DRT2-OD16-1 (PNP)



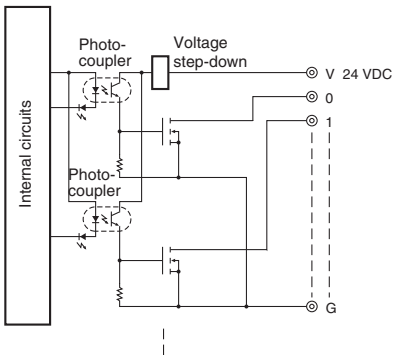
XWT-ID08 (NPN)
XWT-ID16 (NPN)



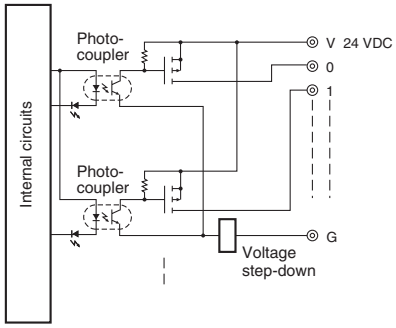
XWT-ID08-1 (PNP)
XWT-ID16-1 (PNP)



XWT-OD08 (NPN)
XWT-OD16 (NPN)



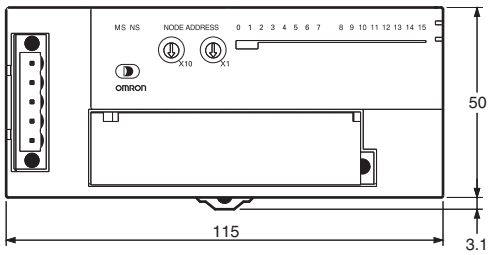
XWT-OD08-1 (PNP)
XWT-OD16-1 (PNP)

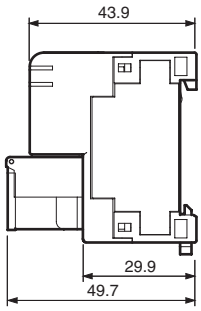


Dimensions

Remote I/O Terminals: Basic Units

DRT2-ID16
DRT2-ID16-1
DRT2-OD16
DRT2-OD16-1

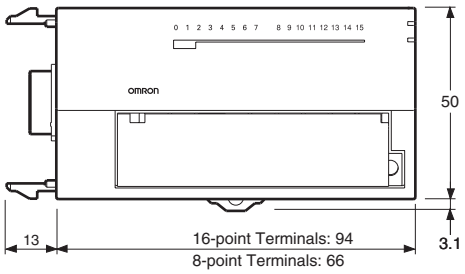


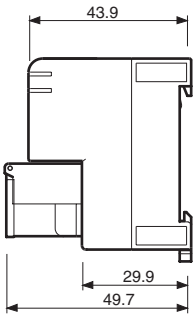


Remote I/O Terminals: Expansion Units

XWT-ID16
XWT-ID16-1
XWT-OD16
XWT-OD16-1

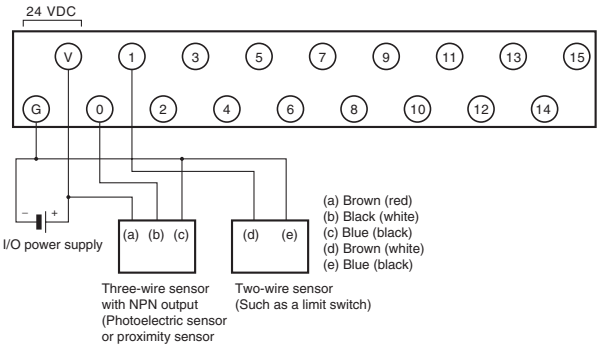
XWT-ID08
XWT-ID08-1
XWT-OD08
XWT-OD08-1



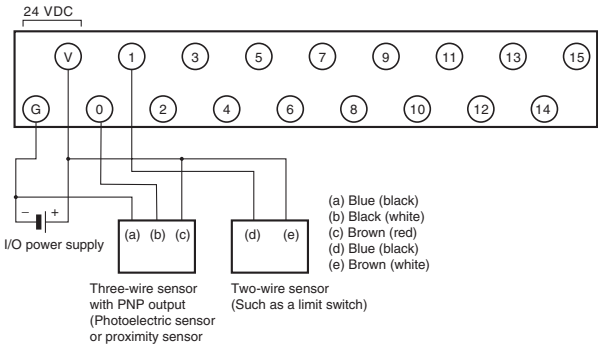


Wiring

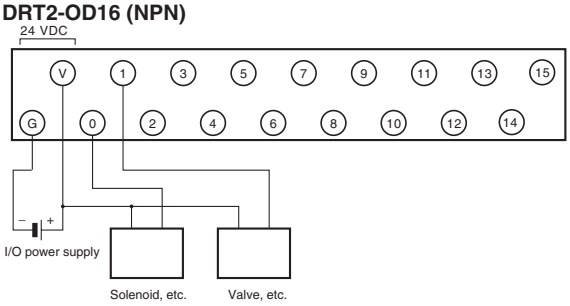
DRT2-ID16 (NPN)



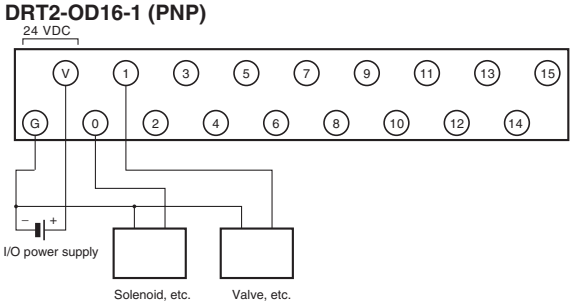
DRT2-ID16-1 (PNP)



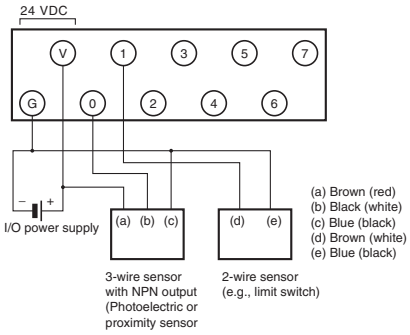
DRT2-OD16 (NPN)



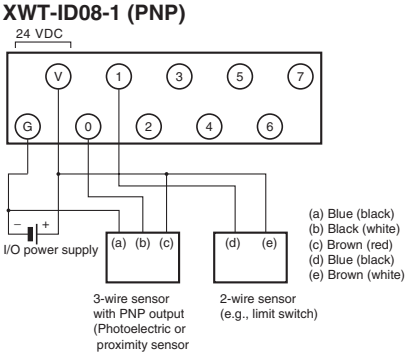
DRT2-OD16-1 (PNP)



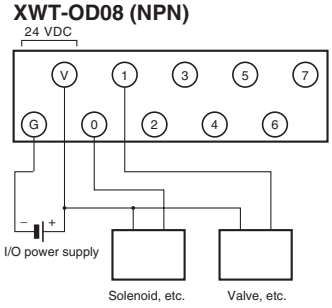
XWT-ID08 (NPN)



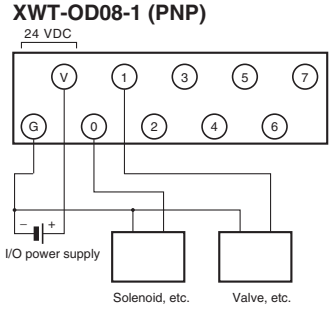
XWT-ID08-1 (PNP)



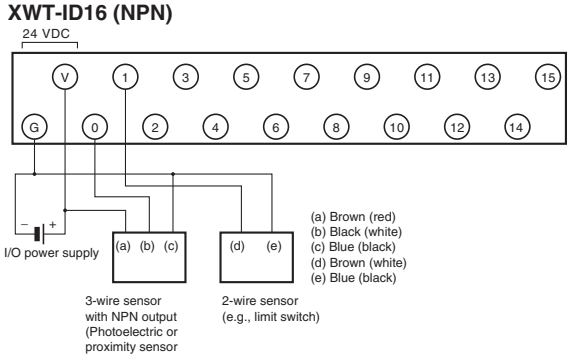
XWT-OD08 (NPN)



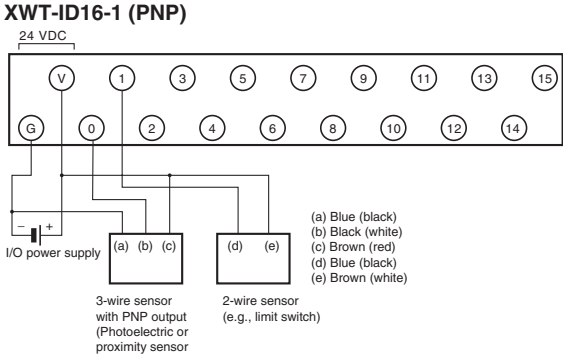
XWT-OD08-1 (PNP)



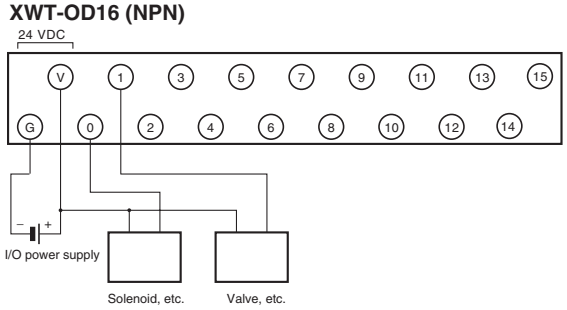
XWT-ID16 (NPN)



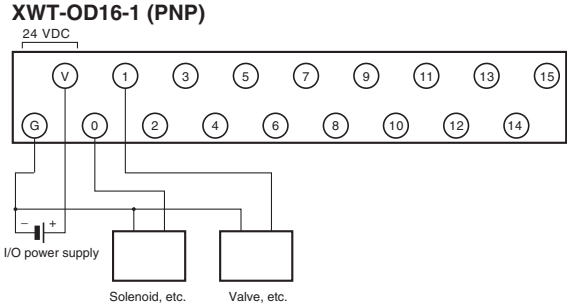
XWT-ID16-1 (PNP)



XWT-OD16 (NPN)



XWT-OD16-1 (PNP)



DRT2-□D08C(-1)/-□D16C(-1)

Harsh Environment Terminals

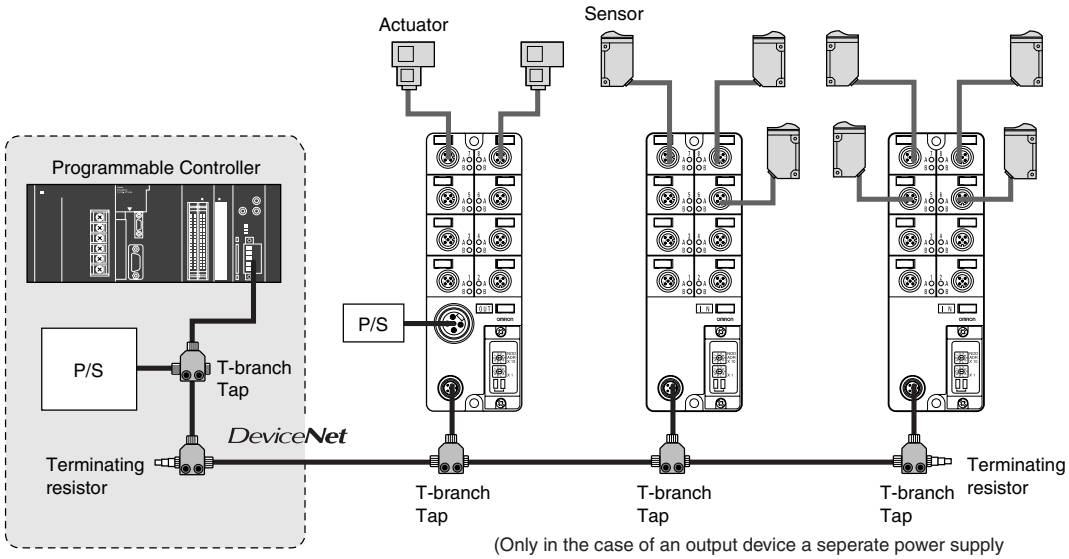


Environment-resistive (IP67) I/O terminals with fault-detection and maintenance functions

- Equipped with the standard Smart Slave functions for preventive maintenance and troubleshooting.
- Conforms to IP67 standards. The terminal housing is also oil- and spatter-resistant.
- The DeviceNet power supply is used by input devices to power the sensors. A extra power supply is not needed for this. (An extra power supply is required for output devices.)
- The terminal detects shortcircuits and broken wires in the cables of the sensors and actuators. In case of a fault the terminal notifies the master.

System Configuration

The communications and internal electronics of the terminal and in case of a input device also the sensors are fed by the DeviceNet power supply.



(Only in the case of an output device a seperate power supply must be use to power the actuators.)

Smart Slave Functions

Superior Dust-tight, Drip-proof Construction (IP67)

The environment-resistive terminals are rated IP67, so they can be used in severe environments and subjected to direct oil and water spray without a protective enclosure. Because a enclosure is not needed space is saved and installation and wiring time is reduced.

Power Supply Wiring not required for Input Devices

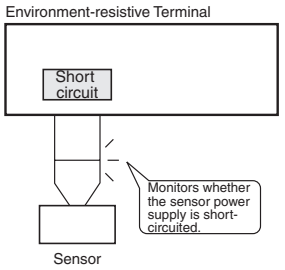
The same power supply is shared for communications, internal circuits, and input devices. Only the communications power supply needs to be wired.

High-load Devices (1.5 A max.) can be connected

The rated output current is 1.5 A, so even output devices with relatively large loads can be connected directly.

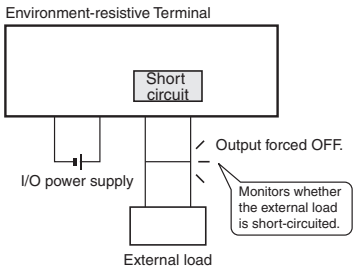
Sensor Power Supply Short-circuit Detection Function

The Slave monitors the I/O power supply current and detects a “sensor power supply short-circuit” if a connector’s current exceeds 100 mA. If a sensor power supply short circuit is detected, the sensor power supply output is turned OFF.



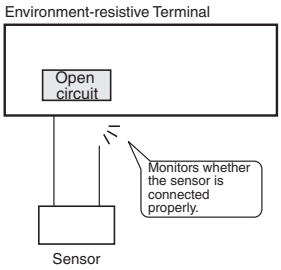
External Load Short-circuit Detection Function (Output Units Only)

The Slave monitors the Output Unit's load current and detects an "external load short-circuit" if the current to the Output Unit exceeds the rated maximum of 1.5A. If an external load short circuit is detected, the output is turned OFF in order to prevent damage to the Unit's output circuit.



Disconnected Sensor Detection Function (Input Units Only)

The Slave monitors the I/O power supply current and detects a "disconnected sensor" if a connector's current falls below 0.5 mA. The DeviceNet configurator or Explicit message communication can be used to read which sensor has been disconnected.

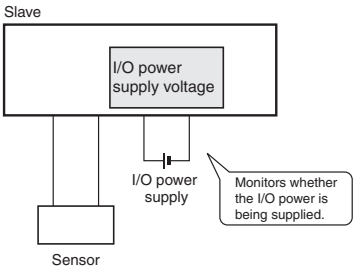


Power Supply Wiring not required for the Slave's Internal Circuits

Power is supplied to the Unit's internal circuits from the communications power supply, so there is no need for a extra power supply tpo power the units internal circuits.

I/O Power Supply Monitor Function

The Slave detects whether or not the I/O power supply is being supplied and notifies the Master through the status bits.

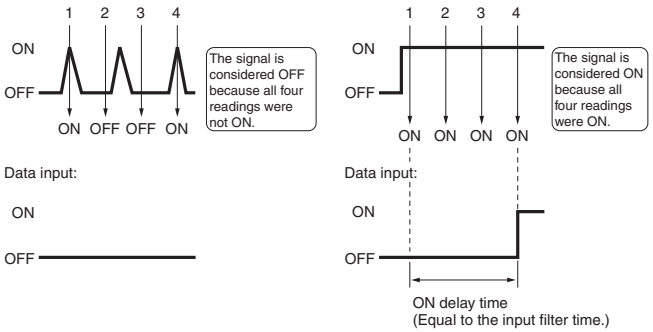


Input Filter Function (Input Units Only)

To eliminate incorrect signal interpretation due to contact bouncing or signal corruption by noise a filter is needed.

This filter is implemented by reading the input value several times within a preset period. If the input value is within the preset period for all measurements of the same state the input value is presumed to be of that state.

The input filter function can also be used to create a ON and OFF delay.



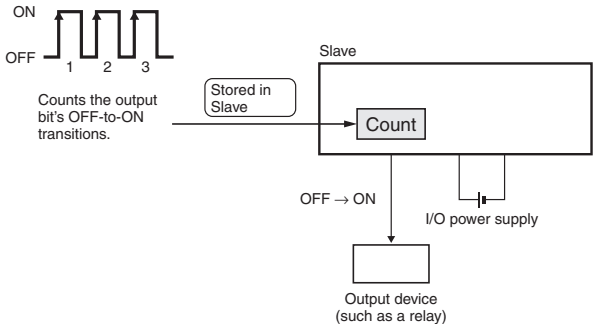
Contact Operation Counter

The number of times an input or output is switched ON is counted and stored in the device.

When the counter reaches a set value than this is indicated in the status information.

The maximum frequency that can be measured is 50 Hz.

Note: The contact operation counter function and the total ON time monitor function cannot be used simultaneously for the same contact.

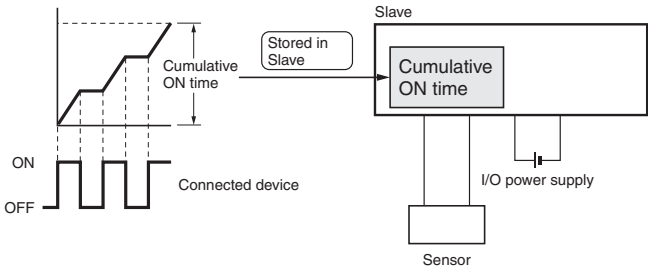


Total ON Time Monitor Function

The device keeps track of the total time an input or output is switch ON. This total On time is stored in the device.

When the counter reaches a set value than this is indicated in the status information.

Note: The contact operation counter function and the total ON time monitor function cannot be used simultaneously for the same contact.



Ordering Information

I/O type	Internal I/O common	Number of I/O points	I/O connections	Internal circuit power	Rated I/O power supply voltage	Model
Input	NPN (+ common)	8	Sensor I/O connector	Supplied from the communications connector.	Supplied from the communications connector.	DRT2-ID08C
	PNP (– common)					DRT2-ID08C-1
Output	NPN (– common)				24 V DC	DRT2-OD08C
	PNP (+ common)					DRT2-OD08C-1
Input	NPN (+ common)	16			Supplied from the communications connector.	DRT2-HD16C
	PNP (– common)					DRT2-HD16C-1

Specifications

Ratings

Inputs

Input current		11 mA max./point (at 24 V DC) 3 mA min./point (at 11 V DC)
ON delay time		1.5 ms max.
OFF delay time		1.5 ms max.
ON voltage	NPN	9 V DC min. between each input terminal and V
	PNP	9 V DC min. between each input terminal and G
OFF voltage	NPN	5 V DC max. between each input terminal and V
	PNP	5 V DC max. between each input terminal and G
OFF current		1 mA max.
Isolation method		Not isolated.
Input indicators		LED indicators (yellow)

Outputs

Rated output current	1.5 A/point, 8.0 A/common
ON delay time	0.5 ms max.
OFF delay time	1.5 ms max.
Residual voltage	1.2 V DC max.
Leakage current	0.1 mA max.
Isolation method	Photocoupler
Output indicators	LED indicators (yellow)

Characteristics

Item	DRT2-ID08C(-1) DRT2-HD16C(-1)	DRT2-OD08C(-1)
Communications power supply voltage	11 to 25 V DC	
Internal power supply voltage	Not required (Supplied from the communications connector.)	
I/O power supply voltage	Supplied from the communications connector.	20.4 to 26.4 V DC (24 V DC $^{+10\%}/_{-15\%}$)
Current consumption	Communications power supply DRT2-ID08C(-1):115 mA max. DRT2-OD08C(-1):60 mA max. DRT2-HD16C(-1):190 mA max.	
Dielectric strength	500 V AC between insulated circuits	
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)	
Vibration resistance	10 to 56 Hz, 0.7-mm double amplitude 56 to 150 Hz, 50 m/s^2	
Shock resistance	150 m/s^2	
Mounting method	M5 screw mounting	
Screw tightening torque	M5 screws: 1.47 to 1.96 N • m Round connectors: 0.39 to 0.49 N • m	
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C	
Ambient humidity	Operating:25% to 85% (with no condensation)	
Weight	340 g max.	390 g max.

Connectors

Communications Cables

Thin Cable

Thin cable with attached Micro Connectors (formerly M12).

Model	Specifications
DCA1-5CN□□W1	Cable with shielded connectors on both ends
DCA1-5CN□□F1	Cable with shielded connector socket (female) on one end
DCA1-5CN□□H1	Cable with shielded connector plug (male) on one end
DCA1-5CN□□W5	Cable with shielded connectors on both ends (a Mini-size male connector plug on one end and a Micro-size female connector socket on the other end)
DCN2-1	Shielded T-branch Connector (1 branch)

Thick Cable

Thick cable with attached Mini Connectors

Model	Specifications
DCA2-5CN□□W1	Cable with shielded connectors on both ends
DCA2-5CN□□F1	Cable with shielded connector socket (female) on one end
DCA1-5CN□□H1	Cable with shielded connector plug (male) on one end
DCN3-11	Shielded T-branch Connector (1 branch)
DCN3-12	Shielded T-branch Connector (1 branch) The branch connector is M12 (Micro) size.

Terminating Resistors

Model	Specifications
DRS2-1	Micro-size male connector plug with terminating resistance
DRS2-2	Micro-size female connector socket with terminating resistance
DRS3-1	Mini-size male connector plug with terminating resistance

I/O Wiring Cables

I/O Power Supply Wiring

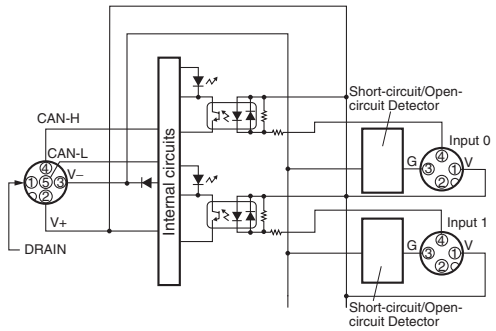
Model	Specifications
XS4W-D421-1□□-A	Cable with connectors on both ends (one socket and one plug)
XS4F-D421-1□□-A	Cable with female connectors (sockets) on both ends
XS4H-D421-1□□-A	Cable with male connectors (plugs) on both ends
XS4R-D424-5T	T-shaped Joint

I/O Wiring

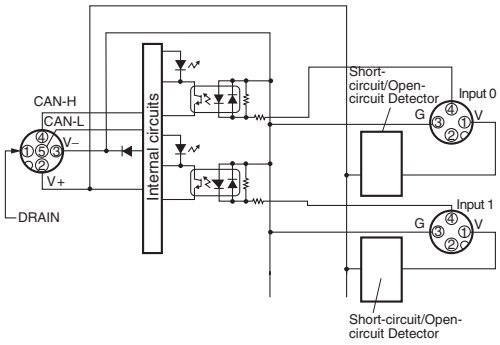
Model	Specifications
XS2H-D421-□80-A	Cable with male connector plug on one end
XS2W-D42□-□81-A	Cable with connectors on both ends (one socket and one plug)
XS2G-D4□□	Male connector plug for assembly (Crimp connection or solder connection)

Internal Circuit Configuration

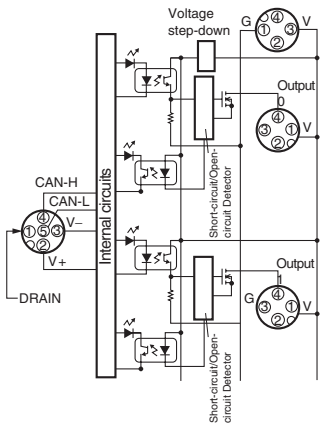
DRT2-ID08C (NPN)



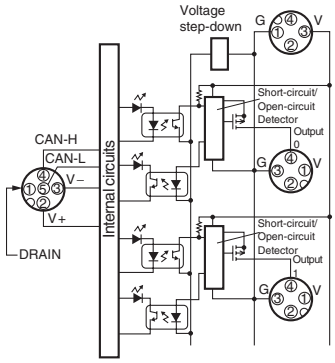
DRT2-ID08C-1 (PNP)



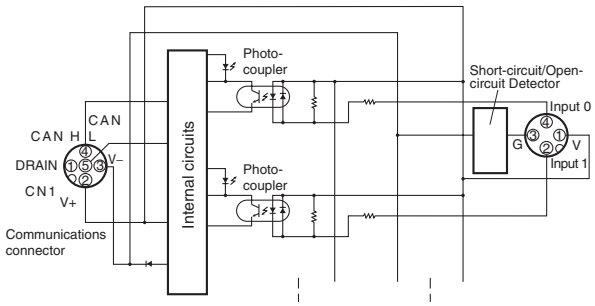
DRT2-OD08C (NPN)



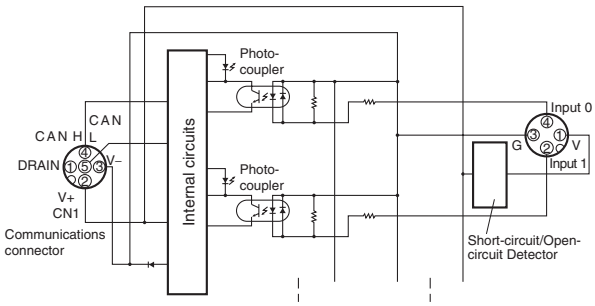
DRT2-OD08C-1 (PNP)



DRT2-HD16C (NPN)



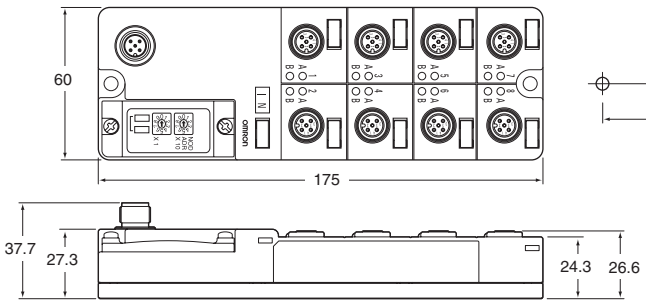
DRT2-HD16C-1 (PNP)



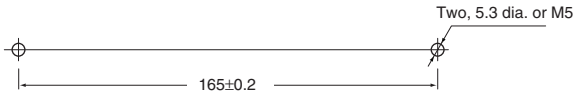
Dimensions

Environment-resistive Terminals (8 or 16 Inputs)

DRT2-ID08C
DRT2-ID08C-1
DRT2-IDHD16C
DRT2-ID16C-1

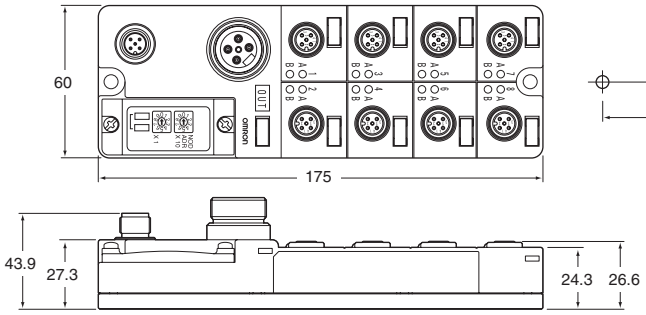


Mounting Hole Dimensions

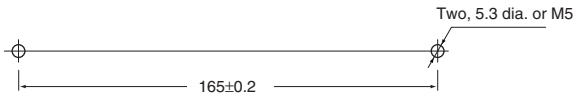


Environment-resistive Terminals (8 Outputs)

DRT2-OD08C
DRT2-OD08C-1

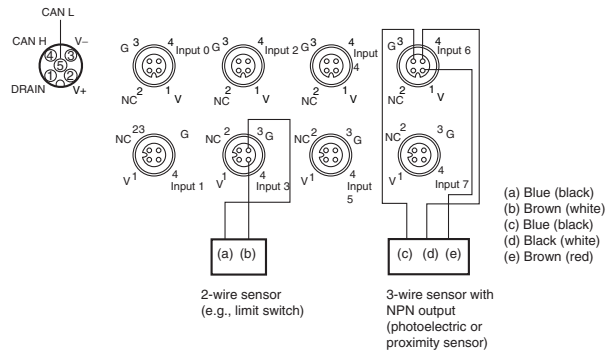


Mounting Hole Dimensions

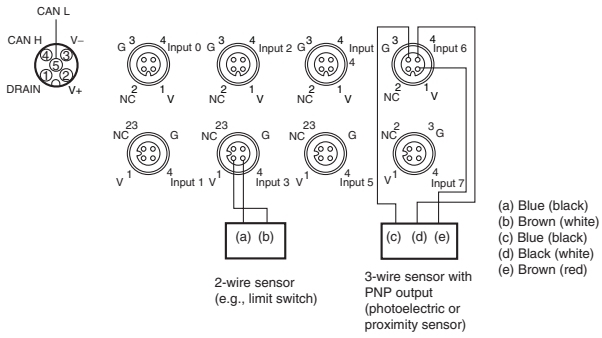


Wiring

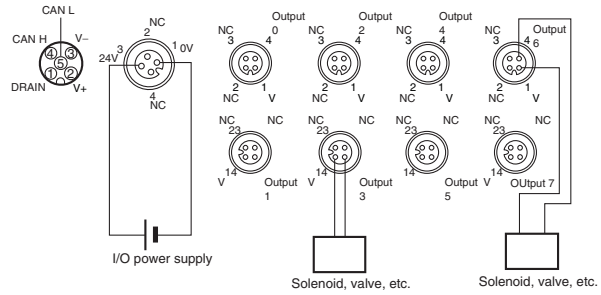
DRT2-ID08C (NPN)



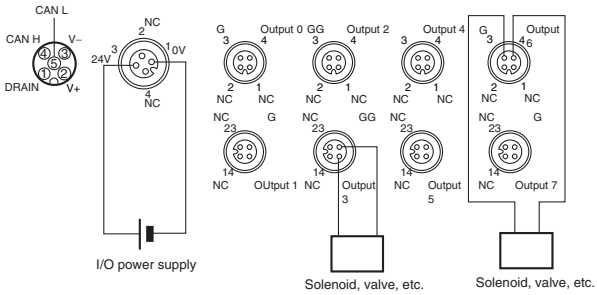
DRT2-ID08C-1 (PNP)



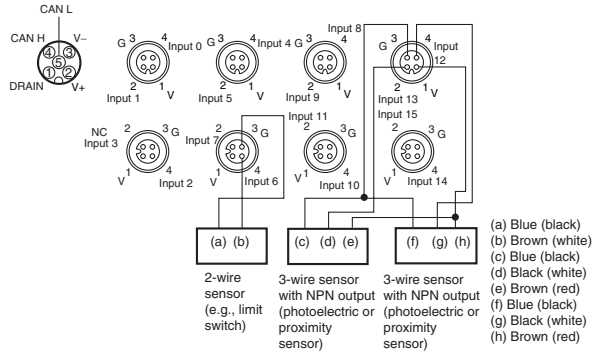
DRT2-OD08C (NPN)



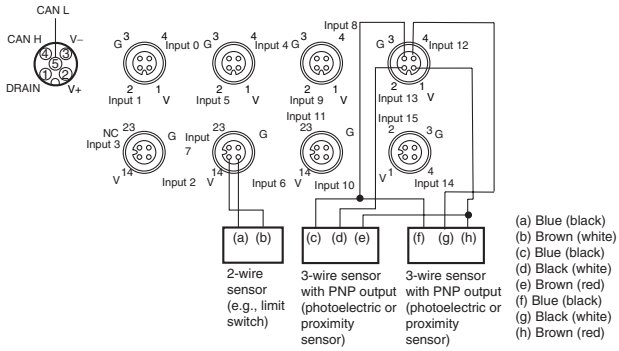
DRT2-OD08C-1 (PNP)



DRT2-HD16C (NPN)



DRT2-HD16C-1 (PNP)



DRT2-AD04/-DA02

Analog I/O Terminals



Calculations on Analog Values Can Be Performed within the Slave Itself

- Equipped with the standard Smart Slave functions for preventive maintenance and troubleshooting.
- Equipped with functions such as the scaling function, peak/bottom hold; top/valley hold; comparator function, cumulative counter, and rate of change.
- Two I/O values can be allocated to any two of the following values: analog input, peak/bottom, top, valley, or rate-of-change. Values without an allocated I/O point can be read with message communications.

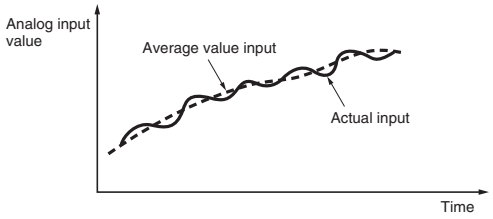
Smart Slave Functions

Number of A/D Conversion Points can be Selected (Input Terminals Only)

The conversion cycle is just 4 ms max. when all 4 analog inputs are being used. The conversion cycle can be made even shorter by reducing the number of inputs used (the number of A/D conversion points.)

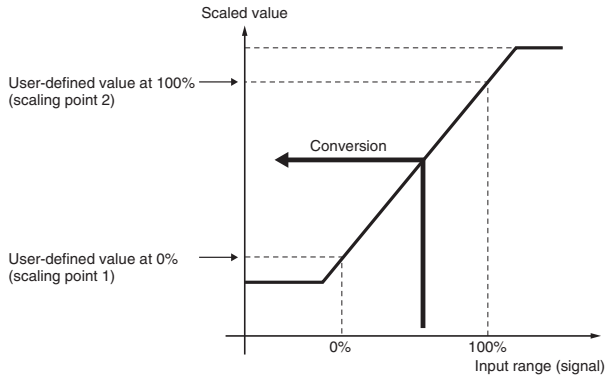
Moving Average Processing Function (Input Terminals Only)

The average of the last 8 inputs (the moving average) can be calculated in the Analog Input Terminal and used as the conversion data. The moving average can be used to obtain a smooth input value when the actual input value is fluctuating slightly.



Scaling Function

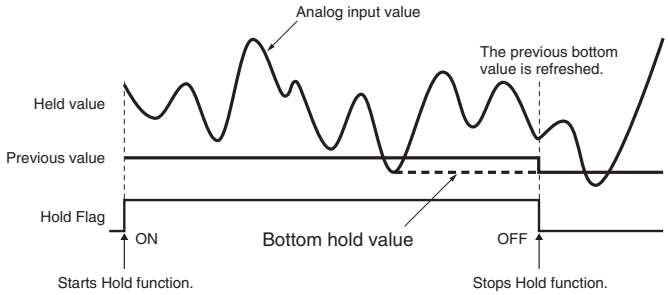
The analog input's raw data can be scaled to engineering value's. Using the scaling function in the Slave can reduce the ladder program processing load for the Master. If an offset is required, the offset value function can be used to offset the analog value calculated by the scaling function.



Note: The Output Terminals also support scaling.

Peak/Bottom Hold Function (Input Terminals Only)

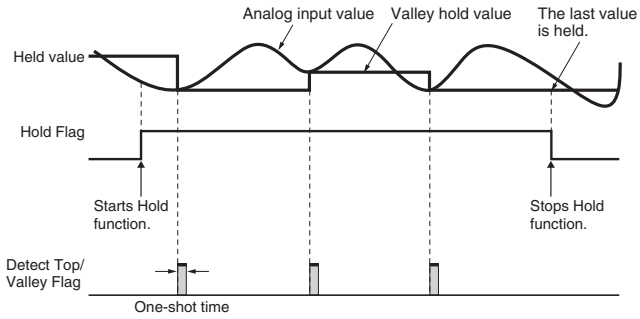
Holds the maximum (peak) value or minimum (bottom) value read by the Analog Input Terminal. In addition, the comparator function can be used to compare the peak value or bottom value to a preset alarm value and turn ON a flag in the status bits when the alarm value is exceeded.



Top/Valley Hold Function (Input Terminals Only)

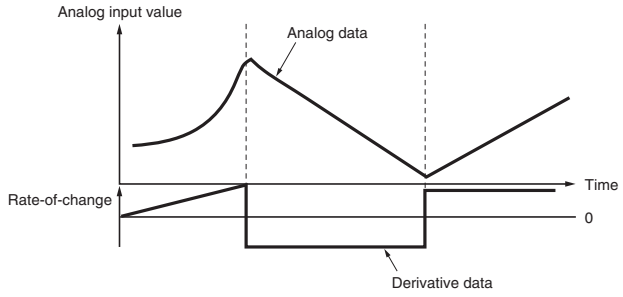
Holds the top value or valley value read by the Analog Input Terminal. The Top/Valley Detection Timing Flags can be used to set the timing for detection of the top/valley. In addition, the comparator function can be used to compare the top value or valley value to a preset alarm value and turn ON a flag in the status bits when the alarm value is exceeded.

Example: Valley Hold Operation



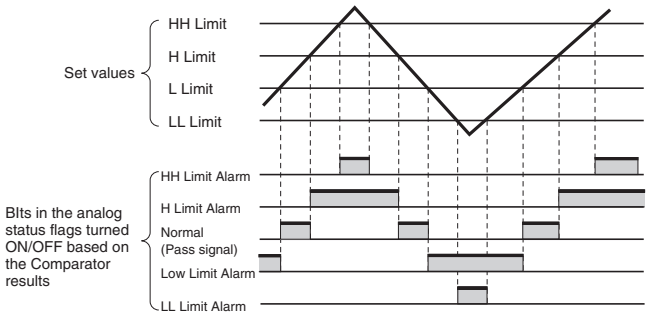
Rate-of-change Calculation Function (Input Terminals Only)

The rate-of-change in the analog input value data can be calculated for the data read by the Analog Input Terminal during each sampling period.



Comparator Function (Input Terminals Only)

Compares the raw data or processed data read by the Analog Input Terminal with the alarm SVs (High-High Limit, High Limit, Low Limit, and Low-Low Limit) and can reflect the result of the comparison in the status bits. The Normal Flag (Pass signal) will be turned ON if the value is within the set range.



Disconnection Detection Function (Input Terminals Only)

The disconnection detection function checks for open circuits in the analog input wiring (voltage inputs or current inputs) of channels for which A/D conversion is enabled. If an open circuit is detected, the Master can be notified through that channel's Disconnection Detection Flag. The input range must be set to 1 to 5 V (voltage input) or 4 to 20 mA (current input) in order to use this function.

User Adjustment Function

Depending on an input or output device's characteristics and connection method, it may be necessary to compensate for an offset in the value. This function can adjust the input or an output and compensate if an offset is required in the input or output's voltage or current. The conversion line can be compensated at two points: the 0% value and the 100% value.

Cumulative Counter

This function calculates the time integral of the input or output's analog value and reads the cumulative value. Also, a monitor value can be set in the Terminal so that the general-purpose status bits' Analog Cumulative Counter Flag will be turned ON when the cumulative value exceeds the monitor value.

Selectable Output Value after Error (Output Terminals Only)

This function can be used to set the Output Unit's output values that will be output from each channel when a communications error has occurred.

Ordering Information

Classification	I/O points	Model
Analog input	4 points	DRT2-AD04
Analog output	2 points	DRT2-DA02

Specifications

Ratings

Input

Item	DRT2-AD04	
	Voltage input	Current input
Input points	4 points (inputs 0 to 3)	
Input type	0 to 5 V 1 to 5 V 0 to 10 V –10 to 10 V	0 to 20 mA 4 to 20 mA
Max. signal input	±15 V	±30 mA
Input impedance	1 MΩ min.	Approx. 250 Ω
Resolution	1/6,000	
Accuracy	25°C: ±0.3% FS –10°C to 55°C: ±0.6% FS	25°C: ±0.4% FS –10°C to 55°C: ±0.8% FS
Conversion time	4 ms max. for 4 inputs (when calculation functions are not used and the DeviceNet communications cycle is 4 ms)	
Converted data	Input ranges other than –10 to 10 V: Full scale is 0000 to 1770 hexadecimal (0 to 6,000). –10 to 10 V input range: Full scale is F448 to 0BB8 hexadecimal (–3,000 to 3,000). A/D conversion range: ±5% FS	
Isolation method	Photocoupler isolation between inputs and communications lines (There is no isolation between input signals.)	
Insulation resistance	20 MΩ min. at 250 V DC (between isolated circuits)	
Accessories	Four shorting bars for use with current inputs.	

Output

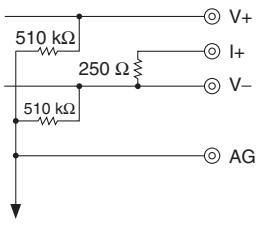
Item	DRT2-DA02	
	Voltage output	Current output
Output points	2 points	
Output type	0 to 5 V 1 to 5 V 0 to 10 V –10 to 10 V	0 to 20 mA 4 to 20 mA
Allowable output load resistance	1 KΩ min.	600 Ω max.
External output impedance	0.5 Ω max.	---
Resolution	1/6,000	
Accuracy	25°C: ±0.4% full scale –10°C to 55°C: ±0.8% full scale	
Conversion time	2 ms/2 points	
Converted data	Output ranges other than –10 to 10 V: Full scale is 0000 to 1770 hexadecimal (0 to 6,000). –10 to 10 V output range: Full scale is F448 to 0BB8 hexadecimal (–3,000 to 3,000). D/A conversion range: ±5% FS	
Isolation method	Photocoupler isolation between outputs and communications lines (There is no isolation between output signals.)	
Insulation resistance	20 MΩ min. at 250 V DC (between isolated circuits)	
Accessories	None	

Characteristics

Item	DRT2-AD04	DRT2-DA02
Communications power supply voltage	11 to 25 V DC	
Internal power supply voltage	Not required. (Supplied from the communications connector.)	
Current consumption	90 mA max. at 24 V DC	120 mA max. at 24 V DC
Dielectric strength	500 V AC for 1 min between the communications circuit and analog circuit (1-mA sensing current)	
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)	
Vibration resistance	10 to 150 Hz, 0.7-mm double amplitude	
Shock resistance	150 m/s^2	
Mounting strength	50 N (10 N in the DIN rail direction)	
Screw tightening torque	0.3 to 0.5 N·m (terminal screws) 0.25 to 0.3 N·m (communications connector screws)	
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C	
Ambient humidity	Operating:25% to 85% (with no condensation)	
Ambient environment	No corrosive gases	
Weight	170 g max.	150 g max.

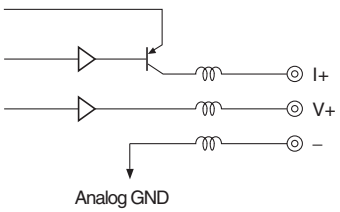
Internal Circuit Configuration

DRT2-AD04



Analog GND

DRT2-DA02

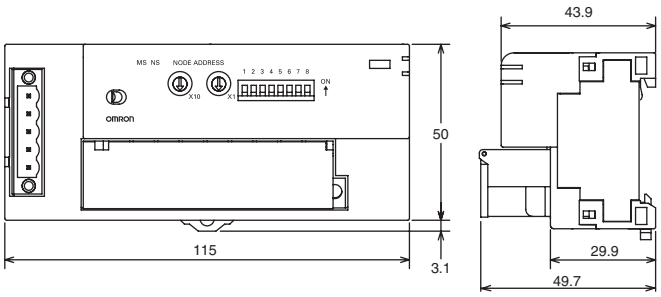


Analog GND

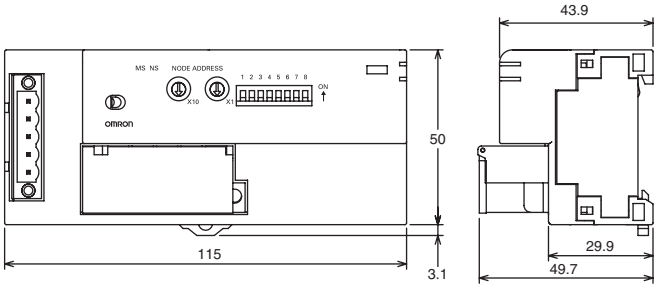
The – terminals of outputs 0 and 1 are connected internally.

Dimensions

DRT2-AD04

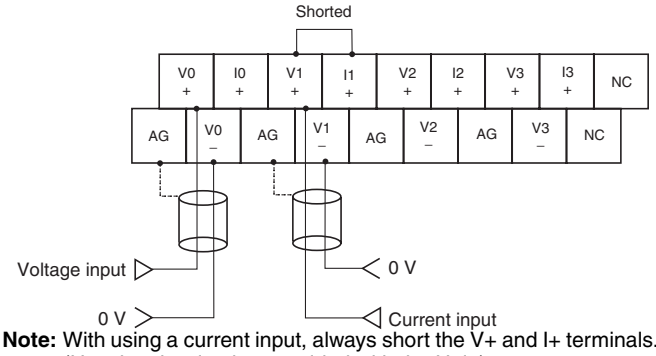


DRT2-DA02



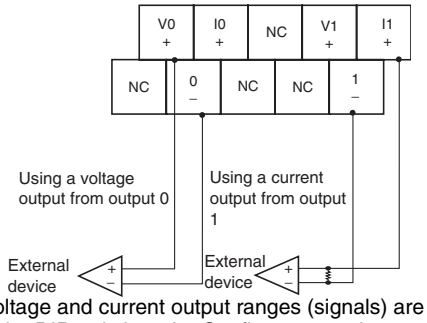
Wiring

DRT2-AD04



Note: With using a current input, always short the V+ and I+ terminals. (Use the shorting bar provided with the Unit.)

DRT2-DA02



Note: The voltage and current output ranges (signals) are set with either the DIP switch or the Configurator settings.

DRT2-TS04□

Temperature Input Terminals



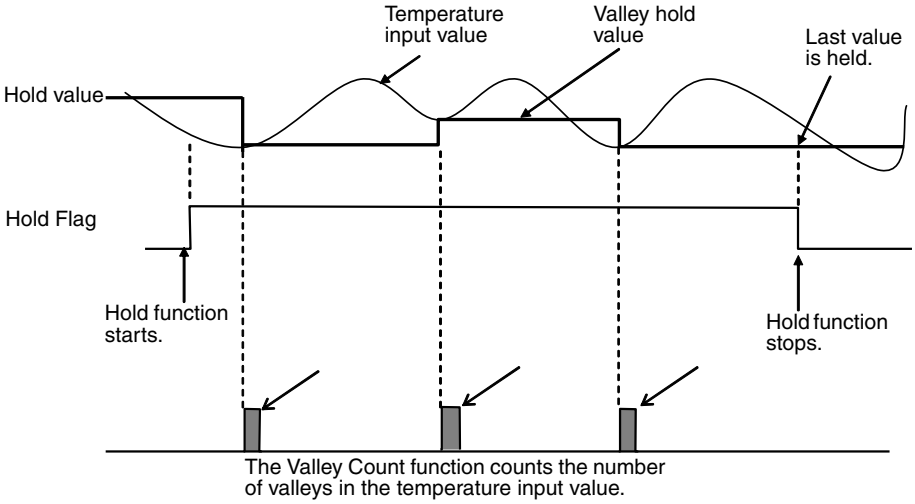
Measure temperatures. A wide range of temperature sensors is supported

- Four inputs
- Models for platinum resistance thermometers or thermocouples are available.
- Incorporating wire burnout detecting function.
- All inputs are insulated to one another

Smart Slave Functions

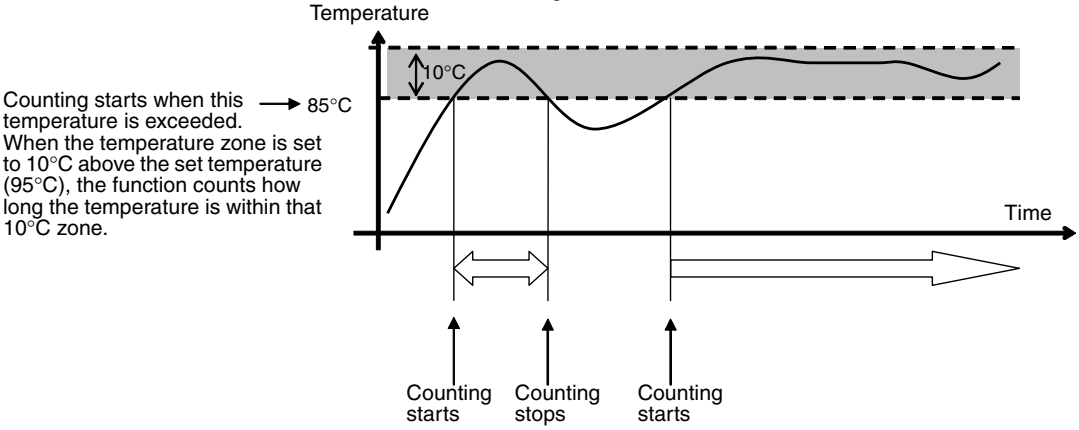
Top/Valley Count Function

The number of times the top or valley value is reached can be counted for an application that has fixed cycles of temperature changes. Explicit messages can be used to see if the number of times that is counted has exceeded a monitoring set value.



Temperature Range Timing Function

The length of time that the system is at a user-set temperature or within a user-set temperature range can be measured in seconds. Explicit messages can be used to see if the measured time has exceeded a monitoring set value.



Input Temperature Variation Detection Function

A relative comparison can be made between two inputs (0 to 3) and to detect temperature differences between two inputs or with a monitoring set value. Explicit messages can be used to see if the temperature difference has exceeded a monitoring set value.

Ordering Information

Classification	I/O points	Model
Temperature Input Terminal	4 inputs (Occupies 4 input words of the Master Unit)	DRT2-TS04T
		DRT2-TS04P

Specifications

Ratings

Model	DRT2-TS04T	DRT2-TS04P
Input type	Switchable between R, S, K1, K2, J1, J2, T, E, B, N, L1, L2, U, W, and PL2 types Configurator: Each input contact set separately. DIP switch: 4 points set at a time.	Switchable between PT, JPT, PT2, and JPT2 types Configurator: Each input contact set separately. DIP switch: 4 points set at a time.
Indicator accuracy	(Indicator value ±0.3% or ±1 °C, whichever is larger) ±1 digit max. (See note 2.)	Input range of –200 to 850 °C: (Indicator value ±0.3% or ±0.8 °C, whichever is larger) ±1 digit max. Input range of –200 to 200 °C: (Indicator value ±0.3% or ±0.5 °C, whichever is larger) ±1 digit max.
Conversion cycle	250 ms/4 points	
Temperature conversion data	Binary (4-digit hexadecimal, 8-digit hexadecimal for 1/100 display)	
Isolation method	Photocoupler isolation (between input and communications lines) Photocoupler isolation (between temperature input signals)	
I/O connection method	Terminal block connection	

Note: 1. Current flow to the Sensor is 0.35 mA when connected to the DRT2-TS04P.
2. Exceptional accuracy

Input type	Input accuracy
Less than –100 °C of K1, K2, T, or N	±2 °C ±1 digit max.
U, L1, L2	±2 °C ±1 digit max.
Less than 200 °C of R, S	±3 °C ±1 digit max.
Less than 400 °C of B	Not specified
W	(Command value ±0.3% or ±3 °C, whichever is larger) ±1 digit max.
PL2	(Command value ±0.3% or ±2 °C, whichever is larger) ±1 digit max.

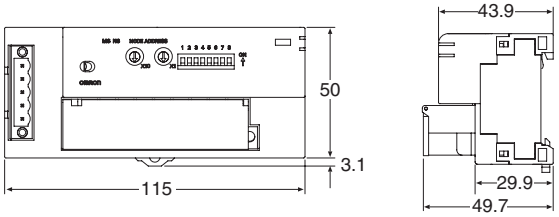
Characteristics

Model	DRT2-TS04T	DRT2-TS04P
Communications power supply voltage	11 to 25 VDC (supplied through communications connector)	
Current consumption	70 mA max. (24 VDC)	
Noise immunity	Conforms to IEC61000-4-4, 2.0 kV	
Vibration resistance	10 to 150 Hz, 0.7 mm double amplitude	
Shock resistance	150 m/s^2	
Dielectric strength	500 VAC between isolated circuits	
Insulation resistance	20 MΩ min. at 100 V DC (default value)	
Ambient temperature	Operating: –10 to 55°C (with no icing or condensation) Storage: –25 to 65°C	
Ambient operating humidity	25% to 85%	
Atmosphere	Must be free from corrosive gases.	
Mounting method	35-mm DIN track mounting	
Mounting strength	50 N (10 N in the DIN track direction)	
Terminal strength	Pulling: 50 N	
Weight	160 g max.	160 g max.

Dimension

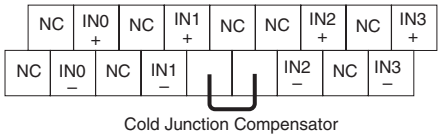
Note: All units are in millimeters unless otherwise indicated

DRT2-TS04

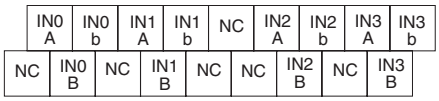


Terminal Arrangement

DRT2-TS04T

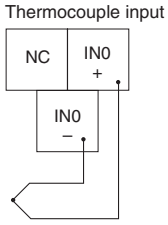


DRT2-TS04P

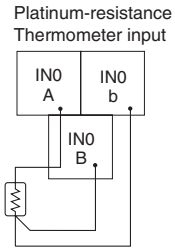


Wiring

DRT2-TS04T



DRT2-TS04P



DRT2-□D16S(-1)

Sensor Connector Terminals



New Slave Equipped with Industry-standard Sensor Connectors

- Equipped with the standard Smart Slave functions that provide powerful preventative maintenance and troubleshooting capabilities.
- Digital I/O Terminal compatible with industry-standard sensor connectors
- Connect sensors easily without special tools. Reduce time required for wiring.
- Load short-circuit detection.

Ordering Information

I/O type	Internal I/O common	Number of I/O points	I/O connections	Internal circuit power	Rated I/O power supply voltage	Model
Input	NPN (+ common)	16	Sensor connector	Supplied from the communications connector	Supplied from the communications connector	DRT2-ID16S
	PNP (– common)					DRT2-ID16S-1
I/O	NPN (+ common for inputs, – common for outputs)	8 inputs and 8 outputs			Supplied from external source for outputs	DRT2-MD16S
	PNP (– common for inputs, + common for outputs)					DRT2-MD16S-1

Specifications

Characteristics

Item	DRT2-ID16S(-1)	DRT2-MD16S(-1)
Communications power supply voltage	11 to 25 VDC	
Unit power supply voltage	Not required. (Supplied from the communications connector.)	
I/O power supply voltage	Supplied from the communications connector.	
Current consumption	Communications power supply: 230 mA max.	Communications power supply: 135 mA max.
Dielectric strength	500 VAC between isolated circuits	
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)	
Vibration resistance	10 to 56 Hz: 0.7-mm double amplitude 56 to 150 Hz: 50 m/s^2	
Shock resistance	150 m/s^2	
Mounting method	M4 screw mounting or 35-mm DIN track mounting	
Screw tightening torque	M4: 0.6 to 0.98 N·m	
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C	
Ambient humidity	Operating:35% to 85% (with no condensation)	
Weight	90 g max.	95 g max.

Input Ratings

Terminals with 16 inputs

Item	DRT2-ID16S	DRT2-ID16S-1
Internal I/O common	NPN	PNP
Number of inputs	16 inputs	
ON voltage	15 VDC min. between each input terminal and V	15 VDC min. between each input terminal and G
OFF voltage	5 VDC max. between each input terminal and V	5 VDC max. between each input terminal and G
OFF current	1 mA max.	
Input current	11 mA max./point (at 24 VDC) 3.0 mA min./point (at 11 VDC)	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits/ common	16 points/common	

Terminals with 8 Inputs and 8 Outputs

Item	DRT2-MD16S	DRT2-MD16S-1
Internal I/O common	NPN	PNP
Number of inputs	8	
ON voltage	9 VDC min. between each input terminal and V	9 VDC min. between each input terminal and G
OFF voltage	5 VDC max. between each input terminal and V	5 VDC max. between each input terminal and G
OFF current	1 mA max.	
Input current	11 mA max./point (at 24 VDC) 3.0 mA min./point (at 11 VDC)	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits/ common	8 points/common	
Sensor short-circuit detection current	100 mA min. (per input)	

Output Ratings

Terminals with 8 Inputs and 8 Outputs

Item	DRT2-MD16S	DRT2-MD16S-1
Internal I/O common	NPN	PNP
Number of inputs	8 (8 to 15)	
Rated output current	0.3 A/point, 2.4 A/ common	0.3 A/point, 1.6 A/ common
Residual voltage	2 VDC max. (0.3 A DC between output and G terminal)	2 VDC min. (0.3 A DC between input and V terminal)
Leakage current	0.1 mA max.	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits/ common	8 points/common	
Load short-circuit detection current	2.4 A min./common	1.6 A min./common

Connectors

OMRON Connectors

Model	Specifications	Compatible wire size
XN2A-1430	Spring-clamp style	28 to 20 AWG (0.08 to 0.5 mm^2) wire, 1.5 mm max. outer diameter including insulation

Tyco Electronics Connectors

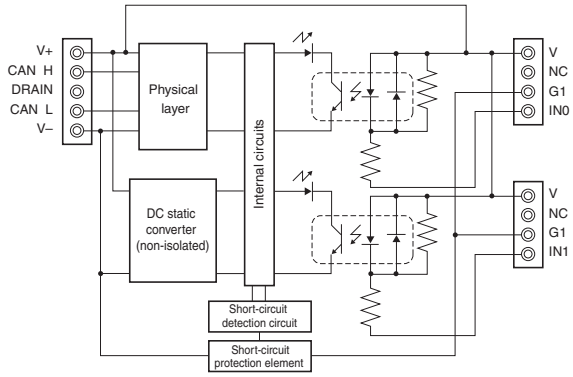
Model	Specifications	Compatible wire size
1-1473562-4	Red	28 to 24 AWG (0.08 to 0.2 mm^2) wire, 0.9 to 1.0 mm max. outer diameter including insulation
1473562-4	Yellow	24 to 22 AWG (0.2 to 0.3 mm^2) wire, 1.0 to 1.15 mm max. outer diameter including insulation
2-1473562-4	Blue	22 to 20 AWG (0.3 to 0.5 mm^2) wire, 1.15 to 1.35 mm max. outer diameter including insulation

Sumitomo 3M Connectors

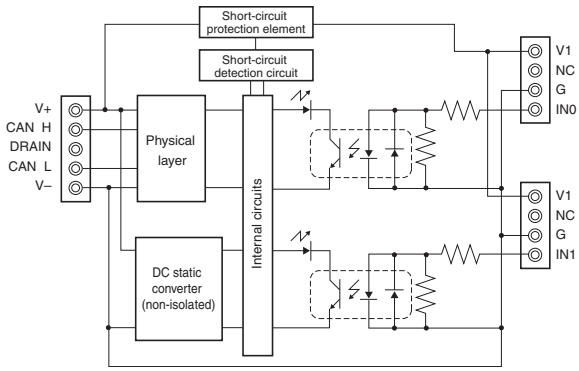
Model	Specifications	Compatible wire size
37104-3101-000FL	Red	26 to 24 AWG (0.14 to 0.2 mm^2) wire, 0.8 to 1.0 mm max. outer diameter including insulation
37104-3122-000FL	Yellow	26 to 24 AWG (0.14 to 0.2 mm^2) wire, 1.0 to 1.2 mm max. outer diameter including insulation
37104-3163-000FL	Orange	26 to 24 AWG (0.14 to 0.2 mm^2) wire, 1.2 to 1.6 mm max. outer diameter including insulation
37104-2124-000FL	Green	22 to 20 AWG (0.3 to 0.5 mm^2) wire, 1.0 to 1.2 mm max. outer diameter including insulation
37104-2165-000FL	Blue	22 to 20 AWG (0.3 to 0.5 mm^2) wire, 1.2 to 1.6 mm max. outer diameter including insulation
37104-2206-000FL	Gray	22 to 20 AWG (0.3 to 0.5 mm^2) wire, 1.6 to 2.0 mm max. outer diameter including insulation

Internal Circuit Configuration

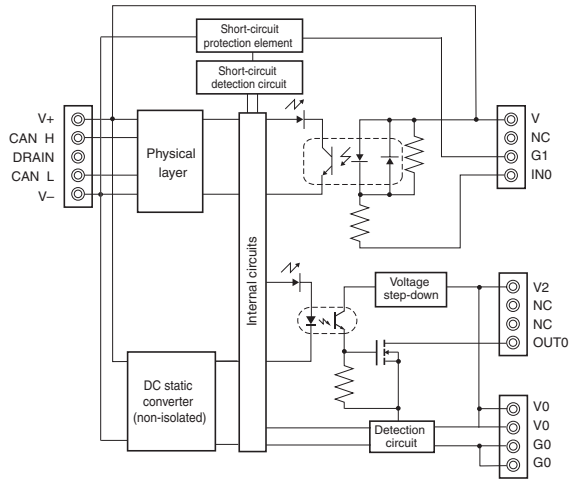
DRT2-ID16S (NPN)



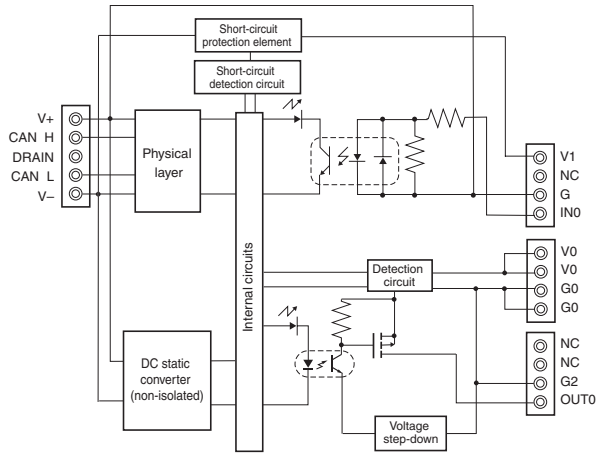
DRT2-ID16S-1 (PNP)



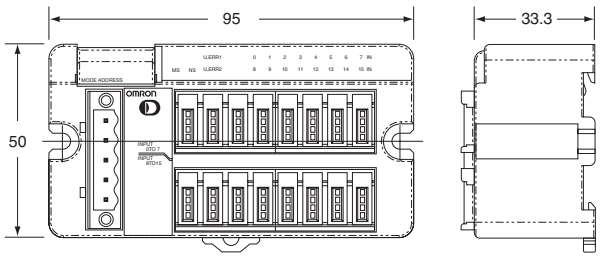
DRT2-MD16S (NPN)



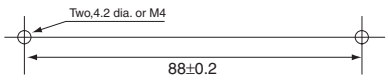
DRT2-MD16S-1 (PNP)



Dimensions

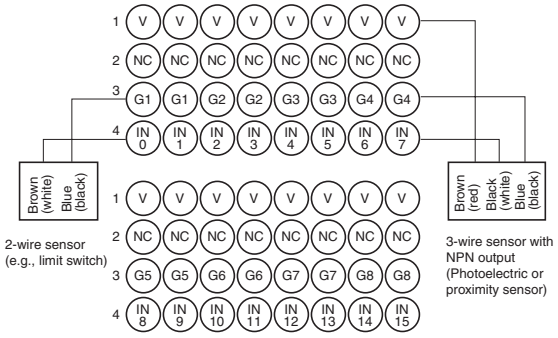


Mounting Hole Dimensions

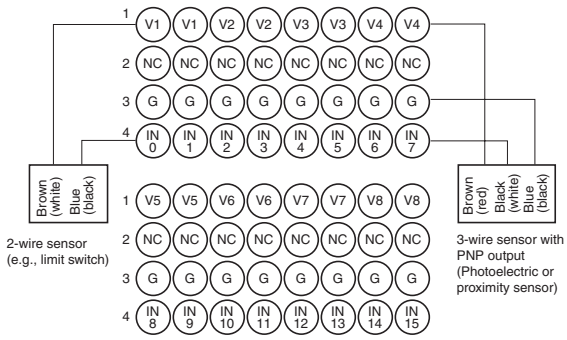


Wiring

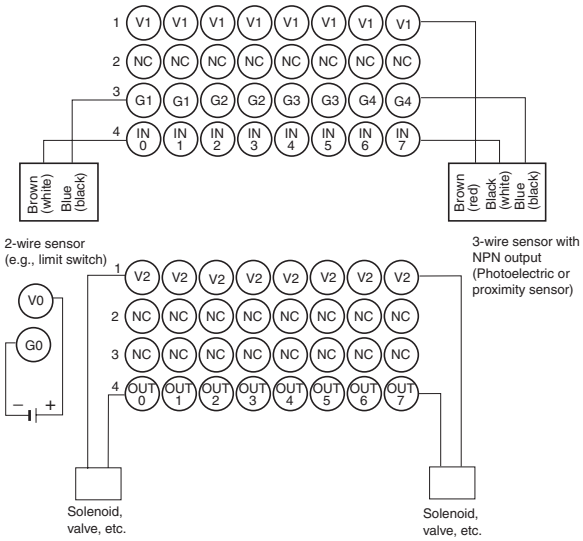
DRT2-ID16S (NPN)



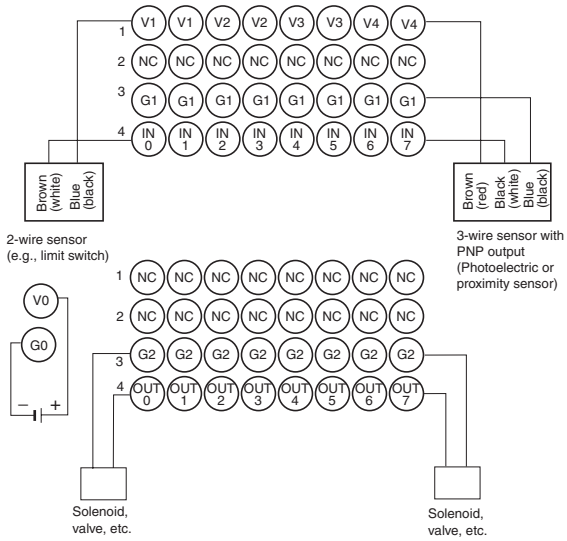
DRT2-ID16S-1 (PNP)



DRT2-MD16S (NPN)

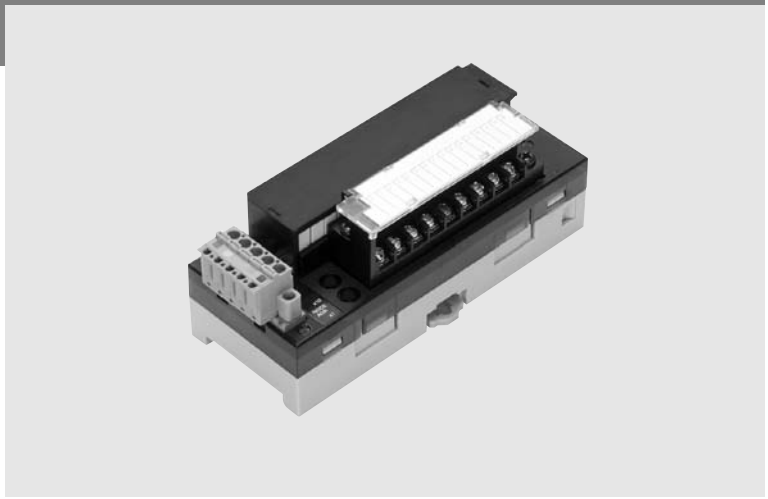


DRT2-MD16S-1 (PNP)



DRT2-ROS16

Relay output Terminal



I/O terminal enhances maintenance capabilities due replaceable relays.

- Smart DeviceNet slave that provides preventive maintenance and trouble shooting information
- 3A replaceable relays
- Relays replaced easily, without special tools needed
- Units can be extended with the XWT I/O blocks, reducing the number of network nodes required

Ordering information

I/O type	Number of I/O	I/O connections	Rated load	Rated carry current	Applicable relay	Model
Output	16	M3 screw terminals	250 V AC, 2 A, 8-A common 30 V DC, 2 A, 8-A common	3 A	DRTANY5W-K	DRT2-ROS16

Specifications

Common Specifications

Item	Specifications
Communication power supply voltage	11 to 25 V DC (Supplied from the communications connector)
Noise immunity	Conforms to IEC61000-4-4. 2kV (power lines)
Vibration resistance	10 to 55 Hz, 0.7-mm double amplitude
Shock resistance	100 m/s²
Dielectric strength	500 V AC (between isolated circuits)
Insulation resistance	20 MW min. at 250 V DC
Ambient temperature	-10 to +55°C
Ambient humidity	25% to 85% (with no condensation)
Operating environment	No corrosive gases
Storage temperature	-25 to +65°C
Mounting	35-mm DIN Track mounting
Screw thightening torque	M2 (communications connector without set screws): 0.26 to 0.3 Nm M3 (screw terminals): 0.3 to 0.5 Nm

Output Specifications (for One Relay)

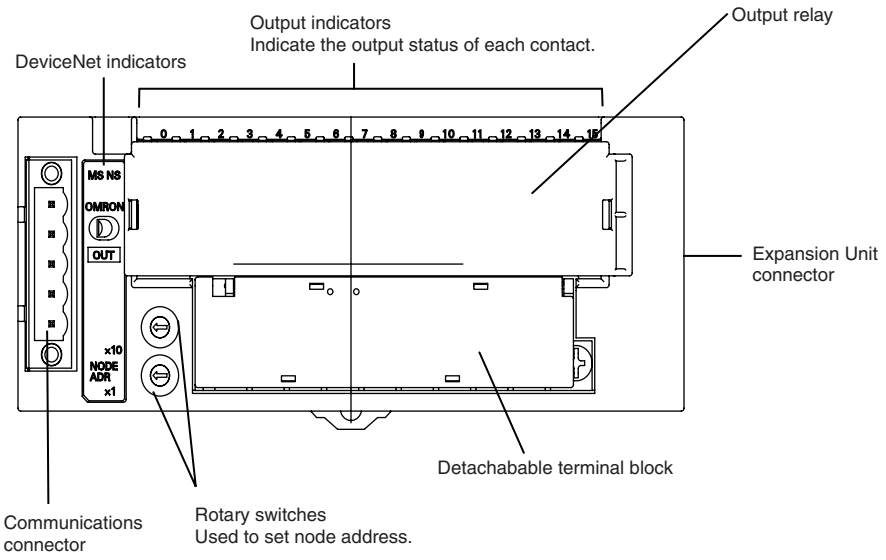
Item	Specifications
Relay	DRTANY5W-K
Rated load	Resistive load 250 V AC, 2 A, 8-A common 30 V DC, 2 A, 8-A common
Rated carry current	3 A[1]
Maximum switching voltage	250 V AC, 125 V DC
Maximum switching current	3 A
Maximum switching capacity	75o V AC, 90 V DC
Maximum applicable load (reference value)	5 V DC at 1 mA

1. The rated carry current can be as high as 3 A (10-A common) if the number of terminal that turn ON simultaneously is four or less per common, or if the ambient temperature is 45°C or lower.

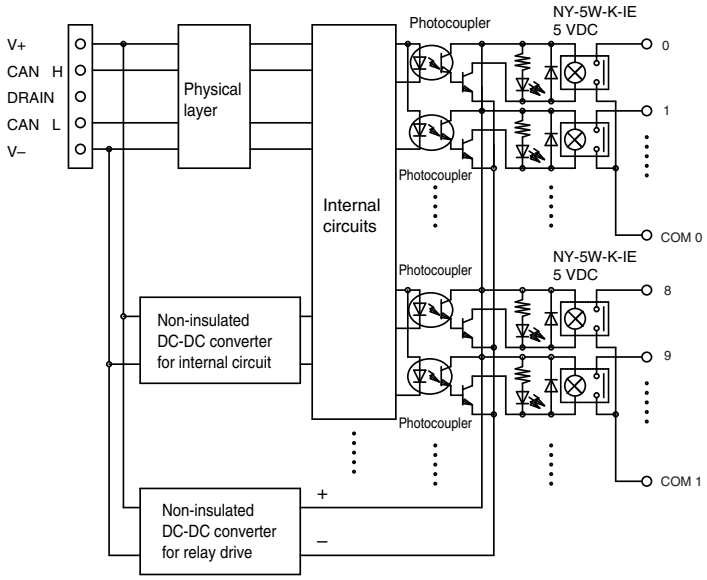
Real Life Expectancy

Item	Specifications
Mechanical life expectancy	20,000,000 times min.
Electrical life expectancy	100,000 times min.

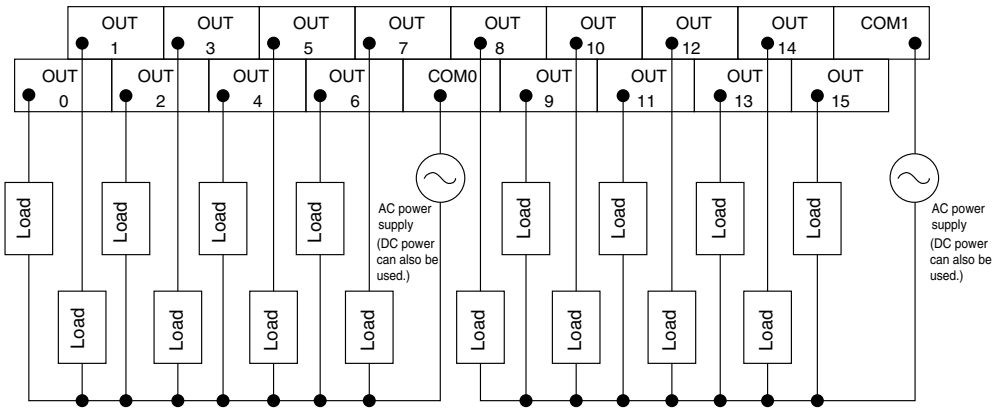
Nomenclature



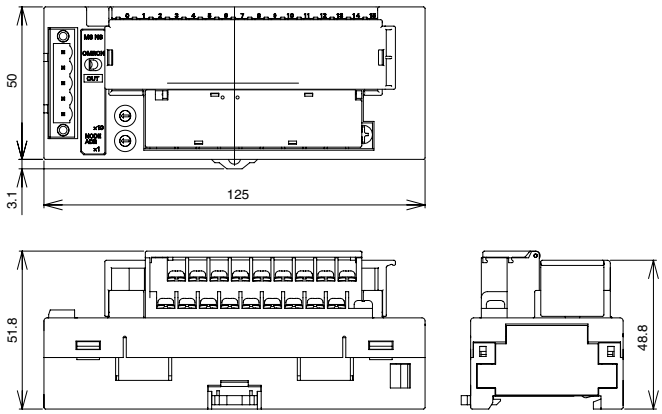
Internal Circuit Diagrams



Wiring



Dimensions



Engeneering Data

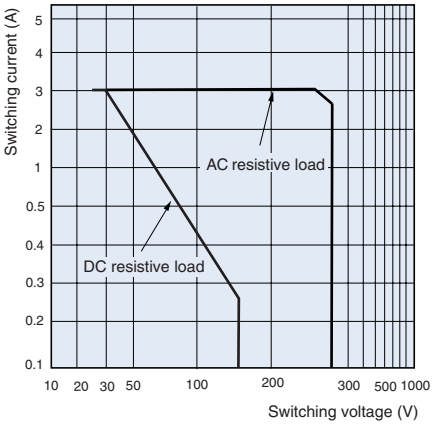
Reference Data

The data shown below is based on actual measurements of samples taken from the production line. There is some degree of variation in relay characteristics and so this data should be used only for reference purposes.

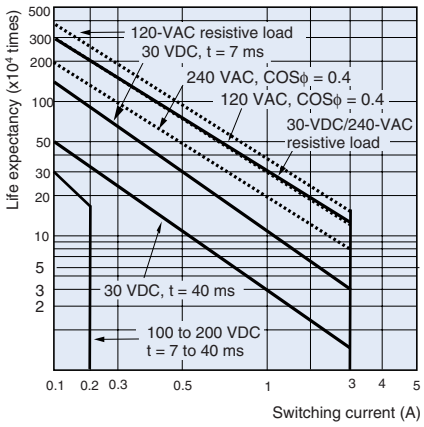
Note: 1. With a current between 2 and 3 A (common: 8 to 10 A), either ensure that the number of points per common that simultaneously turn ON does not exceed 4 or ensure that the temperature does not exceed 45°C. There are no restrictions if the current does not exceed 2 A (common: 8 A).

2. Using at the rated current value assures normal unit operation but does not assure the life expectancy of the relay itself. The relay's life expectancy varies greatly with the operating temperature, type of load, and switching conditions, and so be sure to check the relay characteristics under the actual conditions.

Maximum Switching Capacity

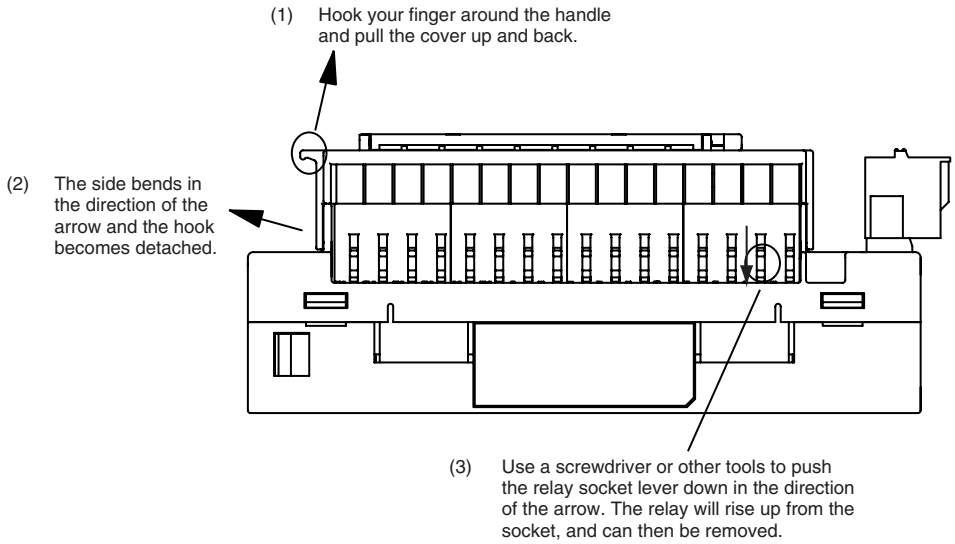


Life Expectancy Curve



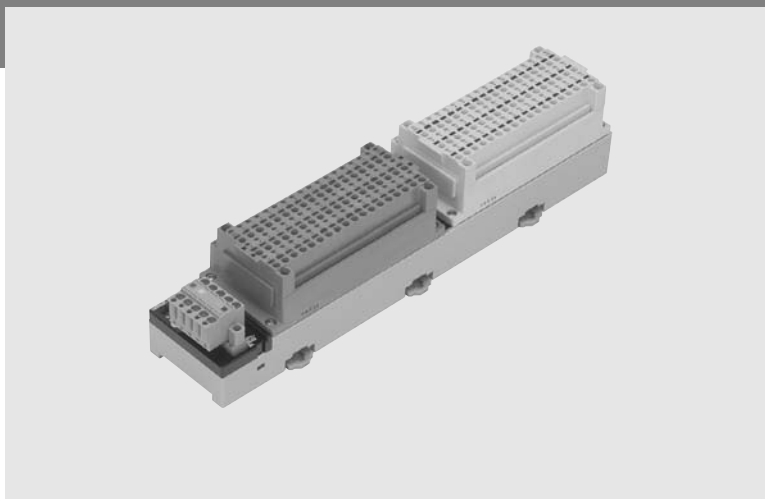
Relay Replacement Method

When replacing output relays, remove the cover as shown below.



DRT2-□D32SL(-1)/□D32SLH(-1)

Screw-less Clamp Terminals



Reduced Wiring and Labor on Factory Sites with Screw-less Terminal Wiring

- Screw-less (M3) structure eliminates tightening work.
- Removable terminal blocks for easier maintenance.
- Single-step wiring by simply inserting pole terminals.

Smart Slave Functions

I/O Short and Disconnection Detection. Communicate Detection Results to Host.

Improved Monitor Functions

- Operation time monitor
- Contact operation counter
- Unit conduction time monitor
- Total ON time monitor
- Unit comments
- Connected device comments
- Network power supply voltage monitor
- I/O power status monitor

Slave and Connected Device Comments

Expansion I/O Units Can Be Added.

Shared Internal and Communications Power Supply

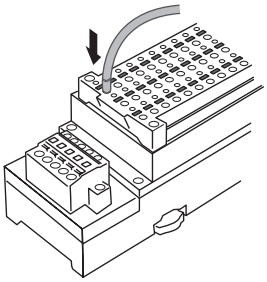
- Reduces wiring. (I/O power supplied externally.)

Automatic Detection of Communications Speed

Power-ON Inrush Current Protection on Input and I/O Terminals

Just Insert Pole Terminals to Complete Wiring

One Step



Ordering Information

Short/disconnection detection	I/O type	Internal I/O common	Number of I/O points	I/O terminals	Internal circuit power	Rated I/O power supply voltage	Model
Supported	Inputs	NPN (+ common)	32	Clamp terminals	Supplied from communications connector.	24 VDC	DRT2-ID32SLH
		PNP (– common)					DRT2-ID32SLH-1
	Outputs	NPN (+ common)					DRT2-OD32SLH
		PNP (– common)					DRT2-OD32SLH-1
	I/O	NPN (+ common for inputs, – common for outputs)	16 inputs and 16 outputs				DRT2-MD32SLH
		PNP (– common for inputs, + common for outputs)					DRT2-MD32SLH-1
Not supported	Inputs	NPN (+ common)	32				DRT2-ID32SL
		PNP (– common)					DRT2-ID32SL-1
	Outputs	NPN (+ common)					DRT2-OD32SL
		PNP (– common)					DRT2-OD32SL-1
	I/O	NPN (+ common for inputs, – common for outputs)	16 inputs and 16 outputs				DRT2-MD32SL
							DRT2-MD32SL-1

Specifications

Terminals with 32 Transistor Inputs (Input Ratings)

Item	DRT2-ID32SL	DRT2-ID32SL-1	DRT2-ID32SLH	DRT2-ID32SLH-1
Internal I/O common	NPN	PNP	NPN	PNP
Input points	32 inputs			
I/O power supply voltage	20.4 to 26.4 (24 VDC −15% to +10%)			
Input current	24 VDC: 6.0 mA max./point, 17 VDC: 3.0 mA max./point			
Input resistance	4 kΩ			
ON delay time	1.5 ms max.			
OFF delay time	1.5 ms max.			
ON voltage	15 VDC min. (between input and V terminal)	15 VDC min. (between input and G terminal)	15 VDC min. (between input and V terminal)	15 VDC min. (between input and G terminal)
OFF voltage	5 VDC max. (between input and V terminal)	5 VDC max. (between input and G terminal)	5 VDC max. (between input and V terminal)	5 VDC max. (between input and G terminal)
ON current	3 mA min.			
OFF current	1 mA max.			
Circuits per common	16			
Power short-circuit protection	---		Operates at 50 mA/point min.	
Disconnection detection	---		Operates at 0.3 mA/point max.	

Terminals with 32 Transistor Outputs (Output Rating)

Item	DRT2-OD32SL	DRT2-OD32SL-1	DRT2-OD32SLH	DRT2-OD32SLH-1
Internal I/O common	NPN	PNP	NPN	PNP
Output points	32 outputs			
I/O power supply voltage	20.4 to 26.4 (24 VDC −15% to +10%)			
Rated output current	0.5 A/point, 4.0 A/common (See note.)			
Residual voltage	1.2 V max.			
Leakage current	0.1 mA max.		0.1 mA max.	
ON delay time	0.5 ms max.			
OFF delay time	1.5 ms max.			
Disconnection detection	---		Operates at current consumption of 3 mA/point max. (Not detected at 3 mA or higher.)	
Output for errors	According to hold/clear setting for errors (default: clear)			

Input Ratings with 16 Transistor Inputs/16 Transistor Outputs

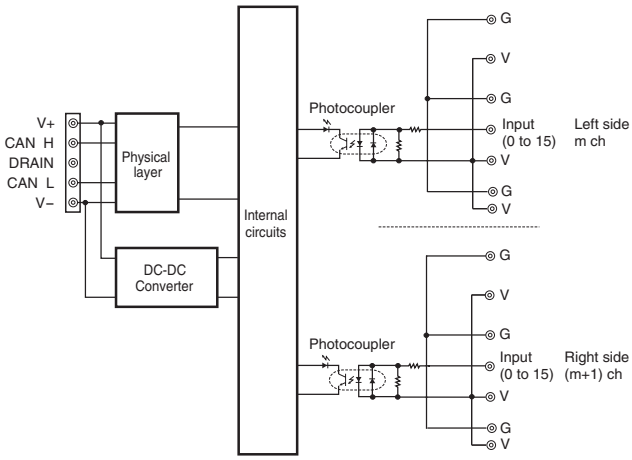
Item	DRT2-MD32SL	DRT2-MD32SL-1	DRT2-MD32SLH	DRT2-MD32SLH-1
Internal I/O common	NPN	PNP	NPN	PNP
I/O points	16 inputs			
I/O power supply voltage	20.4 to 26.4 (24 VDC −15% to +10%)			
Input current	24 VDC: 6.0 mA max./point, 17 VDC: 3.0 mA max./point			
Input resistance	4 kΩ			
ON delay time	1.5 ms max.			
OFF delay time	1.5 ms max.			
ON voltage	15 VDC min. (between input and V terminal)	15 VDC min. (between input and G terminal)	15 VDC min. (between input and V terminal)	15 VDC min. (between input and G terminal)
OFF voltage	5 VDC max. (between input and V terminal)	5 VDC max. (between input and G terminal)	5 VDC max. (between input and V terminal)	5 VDC max. (between input and G terminal)
ON current	3 mA min.			
OFF current	1 mA max.			
Circuits per common	16			
Power short-circuit protection	---		Operates at 50 mA/point min.	
Disconnection detection	---		Operates at 0.3 mA/point max.	

Output Ratings with 16 Transistor Inputs/16 Transistor Outputs

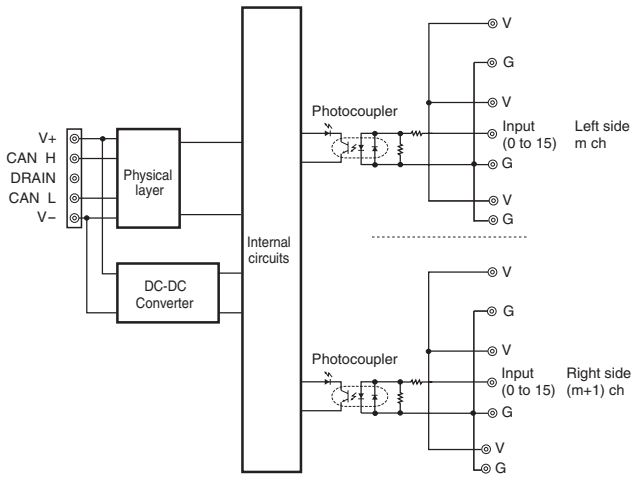
Item	DRT2-MD32SL	DRT2-MD32SL-1	DRT2-MD32SLH	DRT2-MD32SLH-1
Internal I/O common	NPN	PNP	NPN	PNP
Output points	16 outputs			
I/O power supply voltage	20.4 to 26.4 (24 VDC −15% to +10%)			
Rated output current	0.5 A/point, 4.0 A/common (See note.)			
Residual voltage	1.2 V max.			
Leakage current	0.1 mA max.			
ON delay time	0.5 ms max.			
OFF delay time	1.5 ms max.			
Disconnection detection	---		Operates at current consumption of 3 mA/point max. (Not detected at 3 mA or higher.)	
Output for errors	According to hold/clear setting for errors (default: clear)			

Internal Circuit Configuration

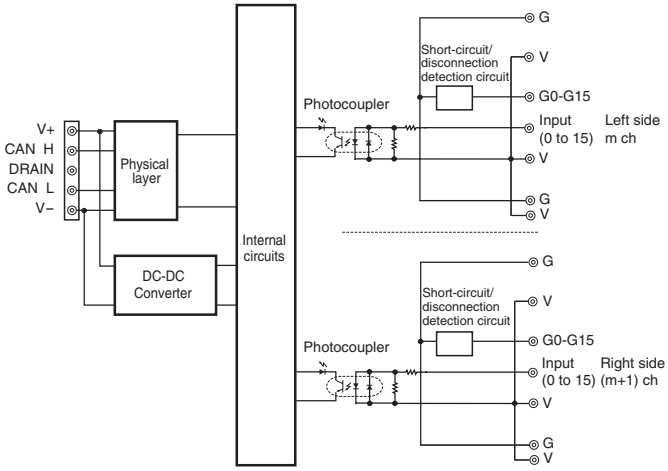
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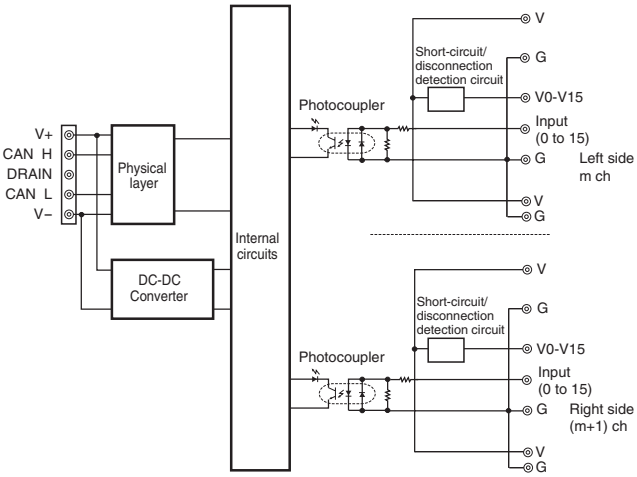
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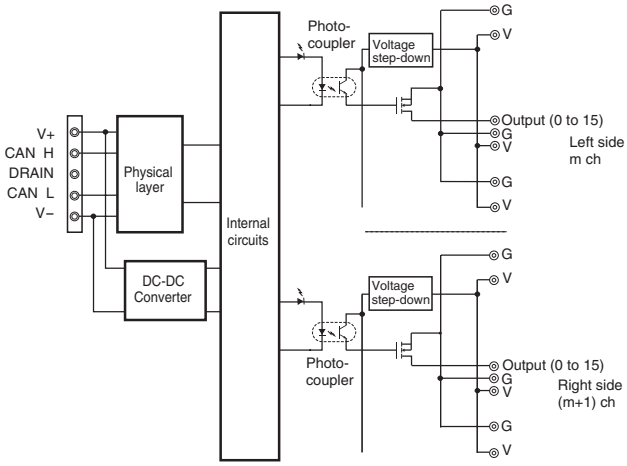
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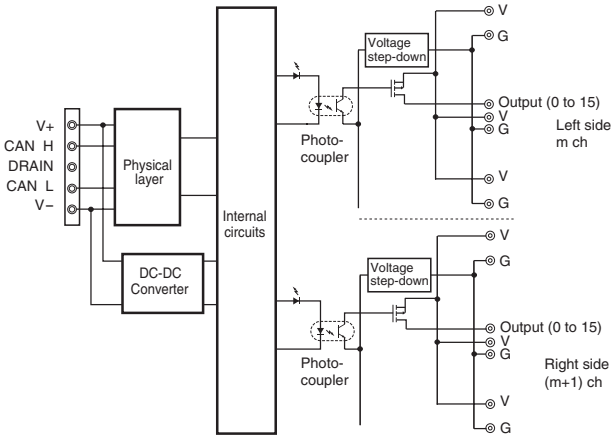
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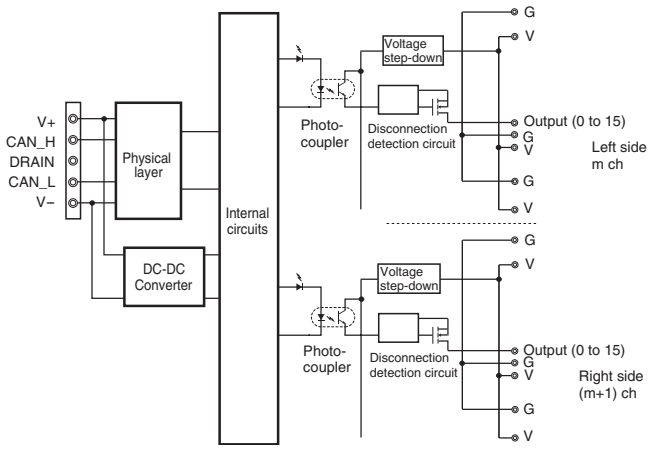
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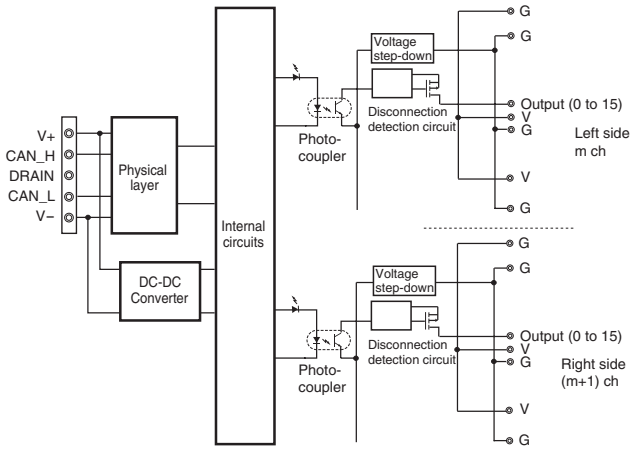
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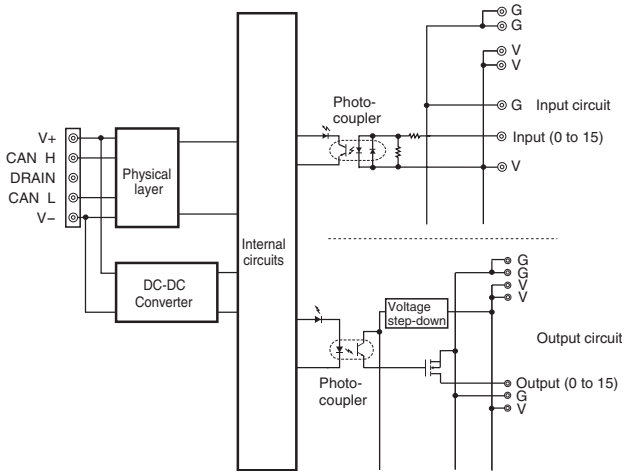
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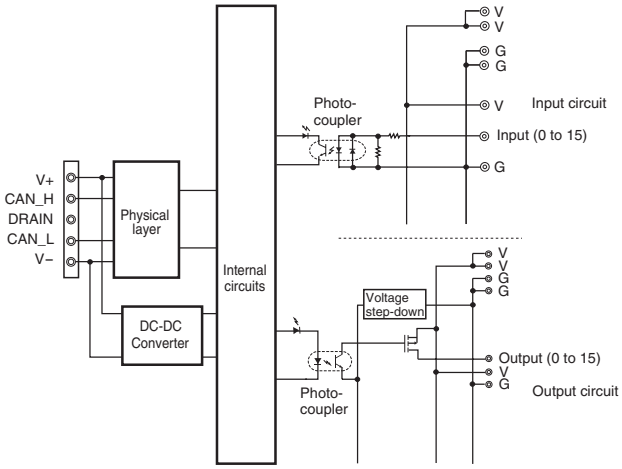
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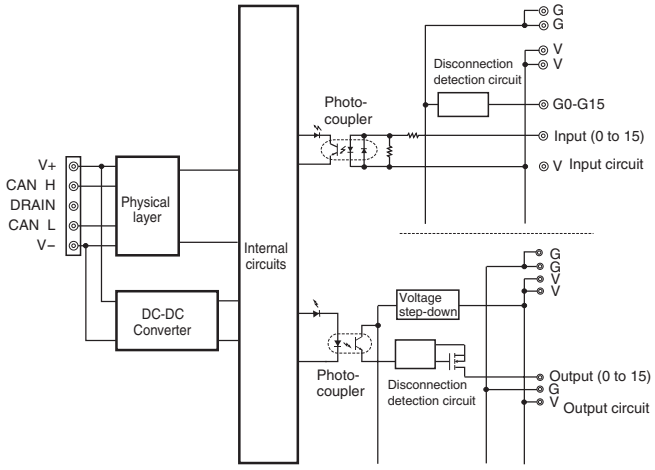
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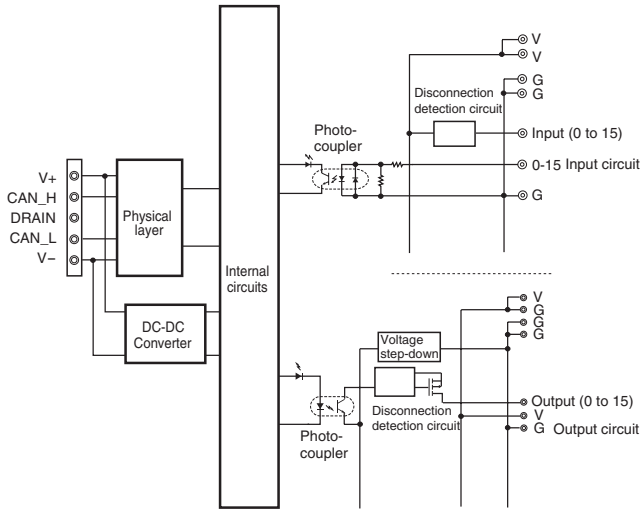
DRT2-MD32SL-1



DRT2-MD32SLH

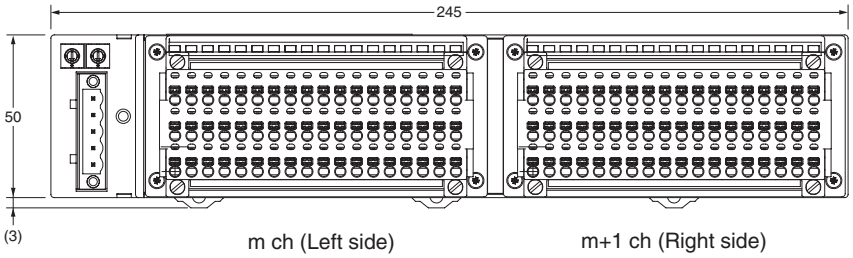


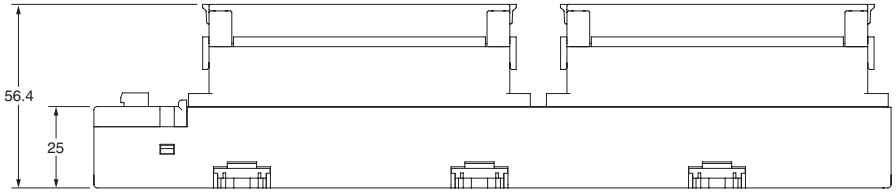
DRT2-MD32SLH-1



Dimensions (Unit: mm)

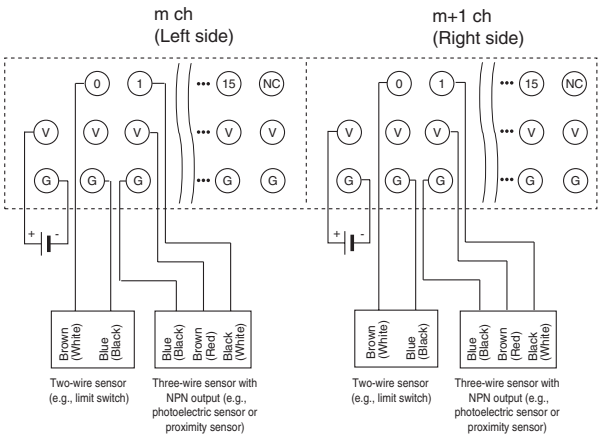
DRT2-ID32SLH(-1)
DRT2-OD32SLH(-1)
DRT2-MD32SLH(-1)
DRT2-ID32SL(-1)
DRT2-OD32SL(-1)
DRT2-MD32SL(-1)



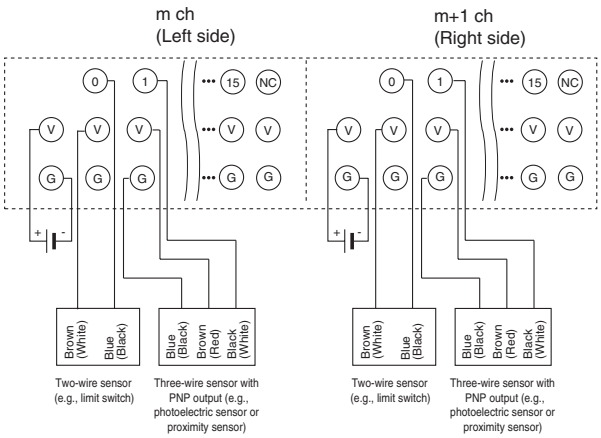


Wiring

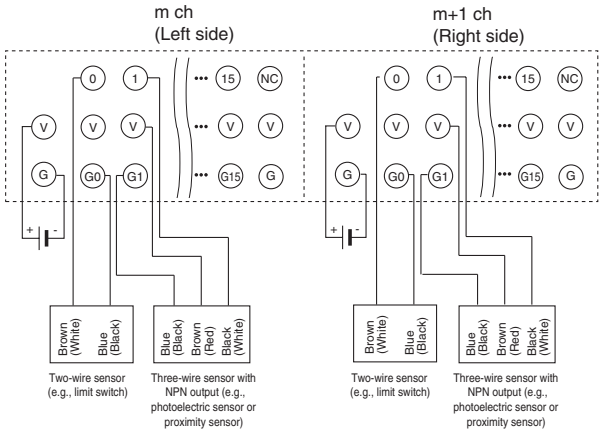
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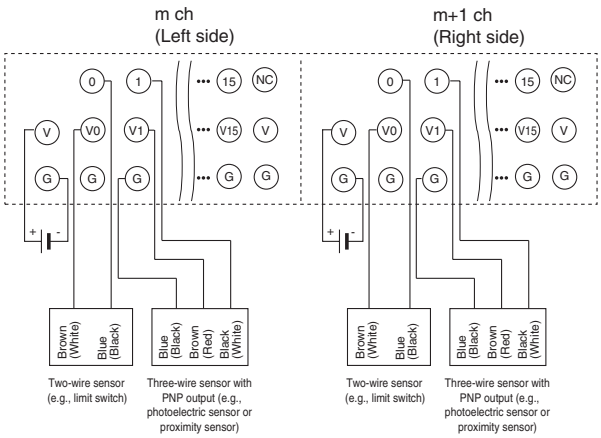
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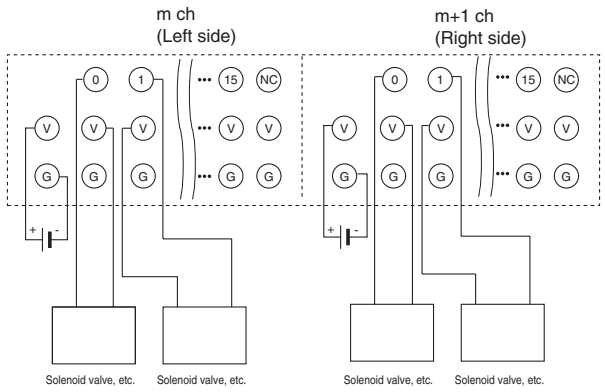
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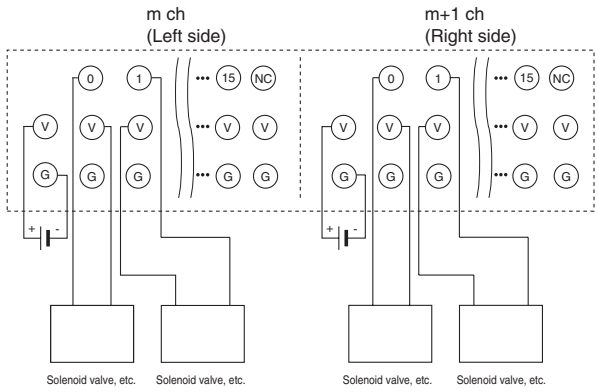
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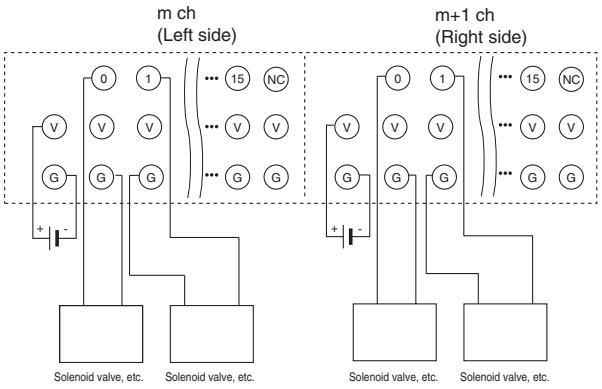
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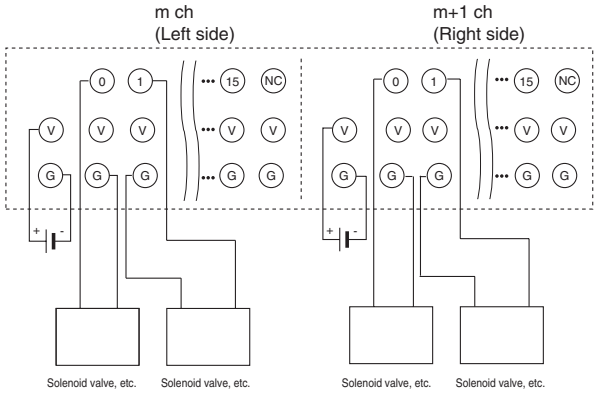
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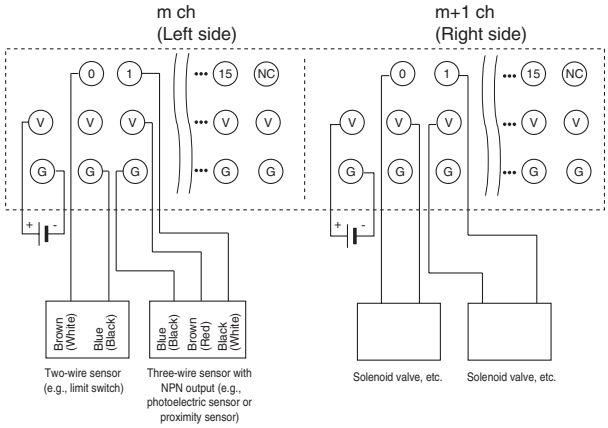
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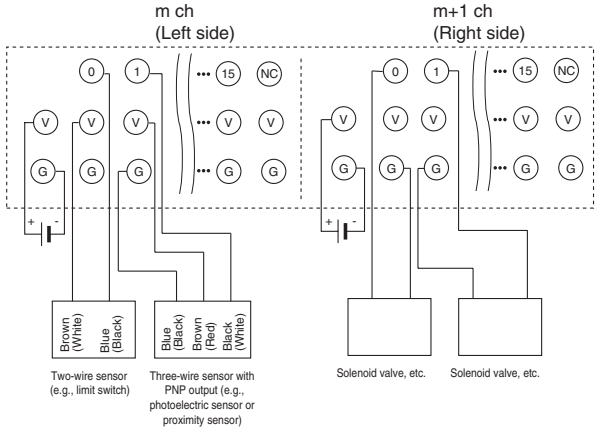
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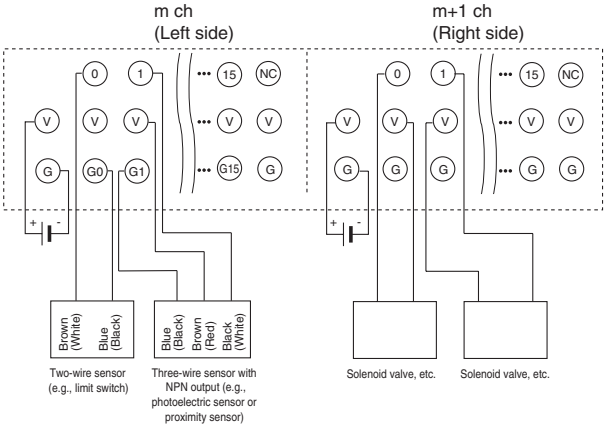
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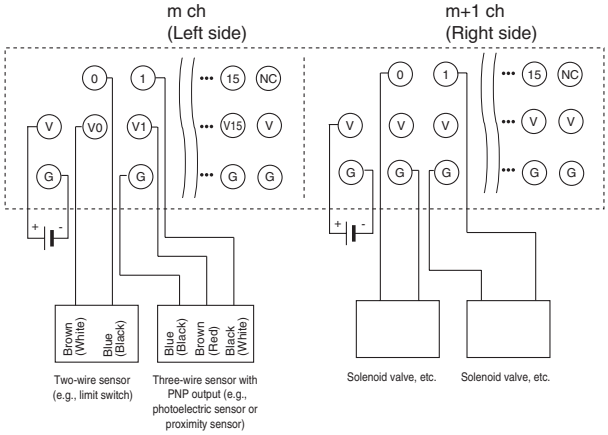
DRT2-MD32SL-1



DRT2-MD32SLH



DRT2-MD32SLH-1



DRT2-□D16TA(-1)

3-tier Connection Terminals



Terminals with 3-tier Terminal Blocks Added to DRT2 Smart Slaves

- Easy wiring with no sharing of terminals. Easy-to-understand wiring locations.
- No relay terminal block terminals required.
- Removable cassette-type circuit sections.

Smart Slave Functions

Improved Monitor Functions

- Contact operation counter
- Unit conduction time monitor
- Total ON time monitor
- Network power supply voltage monitor
- Communications error log
- Last maintenance date
- Operation time monitor

Slave and Connected Device Comments

Automatic Detection of Communications Speed

Input filter on Input and I/O Terminals

Power-ON Inrush Current Protection on Input and I/O Terminals

Ordering Information

I/O type	Internal I/O common	Number of I/O points	I/O terminals	Internal circuit power	Rated I/O power supply voltage	Model
Inputs	NPN (+ common)	16	M3 terminal block	Supplied from communications connector.	24 VDC	DRT2-ID16TA
	PNP (– common)					DRT2-ID16TA-1
Outputs	NPN (+ common)					DRT2-OD16TA
	PNP (– common)					DRT2-OD16TA-1
I/O	NPN (+ common for inputs, – common for outputs)	8 inputs and 8 outputs				DRT2-MD16TA
	PNP (– common for inputs, + common for outputs)					DRT2-MD16TA-1

Specifications

Input Ratings

Terminals with 16 Transistor Inputs

Item	DRT2-ID16TA	DRT2-ID16TA-1
Internal I/O common	NPN	PNP
I/O points	16 inputs	
ON voltage	15 VDC min. (between input and V terminal)	15 VDC min. (between input and G terminal)
OFF voltage	5 VDC max. (between input and V terminal)	5 VDC max. (between input and G terminal)
OFF current	1.0 mA max.	
Input current	24 VDC: 6.0 mA max./point 17 VDC: 3.0 mA max./point	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Circuits per common	8	

Terminals with 8 Transistor Inputs and 8 Transistor Outputs

Item	DRT2-MD16TA	DRT2-MD16TA-1
Internal I/O common	NPN	PNP
I/O points	8 inputs	
ON voltage	15 VDC min. (between input and V terminals)	15 VDC min. (between input and G terminals)
OFF voltage	5 VDC max. (between input and V terminals)	5 VDC max. (between input and G terminals)
OFF current	1.0 mA max.	
Input current	24 VDC: 6.0 mA max./point 17 VDC: 3.0 mA max./point	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
Circuits per common	8	

Output Ratings

Terminals with 16 Transistor Outputs

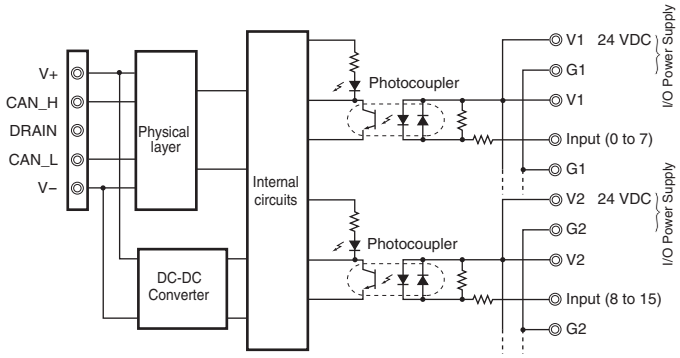
Item	DRT2-OD16TA	DRT2-OD16TA-1
Internal I/O common	NPN	PNP
I/O points	16 outputs	
Rated output voltage	0.5 A/point	
Residual voltage	1.2 VDC max. (0.5 A DC between output and G terminal)	1.2 VDC min. (0.5 A DC between input and V terminal)
Leakage current	0.1 mA max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Circuits per common	8	

Terminals with 8 Transistor Inputs and 8 Transistor Outputs

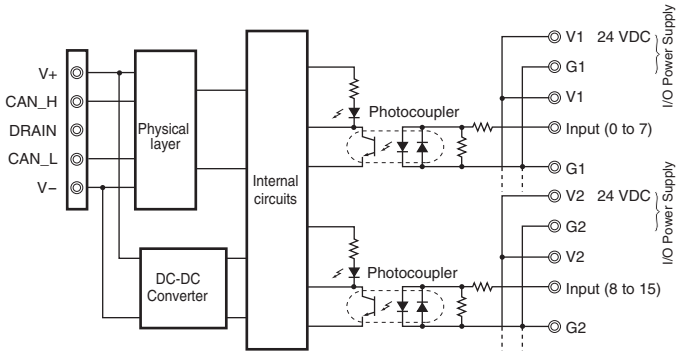
Item	DRT2-MD16TA	DRT2-MD16TA-1
Internal I/O common	NPN	PNP
I/O points	8 outputs	
Rated output voltage	0.5 A/point	
Residual voltage	1.2 VDC max. (0.5 A DC between output and G terminal)	1.2 VDC min. (0.5 A DC between input and V terminal)
Leakage current	0.1 mA max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	

Internal Circuit Configuration

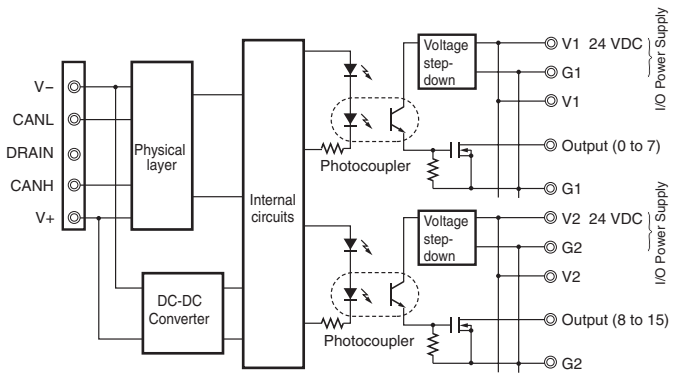
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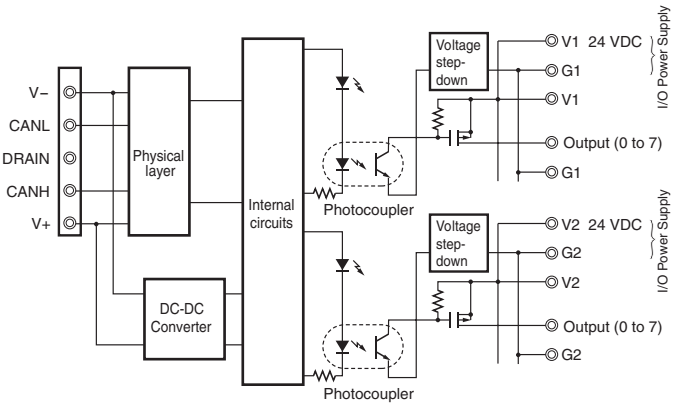
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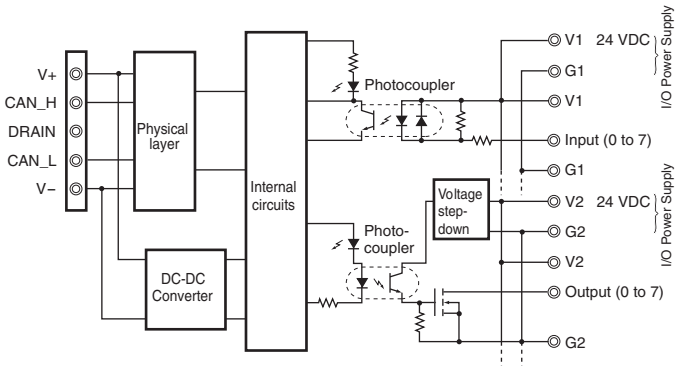
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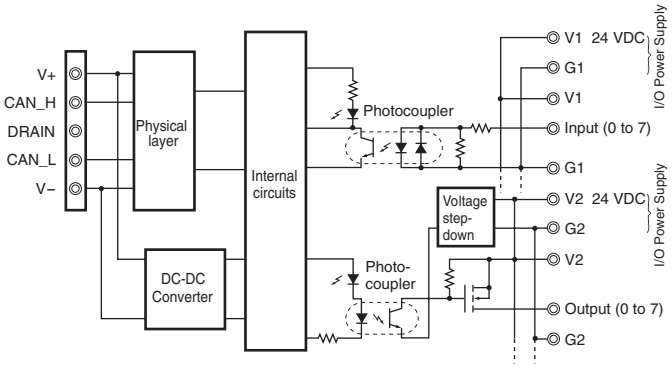
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DRT2-MD16TA

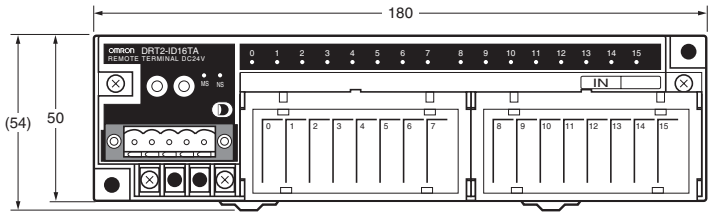


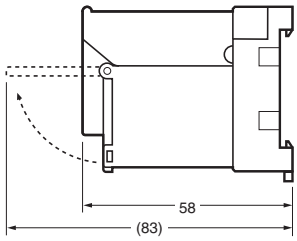
DRT2-MD16TA-1



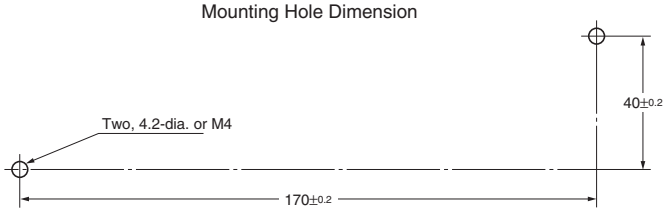
Dimensions (Unit: mm)

DRT2-ID16TA(-1)
DRT2-OD16TA(-1)
DRT2-MD16TA(-1)





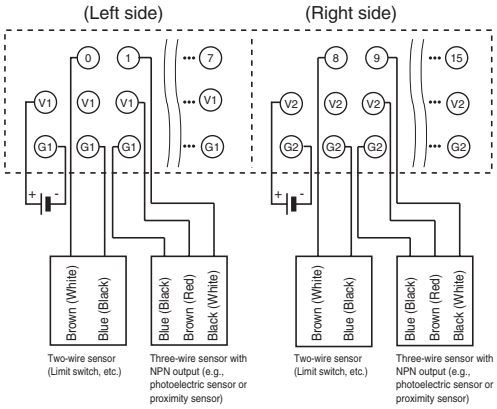
Mounting Hole Dimension



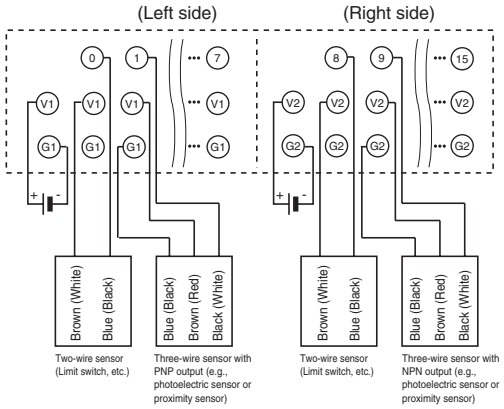
Dimensions in parentheses are reference values.

Wiring

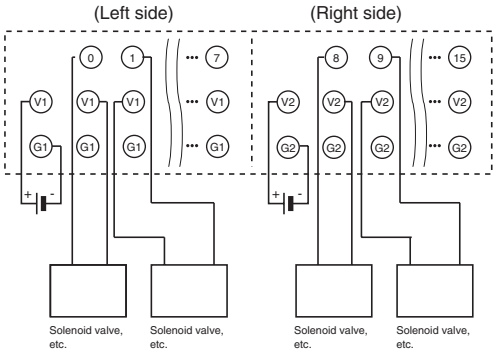
DRT2-ID16TA



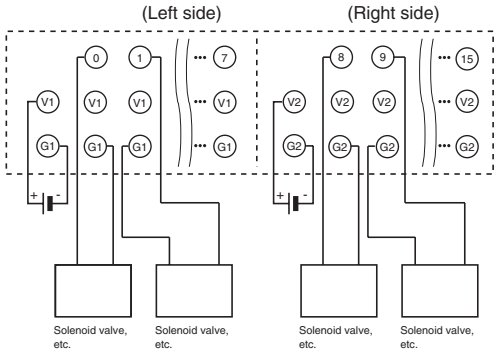
DRT2-ID16TA-1



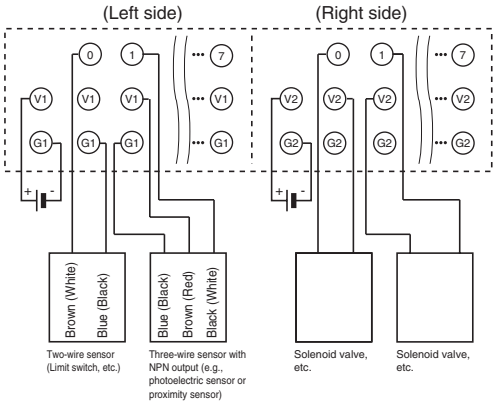
DRT2-OD16TA



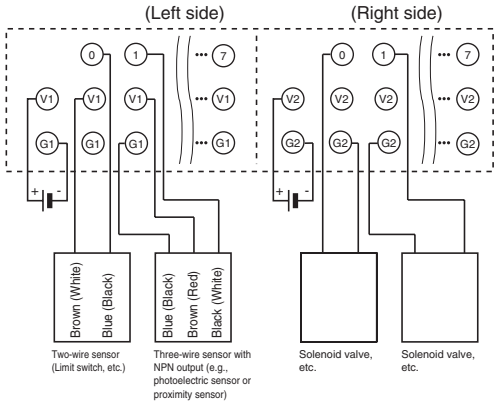
DRT2-OD16TA-1



DRT2-MD16TA



DRT2-MD16TA-1



DRT1-□D08(-1)/-MD16

8 Points I/O Terminals



Compact 8-point and 16-point Transistorized Terminals

- Compact
  (8-point models: 125 x 40 x 50 mm (W x H x D),
  16-point models: 150 x 40 x 50 mm (W x H x D))
- Two independent power supplies can be used because the I/O terminals are insulated from the internal circuits.
- DIN rail mounting and screw mounting are available.
- Approved by UL and CSA.

Ordering Information

I/O classification	Internal I/O circuit common	I/O points	I/O connections	Internal circuit rated voltage	I/O rated voltage	Model
Input	NPN (+ common)	8	M3 terminal block	24 V DC	24 V DC	DRT1-ID08
	PNP (– common)					DRT1-ID08-1
Output	NPN (– common)					DRT1-OD08
	PNP (+ common)					DRT1-OD08-1
I/O	NPN inputs (inputs: + common; outputs: – common)	8 inputs and 8 outputs				DRT1-MD16

Specifications

Ratings

Input

Item		DRT1-ID(-1)/DRT1-MD
Input current		10 mA max./point
ON delay time		1.5 ms max.
OFF delay time		1.5 ms max.
ON voltage	NPN	15 V DC min. between each input terminal and V
	PNP	15 V DC min. between each input terminal and G
OFF voltage	NPN	5 V DC max. between each input terminal and V
	PNP	5 V DC max. between each input terminal and G
OFF current		1 mA max.
Insulation method		Photocoupler
Input indicators		LED (yellow)

Output

Item	DRT1-OD(-1)/DRT1-MD
Rated output current	0.3 A/point (See note.)
Residual voltage	1.2 V max.
Leakage current	0.1 mA max.
Insulation method	Photocoupler
Output indicators	LED (yellow)

Note: Do not connect the DRT1-OD16 (-1) to loads consuming a total current exceeding 2.4 A.

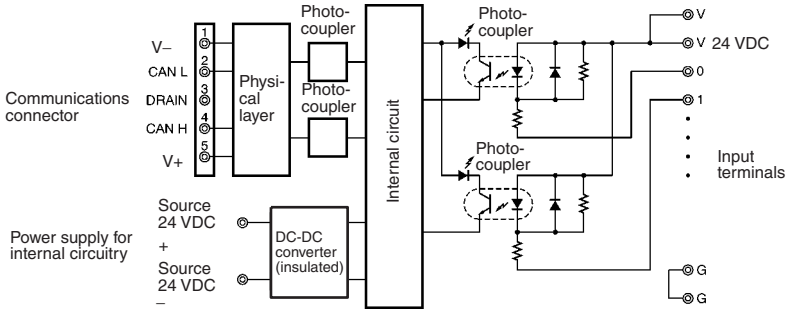
Characteristics

Communications power supply voltage	11 to 25 V DC
Internal power supply voltage	20.4 to 26.4 V DC (24 V DC $^{+10\%}/_{-15\%}$)
I/O power supply voltage	
Current consumption (See note.)	Communications:30 mA max. (25 mA max. for DRT1-MD16) Internal circuit:50 mA max. at 24 V DC (See note.)
Dielectric strength	500 V AC for 1 min (1-mA sensing current between insulated circuits)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Malfunction:200 m/s^2 Destruction:300 m/s^2
Mounting strength	No damage when 50 N pull load was applied for 10 s in all directions (10 N min. in the DIN rail direction)
Terminal strength	No damage when 50 N pull load was applied for 10 s
Screw tightening torque	0.6 to 1.18 N • m
Ambient temperature	Operating:0°C to 55°C (with no icing or condensation) Storage:–20°C to 65°C (with no icing or condensation)
Ambient humidity	Operating:35% to 85%
Weight	8-point model:135 g max. 16-point model:170 g max.

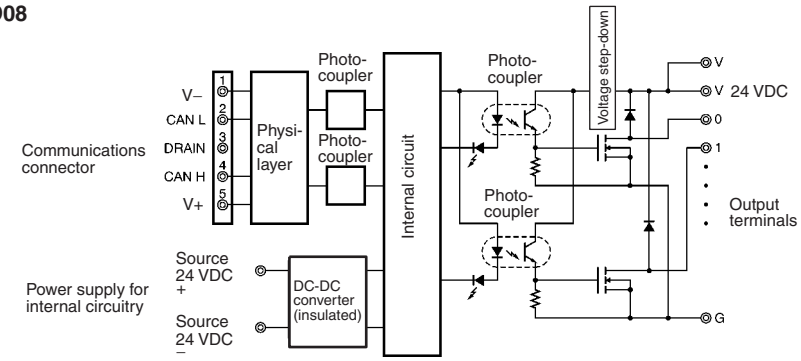
Note: The above current consumption is a value with all 8 and 16 points turned ON excluding the current consumption of the external sensor connected to the input Remote Terminal and the current consumption of the load connected to the output Remote Terminal.

Internal Circuit Configuration

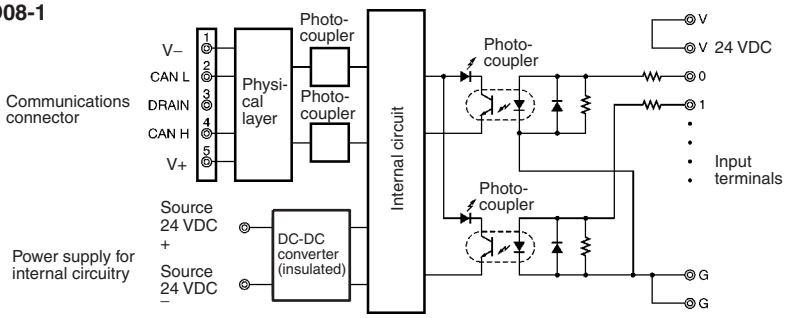
DRT1-ID08



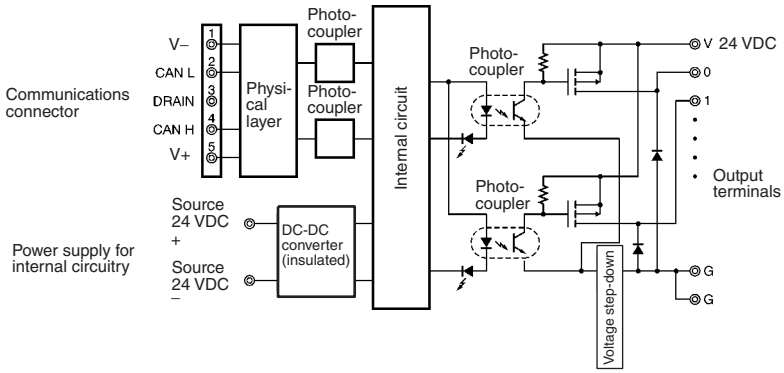
DRT1-OD08



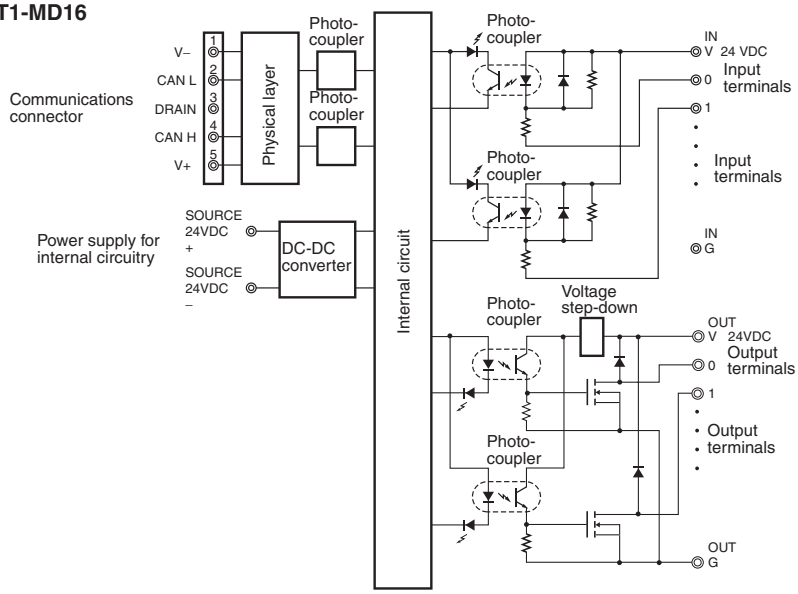
DRT1-ID08-1



DRT1-OD08-1



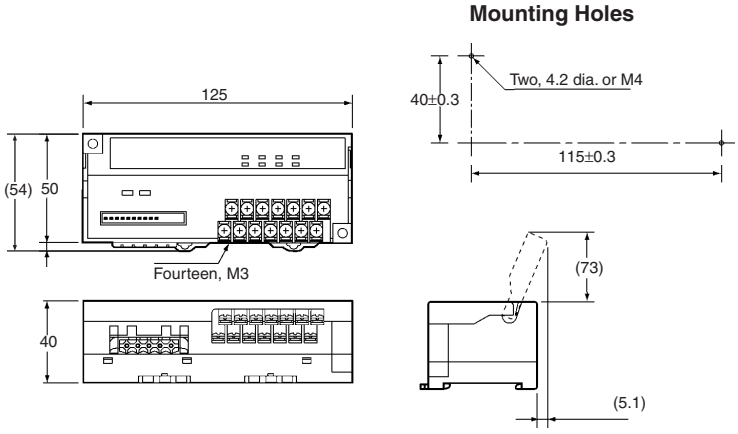
DRT1-MD16



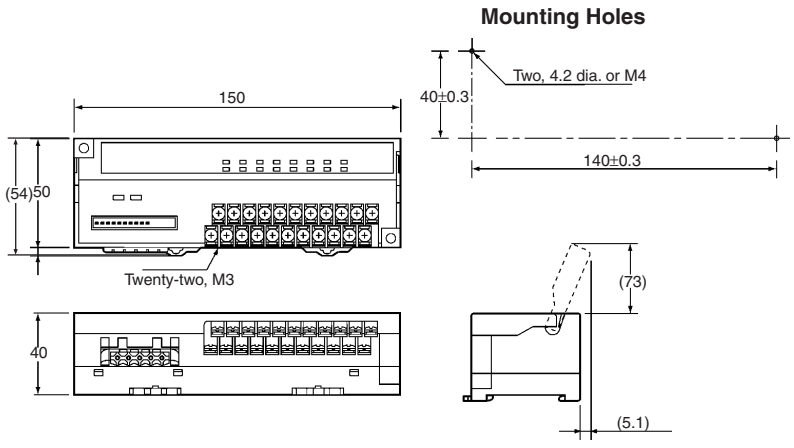
Dimensions

Note: All units are in millimeters unless otherwise indicated.

DRT1-ID08 (-1)
DRT1-OD08 (-1)

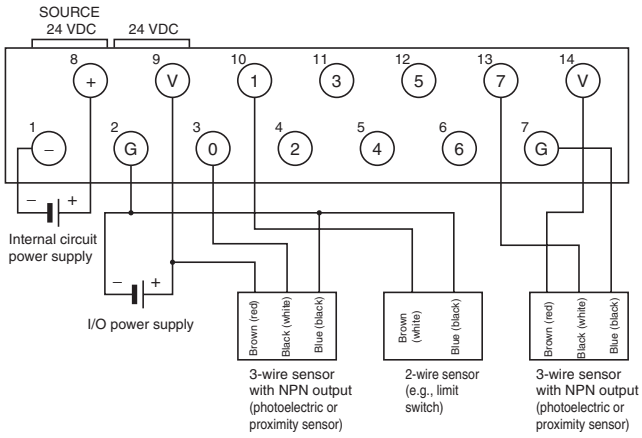


DRT1-MD16

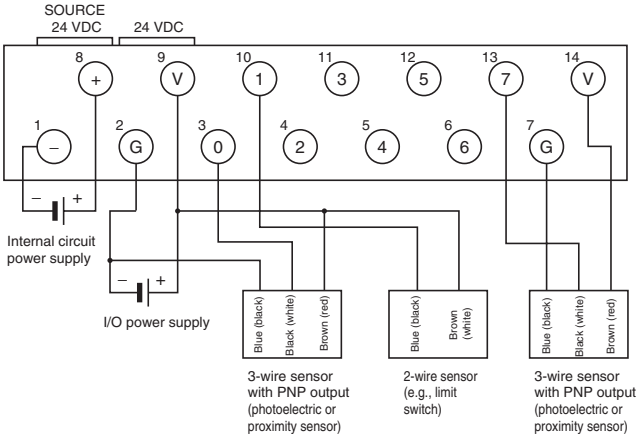


Wiring

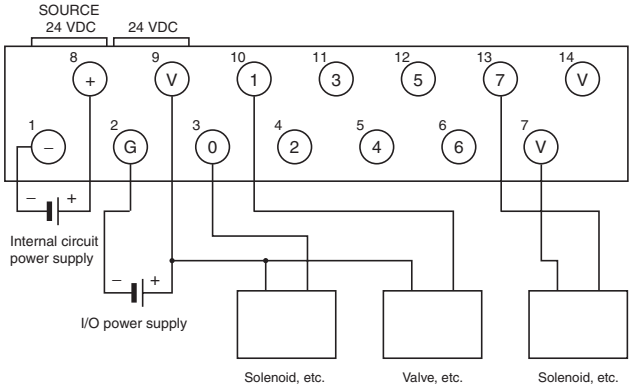
DRT1-ID08 (NPN)



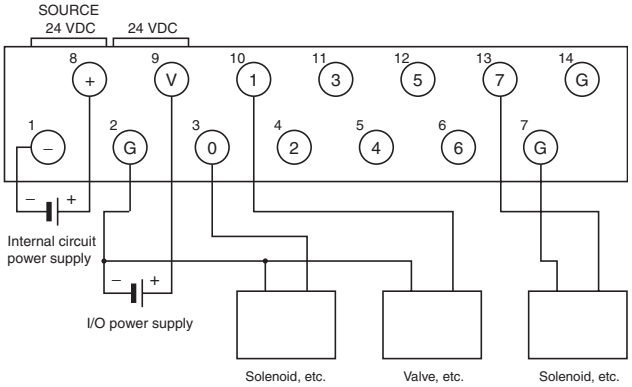
DRT1-ID08-1 (PNP)



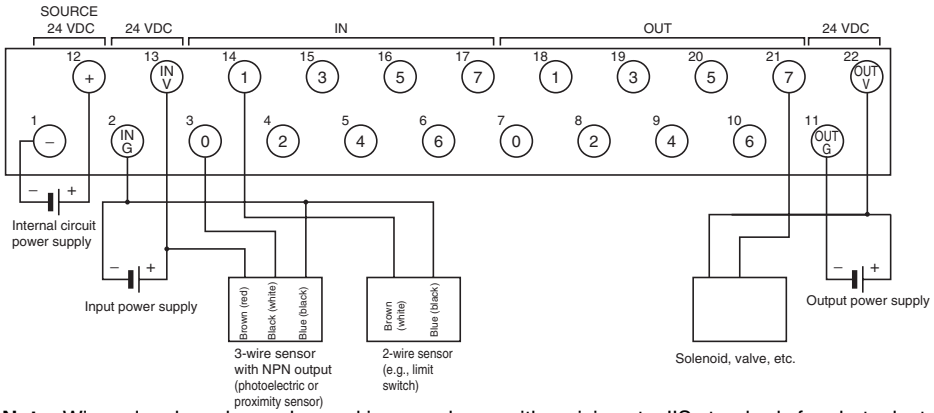
DRT1-OD08 (NPN)



DRT1-OD08-1 (PNP)



DRT1-MD16



Note: Wire colors have been changed in accordance with revisions to JIS standards for photoelectric and proximity sensors. The previous colors are given in parentheses.

DRT1-□D0□CL(-1)

Waterproof Terminals



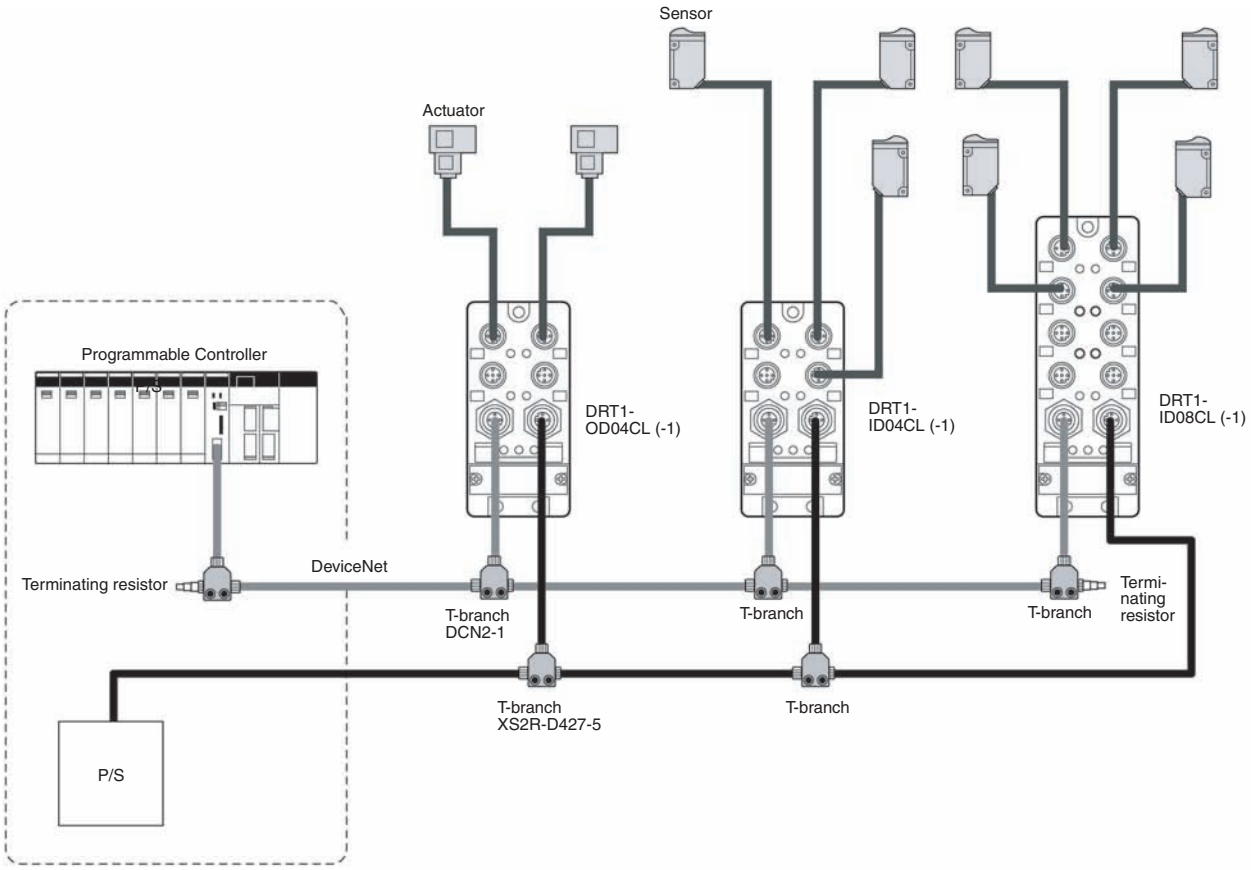
Economical Waterproof Terminals Available in 8 Different Models

- **Reduced Labor**
  Connectors eliminate the need for connection tools.
- **Reduced Wiring**
  The Terminals can be mounted closer to Sensors and so less wiring is required for signal lines.
- **Relay Box Not Required**
  Waterproof, dust-tight, drip-proof construction (IP67) enables direct, on-site mounting.
- **Easier Maintenance**
  Significant reductions not only in setup time but also maintenance time.
- **Reduced Space, Improved Operability**
  Compact design: 160 × 54 (W × H) (8-point models)
  Connect to devices using connectors on front side.
  Switch settings also available.

Ordering Information

I/O classification	Internal I/O circuit common	I/O points	I/O connection method	Rated voltage for I/O power supply	Model
Input	NPN (+ common)	4 points	Sensor I/O connector	24 V DC	DRT1-ID04CL
		8 points			DRT1-ID08CL
	PNP (– common)	4 points			DRT1-ID04CL-1
		8 points			DRT1-ID08CL-1
Output	NPN (– common)	4 points			DRT1-OD04CL
		8 points			DRT1-OD08CL
	PNP (+ common)	4 points			DRT1-OD04CL-1
		8 points			DRT1-OD08CL-1

System Configuration



Specifications

General Specifications

Item	DRT1-ID04CL DRT1-ID04CL-1	DRT1-OD04CL DRT1-OD04CL-1	DRT1-ID08CL DRT1-ID08CL-1	DRT1-OD08CL DRT1-OD08CL-1
Communications power supply voltage	11 to 25 V DC			
I/O power supply voltage	20.4 to 26.4 V DC (24 V DC –15%/+10%)			
Communications power supply current consumption	25 mA max.	35 mA max.	30 mA max.	40 mA max.
Ambient operating temperature	–10 to 55°C (with no icing)			
Ambient operating humidity	25% to 85% (with no condensation)			
Ambient storage temperature	–25 to 65°C			
Ambient storage humidity	25% to 85% (with no condensation)			
Connector tightening torque	0.39 to 0.49 Nm			
Construction	IEC IP67			
Mounting method	M5 screw mounting			
Weight	180 g max.		240 g max.	

Input Specifications

Item	DRT1-ID04CL DRT1-ID04CL-1	DRT1-ID08CL DRT1-ID08CL-1
Input current	For input voltage of 24 V DC: 6 mA max. per point For input voltage of 17 V DC: 3 mA min. per point	
Input impedance	4.4 kΩ	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
ON voltage	15 V DC min.	
OFF voltage	5 V DC max.	
OFF current	1 mA max.	
Number of circuits	4 points with 1 common	8 points with 1 common

Output Specifications

Item	DRT1-OD04CL DRT1-OD04CL-1	DRT1-OD08CL DRT1-OD08CL-1
Rated output current	0.5 A per point (2 A per common)	0.5 A per point (2.4 A per common)
Residual voltage	1.2 V max.	
Leakage current	0.1 mA max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits	4 points with 1 common	8 points with 1 common

Applicable Connectors

Communications Connectors

Model	Specifications
DCA1-5CN□□W1	Cable with a connector at both ends
DCA1-5CN□□F1	Cable with a connector at one end (socket)
DCA1-5CN□□H1	Cable with a connector at one end (plug)
DCN2-1	T-branch connector
DRS2-1	Connector with terminating resistor (plug)

I/O Connectors

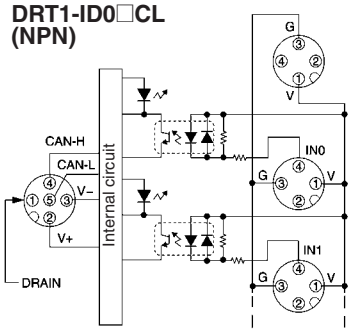
Model	Specifications
XS2G-D4□□	Assembling-type connector (crimp, solder, or screw)
XS2H-D421-□□□-□	Cable with connector at one end (plug)
XS2W-D42□-□□□-□	Cable with connector at both ends
XS2Z-12	Waterproof cover
XS2Z-15	Dust cover

Power Supply Connectors

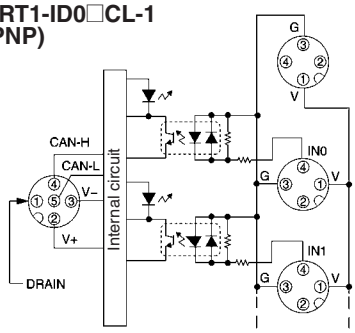
Model	Specifications
XS2C-D4□□	Assembling-type socket (crimp, solder, or screw)
XS2W-D42□-□□□-□	Cable with connector at both ends
XS2F-D42□-□80-□	Cable with connector at one end (socket)
XS2R-D427-5	T-branch connector

Internal Circuit Diagrams

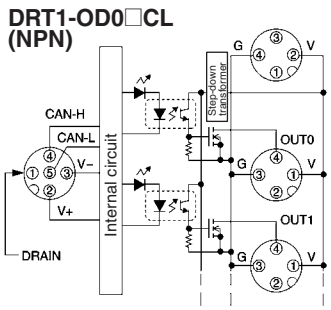
DRT1-ID0□CL (NPN)



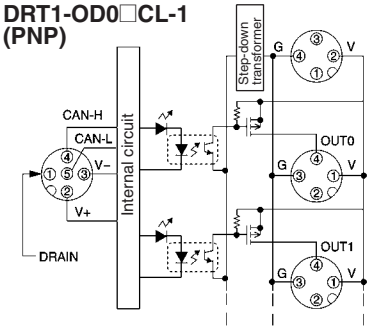
DRT1-ID0□CL-1 (PNP)



DRT1-OD0□CL (NPN)



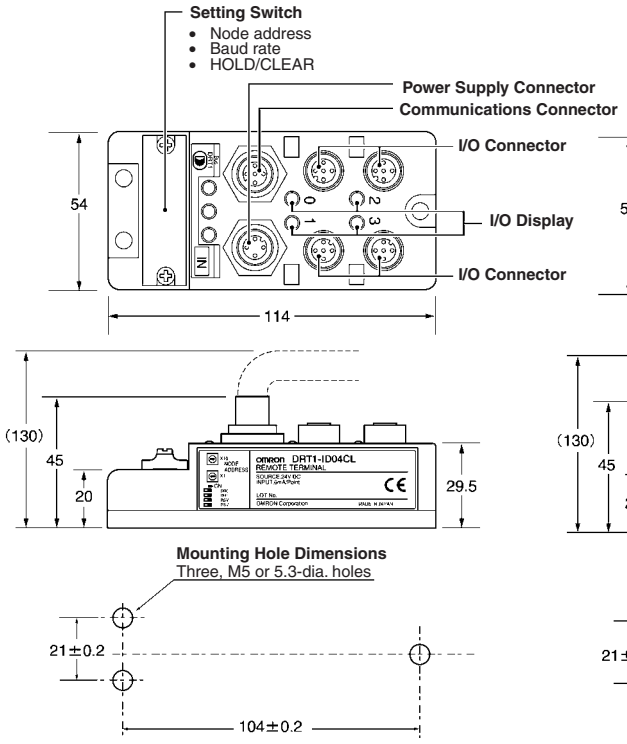
DRT1-OD0□CL-1 (PNP)



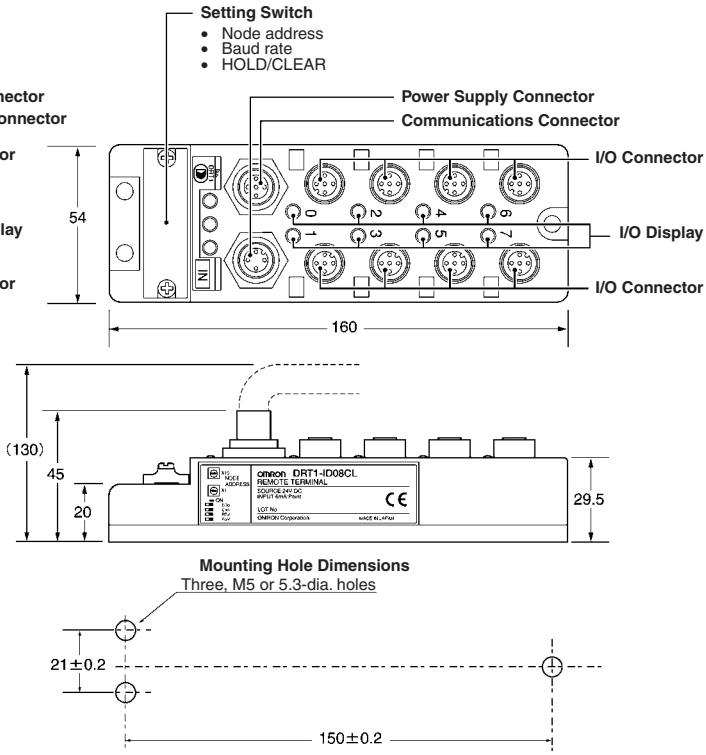
Dimensions

Note: All units are in millimeters unless otherwise indicated.

Models with 4 Points
DRT1-ID04CL/DRT1-ID04CL-1
DRT1-OD04CL/DRT1-OD04CL-1



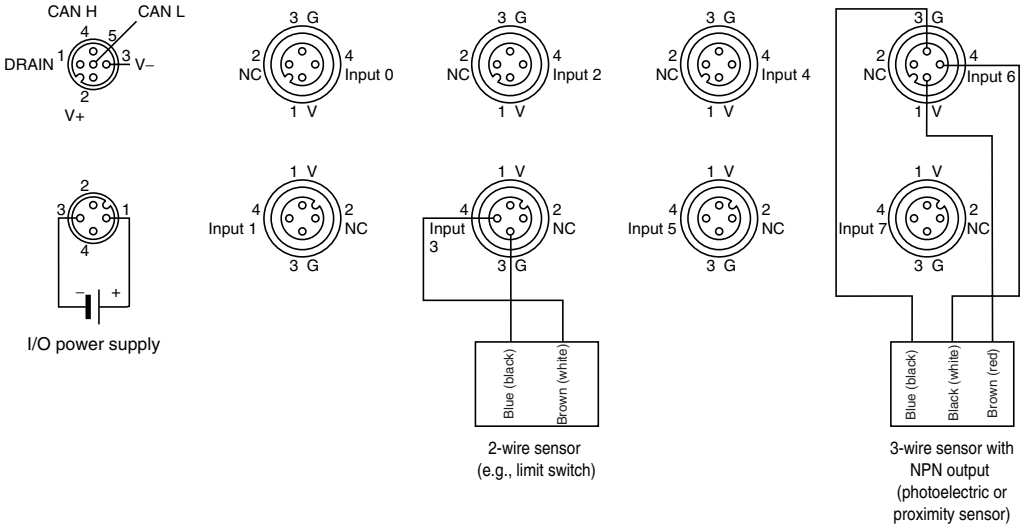
Models with 8 Points
DRT1-ID08CL/DRT1-ID08CL-1
DRT1-OD08CL/DRT1-OD08CL-1



Wiring

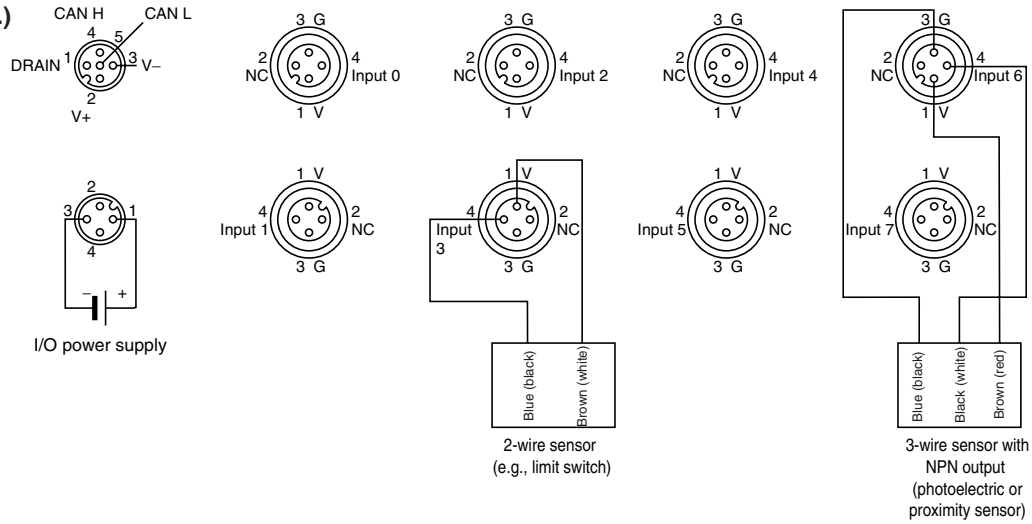
DRT1-ID04CL (See note.)
DRT1-ID08CL
(NPN)

Note: The DRT1-ID04CL has only inputs 0 to 3



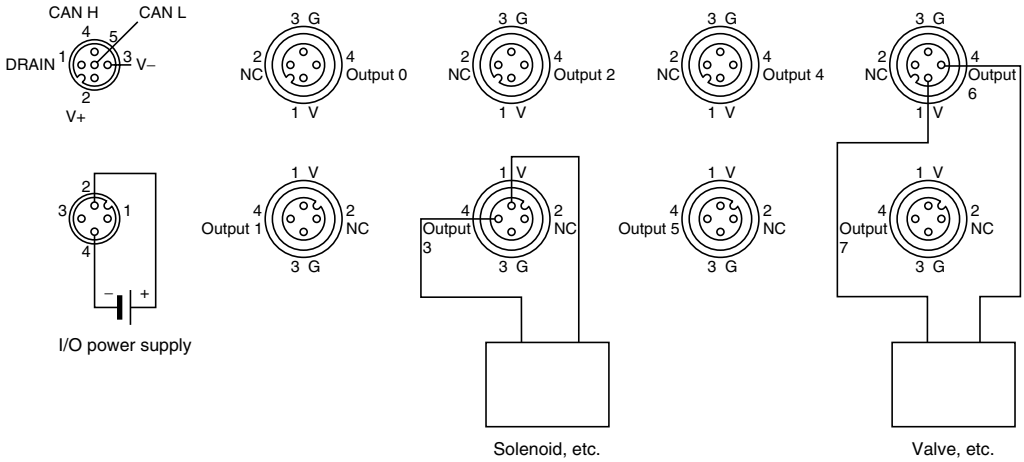
DRT1-ID04CL-1 (See note.)
DRT1-ID08CL-1
(PNP)

Note: The DRT1-ID04CL-1 has only inputs 0 to 3.



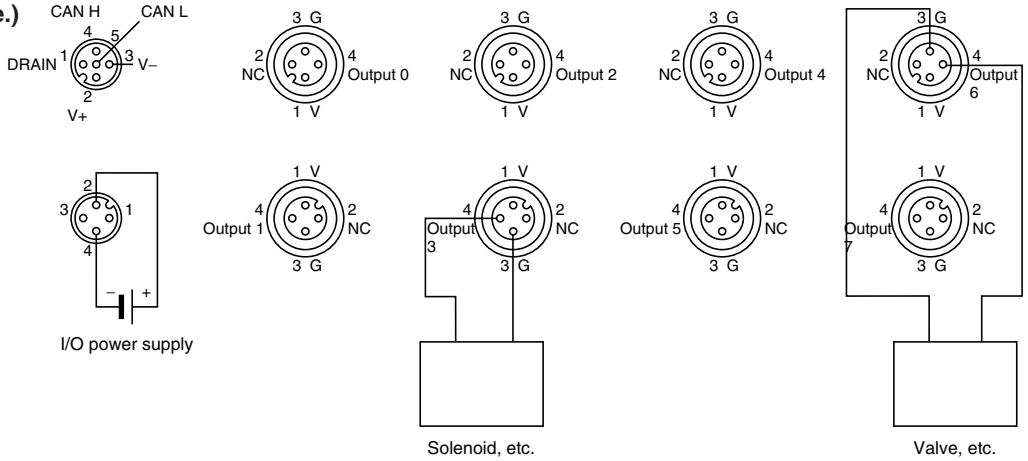
DRT1-OD04CL (See note.)
DRT1-OD08CL
(NPN)

Note: The DRT1-OD04CL has only outputs 0 to 3.



DRT1-OD04CL-1 (See note.)
DRT1-OD08CL-1
(PNP)

Note: The DRT1-OD04CL-1 has only outputs 0 to 3.



DRT1-232C2

RS-232C Unit

Enables Data Exchange between DeviceNet and Peripheral Devices, Such as Bar Code Readers with an RS-232C Port

- Equipped with two RS-232C ports that can be set and controlled independently.
- Data exchanged using explicit message communications.
- Allows reading and writing of up to 151 bytes.



Ordering Information

Name	No. of words	Model
RS-232C Unit (DeviceNet-compatible)	One input word as status area	DRT1-232C2

Specifications

Ratings/Characteristics

General Specifications

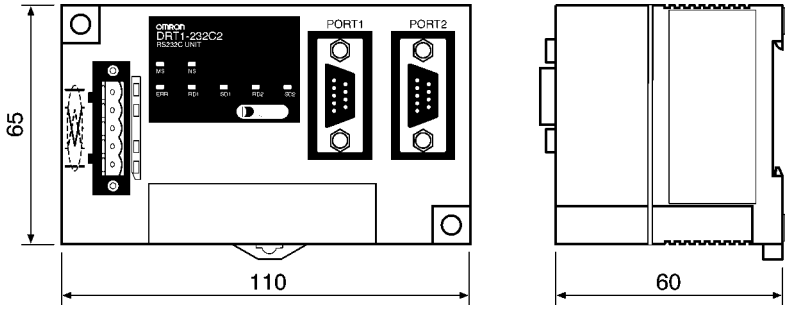
Item	Specification
Communications power supply voltage	11.0 to 25.0 V DC
Internal circuit power supply voltage	20.4 to 26.4 V DC (24 V DC +10%/–15%)
Current consumption	Communications power supply: 50 mA max. Internal circuit power supply: 100 mA max.
Insulation resistance	20 MΩ max. (at 100 V DC) between all DC power supply terminals and FG
Dielectric strength	500 V AC at 50/60 Hz for 1 min between all DC power supply terminals and FG with a leakage current of less than 1 mA
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power line)
Vibration resistance	10 to 57.7 Hz, 0.75-mm single amplitude and 57.7 to 150 Hz at 98 m/s^2 acceleration
Shock resistance	Malfunction: 196 m/s^2 three times each in X, Y, and Z directions Destruction: 294 m/s^2 three times each in X, Y, and Z directions
Ambient temperature	Operating: –10°C to 55°C (with no icing or condensation)
Ambient temperature	Storage: –25°C to 65°C
Ambient humidity	25% to 85% (with no icing or condensation)
Operating environment	With no corrosive gas
Mounting method	M4 screw or 35-mm DIN rail mounting
Mounting strength	100 N: 10 s 10 N in track direction: 10 s
Terminal strength	Pulling force: 100 N: 10 s
Weight	250 g max.
External dimensions	110 x 65 x 60 mm

RS-232C Communications Specifications

Item	Specification
Communications method	Full duplex, start-stop synchronization communications control
Transmission distance	15 m max.
Baud rate	1,200/2,400/4,800/9,600/19,200 bps
Transmission code	ASCII (7 bits)
Parity check	Even, odd, or none
Stop bit length	1/2 bit
No. of ports	2
Connector	9-pin D-sub connector (male) x 2 ports
Communications memory capacity	1,024 bytes x 2 ports
Header code	Enabled (1 byte)/Disabled (selectable)
Delimiter code	Enabled (1 byte)/Disabled (selectable)
Flow control	Enabled/Disabled (selectable) for RS/CS control only

Dimensions

Note: All units are in millimeters unless otherwise indicated.



SRT-series Slaves

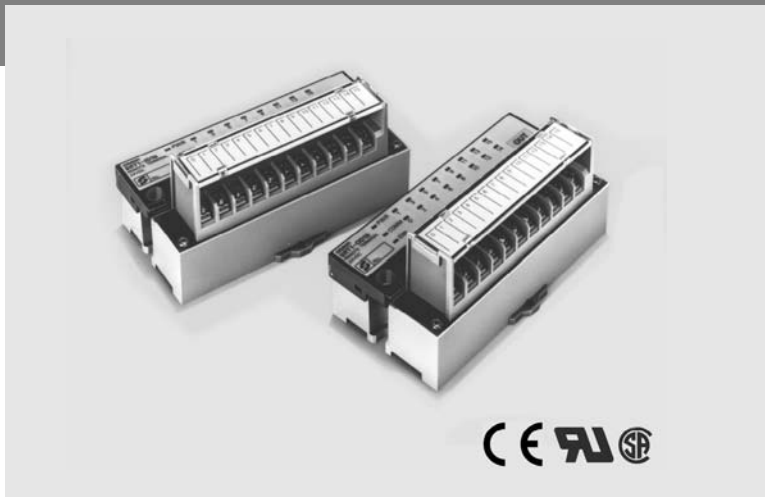
CompoBus/S Remote I/O

Digital I/O Terminals	524
3-tier Connection Terminals	529
Relay output terminals	532
Waterproof Terminals	536
Sensor Terminals	542
Analog Input Terminal	547
Analog Output Terminal	549
Digital I/O Terminals	551

SRT2-ID/-OD(-1)

Digital I/O Terminals

- The standard in/output models
- Very compact at 80 x 48 x 50 (W x H x D) mm for 4- and 8-point terminals and 105 x 48 x 50 (W xH x D) mm for 16-point terminals.
- Two independent power supplies can be used because the I/O terminals are insulated from the internal circuits.
- DIN rail mounting and screw mounting are both supported.



Ordering Information

I/O classification	Internal I/O circuit common	I/O points	Rated voltage	I/O rated voltage	Model
Input	NPN (+ common)	4	24 V DC	24 V DC	SRT2-ID04
	PNP (– common)				SRT2-ID04-1
Output	NPN (– common)				SRT2-OD04
	PNP (+ common)				SRT2-OD04-1
Input	NPN (+ common)	8			SRT2-ID08
	PNP (– common)				SRT2-ID08-1
Output	NPN (– common)				SRT2-OD08
	PNP (+ common)				SRT2-OD08-1
Input	NPN (+ common)	16			SRT2-ID16
	PNP (– common)				SRT2-ID16-1
Output	NPN (– common)				SRT2-OD16
	PNP (+ common)				SRT2-OD16-1

Note: For more details about connections supported by the Master Unit, refer to page 368.

Specifications

Ratings

Inputs

Input current	6 mA max./point
ON delay time	1.5 ms max.
OFF delay time	1.5 ms max.
ON voltage	15 V DC min. between each input terminal and V
OFF voltage	5 V DC max. between each input terminal and V
OFF current	1 mA max.
Insulation method	Photocoupler
Input indicators	LED (yellow)

Outputs

Rated output current	0.3 A/point
Residual voltage	0.6 V max.
Leakage current	0.1 mA max.
Insulation method	Photocoupler
Output indicators	LED (yellow)

Characteristics

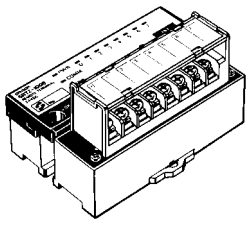
Communications power supply voltage	14 to 26.4 V DC
I/O power supply voltage	24 V DC $^{+10\%}_{-15\%}$
I/O power supply current	1 A max.
Current consumption (see note)	50 mA max. at 24 V DC
Connection method	Multi-drop method and T-branch method
Connecting Units	4-point and 8-point Terminals:16 Input Terminals and 16 Output Terminals per Master 16-point Terminals: 8 Input Terminals and 8 Output Terminals per Master
Dielectric strength	500 V AC for 1 min (1-mA sensing current between insulated circuits)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Malfunction:200 m/s^2 Destruction:300 m/s^2
Mounting strength	No damage when 50 N pull load was applied for 10 s in all directions
Terminal strength	No damage when 50 N pull load was applied for 10 s
Screw tightening torque	0.6 to 1.18 Nm
Ambient temperature	Operating:0°C to 55°C (with no icing or condensation) Storage:–20°C to 65°C (with no icing or condensation)
Ambient humidity	Operating:35% to 85%
Weight	4-point and 8-point Terminals:80 g max. 16-point Terminals:110 g max.
Approved standards (4/8 points)	UL 508, CSA C22.2 No. 14

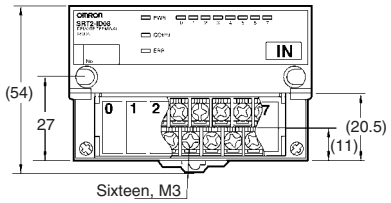
Note: The above current consumption is the value with all 4 and 8 and 16 points turned ON excluding the current consumption of the external sensor connected to the input Remote Terminal and the current consumption of the load connected to the output Remote Terminal.

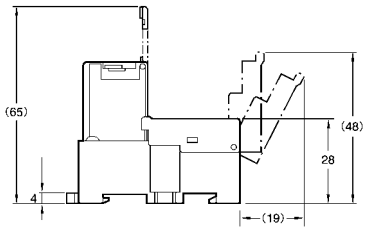
Dimensions

Note: All units are in millimeters unless otherwise indicated.

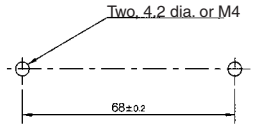
SRT2-ID04 (-1)
SRT2-OD04 (-1)
SRT2-ID08 (-1)
SRT2-OD08 (-1)

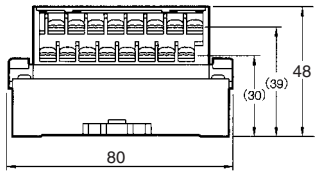




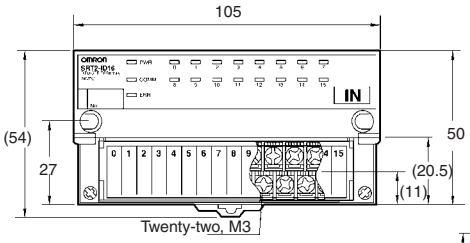


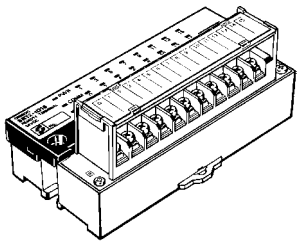
Mounting Holes

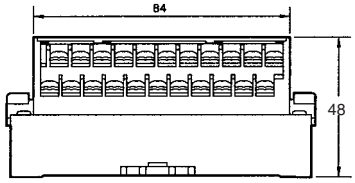


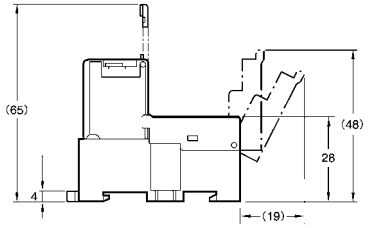


SRT2-ID16 (-1)
SRT2-OD16 (-1)

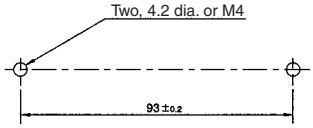








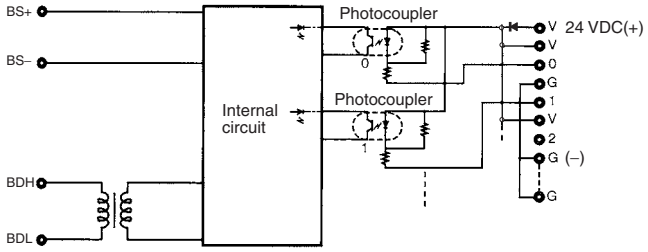
Mounting Holes



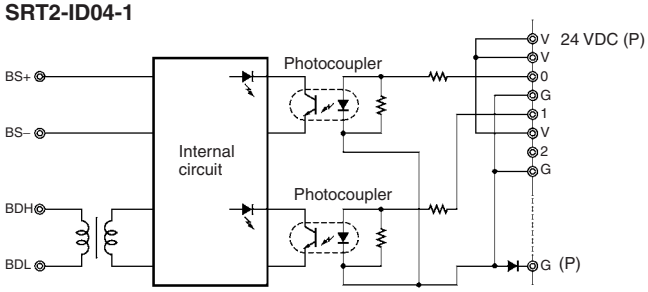
Installation

Internal Circuit Configuration

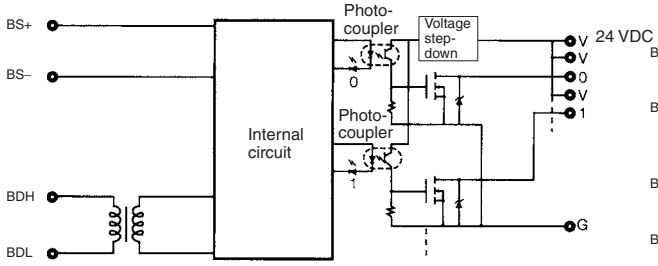
SRT2-ID04



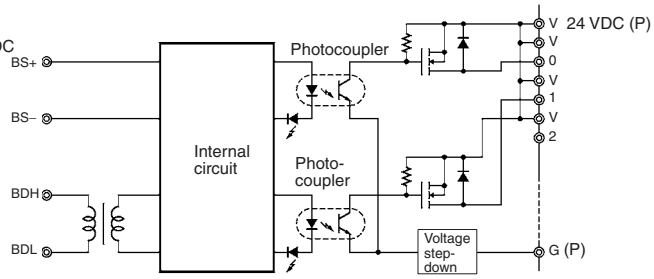
SRT2-ID04-1



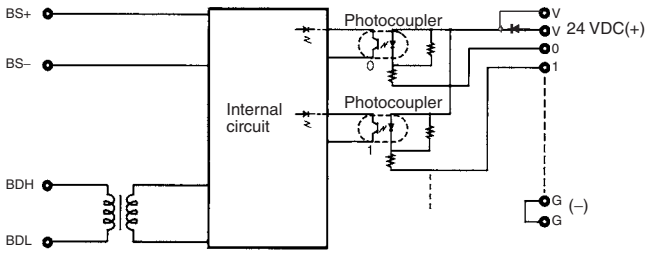
SRT2-OD04



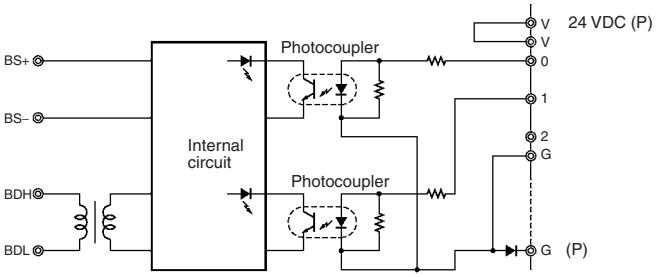
SRT2-OD04-1



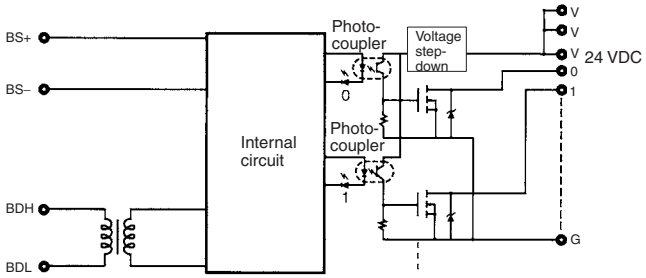
SRT2-ID08



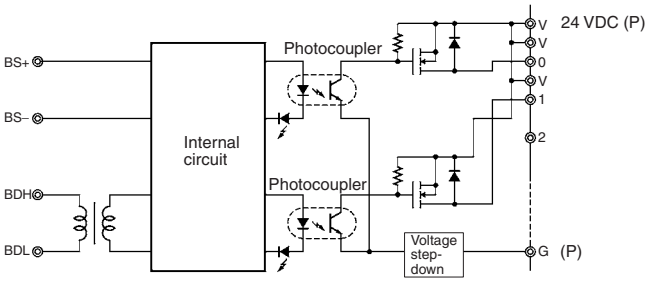
SRT2-ID08-1



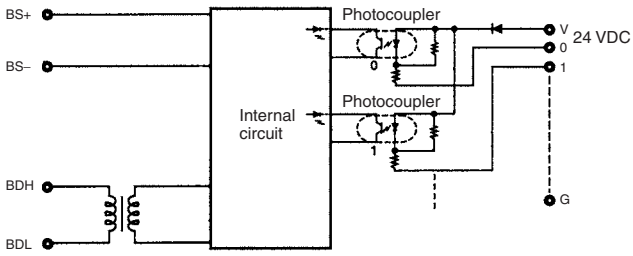
SRT2-OD08



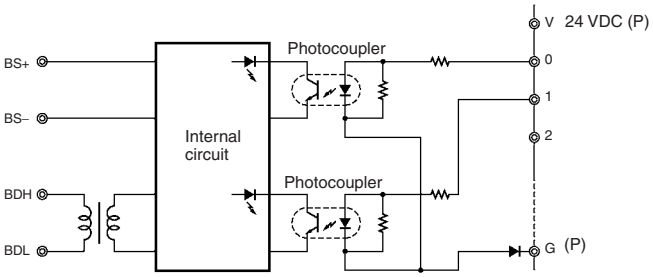
SRT2-OD08-1



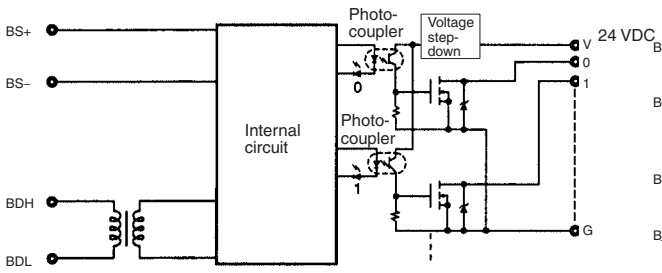
SRT2-ID16



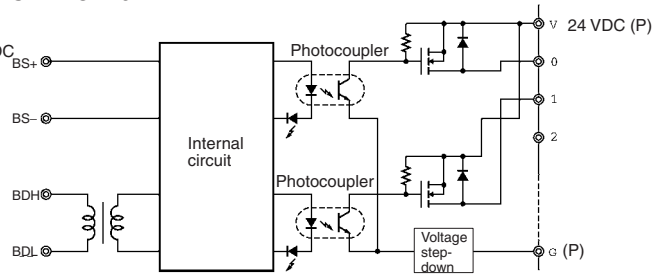
SRT2-ID16-1



SRT2-OD16



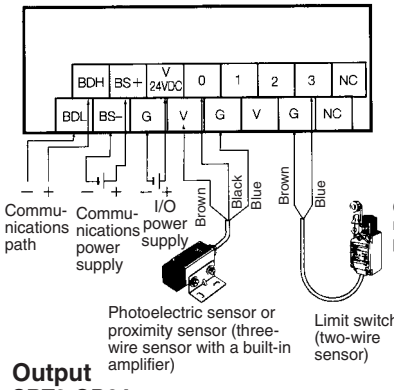
SRT2-OD16-1



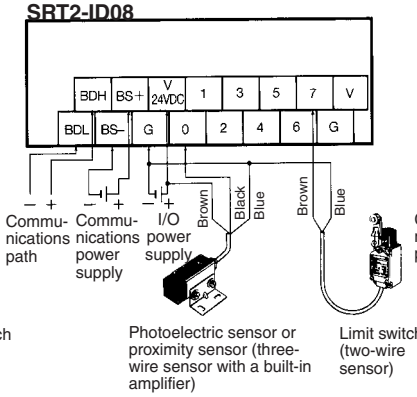
Terminal Arrangement and I/O Device Connection Example (NPN Models)

Input

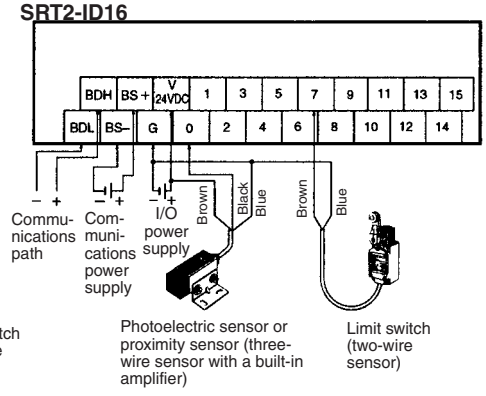
SRT2-ID04



SRT2-ID08

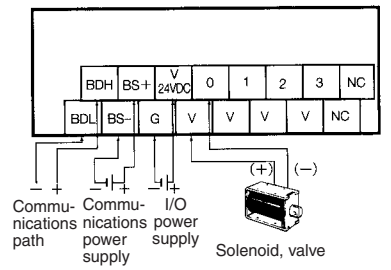


SRT2-ID16

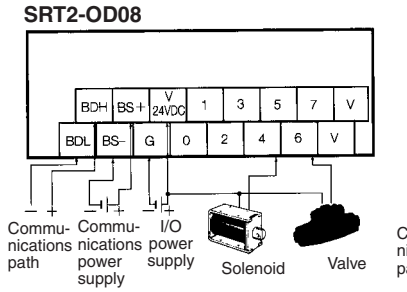


Output

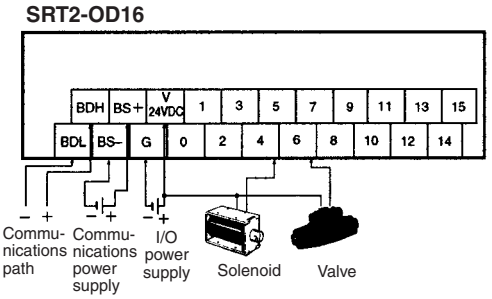
SRT2-OD04



SRT2-OD08



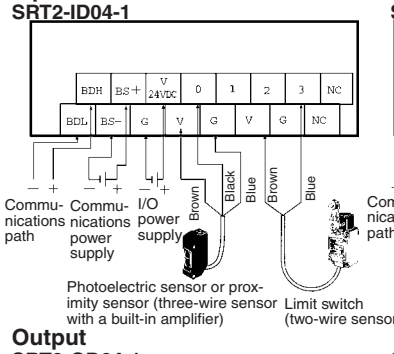
SRT2-OD16



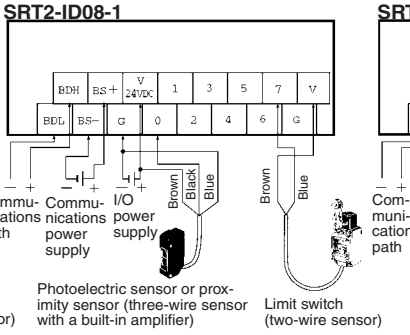
Terminal Arrangement and I/O Device Connection Example (PNP Models)

Input

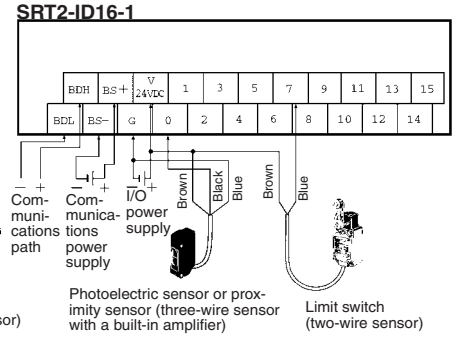
SRT2-ID04-1



SRT2-ID08-1

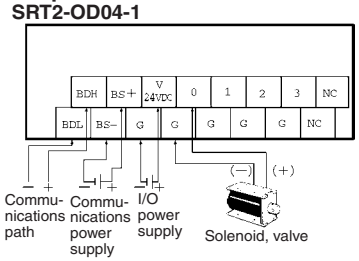


SRT2-ID16-1

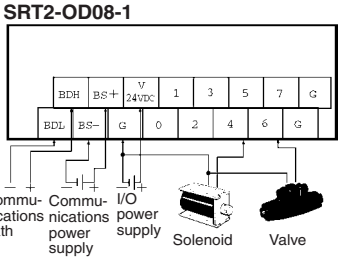


Output

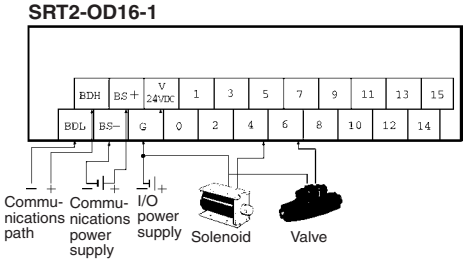
SRT2-OD04-1



SRT2-OD08-1



SRT2-OD16-1



SRT2-□D16T(-1)

3-tier Connection Terminals

- Models with a 3 layer connection terminal (16 Points)
- Reduces designing and wiring effort.
- Incorporates a removable circuit block
- Very compact
- DIN rail mounting and screw mounting are both supported.



Ordering Information

I/O classification	Internal I/O circuit common	I/O points	I/O connection method	Model
Digital input	NPN (+ common)	16	M3 terminal block	SRT2-ID16T
	PNP (– common)			SRT2-ID16T-1
Digital I/O	NPN (– common)			SRT2-MD16T
	PNP (+ common)			SRT2-MD16T-1
Digital output	NPN (– common)			SRT2-OD16T
	PNP (+ common)			SRT2-OD16T-1

Specifications

Ratings

Inputs

Input current	6 mA max./point at 24 V and 3 mA min./point at 17 V
ON delay time	1.5 ms max.
OFF delay time	1.5 ms max.
ON voltage	NPN: 15 V DC min. between V terminals and each input terminal PNP: 15 V DC min. between G terminals and each input terminal
OFF voltage	NPN: 5 V DC max. between V terminals and each input terminal PNP: 5 V DC max. between G terminals and each input terminal
OFF current	1 mA max.
Insulation method	Photocoupler

Outputs

Rated output current	0.5 A max./point
Residual voltage	1.2 V max.
ON delay time	0.5 ms max.
OFF delay time	1.0 ms max.
Leakage current	0.1 mA max.
Insulation method	Photocoupler

Characteristics

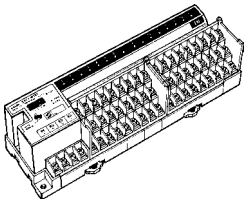
Communications power supply voltage	14 to 26.4 V DC
I/O power supply voltage	24 V DC $^{+10\%}/_{-15\%}$
I/O power supply current	4 A max./common
Current consumption (see note)	50 mA max. at 24 V DC
Connection method	Multi-drop method and T-branch method
Dielectric strength	500 V AC between insulated circuits
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration resistance	10 to 150 Hz, 1.0-mm double amplitude or 70 m/s^2
Shock resistance	200 m/s^2
Mounting strength	No damage with 100 N pull load applied in all directions.
Terminal strength	No damage with 100 N pull load applied
Screw tightening torque	0.3 to 0.5 Nm
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C
Ambient humidity	Operating:25% to 85% (with no condensation)
Weight	300 g max.

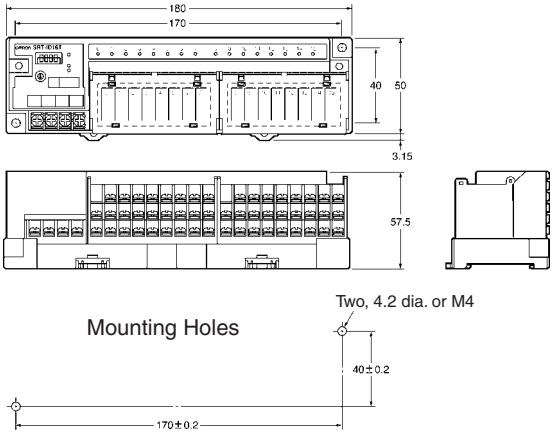
Note: The above current consumption is the value with all points turned ON excluding the current consumption of the external sensor connected to the input Remote Terminal and the current consumption of the load connected to the output Remote Terminal.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

SRT2-ID16T (-1)
SRT2-MD16T (-1)
SRT2-OD16T (-1)

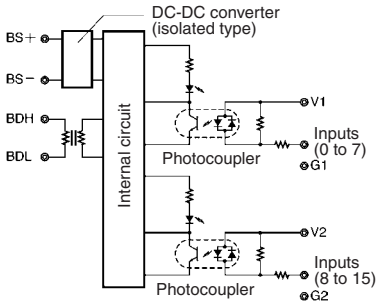




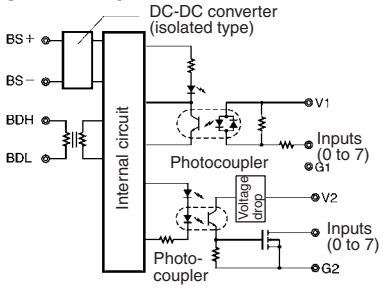
Installation

Internal Circuit Configuration

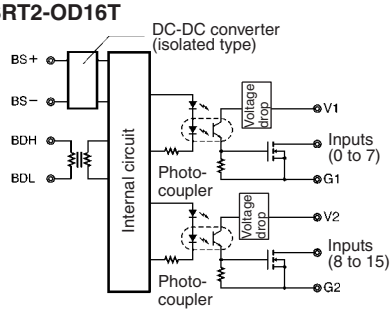
SRT2-ID16T



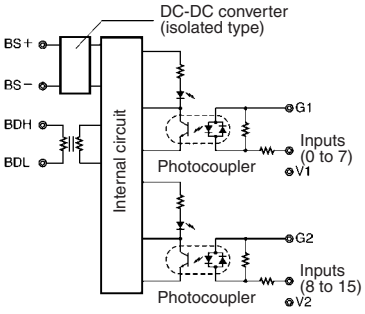
SRT2-MD16T



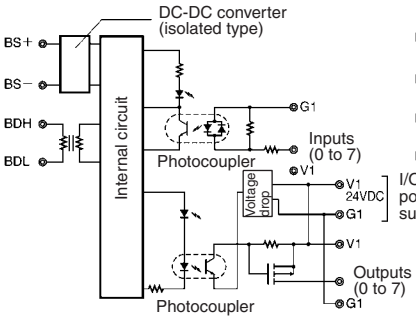
SRT2-OD16T



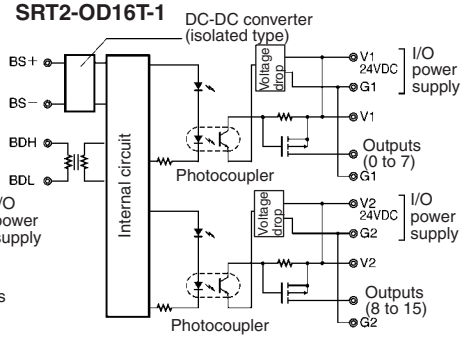
SRT2-ID16T-1



SRT2-MD16T-1



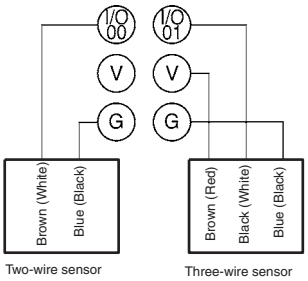
SRT2-OD16T-1



External Connections

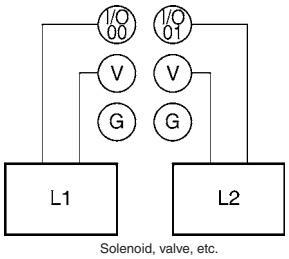
Input (NPN Models)

SRT2-ID16T
SRT2-MD16T



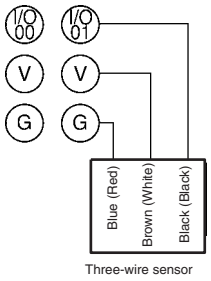
Output (NPN Models)

SRT2-OD16T
SRT2-MD16T



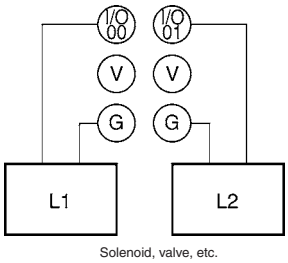
Input (PNP Models)

SRT2-ID16T-1
SRT2-MD16T-1



Output (PNP Models)

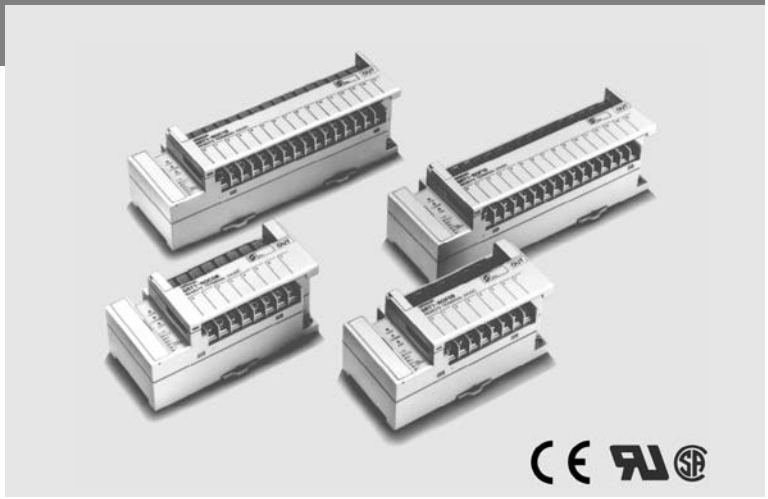
SRT2-OD16T-1
SRT2-MD16T-1



SRT2-R

Relay output terminals

- Power MOS FET Relay and Relay models.
- Very compact
- 8-point models: 101 x 51 x 51 mm (W x H x D);
- 16-point models: 156 x 51 x 51 mm (W x H x D)
- DIN rail mounting and screw mounting are both supported.



Ordering Information

Classification	I/O points	Rated voltage	Relay coil rating	Model	Applicable relay
Relay output	8 points	24 V DC	24 V DC	SRT2-ROC08	G6D-1A
	16 points			SRT2-ROC16	
Power MOS FET relay output	8 points			SRT2-ROF08	G3DZ-2R6PL
	16 points			SRT2-ROF16	

Specifications

Ratings

Relay Output

Item	SRT2-ROC08, SRT2-ROC16
Applicable relay	G6D-1A (one for each output point)
Rated load	3 A at 250 V AC, 3 A at 30 V DC (resistive load)
Rated carry current	3 A (see note 1)
Max. contact voltage	250 V AC, 30 V DC
Max. contact current	3 A
Max. switching capacity	730 VA (AC), 90 W (DC)
Min. permissible load (see note 2)	10 mA at 5 V DC
Life expectancy	Electrical:100,000 operations min. (rated load, at 1,800 operations/h) Mechanical:20,000,000 operations min. (at 18,000 operations/h)

Note: 1. The maximum permissible current of COM0 to COM7 is 3 A.

2. This value fulfills the P reference value of opening/closing at a rate of 120 times per min (ambient operating environment and determination criteria according to JIS C5442).

Power MOS FET Relay Output

Item	SRT2-ROF08, SRT2-ROF16
Applicable relay	G3DZ-2R6PL (one for each output point)
Load voltage	3 to 264 V AC, 3 to 125 V DC
Load current	100 μA to 0.3 A
Inrush current	6 A (10 ms)

Characteristics

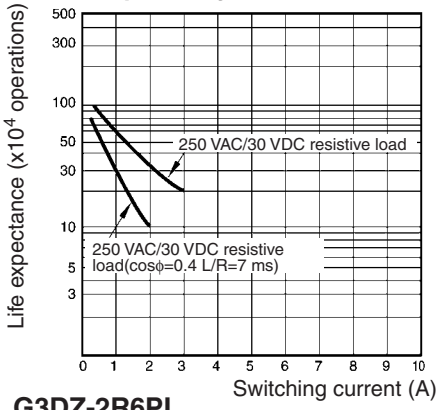
Power supply voltage	24 V DC $^{+10\%}/_{-15\%}$
Current consumption (see note)	350 mA max. at 24 V DC
Connection method	Multi-drop method and T-branch method
Connecting Units	8-point Units:16 per Master 16-point Units:8 per Master
Dielectric strength	2,000 V AC for 1 min (1-mA sensing current) between all output terminals and power supply, between communication terminals, and between contacts of different polarities 500 V AC for 1 min (1-mA sensing current) between all output terminals and power supply, between communication terminals, and between all power supply terminals and communications terminals
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration resistance	10 to 55 Hz, 0.75-mm double amplitude
Shock resistance	Malfunction:100 m/s^2 Destruction:300 m/s^2
Mounting strength	No damage when 50 N pull load was applied for 10 s in all directions
Terminal strength	No damage when 50 N pull load was applied for 10 s
Screw tightening torque	0.6 to 1.18 Nm
Ambient temperature	Operating:0°C to 55°C (with no icing or condensation) Storage:–20°C to 65°C (with no icing or condensation)
Ambient humidity	Operating:35% to 85%
Weight	8-point models: 145 g max., 16-point models: 240 g max.
Approved standards	UL 508, CSA C22.2 No. 14

Note: The above current consumption is a value with all the points turned ON including the current consumption of the G6D coil for the Remote Output Terminal, and the G3DZ's input current.

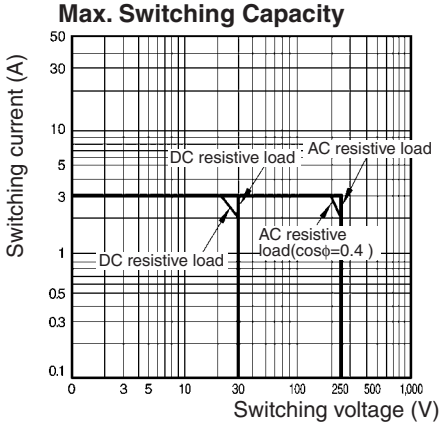
Reference Data

G6D-1A (24 VDC)

Life Expectancy



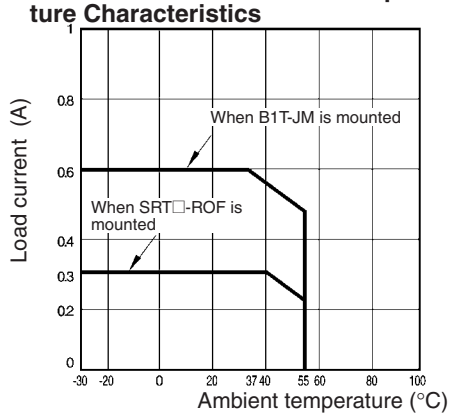
Max. Switching Capacity



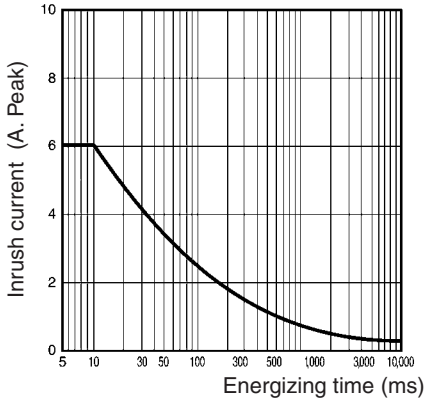
Note: These graphs show the characteristics for when the SRT2-ROC□□ or B1T-JR model is mounted.

G3DZ-2R6PL

Load Current vs. Ambient Temperature Characteristics



Inrush Current Resistivity



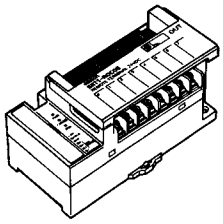
Non-repetitive: (Keep the inrush current to half the rated value if it occurs repetitively.)

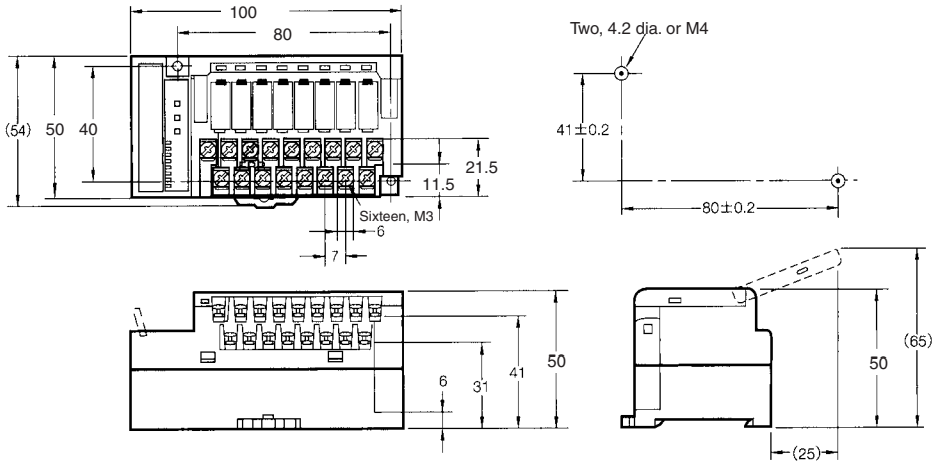
Note: The above graph shows the characteristics for when the SRT2-ROF□□ or B1T-JM model is mounted.

Dimensions

Note: All units are in millimeters unless otherwise indicated.

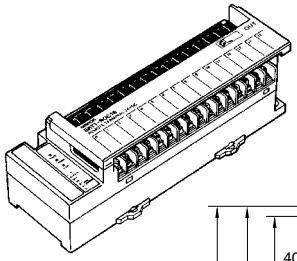
SRT2-ROC08
SRT2-ROF08

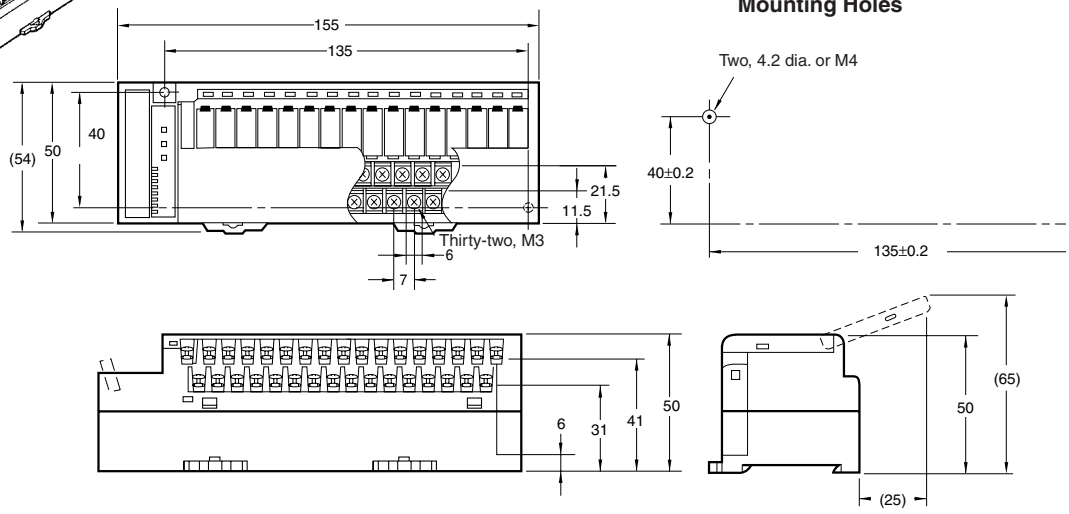




Mounting Holes

SRT2-ROC16
SRT2-ROF16



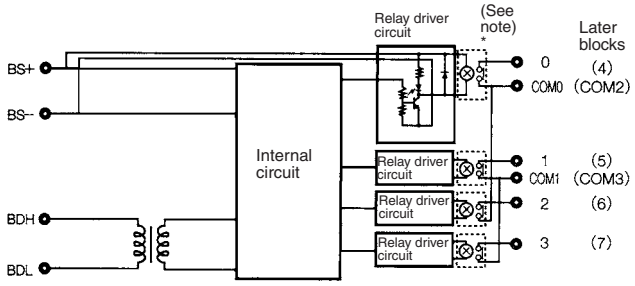


Mounting Holes

Installation

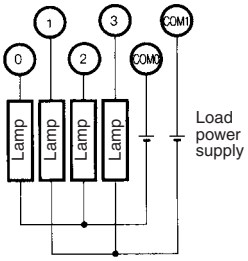
Internal Circuit Configuration

SRT2-ROC08
SRT2-ROC16



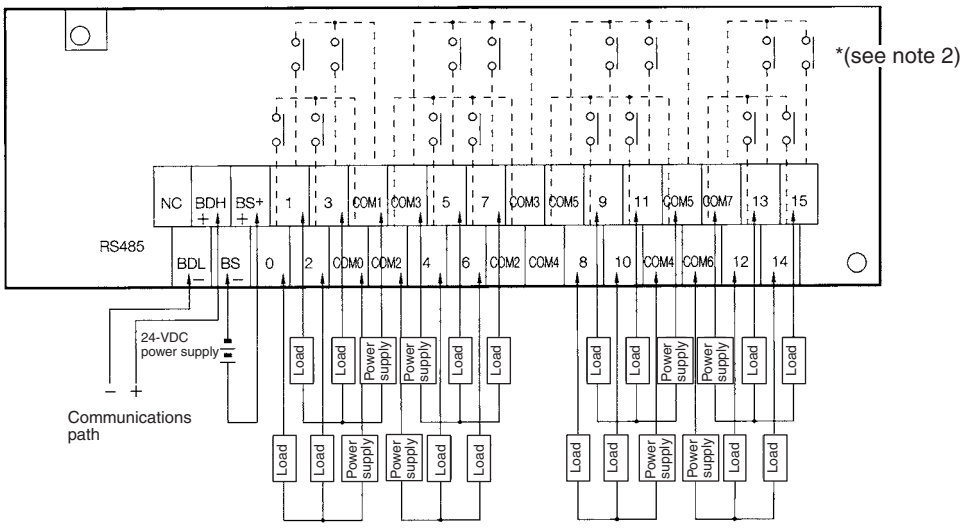
Note: The G3DZ-2R6PL Power MOS FET Relay is inserted into this portion of the SRT2-ROF08 and SRT2-ROF16.

External Connections



Terminal Arrangement and I/O Device Connection Example

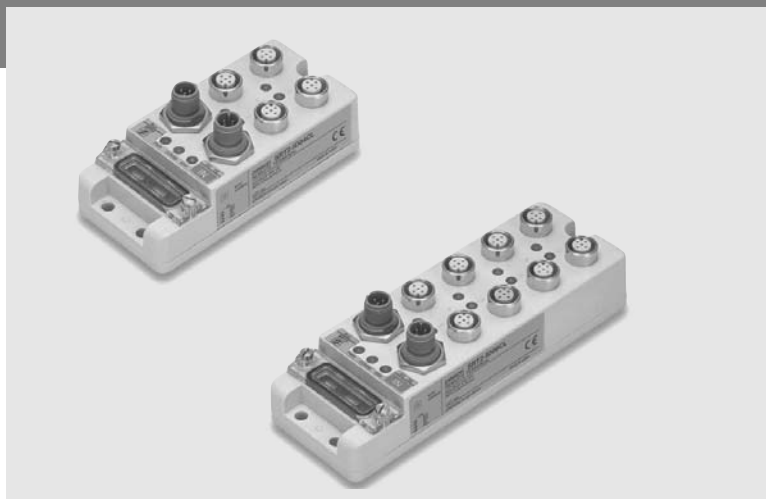
Output
SRT2-ROC16
SRT2-ROF16



Note: 1. Dotted lines indicate internal connections.
SRT2-ROC08 and SRT2-ROF08 have the 0 to 7 and COM0 to COM3 terminals only.
2. The above is a connection example of the SRT2-ROC16 with G6D Relays mounted.
G3DZ Power MOS FET Relays are mounted to the SRT2-ROF08 and SRT2-ROF16.

SRT2-□D0□CL(-1)

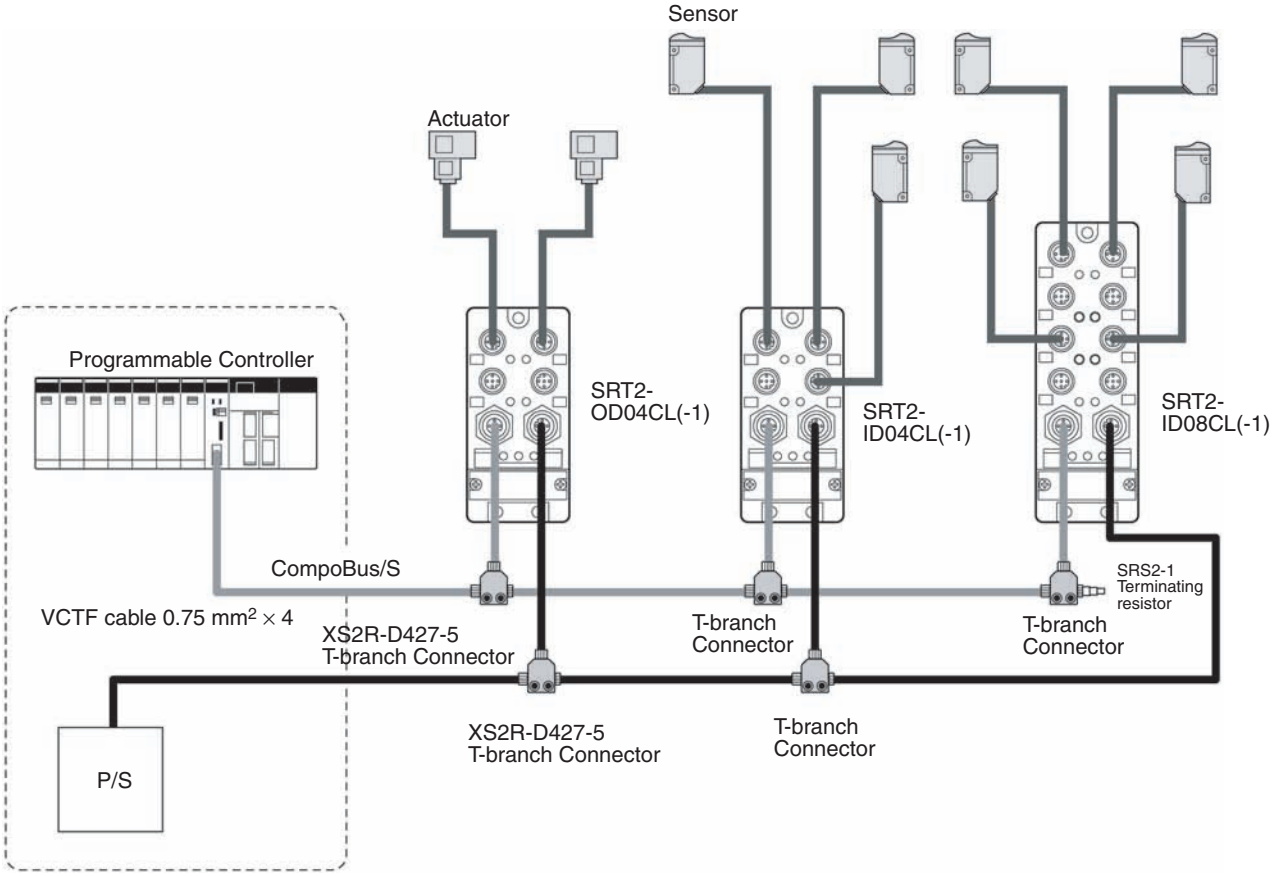
Waterproof Terminals



IP67 rated I/O terminals.
Compact and waterproof.

- Reduced Labor
  The use of standard connectors reduces the installation time
- Reduced Wiring
  The I/O terminal can be mounted closer to sensors and other devices.
- Easier Maintenance
  Significant reductions not only in setup time but also maintenance time.
- Reduced Space, Improved Operability
  Compact design (160 x 54 mm (W x H)) (8-point models)
  Settings and connections can be performed using the switch and connectors on the front side of the Terminal.

System Configuration



Ordering Information

Input/Output	Internal I/O circuit common	I/O points	I/O connections method	Rated voltage for I/O power supply	Model
Inputs	NPN (+ common)	4 points	Sensor I/O connector	24 V DC	SRT2-ID04CL
		8 points			SRT2-ID08CL
	PNP (– common)	4 points			SRT2-ID04CL-1
		8 points			SRT2-ID08CL-1
Outputs	NPN (– common)	4 points			SRT2-OD04CL
		8 points			SRT2-OD08CL
	PNP (+ common)	4 points			SRT2-OD04CL-1
		8 points			SRT2-OD08CL-1

Specifications

General Specifications

Item	SRT2-ID04CL SRT2-ID04CL-1 SRT2-OD04CL SRT2-OD04CL-1	SRT2-ID08CL SRT2-ID08CL-1 SRT2-OD08CL SRT2-OD08CL-1
Communications power supply voltage	14 to 26.4 V DC (supplied via communications connectors)	
I/O power supply voltage	20.4 to 26.4 V DC (24 V DC $_{-15\%}^{+10\%}$)	
Communications current consumption	15 mA max.	20 mA max.
Ambient temperature	Operating:–10°C to 55°C (with no icing) Storage:–25°C to 65°C	
Ambient humidity	Operating:25% to 85% (with no condensation) Storage:25% to 85% (with no condensation)	
Connector tightening torque	0.39 to 0.49 Nm	
Enclosure rating	IEC IP67	
Mounting method	Mounted using M5 screws	
Weight	Approx. 180 g	Approx. 240 g

Communications Media/Distances

Communications medium		4-conductor cable (VCTF, 0.75 mm^2 x 4)
Communications distance	High-speed Communications Mode	4-conductor VCTF cable: Main line length:30 m max. Branch line length:3 m max. Total branch line length:30 m max. (When 4-conductor VCTF cable is used to connect fewer than 16 Slaves, the main line can be up to 100 m long and the total branch line length can be up to 50 m.)
	Long-distance Communications Mode	4-conductor VCTF cable: Variable branch wiring (total cable length 200 m max.) (There are no limits on the branching format or main, branch, or total line lengths. The terminator must be connected to the point in the system farthest from the master.)

Note: Use in combination with two-conductor VCTF cables and special flat cables is not possible.

Input Specifications

Item	SRT2-ID04CL SRT2-ID04CL-1	SRT2-ID08CL SRT2-ID08CL-1
Input current	For input voltage of 24 V DC: 6 mA max. per point For input voltage of 17 V DC: 3 mA min. per point	
Input impedance	4.4 kΩ	
ON delay time	1.5 ms max.	
OFF delay time	1.5 ms max.	
ON voltage	15 V DC min.	
OFF voltage	5 V DC max.	
OFF current	1 mA max.	
Number of circuits	4 points with 1 common	8 points with 1 common

Output Specifications

Item	SRT2-OD04CL SRT2-OD04CL-1	SRT2-OD08CL SRT2-OD08CL-1
Rated output current	0.5 A per point (2 A per common)	0.5 A per point (2.4 A per common)
Residual voltage	1.2 V max.	
Leakage current	0.1 mA max.	
ON delay time	0.5 ms max.	
OFF delay time	1.5 ms max.	
Number of circuits	4 points with 1 common	8 points with 1 common

Applicable Connectors

Power Supply Connectors

Model	Specification
XS2C-D4□□	Assembling-type connector (crimp, soldering, or screw) socket
XS2W-D42□-□□□-□	Cable with connector on each end
XS2F-D42□-□80-□	Cable with connector at one end (socket end)
XS2R-D427-5	T-branch connector

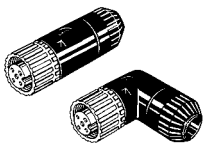
I/O Connectors

Model	Specification
XS2G-D4□□	Assembling type connector (crimp, soldering, or screw) Socket
XS2H-D421-□□□-□	Cable with connector at one end (plug end)
XS2W-D42□-□□□-□	Cable with connector on each end
XS2Z-12	Waterproof cover
XS2Z-15	Dust cover

Communications Connector

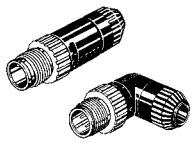
Model	Specification
XS2R-D427-5	T-branch connector
SRS2-1	Connector with terminating resistor (plug)
XS2G-D4S7	Assembling-type connector (for 4-conductor VCTF cable) plug (See note.)
XS2C-D4S7	Assembling-type connector (for 4-conductor VCTF socket) socket (See note.)

Assembling-type Connector Socket
Power Supply and Communications

Model	Applicable cable external dia.	Cable pull-out direction	No. of poles	Connection method		
				Crimp	Solder	Screw
	6 dia. (5 to 6 dia.)	Straight	4	XS2C-D4C1	XS2C-D421	XS2C-D4S1
		L-shaped		XS2C-D4C2	XS2C-D422	XS2C-D4S2
	5 dia. (4 to 5 dia.)	Straight		XS2C-D4C3	XS2C-D423	XS2C-D4S3
		L-shaped		XS2C-D4C4	XS2C-D424	XS2C-D4S4
	3 dia. (3 to 4 dia.)	Straight		XS2C-D4C5	XS2C-D425	XS2C-D4S5
		L-shaped		XS2C-D4C6	XS2C-D426	XS2C-D4S6
	7 dia. (7 to 8 dia.)	Straight		---	---	XS2C-D4S7 (see note)

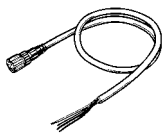
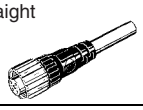
Note: Only the XS2C-D4S7 with a diameter of 7 mm can be used for communications.

Assembling-type Connector Plug
Power Supply and Communications

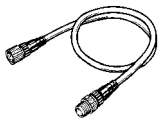
Appearance	Applicable cable external dia.	Cable pull-out direction	No. of poles	Connection method		
				Crimp	Solder	Screw
	6 dia. (5 to 6 dia.)	Straight	4	XS2G-D4C1	XS2G-D421	XS2G-D4S1
		L-shaped		---	XS2G-D422	XS2G-D4S2
	5 dia. (4 to 5 dia.)	Straight		XS2G-D4C3	XS2G-D423	XS2G-D4S3
		L-shaped		---	XS2G-D424	XS2G-D4S4
	3 dia. (3 to 4 dia.)	Straight		XS2G-D4C5	XS2G-D425	XS2G-D4S5
		L-shaped		---	XS2G-D426	XS2G-D4S6
	7 dia.	Straight		---	---	XS2G-D4S7 (see note)

Note: Only the XS2G-D4S7 with a diameter of 7 mm can be used for communications.

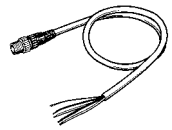
Connectors with Cables (Single-end Socket Each)
Power Supply

Appearance	Cable pull-out direction	No. of cable conductor	Cable length (m)	Standard cable	Robot cable (vibration resistive)
	Straight 	4	1	XS2F-D421-C80-A	XS2F-D421-C80-R
			2	XS2F-D421-D80-A	XS2F-D421-D80-R
			5	XS2F-D421-G80-A	XS2F-D421-G80-R
			10	XS2F-D421-J80-A	XS2F-D421-J80-R
	L-shaped 	4	1	XS2F-D422-C80-A	XS2F-D422-C80-R
			2	XS2F-D422-D80-A	XS2F-D422-D80-R
			5	XS2F-D422-G80-A	XS2F-D422-G80-R
			10	XS2F-D422-J80-A	XS2F-D422-J80-R

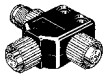
Connectors with Cables (Sockets and Plugs)
Power Supply and I/O

Appearance	Cable pull-out direction	No. of cable conductor	Cable length (m)	Standard cable	Robot cable (vibration resistive)
	Straight/Straight	4	1	XS2W-D421-C81-A	XS2W-D421-C81-R
			2	XS2W-D421-D81-A	XS2W-D421-D81-R
			5	XS2W-D421-G81-A	XS2W-D421-G81-R
	L-shaped/L-shaped		2	XS2W-D422-D81-A	---
			5	XS2W-D422-G81-A	
	Straight/L-shaped		2	XS2W-D423-D81-A	
			5	XS2W-D423-G81-A	
	L-shaped/Straight		2	XS2W-D424-D81-A	
			5	XS2W-D424-G81-A	

Connectors with Cables (Single-end Connector Each) I/O

Appearance	Cable pull-out direction	No. of cable conductor	Cable length (m)	Standard cable
	Straight	3	0.3	XS2H-D421-AC0-A
		4		XS2H-D421-A80-A
		3	1	XS2H-D421-CC0-A
		4		XS2H-D421-C80-A

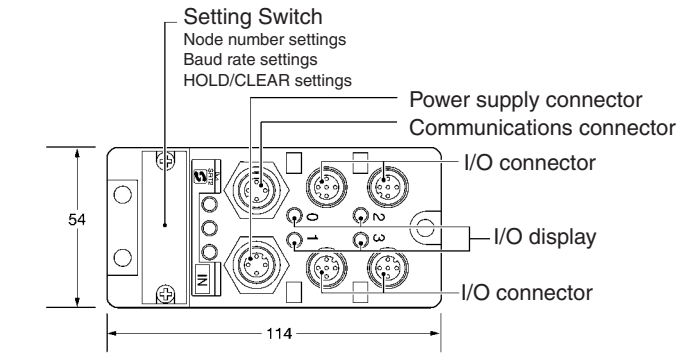
Connector Covers

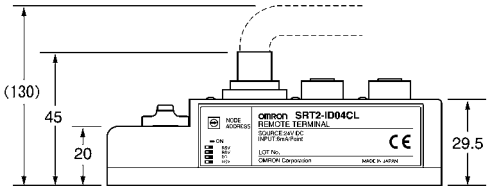
Appearance	Product	Model	Application
	T-branch Connector	XS2R-D427-5	Branching communications lines and power lines
	Connector Terminator (plug)	SRS2-1	Waterproof terminator
	Waterproof cover	XS2Z-12	Covers for unused I/O connectors
	Dust cover	XS2Z-15	

Dimensions

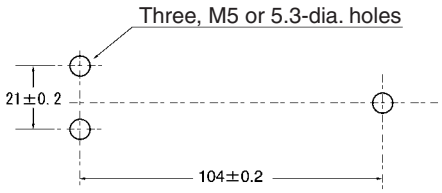
Note: All units are in millimeters unless otherwise indicated.

Models with 4 points
SRT2-ID04CL/SRT2-ID04CL-1
SRT2-OD04CL/SRT2-OD04CL-1

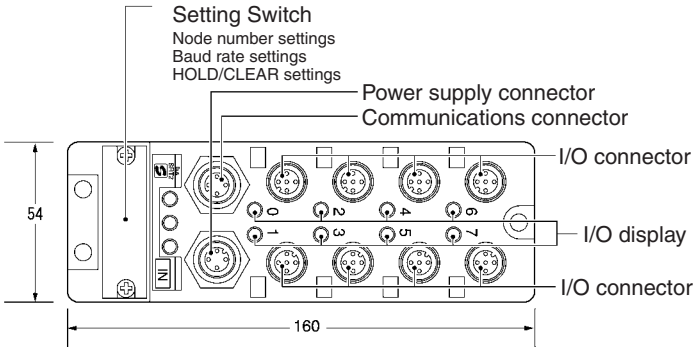


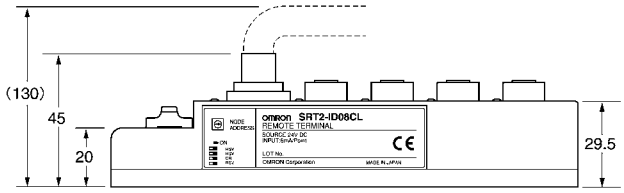


Mounting Dimensions

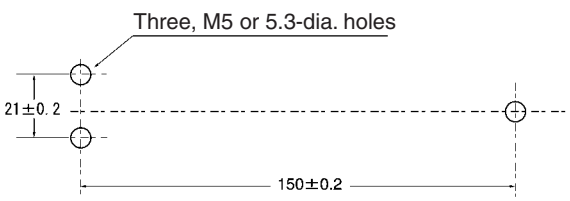


Models with 8 points
SRT2-ID08CL/SRT2-ID08CL-1
SRT2-OD08CL/SRT2-OD08CL-1





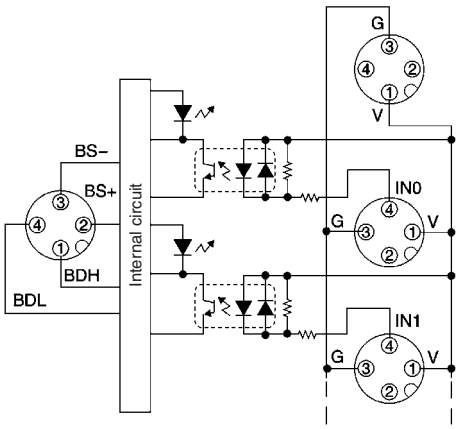
Mounting Dimensions



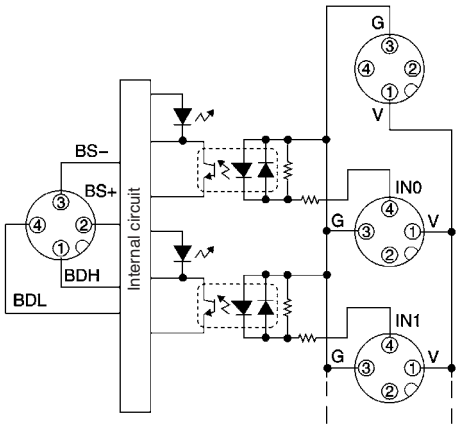
Installation

Internal Circuit Diagrams

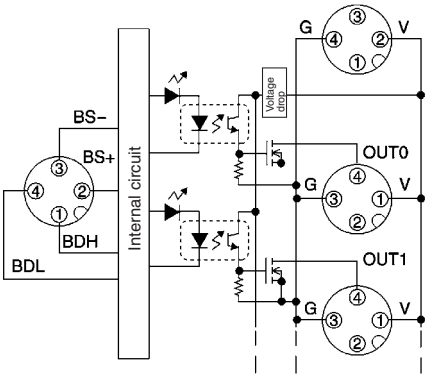
SRT2-ID0□CL (NPN)



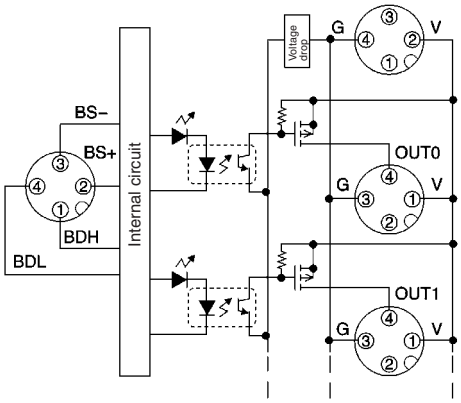
SRT2-ID0□CL-1 (PNP)



SRT2-OD0□CL (NPN)

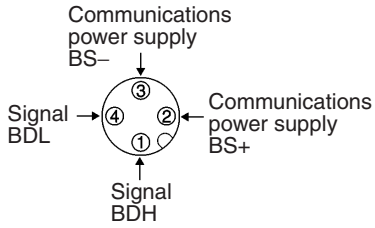


SRT2-OD0□CL-1 (PNP)

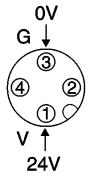


Connections Diagrams for Connectors

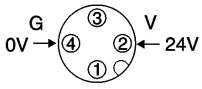
Communications Connector



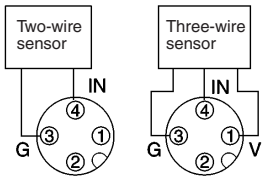
ID0□(-1) Power Supply Connector



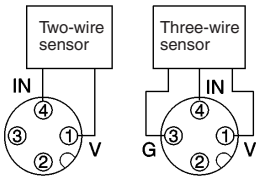
OD0□(-1) Power Supply Connector



ID0□ Input Connector (NPN)

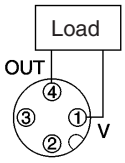


ID0□-1 Input Connector (PNP)



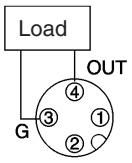
OD0□ Output Connector (NPN)

Solenoid and Voltage



OD0□ Output Connector (PNP)

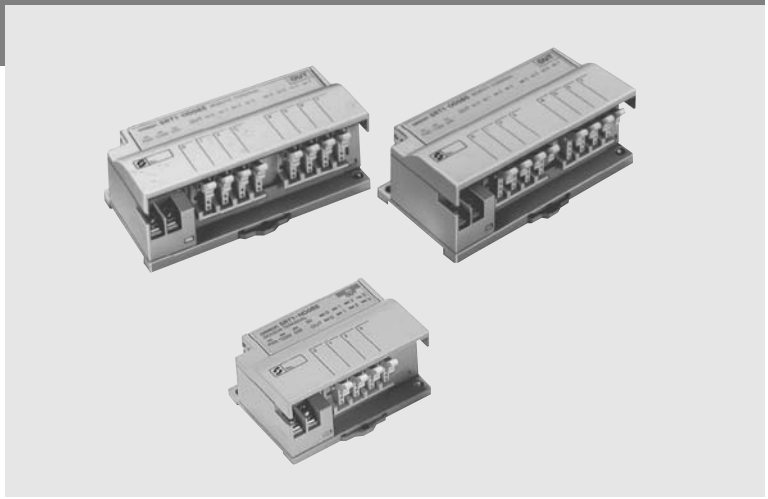
Solenoid and Voltage



SRT2-□D08S

Sensor Terminals

- Sensor connector models
- For sensors with easy-to-wire connectors
- Connects to 2-wire sensors.
- Very compact
- DIN rail mounting and screw mounting are both supported.



Ordering Information

Classification	Internal I/O circuit common	I/O points	Model
For input	NPN (– common)	8 input points	SRT2-ID08S
For I/O	NPN (– common)	4 input/4 output points	SRT2-ND08S
For output	NPN (– common)	8 output points	SRT2-OD08S

Specifications

Ratings

Input

Item	SRT2-ID08S/-ND08S
Input current	10 mA max./point
ON delay time	1 ms max.
OFF delay time	1.5 ms max.
ON voltage	12 V DC min. between each input terminal and V_{CC}, the external sensor power supply
OFF voltage	4 V DC max. between each input terminal and V_{CC}, the external sensor power supply
OFF current	1 mA max.
Insulation method	Photocoupler
Input indicator	LED (yellow)

Output

Item	SRT2-ND08S	SRT2-OD08S
Rated output current	20 mA/point	300 mA/point
Residual voltage	1 V max.	0.6 V max.
ON delay time	1 ms max.	---
OFF delay time	1.5 ms max.	---
Leakage current	0.1 mA max.	
Insulation method	Photocoupler	
Output indicator	LED (yellow)	

Characteristics

Communications power supply voltage (see note 1)	14 to 26.4 V DC
Current consumption (see note 2)	50 mA max. at 24 V DC
Connection method	Multi-drop method and T-branch method
Dielectric strength	500 V AC for 1 min (1-mA sensing current between insulated circuits)
Noise immunity	Conforms to IEC61000-4-4 2kV (power lines)
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	Malfunction:200 m/s^2 Destruction:300 m/s^2
Mounting method	M4 screw mounting or 35-mm DIN rail mounting
Mounting strength	No damage when 50 N pull load was applied for 10 s in all directions (except the DIN rail directions and a pulling force of 10 N)
Terminal strength	No damage when 50 N pull load was applied for 10 s in all directions Tighten each screw to a torque of 0.6 to 1.18 N • m
Ambient temperature	Operating:0°C to 55°C (with no icing or condensation) Storage:–20°C to 65°C (with no icing or condensation)
Ambient humidity	Operating:35% to 85%
Weight	SRT2-ID08S/OD08S: 100 g max., SRT2-ND08S: 80 g max.

Note: 1. The communications power supply voltage must be 20.4 to 26.4 V DC if the Unit is connected to 2-wire proximity sensors.

2. The above current consumption is a value with all the points turned OFF excluding the current consumption of the sensor connected to the Sensor Terminal.

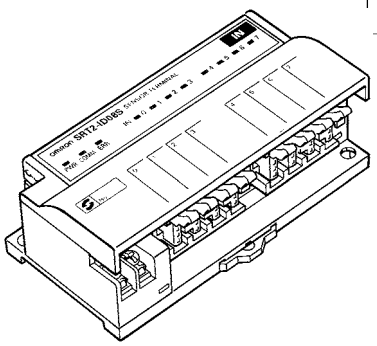
External Sensor Power Supply

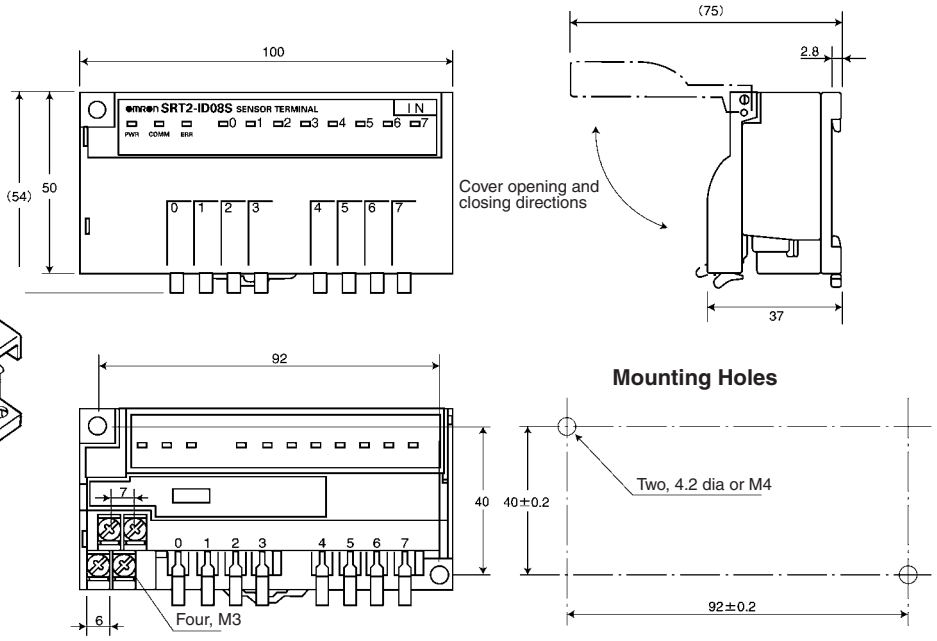
Power supply voltage	13.5 to 26.4 V DC
Current consumption	500 mA max. in total

Dimensions

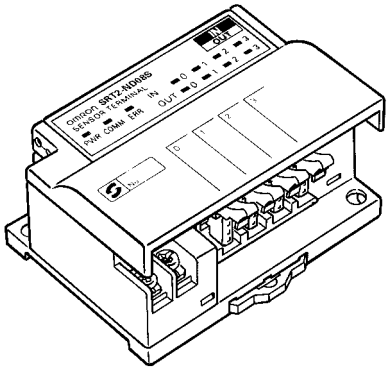
Note: All units are in millimeters unless otherwise indicated.

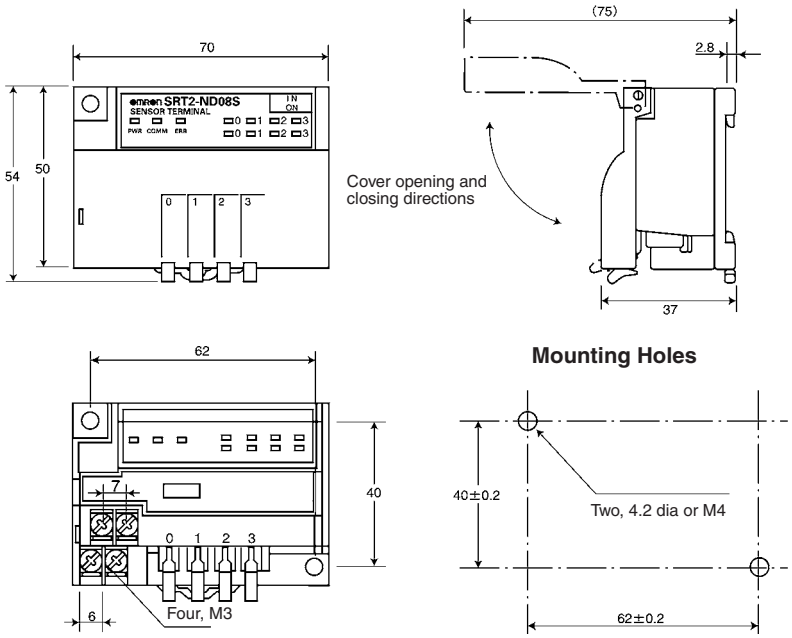
SRT2-ID08S



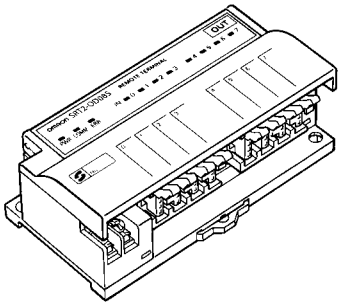


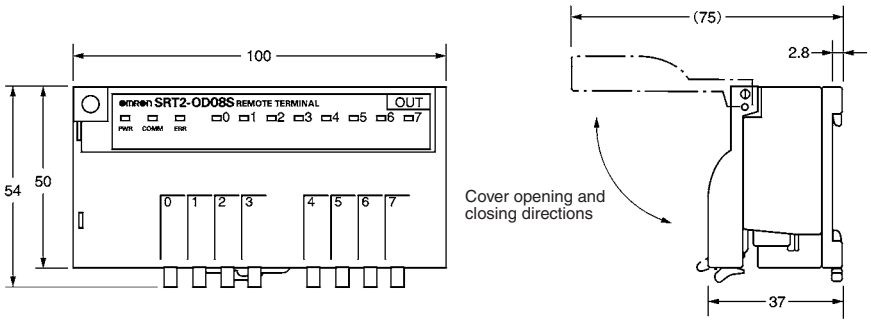
SRT2-ND08S

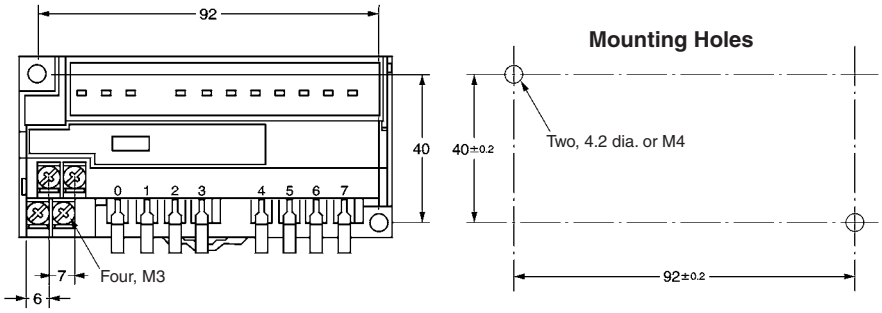




SRT2-OD08S







Cable Connector for SRT2-□D08S

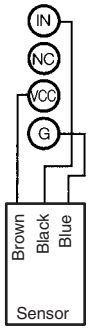
Applicable conductor size (mm^2)	Model
0.3 to 0.5	XS8A-0441
0.14 to 0.2	XS8A-0442
0.3 to 0.5	XS8B-0443

Installation

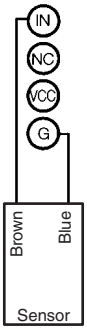
External Connections

SRT2-ID08S

Three-wire Sensor

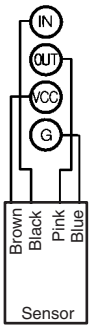


Two-wire Sensor

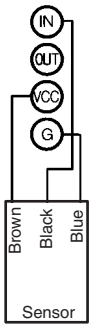


SRT2-ND08S

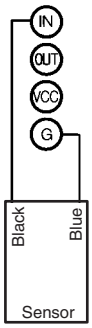
Sensor with Teaching Function
Sensor with External Diagnostic function
Sensor with Bank-switching Function



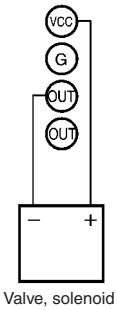
Three-wire Sensor



Two-wire Sensor

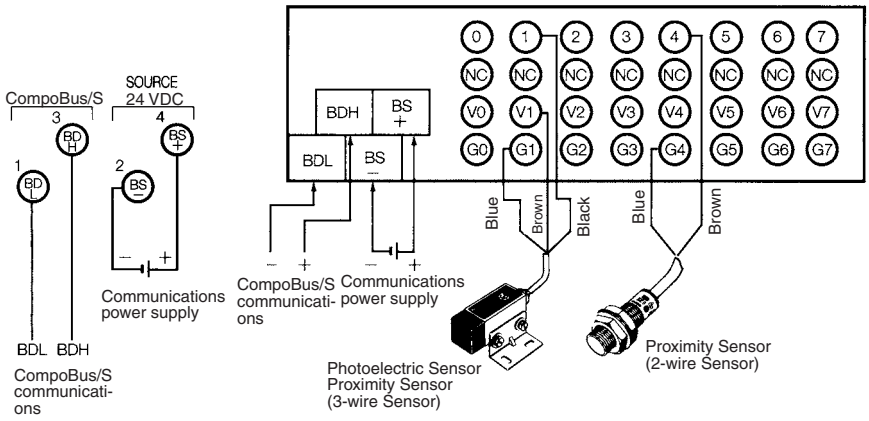


SRT2-OD08S

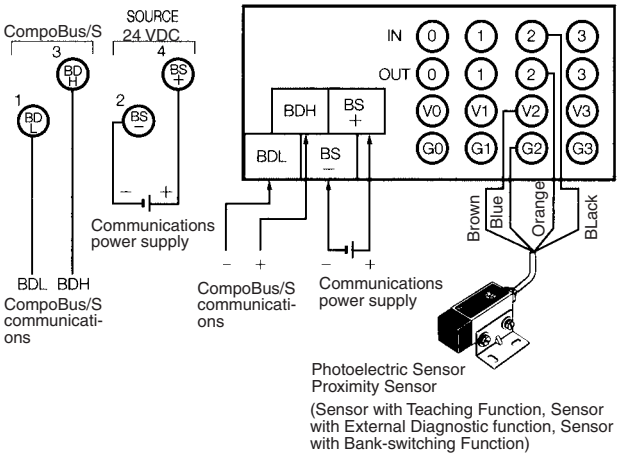


Terminal Arrangement and I/O Device Connection Example

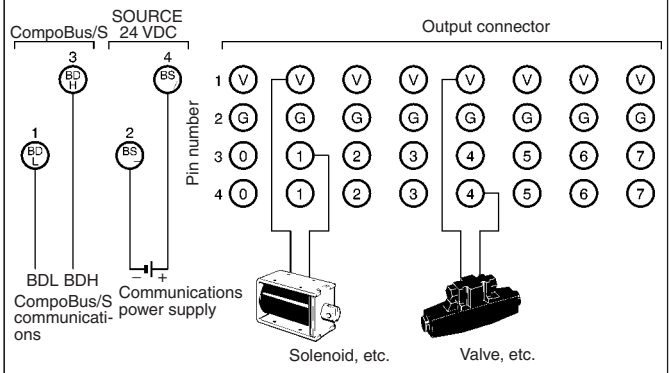
Input
SRT2-ID08S



I/O
SRT2-ND08S



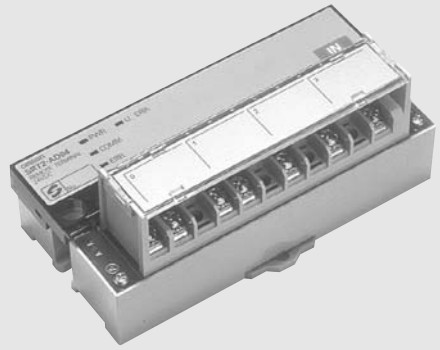
Output
SRT2-OD08S



SRT2-AD04

Analog Input Terminal

- Compact Analog Input Model
- Allows flexible input point settings up to a maximum of four points.
- Resolution: 1/6,000
- Conversion time is 1 ms only
- Wide input ranges available.
- 105 x 48 x 50 (W x H x D)



Ordering Information

Classification	I/O points	Model
Analog Input Terminal	1 to 4 (selectable with DIP switch)	SRT2-AD04

Note: For details about connecting the SRT2-AD04 to the master unit. Refer to page 368.

Specifications

Ratings

Input

Item		Voltage input	Current input
Max. signal input		±15 V	±30 mA
Input impedance		1 MΩ max.	Approx. 250 Ω
Resolution		1/6,000 (FS)	
Total accuracy	**25°C**	±0.3% FS	±0.4% FS
	–10 to 55°C	±0.6% FS	±0.8% FS
Conversion time		4 ms/4 points, 3 ms/3 points, 2 ms/2 points, and 1 ms/1 point	
Dielectric strength		500 V AC for 1 min between communications power supply, analog input, and communications terminals (see note)	

Note: There is no insulation between analog inputs.

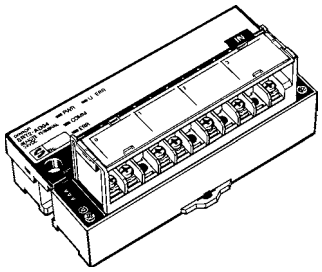
Characteristics

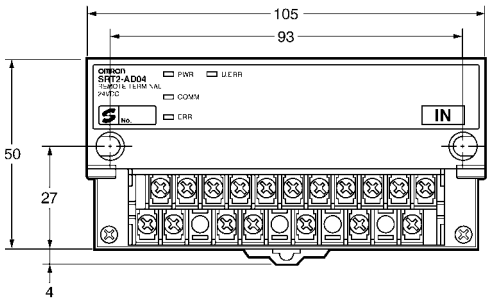
Communications power supply voltage	14 to 26.4 V DC (possible to provide through Special Flat Cable)
Current consumption	100 mA max.
Connection method	Multi-drop method and T-branch method
Dielectric strength	500 V AC (between insulated circuits)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration resistance	10 to 150 Hz, 1.0-mm double amplitude or 70 m/s^2
Shock resistance	200 m/s^2
Mounting strength	No damage with 100 N pull load applied in all directions.
Terminal strength	No damage with 100 N pull load applied
Screw tightening torque	0.3 to 0.5 Nm
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C
Ambient humidity	Operating:25% to 85% (with no condensation)
Weight	Approx. 120 g

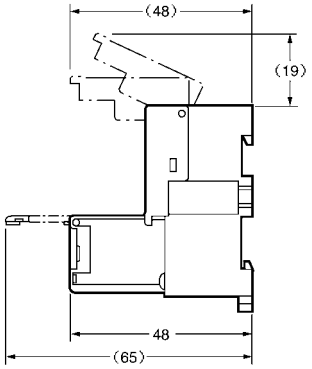
Dimensions

Note: All units are in millimeters unless otherwise indicated.

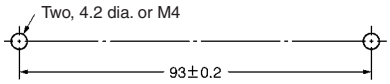
SRT2-AD04







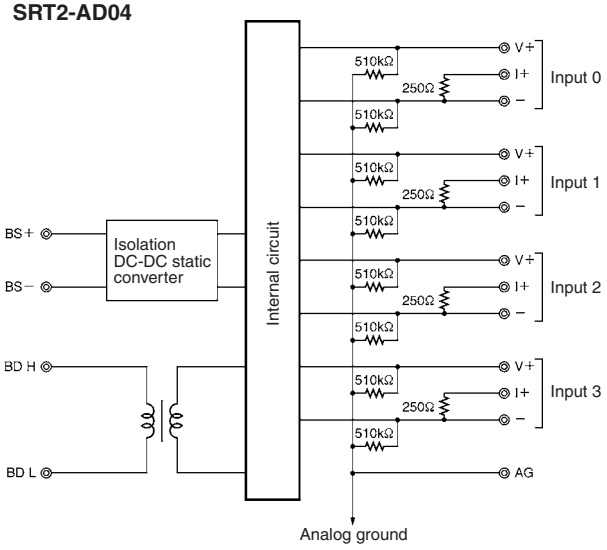
Mounting Holes



Installation

Internal Circuit Configuration

SRT2-AD04



Terminal Arrangement

SRT2-AD04

BD H	BS +	AG	V0 +	I0 +	V1 +	I1 +	V2 +	I2 +	V3 +	I3 +
BD L	BS −	NC	AG	0−	NC	1−	NC	2−	NC	3−

Note: When the input is current input, short-circuit the “V+” terminals and the “I+” terminals. When short-circuiting, use the short-circuiting tool provided as an accessory.

SRT2-DA02

Analog Output Terminal

- Compact Analog Output Model
- Two output points or 1 output point is selectable.
- Resolution: 1/6,000
- 105 x 48 x 50 (W x H x D)



Ordering Information

Classification	I/O points	Model
Analog Output Terminal	1 or 2 (selectable with DIP switch)	SRT2-DA02

Note: For details about connecting the SRT2-DA02 to the master unit, refer to page 368.

Specifications

Ratings

Output

Item		Voltage output	Current output
External output permissible load resistance		5 kΩ min.	600 Ω max.
Output impedance		0.5 Ω max.	---
Resolution		1/6,000 (FS)	
Total accuracy	**25°C**	±0.4% FS	
	–10 to 55°C	±0.8% FS	
Conversion time		2 ms/2 points and 2 ms/1 point	
Dielectric strength		500 V AC for 1 min between communications power supply, analog output, and communications terminals (see note)	

Note: There is no insulation between analog outputs.

Characteristics

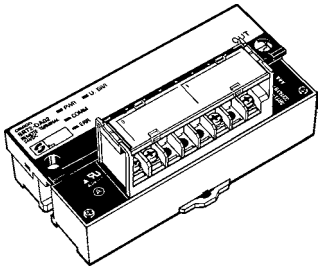
Communications power supply voltage	14 to 26.4 V DC (power supply possible from Special Flat Cable)
Current consumption (see note)	170 mA max.
Connection method	Multi-drop method and T-branch method
Dielectric strength	500 V AC (between insulated circuits)
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration resistance	10 to 150 Hz, 1.0-mm double amplitude or 70 m/s^2
Shock resistance	200 m/s^2
Mounting strength	No damage when 100 N pull load was applied in all directions
Terminal strength	No damage when 100 N pull load was applied
Screw tightening torque	0.3 to 0.5 N • m
Ambient temperature	Operating:–10°C to 55°C Storage:–25°C to 65°C
Ambient humidity	Operating:25% to 85% (with no condensation)
Weight	Approx. 100 g

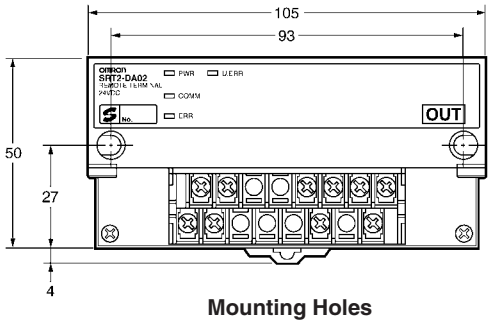
Note: The above current consumption is the value with all points turned ON excluding the current consumption of the external load.

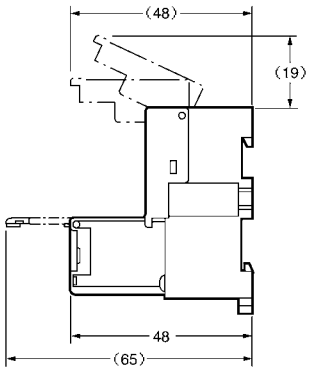
Dimensions

Note: All units are in millimeters unless otherwise indicated.

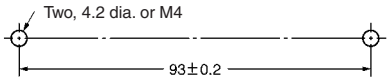
SRT2-DA02







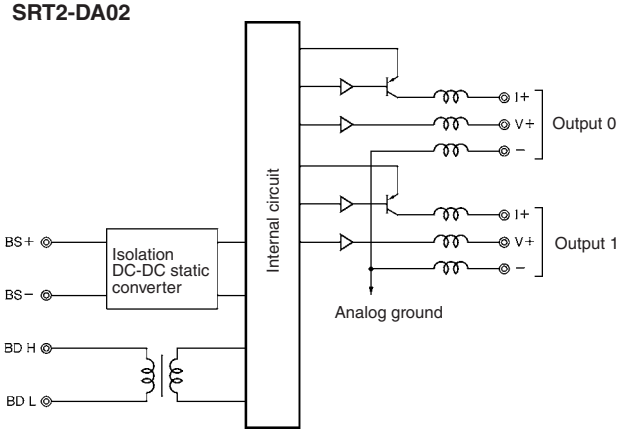
Mounting Holes



Installation

Internal Circuit Configuration

SRT2-DA02



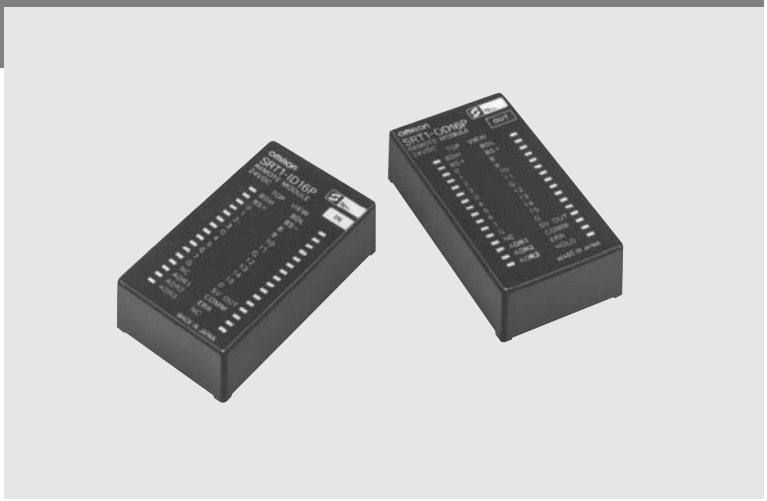
Terminal Arrangement

SRT2-DA02

H	BS +	NC	NC	V0 +	I0 +	V1 +	I1 +
BD L	BS −	NC	NC	NC	0 −	NC	1 −

SRT2-ID16P/-OD16P

Digital I/O Terminals



Module Type that Allows PCB Mounting

- Compact size at 60 x 16 x 35 (W x H x D)
- Lineup now includes the 16-point input model and 16-point output model.

Ordering Information

I/O classification	Internal I/O circuit common	I/O points	Rated voltage	I/O rated voltage	Model
Input	NPN (+ common)	16	24 V DC	24 V DC	SRT2-ID16P
Output	NPN (– common)				SRT2-OD16P

Specifications

Ratings

Input (SRT2-ID16P)

Input current	2 mA max./point
ON delay time	1.5 ms max.
OFF delay time	1.5 ms max.
ON voltage	15 V DC min. between each input terminal and BS+ terminal
OFF voltage	5 V DC max. between each input terminal and BS + terminal

Output (SRT2-OD16P)

Rated output current	0.2 A/point, 0.6 A/common
Residual voltage	0.6 V max. between each output terminal and G terminal at 0.2 A
Leakage current	0.1 mA max. between each output terminal and G terminal at 24 V DC

Characteristics

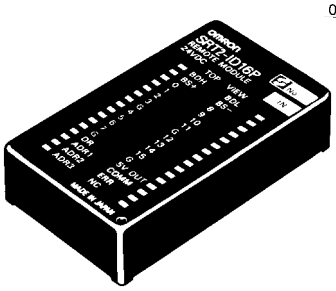
Communications power supply voltage	20.4 to 26.4 V DC
I/O power supply voltage	24 V DC $^{+10\%}/_{-15\%}$
Current consumption (see note)	60 mA max.
Connection method	Multi-drop method and T-branch method
Connecting Units	8 Input Terminals and 8 Output Terminals per Master
Dielectric strength	500 V AC for 1 min (1-mA sensing current between insulated circuits)
5-V output current	20 mA max. (5 V ± 0.5 V)
LED drive current (COMM, ERR)	10 mA max. (5 V DC)
SW carry current (ADR0 to 3, HOLD)	1 mA max.
Ambient temperature	Operating:0°C to 55°C (with no icing or condensation) Storage:–20°C to 65°C (with no icing or condensation)
Ambient humidity	Operating:35% to 85%
Weight	35 g max.

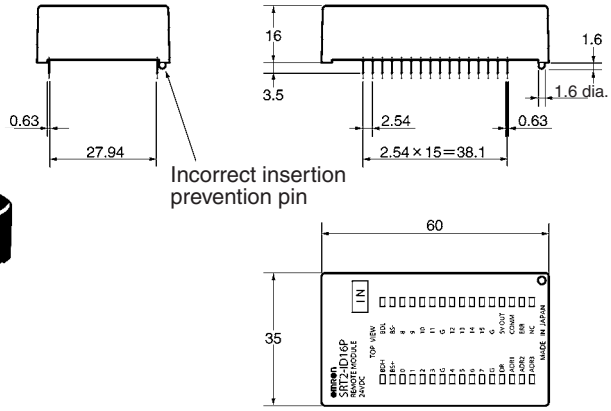
Note: The above current consumption is the value with all points turned ON excluding the current consumption of the external sensor connected to the input model and the current consumption of the load connected to the output model.

Dimensions

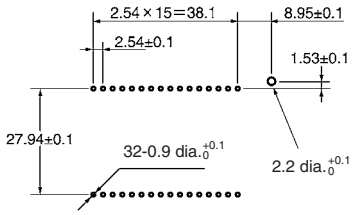
Note: All units are in millimeters unless otherwise indicated.

SRT2-ID16P
SRT2-OD16P





PCB dimensions (top view)

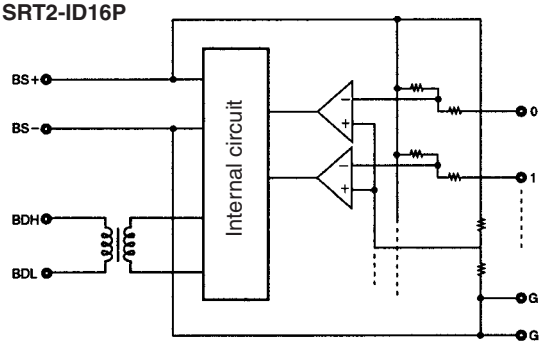


No cumulative tolerance allowed

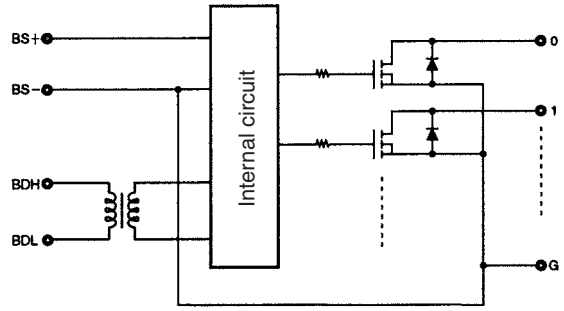
Installation

Internal Circuit Configuration

SRT2-ID16P

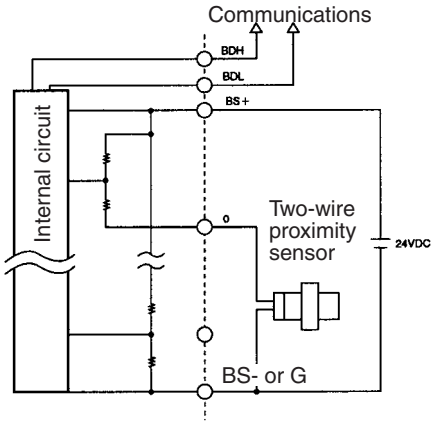


SRT2-OD16P

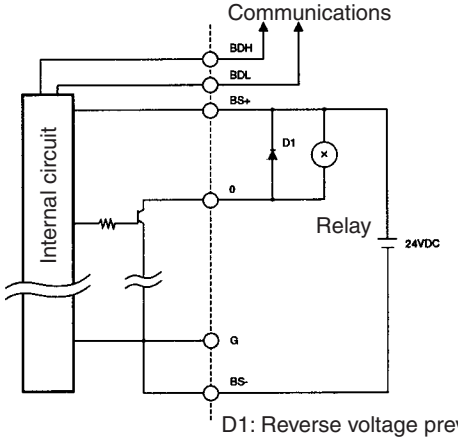


External Connections

Input Module (SRT2-ID16P)

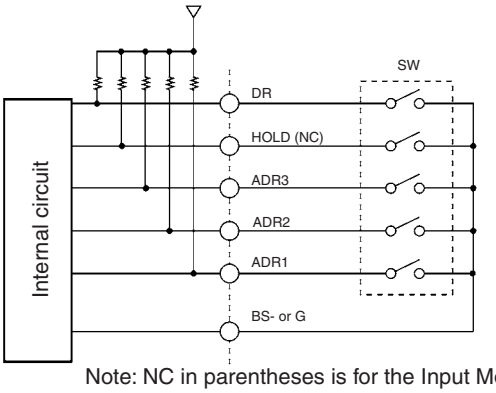


Output Module (SRT2-OD16P)



D1: Reverse voltage prevention diode

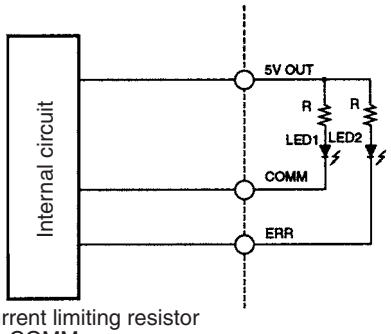
Node Number Settings and Output HOLD/CLEAR Mode



Note: NC in parentheses is for the Input Modules.

Note: Refer to the *CompoBus/S Operation Manual (W266-E1)* for details on the switch.

Indicators



R: LED current limiting resistor
LED1: LED for COMM
LED2: LED for ERR
The maximum current for LED1 and 2 is 10 mA.

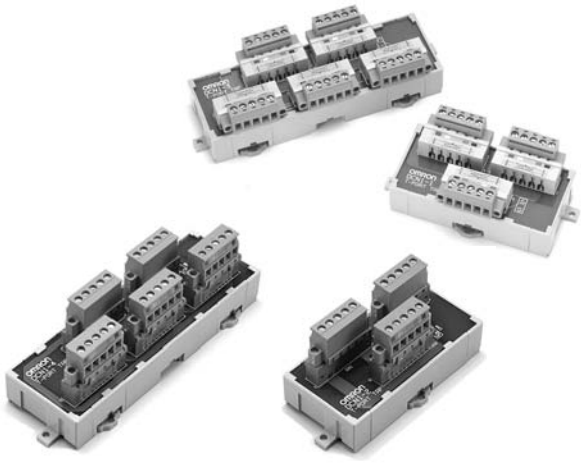
The 5-V Output Terminals have positive power supplies (maximum output current of 20 mA) for the ERR and COMM LEDs. Recommended LED colors are red for ERR and yellow for COMM.

OMRON

DeviceNet Wiring

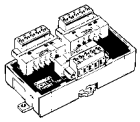
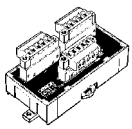
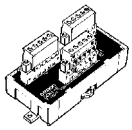
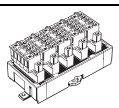
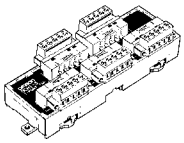
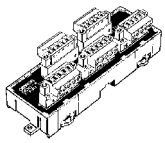
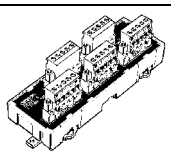
DeviceNet Cables and connectors

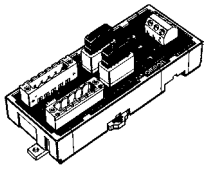
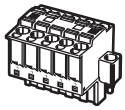
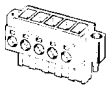
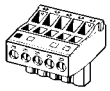
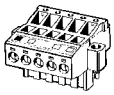
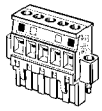
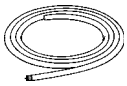
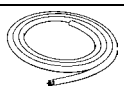
- T-branch taps
- Network terminators
- Network connectors
- DeviceNet cable



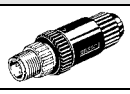
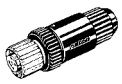
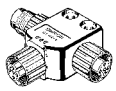
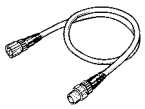
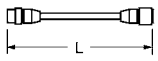
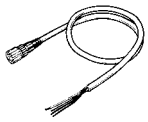
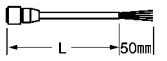
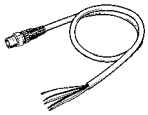
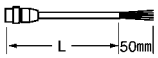
Ordering Information

General-purpose Models

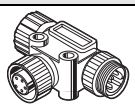
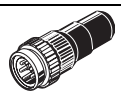
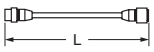
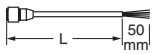
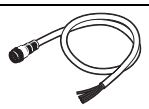
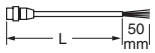
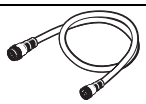
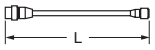
Product	Appearance	Model	Specification	
T-branch Tap for 1 branch line		DCN1-1NC	Cable wiring direction: Toward top Cable lock direction: From top Connector screw direction: From top	Provided with 3 parallel connectors with clamps (XW4G-05C1-H1-D), standard terminating resistor
		DCN1-1C	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From side	Provided with 3 parallel connectors with screws (XW4B-05C1-H1-D), standard terminating resistor
		DCN1-2C	Cable wiring direction: Toward top Cable screw direction: From side Connector screw direction: From top	
		DCN1-2R	Cable wiring direction: From side Cable screw direction: From top Connector screw direction: From top	Provided with 3 orthogonal connectors with screws (XW4B-05C1-VIR-D), standard terminating resistor
T-branch Tap for 3 branch lines		DCN1-3NC	Cable wiring direction: Toward top Cable lock direction: From top Connector screw direction: From top	Provided with 5 parallel clamp connectors with screws (XW4G-05C1-H1-D), standard terminating resistor
		DCN1-3C	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From side	Provided with 5 parallel connectors with screws (XW4B-05C1-H1-D), standard terminating resistor
		DCN1-4C	Cable wiring direction: Toward top Cable screw direction: From side Connector screw direction: From top	
		DCN1-4R	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From top	Provided with 5 orthogonal clamp connectors with screws (XW4B-05C1-VIR-D), standard terminating resistor

Product		Appearance	Model	Specification
Power Supply Tap			DCN1-1P	One-branch tap provided with 2 connectors, standard terminating resistor, and fuse
Connectors			XW4G-05C1-H1-D	Parallel clamp connector with screws Connector insertion and wiring both performed horizontally.
			XW4G-05C4-HF-D	Parallel multi-branching clamp connector with screws Connector insertion and wiring performed in same direction.
			XW4B-05C1-H1-D	Parallel connector with screws Connector insertion and wiring performed in same direction.
			XW4B-05C4-T-D	Parallel, screwless, multi-branching connector Connector insertion and wiring performed in same direction.
			XW4B-05C4-TF-D	Parallel, multi-branching connector with screws Connector insertion and wiring performed in same direction.
			XW4B-05C1-VIR-D	Orthogonal connector with screws Connector insertion and wiring performed at a right angle.
Omron supplied DeviceNet Cables	Thin Cables		DCA1-5C10	Outer diameter: 7.00 mm Length: 100 m
	Thick Cables		DCA2-5C10	Outer diameter: 11.6 mm Length: 100 m
Terminal-block Terminator			DRS1-T	Resistance of 121 Ω

Environment-resistive Models for Thin Cable

Product	Appearance		Model	Specifications	
Sealed Assembling-type Connector (male)			XS2G-D5S7	For communications (plug)	
Sealed Assembling-type Connector (female)			XS2C-D5S7	For communications (socket)	
Sealed T-branch Connector			DCN2-1	For 1 branch line	
Sealed Connector with Terminating Resistor			DRS2-1	Plug	
			DRS2-2	Socket	
Cables with Sealed Connectors			DCA1-5CNC5W1	Length (L): 0.5 m	Cable with connectors on both ends
			DCA1-5CN01W1	Length (L): 1 m	
			DCA1-5CN02W1	Length (L): 2 m	
			DCA1-5CN03W1	Length (L): 3 m	
			DCA1-5CN05W1	Length (L): 5 m	
			DCA1-5CN10W1	Length (L): 10 m	
			DCA1-5CNC5F1	Length (L): 0.5 m	Cable with connector socket on one end
			DCA1-5CN01F1	Length (L): 1 m	
			DCA1-5CN02F1	Length (L): 2 m	
			DCA1-5CN03F1	Length (L): 3 m	
			DCA1-5CN05F1	Length (L): 5 m	
			DCA1-5CN10F1	Length (L): 10 m	
			DCA1-5CNC5H1	Length (L): 0.5 m	Cable with connector plug on one end
			DCA1-5CN01H1	Length (L): 1 m	
			DCA1-5CN02H1	Length (L): 2 m	
			DCA1-5CN03H1	Length (L): 3 m	
			DCA1-5CN05H1	Length (L): 5 m	
			DCA1-5CN10H1	Length (L): 10 m	

Environment-resistive Models for Thick Cable

Product	Appearance		Model	Specifications	
Sealed T-branch Connector			DCN3-11	T-branch Connector	
			DCN3-12	T-branch Connector (Branch connector is M12.)	
Sealed Connector with Terminating Resistor			CRS3-1	Plug	
Cables with Sealed Connectors			DCA2-5CN01W1	Length (L): 1 m	Cable with connectors on both ends
			DCA2-5CN02W1	Length (L): 2 m	
			DCA2-5CN05W1	Length (L): 5 m	
			DCA2-5CN10W1	Length (L): 10 m	
			DCA2-5CN01F1	Length (L): 1 m	Cable with connector socket on one end
			DCA2-5CN02F1	Length (L): 2 m	
			DCA2-5CN05F1	Length (L): 5 m	
			DCA2-5CN10F1	Length (L): 10 m	
			DCA2-5CN01H1	Length (L): 1 m	Cable with connector plug on one end
			DCA2-5CN02H1	Length (L): 2 m	
			DCA2-5CN05H1	Length (L): 5 m	
			DCA2-5CN10H1	Length (L): 10 m	
			DCA1-5CN01W5	Length (L): 1 m	Cable with connectors on both ends Thin cable M12 socket
			DCA1-5CN02W5	Length (L): 2 m	
			DCA1-5CN05W5	Length (L): 5 m	
			DCA1-5CN10W5	Length (L): 10 m	
Panel-mounting Connector (female)			DCA2-5CNC5P1	Connector socket for panel mounting Cable: 0.5 m	
Panel-mounting Connector (male)			XS4M-D521-1	Connector plug for panel mounting DIP terminals	

Recommended cable types, non-Omron

Network	Reference	Description
DeviceNet	Belden 46012 or compatible	DeviceNet thick cable (trunk). For use in Europe only. 18AWG/1PR 15AWG/1PR STR TC IND.
Device Net	Belden 3082A or compatible	DeviceNet thick cable (trunk). For global use. 18AWG/1PR 15AWG/1PR STR TC IND.
DeviceNet	Belden 3084A or compatible	DeviceNet thin cable (drop). 22AWG/1PR 24AWG/1PR STR TC IND.
PROFIBUS-DP	Belden 3079A or compatible	PROFIBUS cable. Type A (EN50170 vol. 2) Multi conductor, twisted, 22AWG

Specifications

General-purpose Models (T-branch Taps)

Ratings/Characteristics

Rated current	Between main lines:8 A (power supply line) and 2 A (signal line) Between main and branch lines:3 A (power supply line) and 1 A (signal line)
Insulation resistance	100 MΩ min. (at 500 V DC)
Dielectric strength	500 V AC for 1 min, leakage current: 1 mA max.
Ambient temperature	Operating: 0°C to 55°C

Materials

Item	Component	Materials
Unit	Main and Expansion Units	PBT resin with glass (UL14V-0)/gray
	DIN rail lock	POM resin/yellow
Terminal block connector (See note.)	Housing	PA66 resin (UL94V-0)
	Contact	Phosphor bronze coated with gold
PCB		Glass epoxy resin

Environment-resistive Models (Thin Cable Communications Connectors)

Ratings/Characteristics

Item	DCA1-5CN□□□1 Connectors with Cables	DCN2-1 T-branch Connector	XS2□-D5S7 Assembling-type Connector	DRS2-□ Connectors with Terminating Resistor
Rated current	3 A			
Rated voltage	125 V DC			
Contact resistance (connector)	40 mΩ max. (at 20 m V DC max. and 100 mA max.)			
Insulation resistance	1,000 MΩ min. (at 500 V DC)			
Dielectric strength (connector)	1,500 V AC for 60 seconds (leakage current: 1 mA max.)			
Ambient temperature range	–20 to 65°C			
Storage temperature range	–25 to 70°C			
Enclosure rating	IEC IP67			
Insertion durability	200 times			
Cable strength	98 N for 15 s	---		
Vibration resistance	No current interruptions of more than 1 μm while performing simple vibrations at either 10 to 500 Hz with 1.52-mm full amplitude or at acceleration 100 m/s^2, whichever is smaller			

Environment-resistive Models (Thick Cable Communications Connectors)

Ratings/Characteristics

Item	DCA2-5CN□□□1 Connectors with Thick Cable	DCA1-5CN□□W5 Connectors with Thick Cable	DCN3-11 T-branch Connector	DCN3-12 T-branch Connector	DRS3-1 Connectors with Terminating Resistor	DCA2-5CNC5P1 Panel Mounting Connector	XS4M-D521-1 Panel Mounting Connector
Rated current	8 A	3 A	8 A	3 A (See note.)	8 A		
Rated voltage	125 V DC						
Contact resistance (connector)	30 mΩ max. (at 20 m V DC max. and 100 mA max.)						
Insulation resistance	1,000 MΩ min. (at 500 V DC)						
Dielectric strength (connector)	1,500 V AC for 60 seconds (leakage current: 1 mA max.)						
Ambient temperature range	–20 to 65°C						
Storage temperature range	–25 to 70°C						
Enclosure rating	IEC IP67						
Insertion durability	200 times						
Cable strength	98 N for 15 s		---			98 N for 15 s	---
Vibration resistance	No current interruptions of more than 1 μm while performing simple vibrations at either 10 to 500 Hz with 1.52-mm full amplitude or at acceleration 100 m/s^2, whichever is smaller						

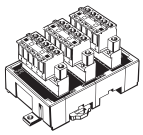
Note: The rated current between thick wires is 8 A.

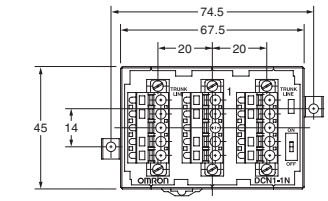
Dimensions

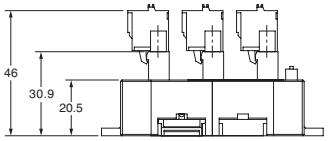
Note: All units are in millimeters unless otherwise indicated.

General-purpose Models

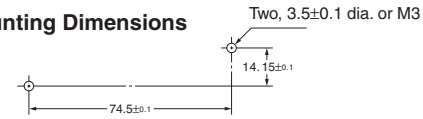
DCN1-1NC
T-branch Tap for 1 Branch Line
(With Three Branching Connectors)



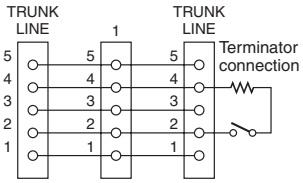




Mounting Dimensions

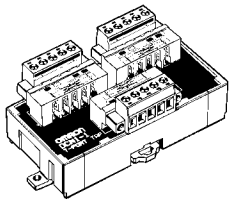


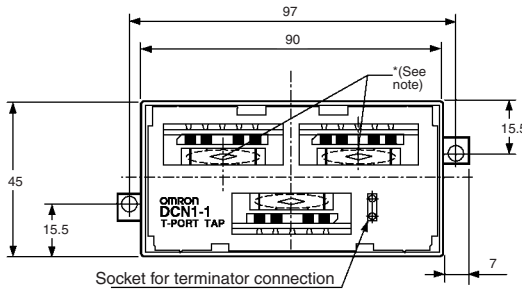
Internal Circuit

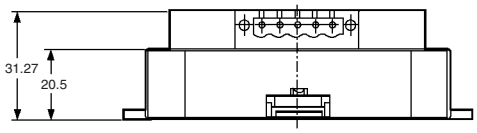


Terminal No.	Name
1	V–
2	CAN-L
3	DRAIN
4	CAN-H
5	V+

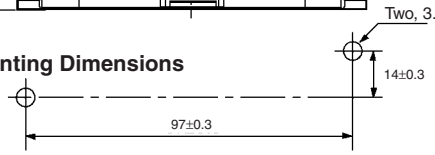
DCN1-1C
T-branch Tap for 1 Branch Line
(With Three Branching Connectors)



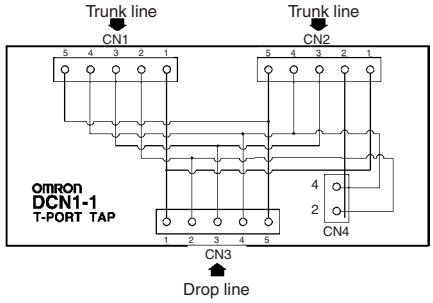




Mounting Dimensions



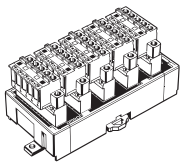
Internal Circuit

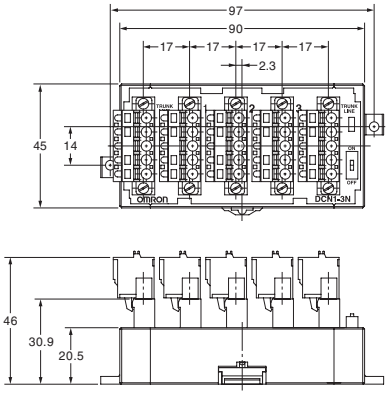


Terminal No.	Name
1	V–
2	CAN-L
3	DRAIN
4	CAN-H
5	V+

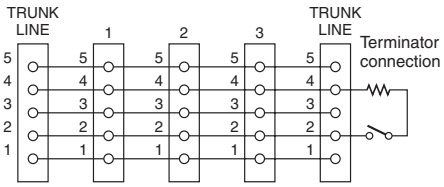
Note: When connecting a branch line to the main line, connect the trunk line to the connector marked with an asterisk because the resistance between the trunk line is minimal.

DCN1-3NC
T-branch Tap for 3 Branch Lines
(With Five Branching Connectors)



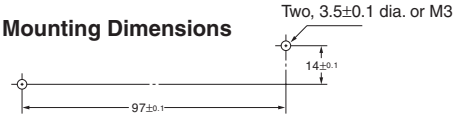


Internal Circuit

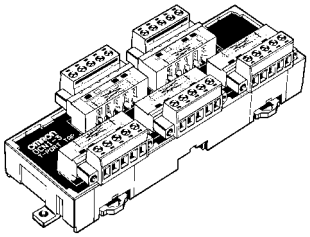


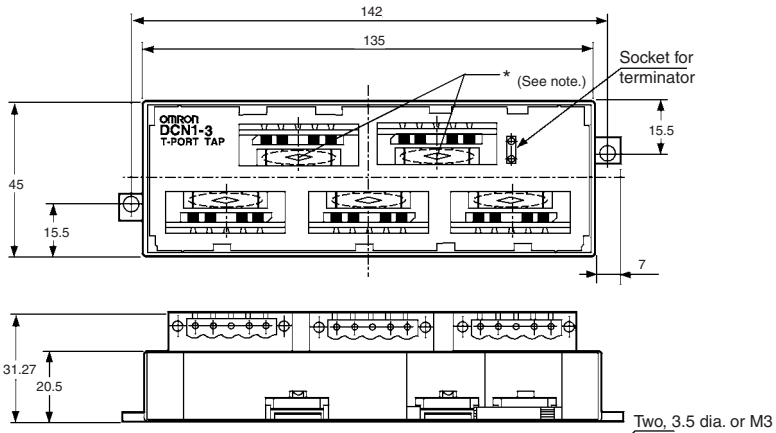
Terminal No.	Name
1	V–
2	CAN-L
3	DRAIN
4	CAN-H
5	V+

Mounting Dimensions

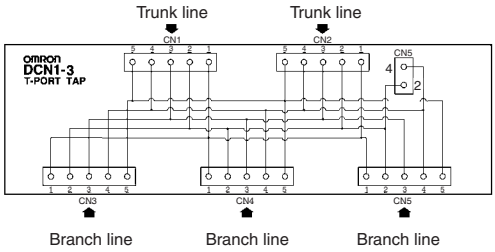


DCN1-3C
T-branch Tap for 3 drop Lines
(With Five Branching Connectors)





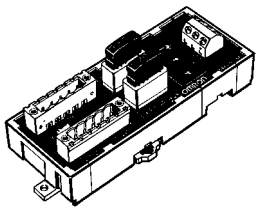
Internal Circuit

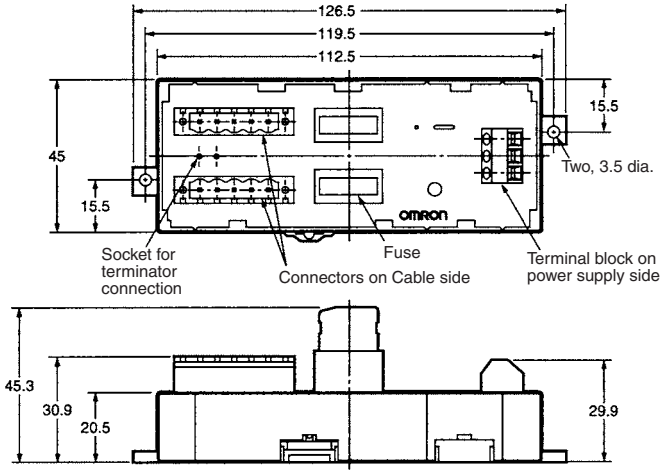


Terminal No.	Name
1	V–
2	CAN-L
3	DRAIN
4	CAN-H
5	V+

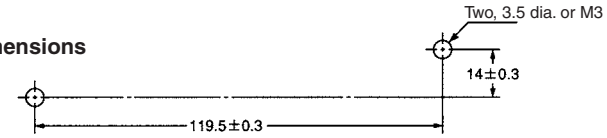
Note: When connecting a drop line to the trunk line, connect the trunk line to the connector marked with an asterisk because the resist ance between the trunk line connectors portion is minimal.

DCN1-1P
Power Supply Tap
(With Two Branching Connectors)

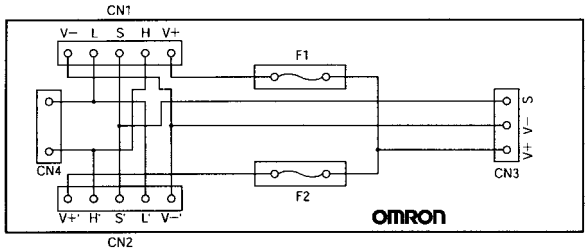




Mounting Dimensions

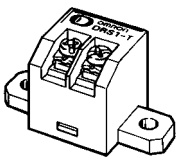


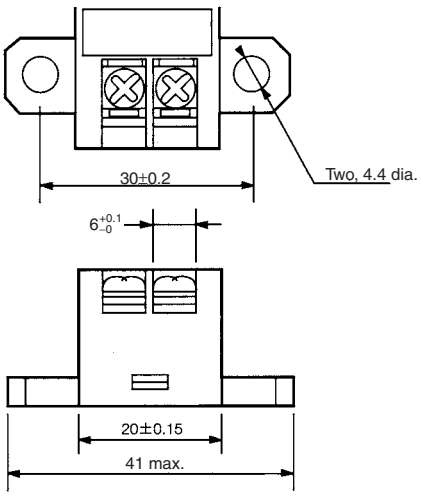
Internal Circuit



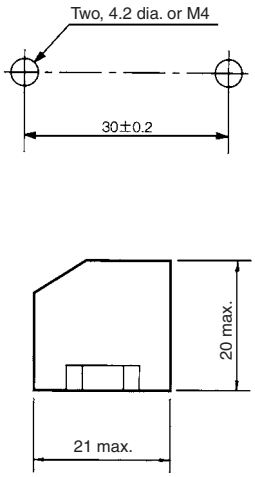
Terminal No.	Name
V–	V–
L	CAN-L
S	DRAIN
H	CAN-H
V+	V+

DRS1-T Terminal-block Terminator



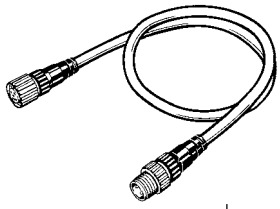


Mounting Holes

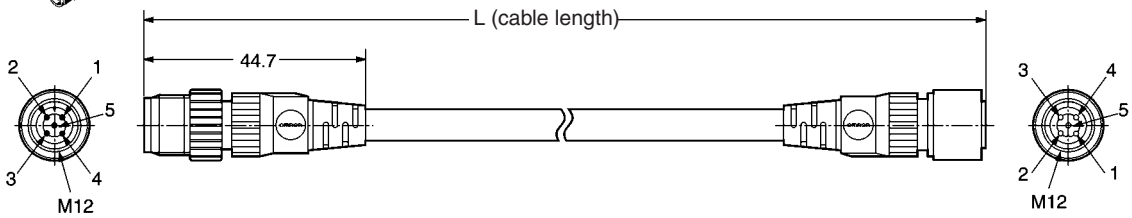


Environment-resistive Models for thin cable

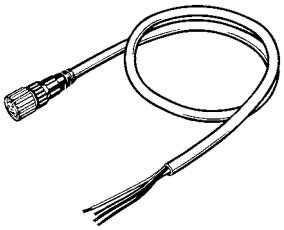
DCA1-5CN□□W1
Cables with Connectors on Both Ends



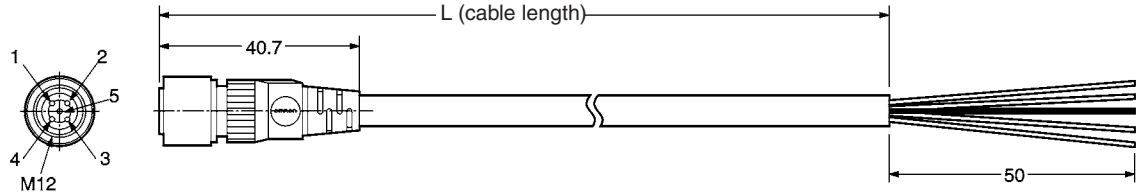
Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN L



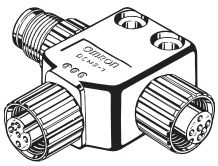
DCA1-5CN□□F1
Cables with Connector (Socket) on Single End



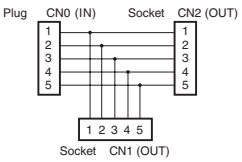
Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN L



DCN2-1
T-branch Connector

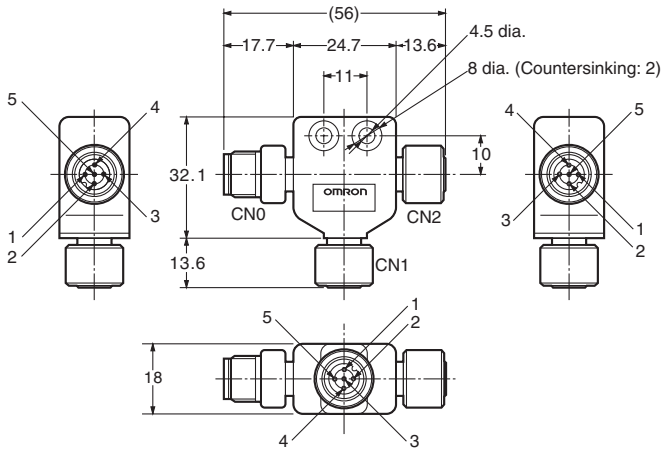


Connections Diagram

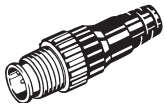


Wiring

Terminal No.	Name
1	SHIELD
2	V+
3	V–
4	CAN-H
5	CAN-L



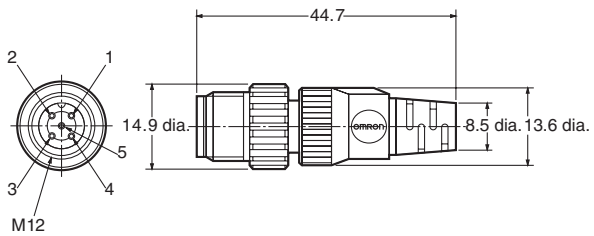
DRS2-1 (Plug)
DRS2-2 (Socket)
Connectors with Terminating Resistance



Wiring

Terminal No.	Name
1	DRAIN: NC
2	V+: NC
3	V–: NC
4	CAN-H: ⇝ 121 Ω
5	CAN-L:

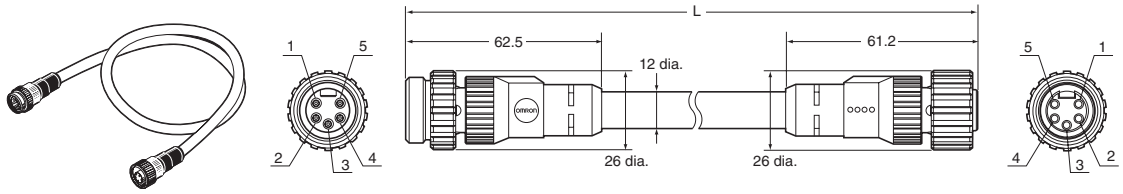
Note: Terminating resistance (121 Ω) is connected between terminals 4 and 5.



Note: The diagram shows the DRS2-1 (plug).

Environment-resistive Models for Thick Wires

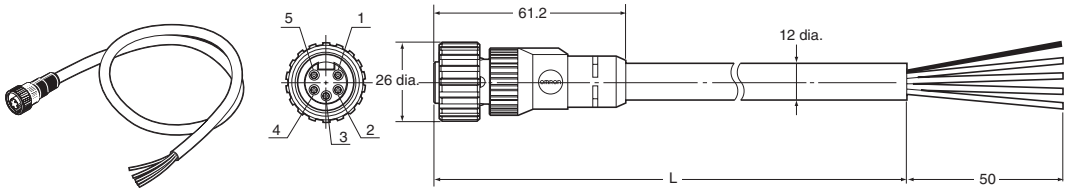
DCA2-5CN□□W1
Thick Cable with Connectors on Both Ends
(5 Conductors for Communications)



Wiring

Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN-L

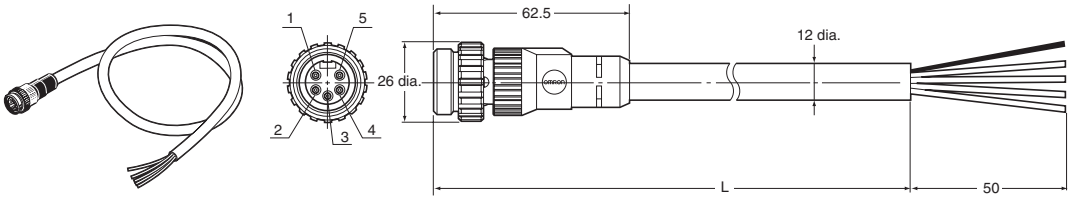
DCA2-5CN□□F1
Thick Cable with Connector Socket on One End
(5 Conductors for Communications)



Wiring

Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN-L

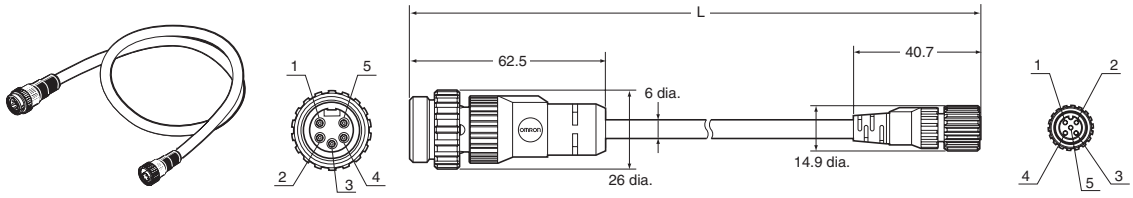
DCA2-5CN□□H1
Thick Cable with Connector Plug on One End
(5 Conductors for Communications)



Wiring

Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN-L

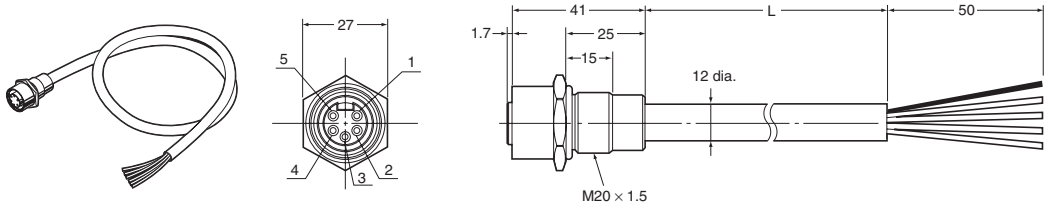
DCA1-5CN□□W5
Thin Cable with Connectors on Both Ends (5 Conductors for Communications)



Wiring

Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN-L

DCA2-5CNC5P1
Thin Cable with Panel-mounting Connector Socket on One End (5 Conductors for Communications)

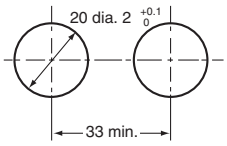


Wiring

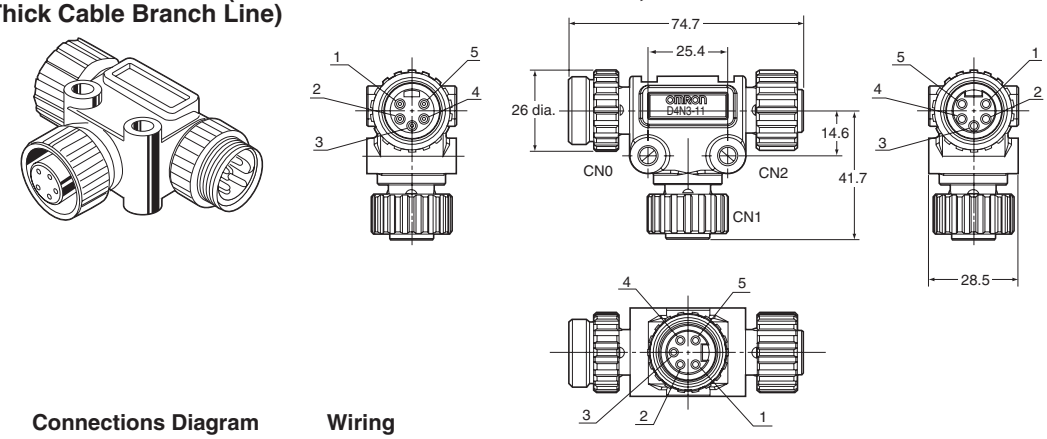
Terminal No.	Color	Name
1	---	DRAIN
2	Red	V+
3	Black	V–
4	White	CAN-H
5	Blue	CAN-L

Note: A rubber seal and nut for panel mounting are included.

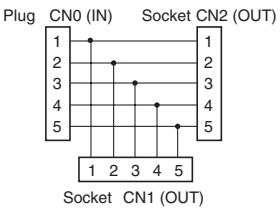
Panel Cutout Dimensions



DCN3-11
T-branch Connector (5 Conductors for Communications, Thick Cable Branch Line)



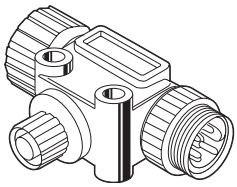
Connections Diagram

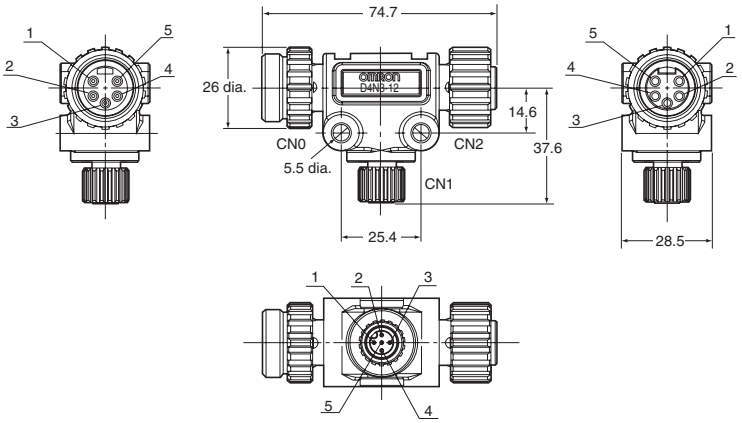


Wiring

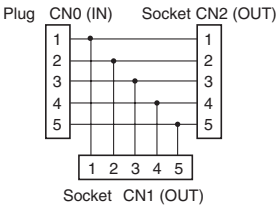
Terminal No.	Name
1	DRAIN
2	V+
3	V–
4	CAN-H
5	CAN-L

DCN3-11
T-branch Connector (5 Conductors for Communications, Thin Cable Branch Line)





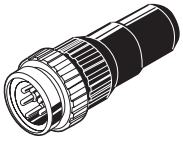
Connections Diagram



Wiring

Terminal No.	Name
1	DRAIN
2	V+
3	V–
4	CAN-H
5	CAN-L

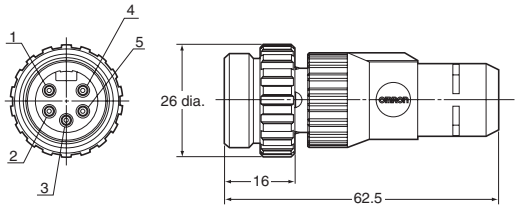
DRS3-1
Connector Plug with Terminating Resistance



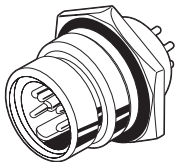
Wiring

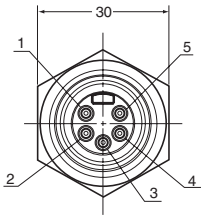
Terminal No.	Name
1	DRAIN: NC
2	V+: NC
3	V–: NC
4	CAN-H: 121 Ω
5	CAN-L:

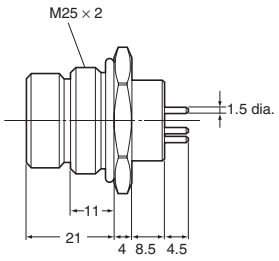
Note: Terminating resistance (121 Ω) is connected between terminals 4 and 5.



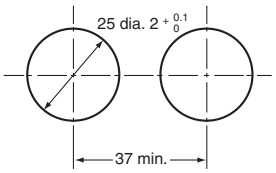
XS4M-D521-1
Panel-mounting Connector Plug (5 Pins for Communications)



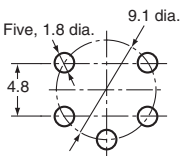




Panel Cutout Dimensions



PCB Processing Dimensions



Note: A rubber seal and nut for panel mounting are included.

Environment-resistive Peripheral Devices

Applicable Connectors

Power Supply Connectors (M12 Microconnectors)

Model number	Specifications
XS2C-D4□□	Connector assembly with socket (press-fit, solder, and screw types)
XS2W-D42□-□□□-□	Cable with connectors on both ends
XS2F-D42□-□80-□	Cable with connector socket on one end
XS2R-D427-5	T-branch connector

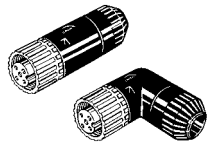
Power Supply Connectors (7/8-16UN Miniconnectors)

Model number	Specifications
XS4W-D421-1□□-A	Cable with connectors on both ends
XS4F-D421-1□□-A	Cable with connector socket on one end
XS4H-D421-1□□-A	Cable with connector plug on one end
XS4R-D424-5	T-branch connector

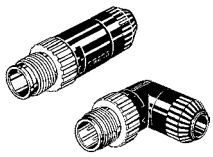
I/O Connectors (M12 Microconnectors)

Model number	Specifications
XS2G-D4□□	Connector assembly (crimp, solder, and screw types)
XS2H-D421-□□□-□	Cable with connector plug on one end
XS2W-D42□-□□□-□	Cable with connectors on both ends
XS2R-D426-□11F	Y-shaped joint with plug/socket at both ends of cable (Can be used with DRT1-□D08C/□D16C(-1) only.)
XS2R-D426-□10F	Y-shaped joint with sockets on one end of cable (Can be used with DRT1-□D08C/□D16C(-1) only.)
XS2R-D426-1	Y-shaped joint with plug/socket (no cable) (Can be used with DRT1-□D08C/□D16C(-1) only.)
XS2Z-12	Waterproof cover
XS2Z-15	Dust cover

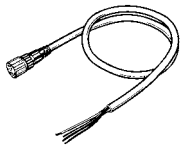
Connector Assemblies with Socket (M12 Microconnectors for Power Supply)

Appearance	Dimensions of applicable cable (mm)	Cable direction	Number of pins	Connection method		
				Crimp	Solder	Screw
	6 dia. (5 to 6 dia.)	Straight	4	XS2C-D4C1	XS2C-D421	XS2C-D4S1
		L-shaped		XS2C-D4C2	XS2C-D422	XS2C-D4S2
	5 dia. (4 to 5 dia.)	Straight		XS2C-D4C3	XS2C-D423	XS2C-D4S3
		L-shaped		XS2C-D4C4	XS2C-D424	XS2C-D4S4
	3 dia. (3 to 4 dia.)	Straight		XS2C-D4C5	XS2C-D425	XS2C-D4S5
		L-shaped		XS2C-D4C6	XS2C-D426	XS2C-D4S6
	7 dia. (6 to 7 dia.)	Straight		---	---	XS2C-D4S9
	8 dia. (7 to 8 dia.)					XS2C-D4S7

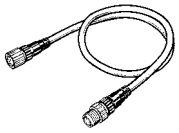
Connector Assemblies with Plug (M12 Microconnectors for Power Supply)

Appearance	Dimensions of applicable cable (mm)	Cable direction	Number of pins	Connection method		
				Crimp	Solder	Screw
	6 dia. (5 to 6 dia.)	Straight	4	XS2G-D4C1	XS2G-D421	XS2G-D4S1
		L-shaped		---	XS2G-D422	XS2G-D4S2
	5 dia. (4 to 5 dia.)	Straight		XS2G-D4C3	XS2G-D423	XS2G-D4S3
		L-shaped		---	XS2G-D424	XS2G-D4S4
	3 dia. (3 to 4 dia.)	Straight		XS2G-D4C5	XS2G-D425	XS2G-D4S5
		L-shaped		---	XS2G-D426	XS2G-D4S6
	7 dia. (6 to 7 dia.)	Straight		---	---	XS2G-D4S9
	8 dia. (7 to 8 dia.)					XS2G-D4S7

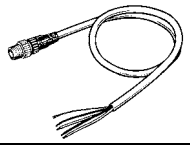
Cables with Connector Socket on One End (M12 Microconnectors for Power Supply)

Appearance	Cable direction	Number of core wires	Cable length (m)	Standard cable	Earthquake-resistant cable
	Straight 	4	1	XS2F-D421-C80-A	XS2F-D421-C80-R
			2	XS2F-D421-D80-A	XS2F-D421-D80-R
			5	XS2F-D421-G80-A	XS2F-D421-G80-R
			10	XS2F-D421-J80-A	XS2F-D421-J80-R
	L-shaped 		1	XS2F-D422-C80-A	XS2F-D422-C80-R
			2	XS2F-D422-D80-A	XS2F-D422-D80-R
			5	XS2F-D422-G80-A	XS2F-D422-G80-R
			10	XS2F-D422-J80-A	XS2F-D422-J80-R

Cables with Connector (Socket/Plug) on Both Ends (M12 Microconnectors for Power Supply and I/O)

Appearance	Cable direction	Number of core wires	Cable length (m)	Standard cable	Earthquake-resistant cable
	Straight/straight	4	1	XS2W-D421-C81-A	XS2W-D421-C81-R
			2	XS2W-D421-D81-A	XS2W-D421-D81-R
			5	XS2W-D421-G81-A	XS2W-D421-G81-R
	L-shaped/L-shaped		2	XS2W-D422-D81-A	---
			5	XS2W-D422-G81-A	
	Straight/L-shaped		2	XS2W-D423-D81-A	
			5	XS2W-D423-G81-A	
	L-shaped/straight		2	XS2W-D424-D81-A	
			5	XS2W-D424-G81-A	

Cables with connector plug on One End (M12 Microconnectors for I/O)

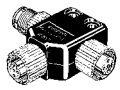
Appearance	Cable direction	Number of core wires	Cable length (m)	Standard cable
	Straight	3	0.3	XS2H-D421-AC0-A
		4		XS2H-D421-A80-A
		3	1	XS2H-D421-CC0-A
		4		XS2H-D421-C80-A

Plugs and Sockets on Y-shaped Joints (M12 Microconnectors for I/O)

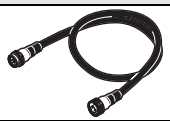
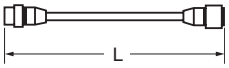
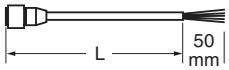
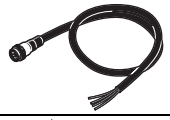
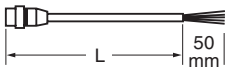
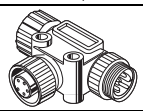
Appearance	With/without cable	Connector	DC models	
			Cable length (m)	Model number
	With cable	Connectors on both ends	0.5	XS2R-D426-B11-F
			1	XS2R-D426-C11-F
			2	XS2R-D426-D11-F
			3	XS2R-D426-E11-F
		Connector on one end	2	XS2R-D426-D10-F
			5	XS2R-D426-G10-F
	Without cable	Connectors on both ends	---	XS2R-D426-1

Note: These Plugs and Sockets can be used with Environment-resistive Terminals (DRT□-□16C(-1)) only.

T-branch Connectors and Connector Covers (M12 Microconnectors)

Appearance	Type	Model number	Application
	T-branch connector	XS2R-D427-5	For branching power lines
	Waterproof cover	XS2Z-12	For covering unused I/O connectors
	Dust cover	XS2Z-15	

Power Supply Connectors (7/8-16UN Miniconnectors)

Appearance		Cable length	Model
		1 m	XS4W-D421-101-A
		2 m	XS4W-D421-102-A
		5 m	XS4W-D421-105-A
		10 m	XS4W-D421-110-A
		1 m	XS4F-D421-101-A
		2 m	XS4F-D421-102-A
		5 m	XS4F-D421-105-A
		10 m	XS4F-D421-110-A
		1 m	XS4H-D421-101-A
		2 m	XS4H-D421-102-A
		5 m	XS4H-D421-105-A
		10 m	XS4H-D421-110-A
	T-branch Connector	---	XS4R-D424-5
	Panel mounting connector socket Cable: 50 cm	---	XS4P-D421-1C5-A
	Panel mounting connector plug DIP terminals	---	CS4M-D421-1

Accessory: Waterproof Caps (for 7/8-16UN Miniconnectors)

Type	Model
Waterproof Cap for Plug	XS4Z-11
Waterproof Cap for Socket	XS4Z-12

Recommended cable types, non-Omron

Network	Reference	Description
DeviceNet	Belden 46012 or compatible	DeviceNet thick cable (trunk). For use in Europe only. 18AWG/1PR 15AWG/1PR STR TC IND.
DeviceNet	Belden 3082A or compatible	DeviceNet thick cable (trunk). For global use. 18AWG/1PR 15AWG/1PR STR TC IND.
DeviceNet	Belden 3084A or compatible	DeviceNet thin cable (drop). 22AWG/1PR 24AWG/1PR STR TC IND
PROFIBUS-DP	Belden 3079A or compatible	Profibus cable. Type A (EN50170 vol.2) Multi conductor. twisted. 22 AWG

Note: Please contact either your local Omron or Belden distributor for the availability of these cables

OMRON

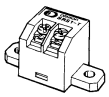
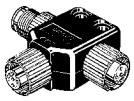
CompoBus/S Wiring

Cables and Connectors for CompoBus/S

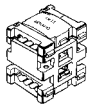
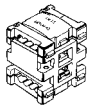
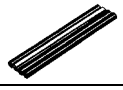


Ordering Information

VCTF Cable Products

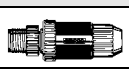
Product	Appearance	Model	Specification
Terminal-block Terminator		SRS1-T	Resistance: 100 Ω
T-branch Connector		XS2R-D427-5	Used to branch communications lines and power lines. (Waterproof specifications)
Connector Terminator (plug)		SRS2-1	Waterproof terminating resistance

Special Flat Cable Products

Product	Appearance	Model	Specification
Branch Connector		SCN1-TH4	Used with Special Flat Cable.
Extension Connector		SCN1-TH4E	Used with Special Flat Cable.
Connector Terminator		SCN1-TH4T	Used with Special Flat Cable.
Special Flat Cable		SCA1-4F10	100 m

Note: Branch Connectors and Extension Connectors are sold in blocks of 10 Units.

Four-core VCTF Cable Products

Product	Appearance	Model	Specification
Assembling Connector		XS2C-D4S7	Communications connector plug for 4-conductor VCTF cable
		XS2G-D4S7	Communications connector socket for 4-conductor VCTF cable

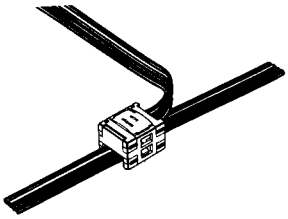
Recommended cable types, non-Omron

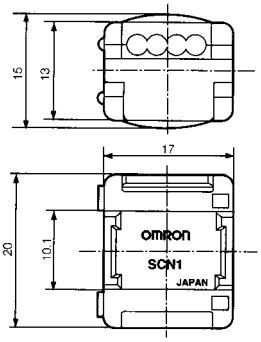
Belden 9409 or compatible	Non shielded two conductor VCTF communication cable
Belden 5341 UE or compatible	Non shielded four conductor VCTF communication cable

Dimensions

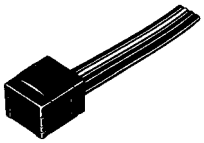
Note: All units are in millimeters unless otherwise indicated.

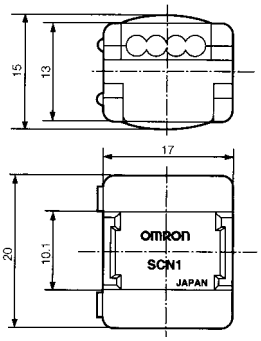
SCN1-TH4 Branch Connector
SCN1-TH4E Extension Connector



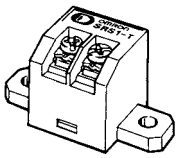


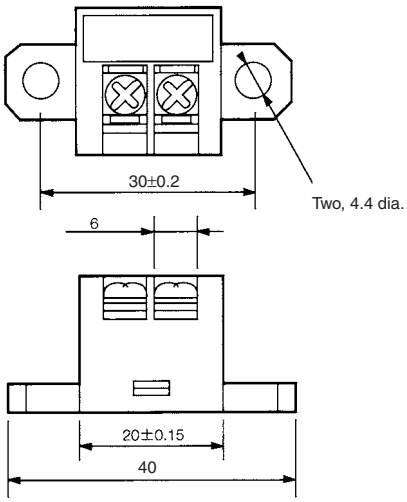
SCN1-TH4T Connector Terminator



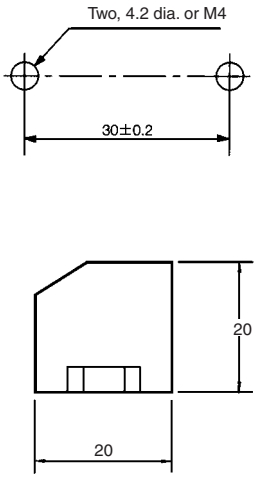


SRS1-T Terminal-block Terminator





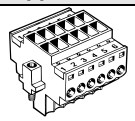
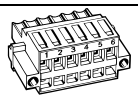
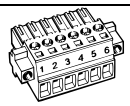
Mounting Holes



Weidmuller Communications Connectors for CompoBus/S Connector Terminals

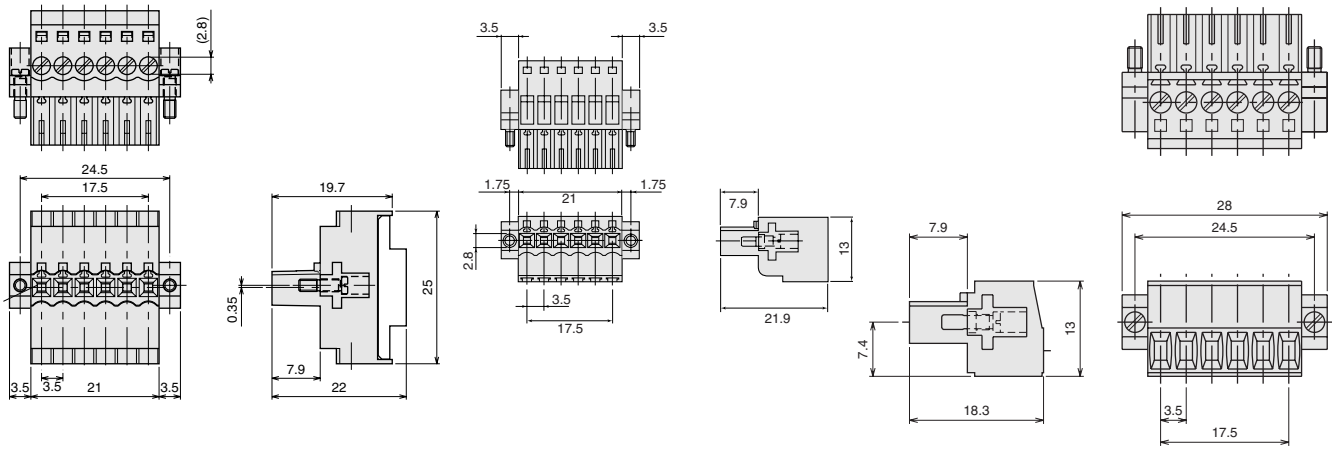
- The communications connectors provided with the SRT2-VID/VOD Connector Terminals are Weidmuller BL3.5/6F (part number 160668) PCB Plugs. These connectors do not require any special tools; the cables can be connected with just a standard flat-blade screwdriver. Two kinds of connectors are available to suit different applications.

Ordering Information

Connector type	Appearance	Model	Application
Branching connector		BLDZ3.5/6F	Ideal for multi-drop wiring
Tension Clamp Connectors		BLZF3.5/6F	Ideal for "one touch" connections
Communications Connectors for Connector Terminals		BL3.5/6F	Connector for the SRT2-□D32ML and SRT2-VID/VOD

Dimensions

Note: All units are in millimeters unless otherwise indicated.



DeviceNet Wireless Communication

WD30



The DeviceNet wireless units, consisting of a DeviceNet wireless master station and a DeviceNet wireless slave station, allow wireless communication with DeviceNet slaves.

- Up to 3,200 I/O points can be communicated through a single Unit.
- Uses spread spectrum technology for superior noise resistance in manufacturing environments.
- Compact construction.
- Long-range communications have been achieved with a relay function (3 repeaters max.).
- Explicit message communication is supported.

Ordering Information

List of Models

Name	Number of I/O points (words used)	Model	Antenna style
DeviceNet Wireless Master	1,600 inputs max. (100 words) 1,600 outputs max. (100 words)	WD30-ME	Pencil antenna
		WD30-ME01	Magnetic base antenna
DeviceNet Wireless Slave	512 inputs max. (32 words) 512 outputs max. (32 words)	WD30-SE	Pencil antenna
		WD30-SE01	Magnetic base antenna
Magnetic Base Antenna (1)	---	WD30-AT001 (See note.)	---

Note: The WD30-AT001 Magnetic Base Antenna can be used with the WD30-ME, WD30-ME01, WD30-SE, and WD30-SE01.

Optional Accessories (Micro Connectors)

Name	Model	Specifications
Shielded T-branch Connector	DCN2-1	Connector with one branch
Cable with Shielded Connectors	DCA1-5CN□□W1	Cables with connectors on both ends
	DCA1-5CN□□F1	Cables with a connector socket on one end
Shielded Terminator	DRS2-1	Terminator with plug connector

Included Accessories

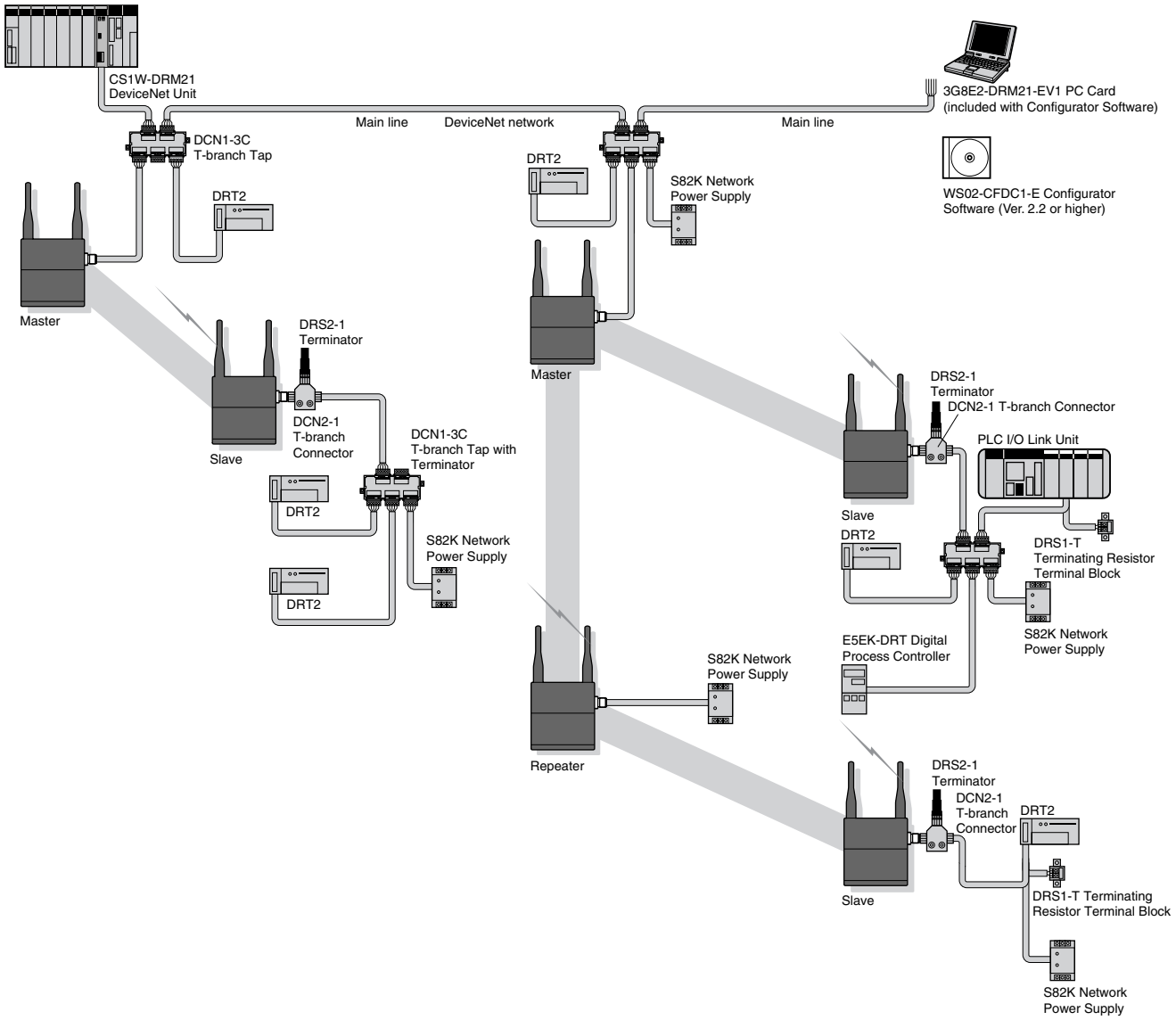
The following accessories are included with a DeviceNet Wireless Master or DeviceNet Wireless Slave.

- Two antennas
- DeviceNet Wireless Units Instruction Sheet
- Sticker
- Two M4 mounting bolts (with nuts, flat washers, and spring washers)

Optional Accessories (Configurator Software)

Name	Model
Configurator (PC Card)	3G8E2-DRM21-EV1
Configurator Software	WS02-CFDC1-E

System Configuration



Specifications

General Specifications

Item	Specifications
DeviceNet communications power supply voltage	11 to 25 V DC (Supplied from the DeviceNet network power supply.)
Current consumption (See note.)	350 mA max. (at startup), 120 mA average
Ambient temperature	Operating:–10° to 50°C Storage:–20° to 65°C
Ambient humidity	Operating:25% to 85% (with no condensation)
Weight	Approx. 200 g

Note: Select a power supply with excess capacity. (We recommend a minimum of 25 W.)

Wireless Interface Specifications

Item	Specifications
Wave type	Spread Spectrum (direct sequence; DS-SS)
Communication method	Simplex (half duplex)
Frequency band	2.4 GHz (2401 MHz to 2480.2 MHz)
Number of channels	34 channels (based on frequency division)
Antenna power	10 mW
Data transfer speed between wireless units	100 kbps
Transmission distance (See note 1.)	Indoors: 60 m (approx. 50 m with magnetic base antennas) Outdoors: 300 m (unobstructed)
Relay stations	3 repeaters max.
Max. number of sets in the same area (See note 1.)	10 sets max.
Max. number of wireless Slaves	64 max.

Note: 1. The actual transmission distance depends on many factors in the installation environment.
2. The wireless system is not suitable for applications requiring real-time control.

DeviceNet Interface Specifications (Summary)

Item	Specifications	
Communications functions (See note.)	Master/Slave connections	Remote I/O functions and Explicit message communications functions
Self-diagnostic functions	Unit	WDT error, hardware errors (such as memory and CAN errors), and setting errors
	DeviceNet communications	Duplicate node address errors, Bus OFF detection, and connection timeout
Device profiles	Communication control unit	Refer to Appendix A of the *WD30 DeviceNet Wireless Units Operation Manual* for various DeviceNet IDs (vendor, device type = communication adapter, product code, product revision, product name, serial number, status, and I/O unit IDs.)

Note: FINS message communications are not supported. Explicit messages must be handled in the ladder program. Refer to the *WD30 DeviceNet Wireless Units Operation Manual* for details.

I/O Points

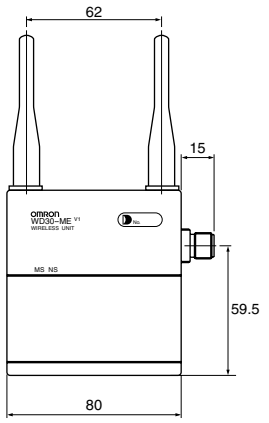
Name	Number of I/O points (words used)
DeviceNet Wireless Master	1,600 inputs max. (100 words) 1,600 outputs max. (100 words)
DeviceNet Wireless Slave	512 inputs max. (32 words) 512 outputs max. (32 words)

Note: Relay Stations can be used to create up to 3 levels and DeviceNet Slaves can be connected in each level. Terminators are required when Slaves are connected to a Relay Station or Slave Station. Refer to the *WD30 DeviceNet Wireless Units Operation Manual* for details on Terminator installation.

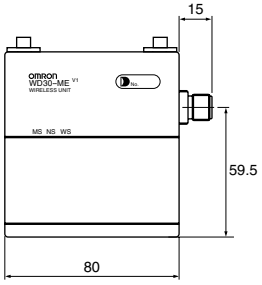
Dimensions

Note: All units are in millimeters unless otherwise indicated.

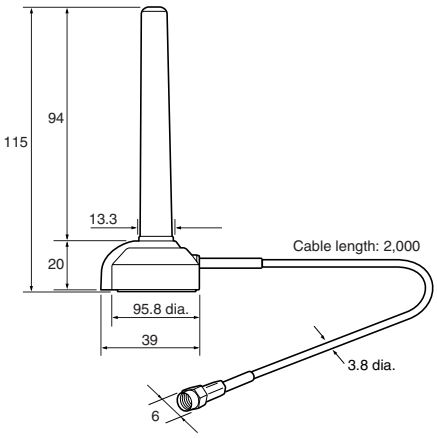
WD30-ME and WD30-SE DeviceNet Wireless Units



WD30-ME01 and WD30-SE01 DeviceNet Wireless Units



WD30-AT001 Magnetic Base Antenna (Included with the WD30-ME01 and WD30-SE01.)

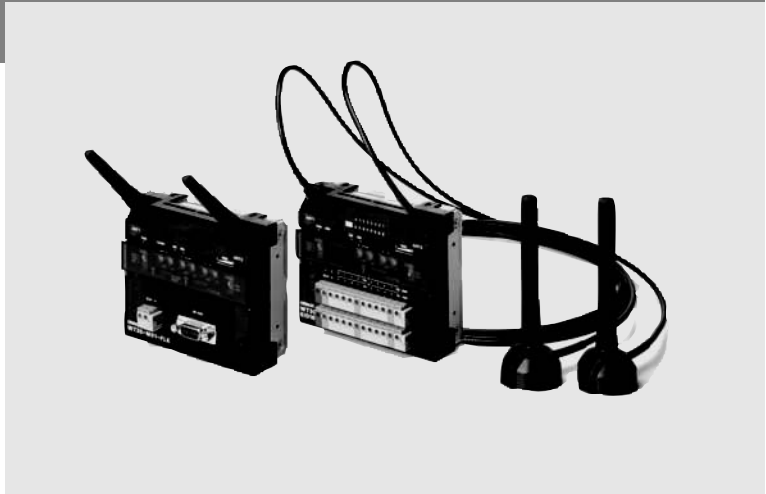


Precautions

Refer to the *WD30 DeviceNet Wireless Units Datasheet* (Catalog No. M502-E1-□, M503-E1-□) or *WD30 DeviceNet Wireless Units Operation Manual* (Catalog No. M071-E1-□) for more detailed specifications.

Wireless I/O Terminal

WT30



Construct a Wireless System for ON/OFF Data Collection That Is Ideal for Monitoring Production Site Equipment

- Wireless Slave Station equipped with I/O.
- Height of 90 mm and DIN Rail mounting enables installation in control panels.
- Easily check wireless communications status from indicator display.
- I/O Slave Stations can also be used as Slave Stations in WD30 systems.

Ordering Information

List of Models

Wireless Unit model	Type	Specifications/No. of I/O points
WT30-M01-FLK	Serial master	RS-232C
WT30-SID16	I/O slaves	16 DC inputs (NPN/PNP)
WT30-SMD16		8 DC inputs (NPN/PNP) + 8 transistor outputs (NPN)
WT30-SMD16-1		8 DC inputs (NPN/PNP) + 8 transistor outputs (PNP)

Accessories

Antennas

Model	Type
WT30-AT001	Magnet-base Antenna (2 antennas per set)
WT30-AT002	Flat Diversity Antenna (1 antenna)
WT30-AT003	Pencil Antenna (2 antennas per set)

Communications Cables

Model	Length	Application
XW2Z-0100U-3	1 m	For personal computer
XW2Z-0200U-3	2 m	
XW2Z-0500U-3	5 m	
XW2Z-0200U-5	2 m	Cross cable for PLC
XW2Z-0500U-5	5 m	

Other

Model	Type
WT30-FT001	DIN Rail Mounting Bracket (for TH35-7.5)
WT30-FT002	DIN Rail Mounting Bracket (for TH35-15)
WT30-FT003	Surface Mounting Bracket (screw-mounting)
(2 brackets per set)	
WT30-FT011	Flat Diversity Antenna Mounting Brackets
(with magnets)	
WT30-CA2M	Antenna Extension Cable (1 cable, 2 m)

Applicable Countries

Wireless standards have been met for the following countries.

Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungry, Iceland, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK, USA

Specifications

General Specifications

Item		WT30-M01-FLK Serial Master	WT30-SID16/SMD16/SMD16-1 I/O Slaves
Power supply (wireless communications power supply)	Rated voltage	24 V DC	
	Allowable voltage range	20.4 to 26.4 V DC	
	Power consumption	3 W max. (See note 1.)	
Error output/output power supply (for output circuits)	Rated voltage	---	24 V DC
	Allowable voltage range	---	20.4 to 26.4 V DC
Insulation resistance		20 MΩ min. (at 100 V DC) between the power supply and chassis	20 MΩ min. (at 100 V DC) between the power supply and all I/O and I/O power supply and between the power supply and chassis
Dielectric strength		1,500 V AC for 1 min between power supply and chassis	1,500 V AC for 1 min between the power supply and all I/O and I/O power supply and between the power supply and chassis
Noise immunity		IEC61000-4-4. 1 kV (power supply line)	
Vibration resistance (See note 2.)		JIS C0040 Frequency: 10 to 55 Hz; Amplitude of 0.35 mm or acceleration of 50 m/s², whichever is smaller (DIN Rail mounting: single amplitude of 0.1 mm or acceleration of 15 m/s²) 10 sweeps of 8 min each (i.e., 80 min in total) in X, Y, Z directions	
Shock resistance		Conforms to JIS C0041: 300 m/s2 3 times each in X, Y, and Z directions	
Ambient operating temperature		-10 to 55°C (with no condensation or icing) (with the Terminal mounted with the dust-proof label facing up)	Number of simultaneously ON I/O points 10 max.: -10 to 55°C (with no condensation or icing) 16 max.: -10 to 50°C (with no condensation or icing) (with the Terminal mounted with the dust-proof label facing up)
Ambient operating humidity		25% to 85% (with no condensation or icing)	
Ambient environment		No corrosive gases	
Storage temperature		-25 to 65°C (with no condensation or icing)	
Protective structure		IP20	
Terminal construction	Power supply and I/O	Screwless terminal block (Phoenix Contact FFKDS/V1-5.08 or equivalent)	
	Serial	D-sub, 9-pin (female) Inch screws (OMRON XM2F-0910-132 or equivalent), Master station only	---
Safety standards		UL: UL508 (Listing)	
Weight		330 g max.	

Note: 1. Provide a power supply of at least 15 W, considering the inrush current generated at startup.
2. Use the WT30-FT003 Surface Mounting Bracket when installing the WT30 in environments subject to vibration.

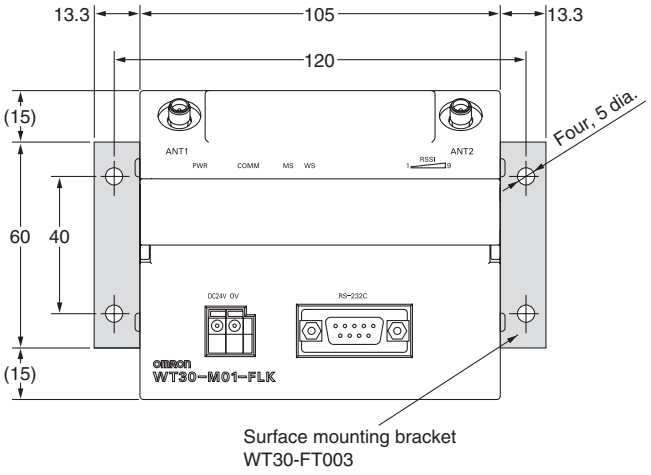
Wireless Interface Specifications

Item	Specifications
Wave type	Spread Spectrum (direct sequence; DS-SS)
Communication method	Simplex
Frequency band	2,401 to 2,480.2 MHz
Number of channels	67 channels (based on switching)
Transmitter output power	10 mW/MHz
Baud rate between wireless stations	100 kbps
Communications distance (See note.)	Indoors: 60 m min. (approx. 50 m min. with Magnet-base Antennas and Flat Diversity Antennas) Outdoors: Approx. 300 m min. (anticipated distances) (without using relay stations)
Error detection method	CRC-CCITT (16 bits)
Relay functions	One stage using I/O slave for the serial master configuration.
Number of stations per area (See note.)	10 sets max. (recommended)
Number of I/O Slaves connected	64 max.

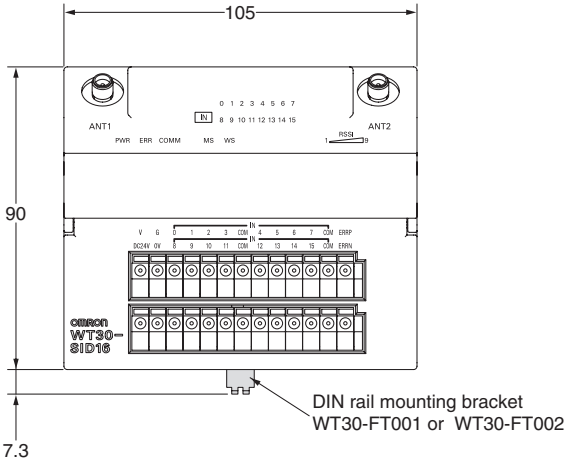
Note: Varies according to the installation environment.

Dimensions

WT30-M01-FLK

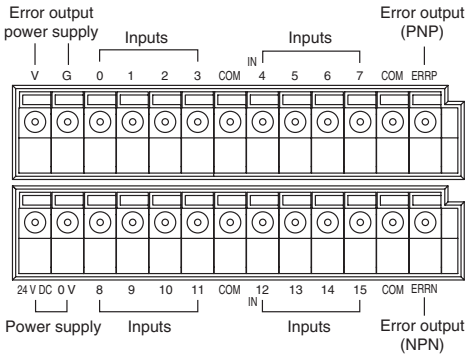


WT30-SID16/SMD16/SMD16-1

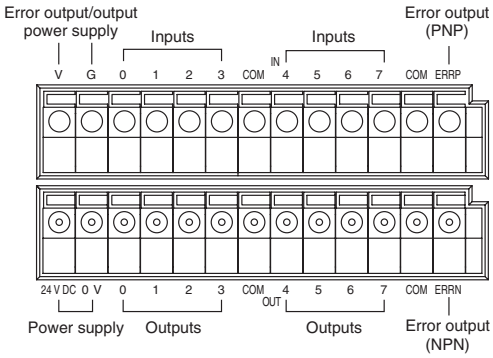


Wiring

WT30-SID16



WT30-SMD16/SMD16-1



PRT1-SCU11

PROFIBUS-DP Gateway



Omron's intelligent PROFIBUS gateway

- Supports all Compoway-F-equipped products (temperature controllers, digital panel meters, etc.).
- Can be used in Host Link mode for connecting MCW151-E.
- Cost-effectively integrates existing instruments into a PROFIBUS network.
- Requires no complex protocol conversion writing.
- Has function blocks for drag-and-drop configuration.
- Connects up to 15 instruments to a single PROFIBUS point.

Model Number Structure

PRT1-SCU11

- 1: Version
- 1: Wired
- SCU: Serial Communication Unit
- PRT1: PROFIBUS Remote Terminal

Specifications

Unit Specifications

Storage temperature	-20 to +75 °C
Ambient temperature	0 to +55 °C
Ambient humidity	10 to 90% (non-condensing)
EMC compliance	EN 50081-2, EN 61131-2
Power supply	+ 24 VDC (+10% / -15%) Current consumption 80 mA (typical)
Weight	125 g (typical)
Communication interface	RS-485 based PROFIBUS-DP
	RS-422A Host Link RS-485 Compoway-F
	RS-232C Peripheral Port supporting connection to Thermotools

Peripheral Port

- The Peripheral Port is intended to allow communication between Personal Computer based software (i.e. Thermo-tools) and temperature controllers.
- Use OMRON's CS1W-CN226 cable to setup the connection.

PROFIBUS Cable

- Only use shielded twisted pair cable, line type A as specified by EN 50170 vol. 2 (e.g. Belden 3079A).
- The maximum cable length per bus segment (32 stations) depends on the selected communication speed:

Baud rate (kbit/s)	Length/segment
9.6, 19.2, 45.45, 93.75	1200
187.5	1000
500	400
1500	200
3000, 6000, 12000	100

PROFIBUS Communication Specifications

Applicable standard	EN 50170 vol. 2 (PROFIBUS-DP)
Type	PROFIBUS-DP Slave
Bus connector	9-pin sub-D female, RS-485
Bus termination	NOT included
Baud rates in kbit/s (auto-detect)	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000, 12000
PROFIBUS address range	01-99
Communication cable	Type A (EN 50170 vol. 2)
Minimum slave interval	0.5 ms
Input data	200 bytes maximum
Output data	200 bytes maximum
Supported DP functions (as responder)	Data_Exchange Chk_Cfg / Set_Prm Slave_Diag Global_Control (SYNC/FREEZE/CLEAR) RD_Inp / RD_Outp / Get_Cfg
GSD file	OC_0780.GSD

Host Link / Compoway-F Communication Specifications

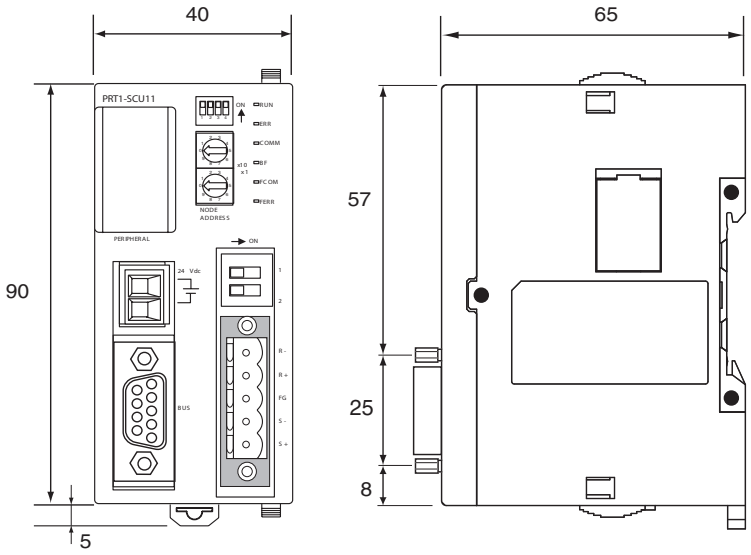
Host Link slaves supported	MCW151-E E5EK / E5AK
Compoway-F slaves supported	E5AN / E5CN / E5EN / E5GN E5ZN E5ER / E5AR
Max. No of devices	15
Connection type	RS-422A (4-wire) for Host Link RS-485 (2-wire) for Compoway-F
Baud rates in kbit/s	9.6, 19.2, 34.8
Slave address range supported	1 ~ 15 (address and selected PROFIBUS I/O module must match)

I/O Configuration Options

Type			Device	Description
Compoway-F	Fixed Comm. Blocks	Basic	E5□N E5ZN E5□R	1 word I/O per loop
		Extended	E5□N	6 word in / 2 word out
			E5ZN	11 word in / 3 word out
			E5□R	21 word in / 5 word out
	Free Comm.	READ	See note	5 word in / 4 word out
		WRITE		2 word in / 7 word out
		OPERATE		2 word in / 3 word out
Host Link			MCW151-E	5, 10, 15 word I/O

Note:
- Host Link and Compoway-F devices can not be intermixed on the same network.
- Total maximum I/O size: 100 words I/O.
- Other non-listed Compoway-F devices can be handled using Free Communication Block. Refer to the PRT1-SCU11 Operation Manual (W01E-EN-01).
- Fixed Communication Blocks are pre-defined I/O blocks designed for the listed Compoway-F devices.
- Free Communication Blocks require programming in the PROFIBUS master to assemble Compoway-F commands.

Dimensions



Units: mm

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P12E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

NE1A/DST1

DeviceNet Safety System

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Ordering Information	585
Specifications	586
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Wiring Diagrams	589
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DeviceNet Safety System

NE1A/DST1



Omron now offers a DeviceNet compatible Safety System, that can be used 3-ways: as a Stand-alone controller, as a Safety network expandable with remote I/O blocks, or combined with DeviceNet to form a combined Network.

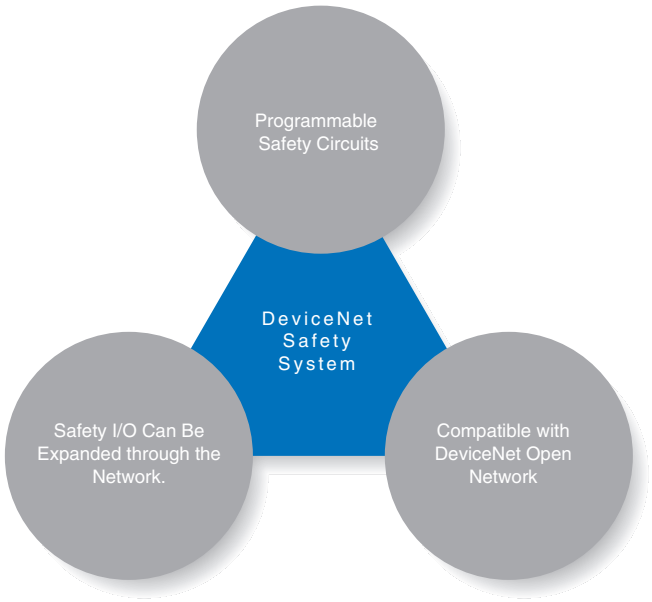
- Conforms to Global Safety Standards
- Individual I/O LED status and error indicators
- USB Programming Port
- IEC 61508 SIL 3
- EN954-1 Category 4
- UL1604 Class 1, Div. 2 Group A,B,C,D

Product Information

Introducing a Safety Network System that dramatically alters previous safety design.

Programmable safety circuits are incorporated to facilitate efficient designing and modifications. Moreover, Safety I/O Terminals can be added to increase safety I/O capacity for distributed allocation through the network. DeviceNet wiring on the existing network can be used as is, facilitating efficient design by expanding on the existing system.

The programmability of safety circuits, expandability of I/O using the network, and compatibility with the DeviceNet open network effects major changes to the framework of previous safety design systems.



Complies with the Highest Safety Standards in the world

The DeviceNet Safety System conforms to IEC 61508 SIL3 for functional safety, and EN 954-1 Category 4 for machine safety, complying with the world's highest level of safety standards.

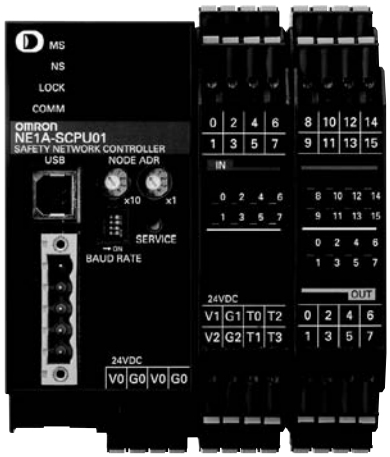
IEC 61508 SIL 3

Safety circuits must be able to function to provide safety at anytime. Conversely, the degree of lack of safety is used as the indicator. In IEC 61508, safety is defined as the Probability of Failure per Hour, or PFH. Based on this, the SIL (Safety Level) is classified into four levels. SIL 3 indicates a probability of dangerous failure of once in 1,000 years, which is the highest level in machine safety.

EN 954-1 Safety Category 4

EN standards evaluate the level of machine risk and require the incorporation of risk minimization measures. In EN 954-1, five safety categories have been established, with Safety Category 4 indicating designs that require the highest safety design level. This category is demanded for machines with the highest level of danger, wherein "serious injury (severed limbs, death, etc.) will occur frequently, with little chance of escaping danger." This category demands that a single fault (failure) in any part of the machine, or a series of faults, will not lead to loss of the machine's safety functions.

NE1A-SCPU01 Safety Network Controller



Programmable Safety Control

- Incorporates 16 safety inputs and 8 safety outputs. Functions as a compact safety PLC even without using a network.
- Construct safety circuits easily with special Function Blocks.
- Up to 128 Function Blocks can be used.

DeviceNet Safety Communications Functions

- Provides DeviceNet Safety Master functionality. Connect up to 16 Safety Slaves. Expand using up to sixteen Input Slaves with 12 points each (192 points total) and eight I/O Slaves with 16 points each (128 points total).
- Safety Slave functionality is also included. Interlock control can be incorporated between Safety Network Controllers.

DeviceNet Slave Functionality

- Monitor safety I/O and status information from the DeviceNet Master.

DST1-series Safety I/O Terminals



Safety Input and Safety I/O Models Available

- Safety inputs: 12-point model (DST1-ID12SL-1)
- Safety I/O: 8-point/8-point model (DST1-MD16SL-1)
- Safety I/O: 4-point/4-point (relay outputs) model (DST1-MRD08SL-1)

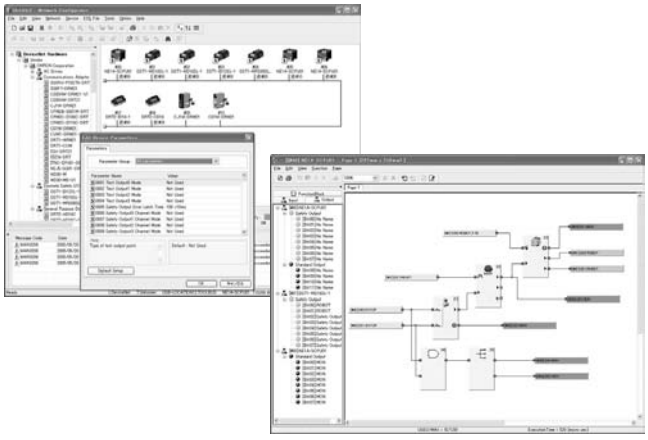
DeviceNet Slave Functionality

- Safety I/O and status information can be allocated as a DeviceNet Slave.
- Maintenance functions are provided for measuring the number of operations or the operating time for safety devices.

Easy Wiring

- Superior construction and preventive maintenance using clamp connectors.

WS02-CFSC1-E Safety Network Configurator



Network Configurator Functions

- Includes previous DeviceNet Configurator functions.
- Performs setup for the DeviceNet Safety network configuration.

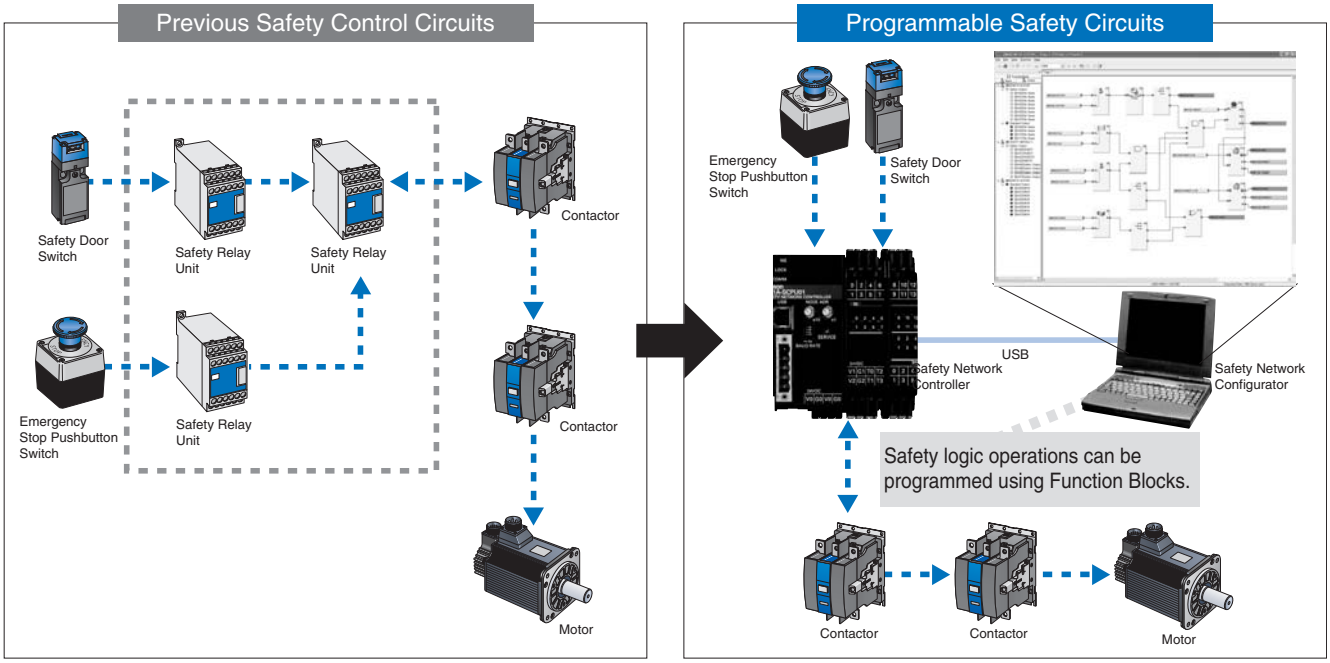
Programming Functions

- I/O configuration functions for Safety Network Controllers and Safety I/O Terminals.
- Programming functions for safety circuits.
- Monitor programs.

Stand-Alone Programmable Controller

Programmable Safety Circuits

Until now, safety design involved combining safety relays to configure safety control circuits. This process involved tedious wiring, and moreover, any changes required direct modification of the wiring. The DeviceNet Safety System uses programmable safety circuits, dramatically improving the ease of design and modification.

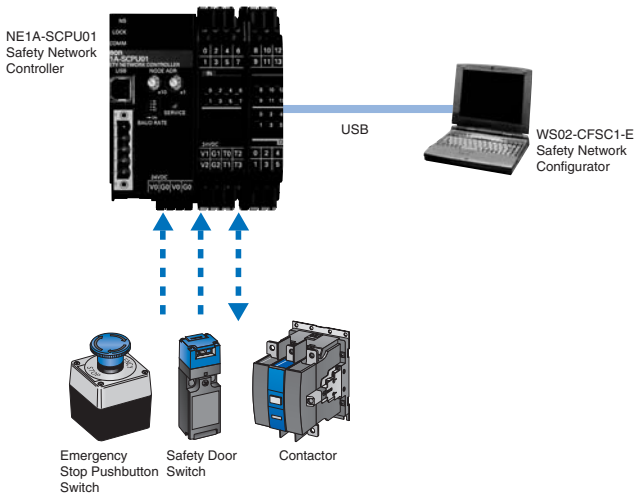


System Configuration 1

Configuration Example for High-speed Safety I/O Response Using Small Number of Points

- NE1A-SCPU01
- WS02-CFSC1-E

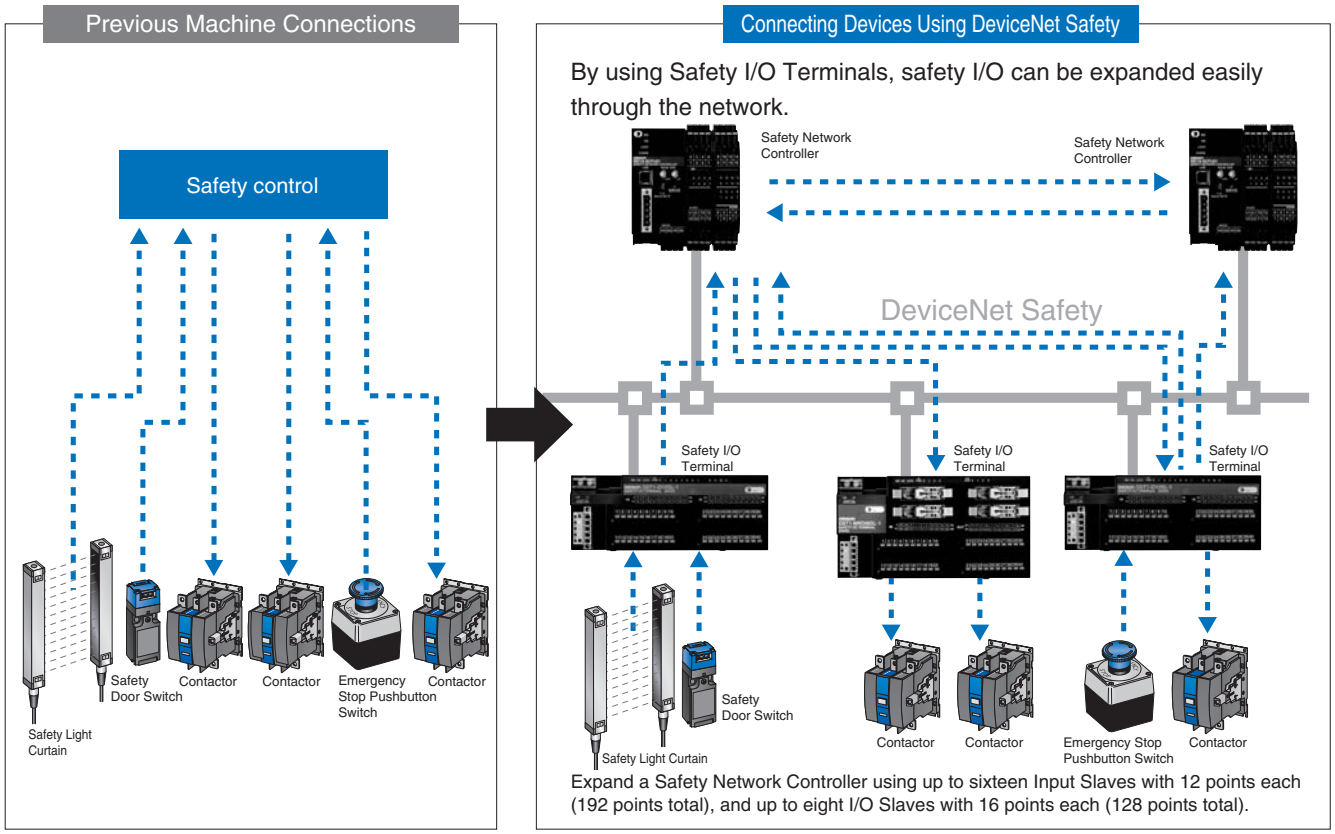
Delivers high-speed I/O response in a single Unit with up to 16 safety inputs and 8 safety outputs.



Safety Network

Expand Safety I/O Through Networks

Safety components distributed over many different installation locations required long and complicated wiring.
Replacing the wiring with a network between safety components greatly improves productivity

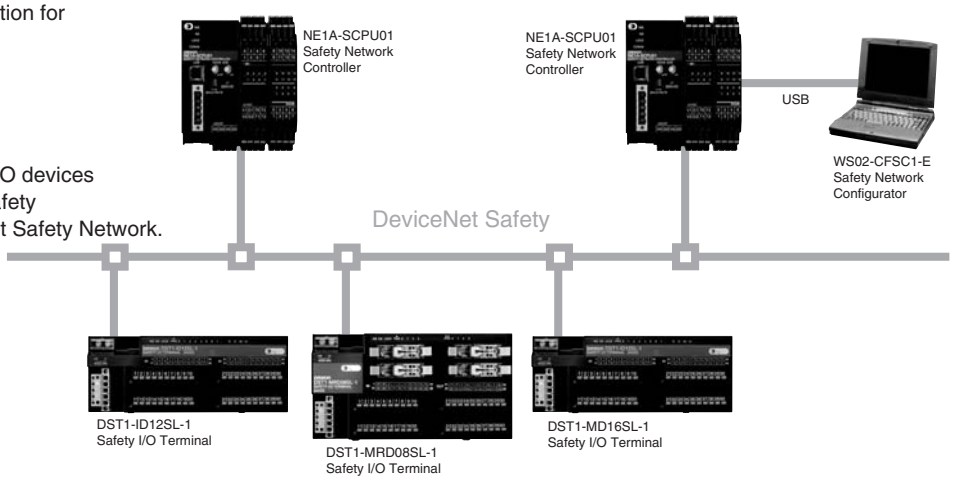


System Configuration 2

Example of Safety I/O Configuration for Distributed Hazard Sources

- NE1A-SCPU01
- DST1 Series
- WS02-CFSC1-E

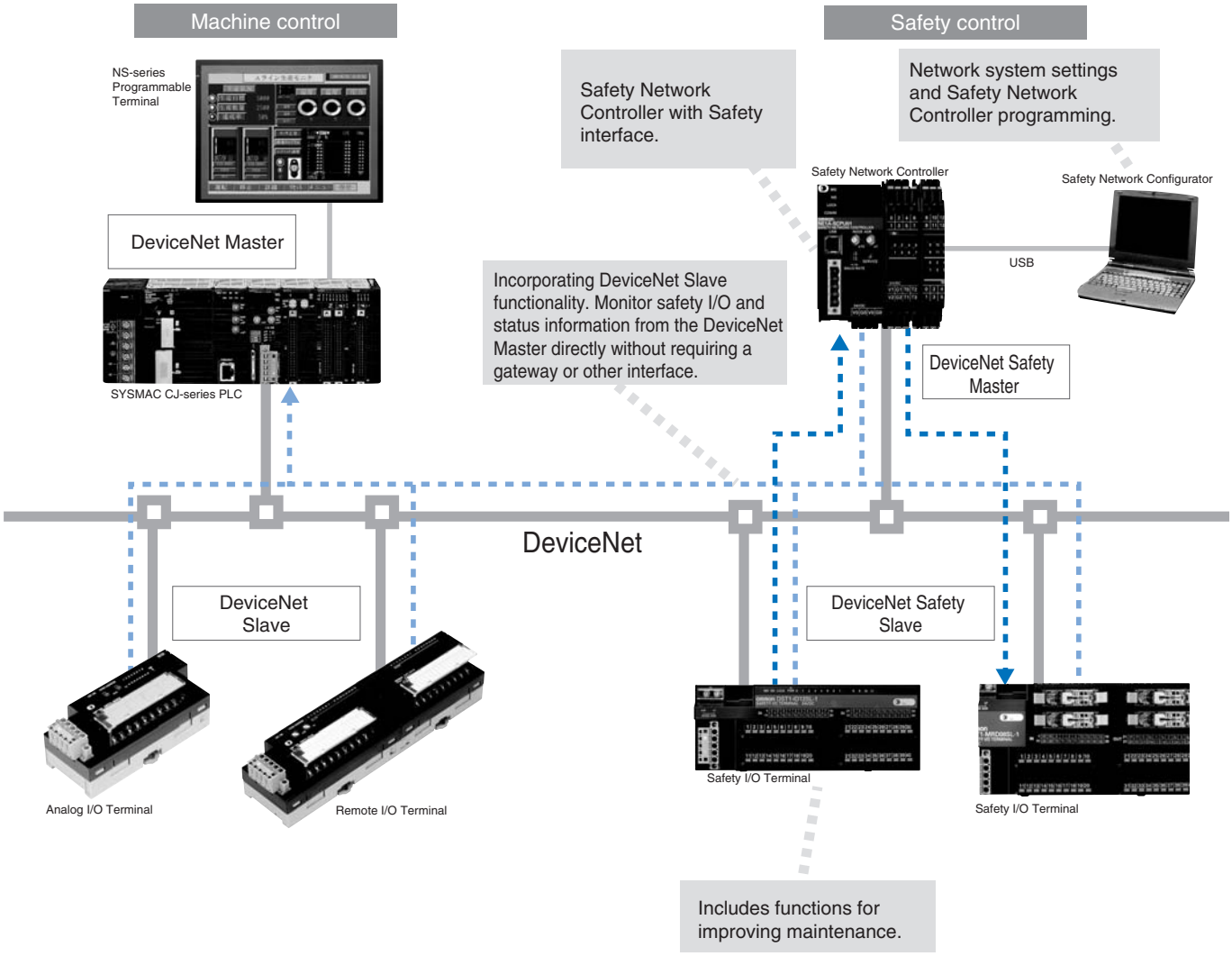
Distributed allocation of safety I/O devices can be achieved easily using Safety I/O Terminals and the DeviceNet Safety Network.



Combined Safety / DeviceNet Network

Compatible with the DeviceNet Open Network

Linking machine control is indispensable for achieving total control. By linking to machine control data, safety control can be monitored from the PLC, enabling the location of an error to be identified in an instant and improving maintenance.
DeviceNet Safety System utilizes the DeviceNet wiring from the existing network as is.

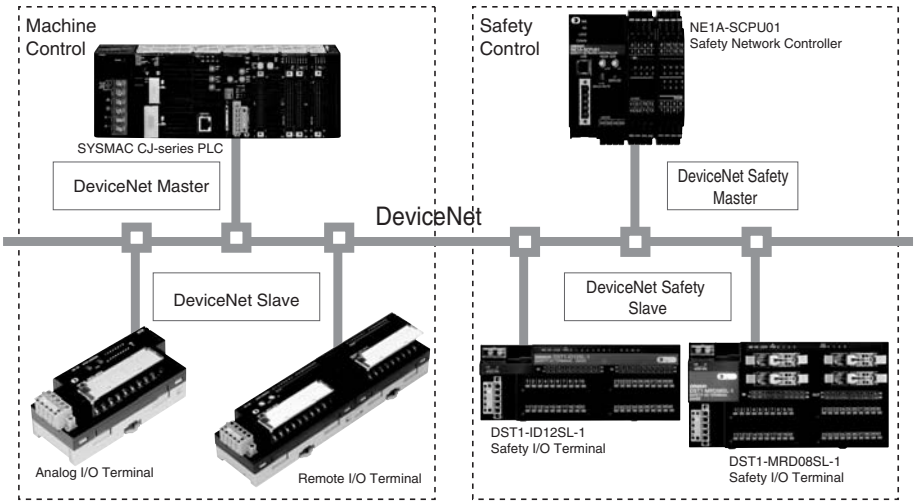


System Configuration 3

System Configuration Example for Total Control of Machine Control and Safety Control

- SYSMAC CJ Series
- NE1A-SCPU01
- DST1 Series
- WS02-CFSC1-E

The DeviceNet Network can be used to monitor the status of safety I/O and safety circuits on the DeviceNet Safety Network from existing DeviceNet Masters or other PLCs.



Ordering Information

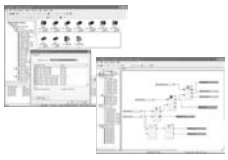
Safety I/O Terminals

Appearance	Appearance Description	Part Number
Safety Network Controller 	16 PNP Inputs 8 PNP Outputs 4 Test Outputs 128 Function Block Programming Removable Cage Clamp Terminals	NE1A-SCPU01

IP20 Safety I/O Terminals

Appearance	Appearance Description	Part Number
Input Terminal 	12 PNP Inputs 4 Test Outputs Removable Cage Clamp Terminals	DST1-ID12SL-1
Mixed I/O Terminal 	8 PNP Inputs 8 PNP Outputs 4 Test Outputs Removable Cage Clamp Terminals	DST1-MD16SL-1
Mixed I/O Terminal 	4 PNP Inputs 4 relay Outputs (4 x 2-single pole) 4 Test Outputs Removable Cage Clamp Terminals	DST1-MRD08SL-1

Software

Appearance	Appearance Description	Part Number
Safety Network Configurator 	Installation Disk (CD-ROM) IBM PC/AT Compatible Windows 2000 or XP	WS02-CFSC1-E (English Version)

Specifications

NE1A-SCPU01

General Specifications

DeviceNet communications power supply voltage		11 to 25 VDC (supplied from communications connector)
Unit power supply voltage		20.4 to 26.4 VDC (24 VDC 15% +10%)
I/O power supply voltage		
Consumption current	Communications power supply	24 VDC, 15 mA
	Internal circuit power supply	24 VDC, 230 mA
Overvoltage category		II
Noise immunity		Conforms to IEC 61131-2
Vibration resistance		10 to 57 Hz: 0.35 mm, 57 to 150 Hz: 50 m/s2
Shock resistance		150 m/s2: 11 ms
Mounting method		35-mm DIN Track
Ambient operating temperature		-10 to +55°C
Ambient operating humidity		10% to 95% (with no condensation)
Ambient storage temperature		-40 to +70°C
Degree of protection		IP20
Weight		460 g max.

Safety Input Specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC min. between each input terminal and G1
OFF current	1 mA max.
Input current	4.5 mA

DST1-□SL-1

General Specifications

DeviceNet communications power supply voltage		11 to 25 VDC (supplied from communications connector)
Unit power supply voltage		20.4 to 26.4 VDC (24 VDC 15% +10%)
I/O power supply voltage		
Consumption current	Communications power supply	DST1-ID12SL-1/MD16SL-1: 100 mA DST1-MRD08SL-1: 110 mA
Overvoltage category		II
Noise immunity		Conforms to IEC 61131-2
Vibration resistance		10 to 57 Hz: 0.35 mm, 57 to 150 Hz: 50 m/s2
Shock resistance		DST1-ID12SL-1/MD16SL-1: 150 m/s² 11 ms DST1-MRD08SL-1: 100 m/s² 11 ms
Mounting method		35-mm DIN Track
Ambient operating temperature		-10 to +55°C
Ambient operating humidity		10% to 95% (with no condensation) DST1-MRD08SL-1: 10% to 85% (with no condensation)
Ambient storage temperature		-40 to +70°C
Degree of protection		IP20
Weight		DST1-ID12SL-1/MD16SL-1: 420 g DST1-MRD08SL-1: 600 g

Safety Input Specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC min. between each input terminal and G1
OFF current	1 mA max.
Input current	6 mA

Note: For details on operating precautions and other information required to use the product, be sure to read the following operation manual:
DeviceNet Safety DST1-series Safety I/O Terminals Operation Manual (Z904)

Safety Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V2
Leakage current	0.1 mA max.

Test Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per output (See note.)
Residual voltage	1.2 V max. between each output terminal and V1
Leakage current	0.1 mA max.

Note: Total simultaneous ON current: 1.4 A

Standards

Certifying body	Standards
TÜV Rheinland	EN954-1:1996, EN60204-1:1997, EN61000-6-2:2001, EN61000-6-4:2001, EN418:1992, IEC61508 part1-7/12.98-05.00, IEC61131-2/02.03, NFPA 79-2002, ANSI RIA15.06-1999, ANSI B11.19-2003
UL	UL1998 (pending), NFPA79 (pending), UL508, CSA22.2 No14, UL1604

Note: For details on operating precautions and other information required to use the product, be sure to read the following operation manual:
DeviceNet Safety Network Controller Operation Manual (Z906)

Safety Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V2
Leakage current	0.1 mA max.

Test Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per point
Residual voltage	1.2 V max. between each output terminal and V1
Leakage current	0.1 mA max.

Safety Output Specifications for Realy Outputs

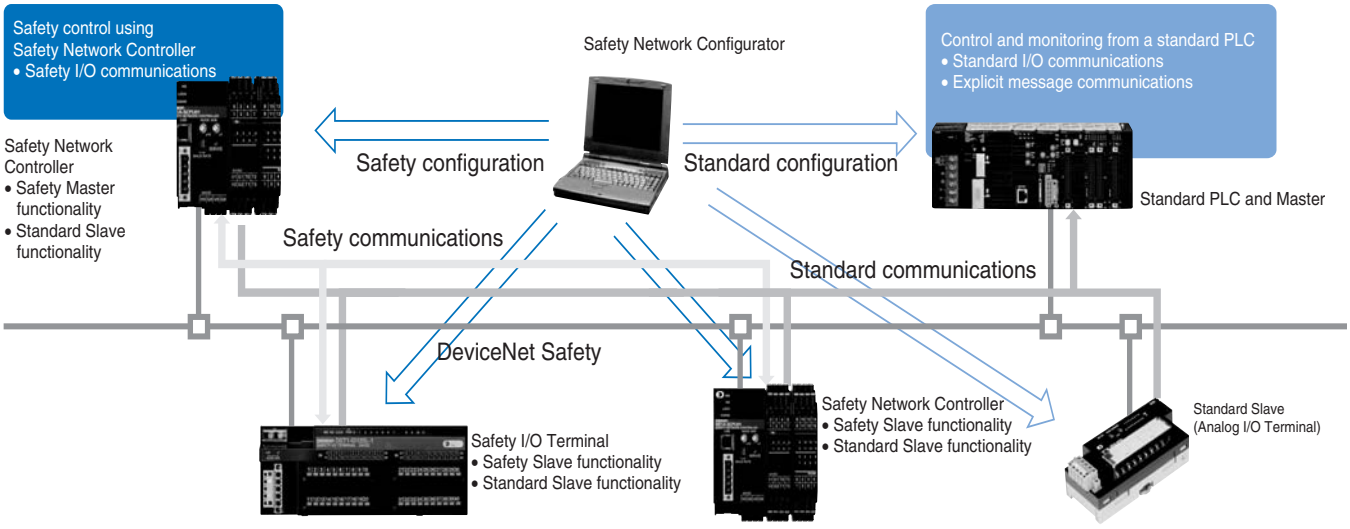
Relays	G7SA-2A2B, EN 50205 Class A
Minimum applicable load	1 mA at 5 VDC
Rated load for a resistive load	240 VAC: 2 A, 30 VDC: 2 A
Rated load for an inductive load	2 A at 240 VAC (cos =0.3), 1 A at 24 VDC
Mechanical life expectancy	5,000,000 operations min. (switching frequency of 7,200 operations/h)
Electrical life expectancy	100,000 operations min. (at rated load and switching frequency of 1,800 operations/h)

Standards

Certifying body	Standards
TÜV Rheinland	EN954-1/12.96, EN60204-1/12.97, EN61000-6-2/10.01, EN61000-6-4/10.01,EN418/1992, IEC61508 part1-7/12.98-05.00,IEC61131-2/02.03, NFPA 79-2002,ANSI RIA15.06-1999, ANSI B11.19-2003
UL	UL1998, NFPA79, UL508, CSA22.2 No14, UL1604 (DST1-ID12SL-1 and DST1-MD16SL-1 only)

WS02-CFSC1-E

System Configuration



General Specifications

Compatible computer	IBM PC/AT or compatible
CPU	Pentium 300 MHz min.
OS	Windows 2000 or XP
Supported languages	English
Memory	128 Mbytes min.
Hard disk	40 Mbytes min. available space
Monitor	Display functionality of S-VGA monitor or higher
CD-ROM	One CD-ROM drive min.
Communications port	Either of the following communications ports is required. • USB port: For online communications via SNC USB port (USB1.1) • DeviceNet Interface Card (3G8E2-DRM21-EV1): For online communications via DeviceNet.

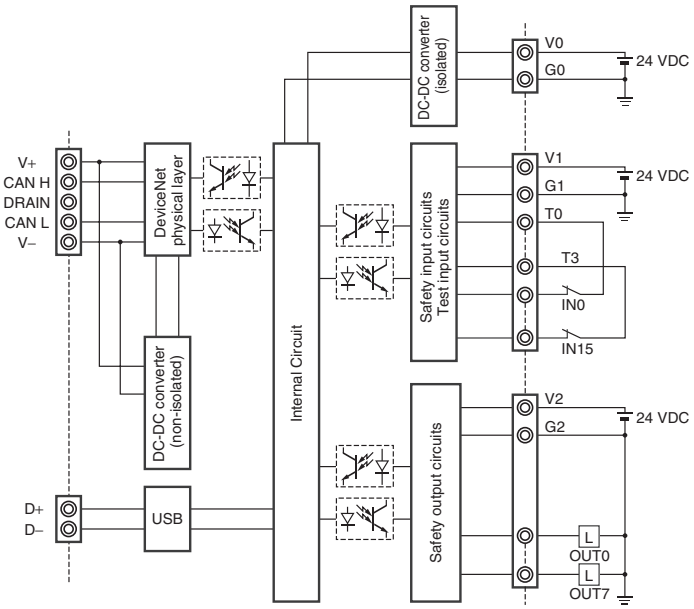
Note: Windows is a registered trademark of Microsoft.
IBM is a registered trademark of International Business Machines Corp.

Manuals

Description	Reference Number
Devicenet Safety Network Controller Operation Manual	Z906
Devicenet Safety DST1-series Safety I/O Terminals Operation Manual	Z904
Devicenet Safety System Configuration Manual	Z905

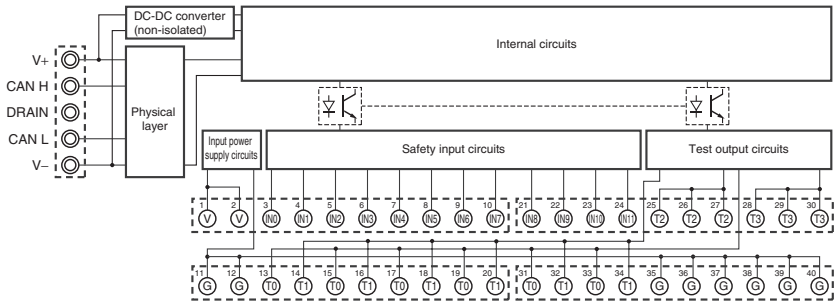
Internal Circuit Configuration

NE1A-SCPU01

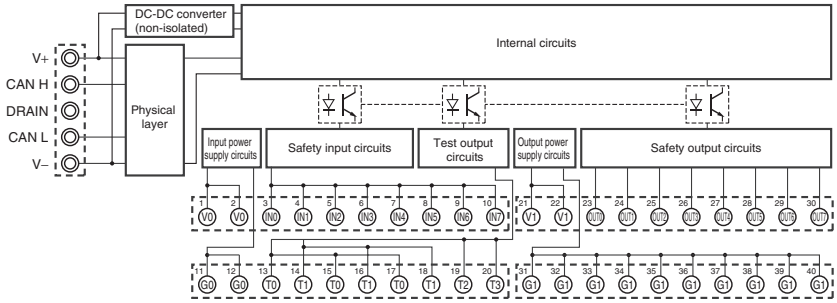


Safety I/O Terminals

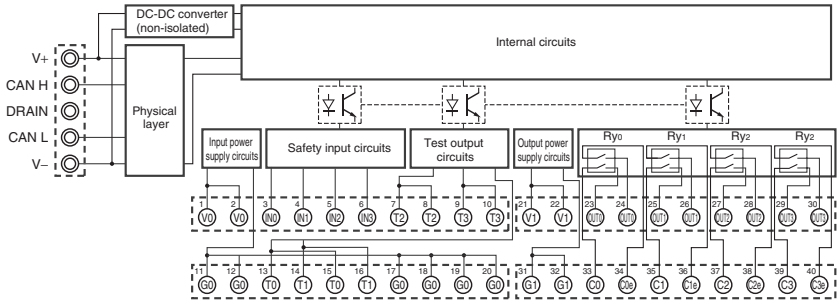
DST1-ID12SL-1



DST1-MD16SL-1



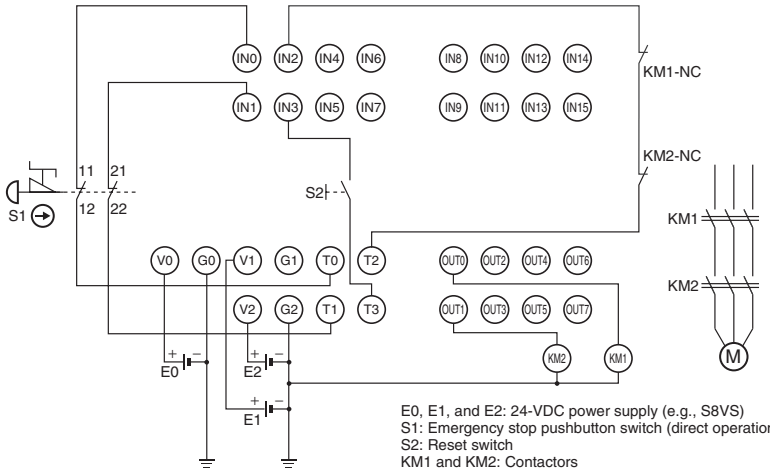
DST1-MRD08SL-1



Wiring Diagrams

NE1A-SCPU01

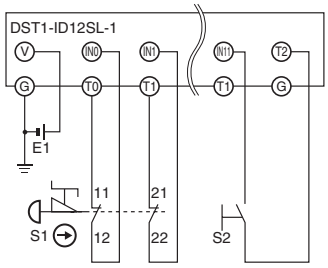
Emergency Stop Applications (Manual Reset)



E0, E1, and E2: 24-VDC power supply (e.g., S8VS)
S1: Emergency stop pushbutton switch (direct operation mechanism)
S2: Reset switch
KM1 and KM2: Contactors

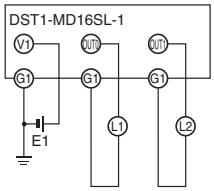
Safety I/O Terminals

● Emergency Stop Switch and Reset



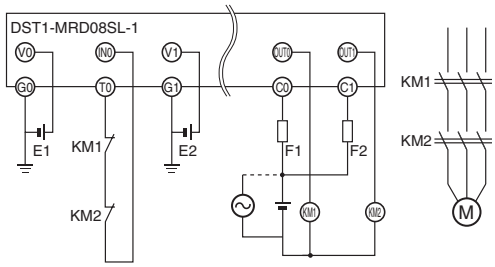
E1: 24-VDC Power Supply (e.g., S8VS)
S1: Emergency stop pushbutton switch (direct operation mechanism)
S2: Reset switch

● Safety Outputs



E1: 24-VDC Power Supply (e.g., S8VS)
L1 and L2: Loads

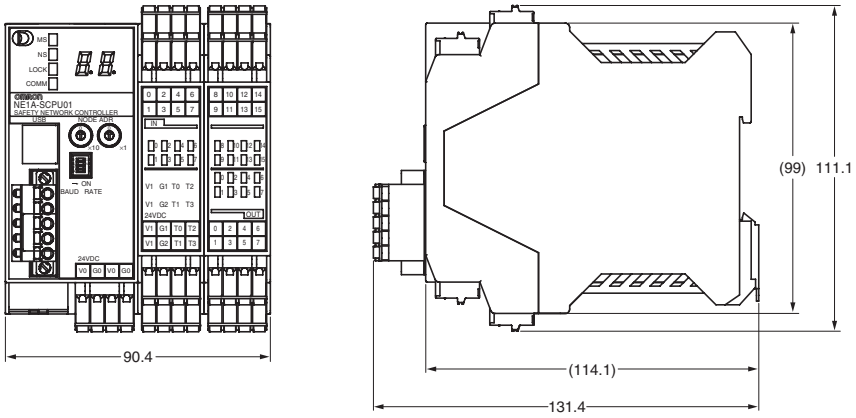
● Safety Output and Output Feedback



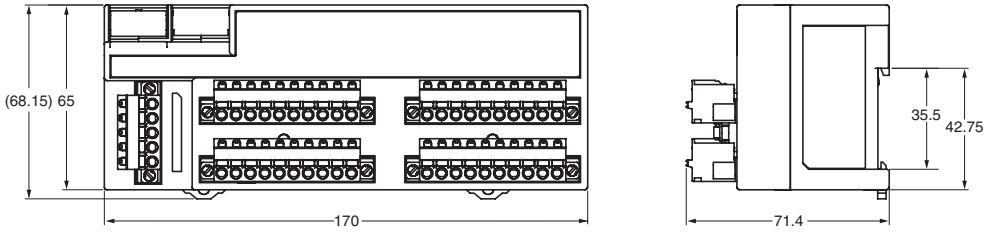
E1: 24-VDC Power Supply (e.g., S8VS)
KM1 and KM2: Contactors
F1 and F2: Fuses

Dimensions

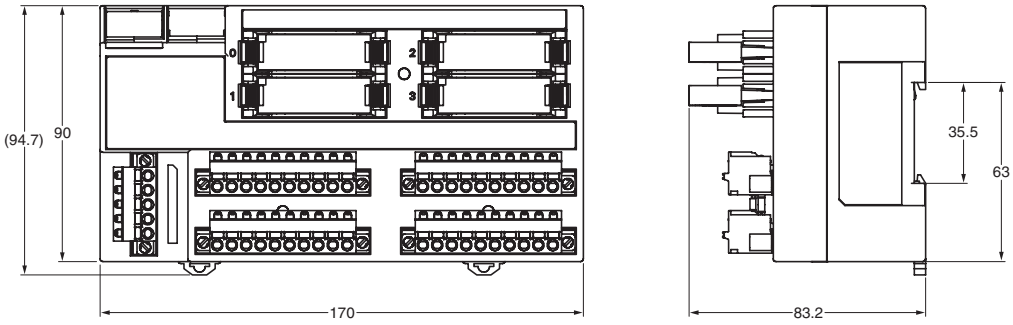
NE1A-SCPU01



DST1-ID12SL-1
DST1-MD16SL-1



DST1-MRD08SL-1



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. Z907-E2-01-X In the interest of product improvement, specifications are subject to change without notice.

Human Machine Interfaces

Introduction to OMRON HMI	592
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NT-XS series Function Key Screens	618
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OMRON

Introduction to OMRON HMI

HMIs for essentially any purpose

						
Model	**NS12**	**NS10**	**NS8**	**NS5-T**	**NS5-S / NSH5-S**	**NS5-M**
Type of display	TFT 12 inch colour display	TFT 10 inch colour display	TFT 8 inch colour display	TFT 5.7 inch colour display	STN 5.7 inch colour display	STN 5.7 inch mono-chrome display
Size in mm (HxWxD mm)	241x215x48.5		177x232x48.5	142x195x54 NSH5 176x223x70.5 (depth excl. emergency button)		
Effective display area	246x184.5 mm (800 x 600 pixels)	215.2x162.4 mm (640 x 480 pixels)	170.9x128.2 (640 x 480 pixels)	117.2x88.4 mm (320 x 240 pixels)		
Display colour	256 colours Image data: 32,768 colours				256 colours Image data: 4,096 colours	16 grey scales
Power supply	24 V DC ±15%					
Touch panel	38 vertical x 50 horizontal	30 vertical x 40 horizontal	24 vertical x 32 horizontal	15 vertical x 20 horizontal		
Obtained standards	UL 1604 C1D2, cUL, EC Directives, NEMA equivalent					
Display graphics	Rectangle, circle, oval, straight line, polyline, polygon, arc					
No. of display characters (standard characters)	100 characters x 37 lines	80 characters x 30 lines				
No. of registered screens	3,999 screens max. (depending on screen contents)					
Screen data capacity (standard)	60 MB			20 MB		
Memory card interface	ATA compact flash card interface, 1 slot					
Internal memory	Bit memory: 32,767 bits, Word memory: 32,767 words, Retentative memory: 8,192 bits and 8,192 words.					
Printer connection	Supported			---	---	
Backlight life	50,000 hours minimum		40,000 hours minimum	75,000 hours minimum		50,000 hours minimum
Multivendor support	Supported for most third-party PLCs. Please contact your local OMRON distributor for more information.					
Video board (composite / RGB)	Supported			---	---	

	
Model	**NSJ5**
Features	A combination of a fast and powerful CJ1 PLC, a 5.7" NS series touchscreen and open network connections. With the NSJ5 you are able to configure, commission, operate and maintain your complete automation solution. Ideal for applications that require visualisation, control and open network connection with little space. Panelless automation by making use of remote I/O terminals and intelligent devices. - 5.7“ colour touchscreen, 4096 colours (images), 20 MB screen data memory - 20 k Steps PLC program memory - 32 K Words PLC data memory - DeviceNet or CAN interface - Ethernet interface - Compact Flash card interface

Select the HMI that suits your application best

					
Model		**NT21S-ST121(B)**[1]	**NT11–SF121(B)**[1]·	**NT2S-SF12□B-E(V2)**	**NT3S-ST12□B-E**
Size in mm (HxWxD)		110x190x58	113x218x38.2	60x108x43	77x140x35
Effective display area		117x63 mm (260x140 dots)	160x64 mm	56x11 mm	98x35 mm (192 x 64 pixels, 4.1 inch)
Type with ethernet		24 VDC +10%/-15%	24 VDC ±15%	24 VDC ±10% (when applicable)	24 VDC ±15%
I/O	Function keys	-	22 keys	6 to 20 keys depending on model	-
	Touch panel	7 vertical x 13 horizontal	---	---	Analog Resistive
Obtained standards		UL, CSA, EC Directives,NEMA equivalent	CE, cULus	CE, cULus	CE, cULus
Display graphics		Straight lines, rectangles, polygons, circles, ovals, sector, bitmaps			Rectangle, rounded rectangle, circle, oval, line, bitmaps
No. of display characters (standard characters)		16 characters x 8 lines	20 characters x 4 lines	16 characters x 2 lines	32 characters x 8 lines
No. of registered screens		3,999 screens max. (depending on screen contents)	250	250	65,000 max. (limited by memory capacity)
Screen data capacity (standard)		512 KB	32 KB	24 KB	120 KB
Expansion memory		---	---	---	---
Memory card interface		NT-MF261 memory unit for screen transfer can be used.	---	---	---
Expansion interface		---	---	---	---
Ethernet		---	---	---	---
Internal memory		Numeral memory table: 2,000 entries max., Character memory table: 2,000 entries max.	-	1 kWords data, 1 kWords retentative memory	1 kWords data, 1 kWords retentative, 64 words system memory
Ladder monitor		---	---	---	---
Programming Console function		Supported	---	---	---
Device monitor		---	---	---	---
Barcode reader connection		Supported	---	---	---
Printer connection		---	Supported	Supported	Supported
Multivendor support		Supports most third party PLCs. [2]	---	Supports most third party PLCs [2]	Supports most third party PLCs [2]
Backlight life		50,000 hours average	50,000 hours average	LED, min. 50,000 hours	LED, min. 50,000 hours

1. Model numbers with 'B' have a black frame and without a beige frame.
2. Please contact your local OMRON representative for a list of available drivers.

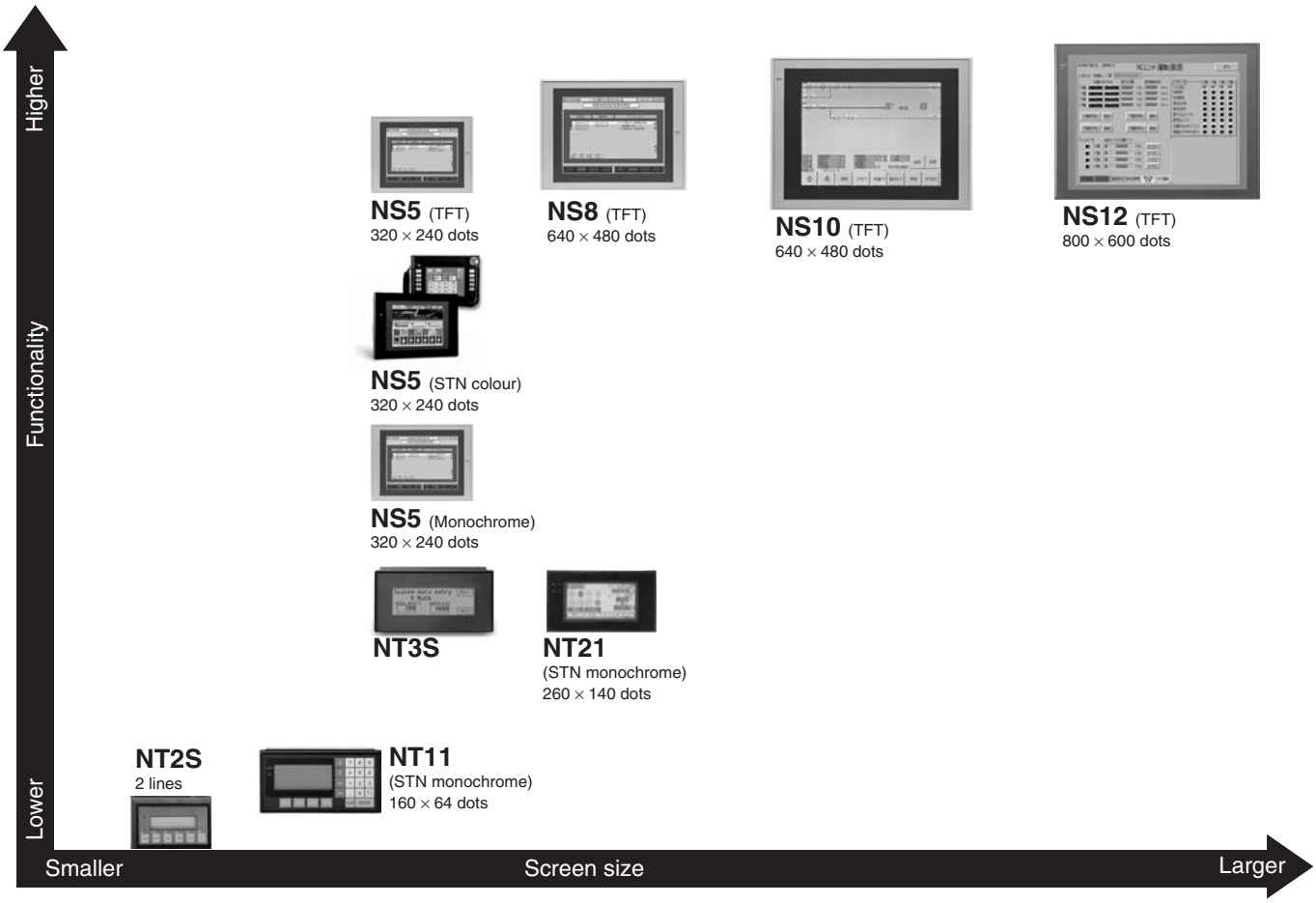
HMI Overview

As a machine management tool ... as an information terminal ... as a system component

As a global supplier of HMI solutions and high-reliability industrial touch screen technology for over 12 years, Omron has supplied more than 500,000 pieces of HMI through more than 200 world-wide sales and support offices each offering after-sales support, service and training in the local language.

We also understand the changing needs of our customers. As control systems become more complex the HMI is increasingly being used not only as an operator display and data-setting terminal, but also as a maintenance tool for the complete control system. Many HMI applications now contain 100's of screens of maintenance information for the complete control system and Omron's easy software and hardware integration within the control system can greatly reduce programming time needed and also greatly increase the functionality of the maintenance, therefore dramatically reducing the total cost of ownership.

Select by screen size. Select by functions. The wide range of NT- and NS-series HMIs suits most applications.



NS5, NS8, NS10, NS12

NS series Advanced Touch Screens

Design Software

The CX-Designer is used to create screen data for NS-series Programmable Terminals. The CX-Designer can also be used to test the operation of the created screen data on the computer.

Screen Creation

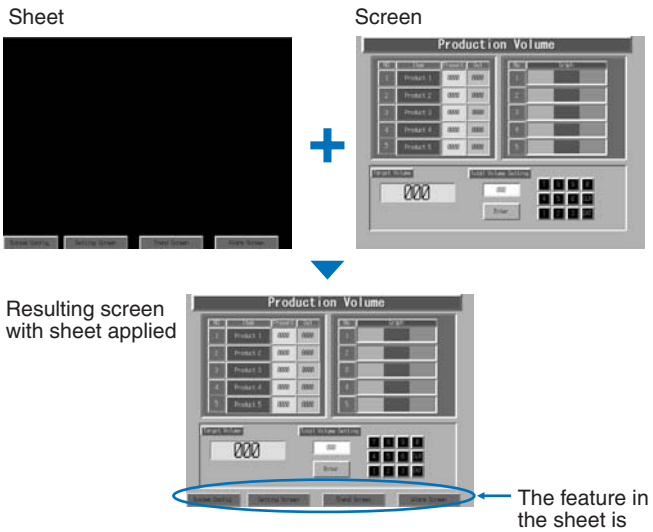
Develop Screens More Efficiently with Easy-to-use Support Software. The CX-Designer has about 1,000 standard functional objects with associated graphics and advanced functions, so even first-time users can create screens easily just by arranging functional objects in a screen.

The CX-Designer is also equipped with a variety of functions that make it easy to create screens for common applications. Screen development is very efficient with the CX-Designer.

Screen templates

Make one common screen (sheet) that overlaps other screens (to save having to recreate the same part, such as a menu, in every screen).

A feature that is common to several screens can be registered in a sheet. The common feature can be added to any screen just by applying the corresponding sheet to the screen. (Up to 10 sheets can be created for one project.)



Multiple language support

Switching error messages between English and Japanese

A Dual-language (English/Japanese) system program

With an NS-series PT, the display language for the system menu and error messages can be switched between English and Japanese with the System Menu's Select Language function. Like the Label Switching function, the Dual-language setting is useful for exported products because the language can be set to English for normal operation and switched to Japanese when Japanese staff need to operate the equipment or perform maintenance.



Language selection tab page

Creating Italian, German, or Other Language Screens in any language version of Windows

Multi-language Input (When Windows 2000 or XP is Used)

When Windows 2000 or XP is being used, French, German, Spanish, Italian, and other language text can be input in NS-Designer. Select the desired language with regional options to input a different language.

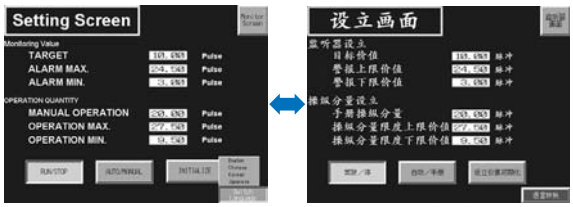


Making multiple language versions with a single screen data file

Label switching function

Up to 16 groups of labels (labels 0 to 15) can be registered for functional objects such as buttons, lamps, labels, and alarm settings. (Each label can correspond to a different language, for example, label 0 = Japanese, label 1 = Simplified Chinese, label 2 = Korean, label 3 = English, etc.)

Once all of the labels have been input in each language with the multilingual input function, all of the labels can be switched to a different language at once just by specifying the corresponding label number from the PLC.

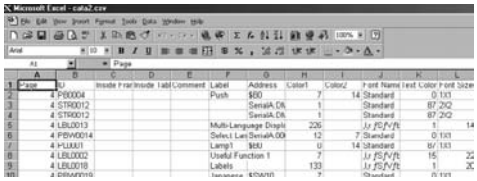


Example: The label switch function can be used to switch between English and Simplified Chinese.

Having a text label converted into multiple languages by a translation company

CSV File Input/Output

The labels for each functional object can be exported in CSV format. The changed labels can be imported again after it has been edited with a program such as Excel.



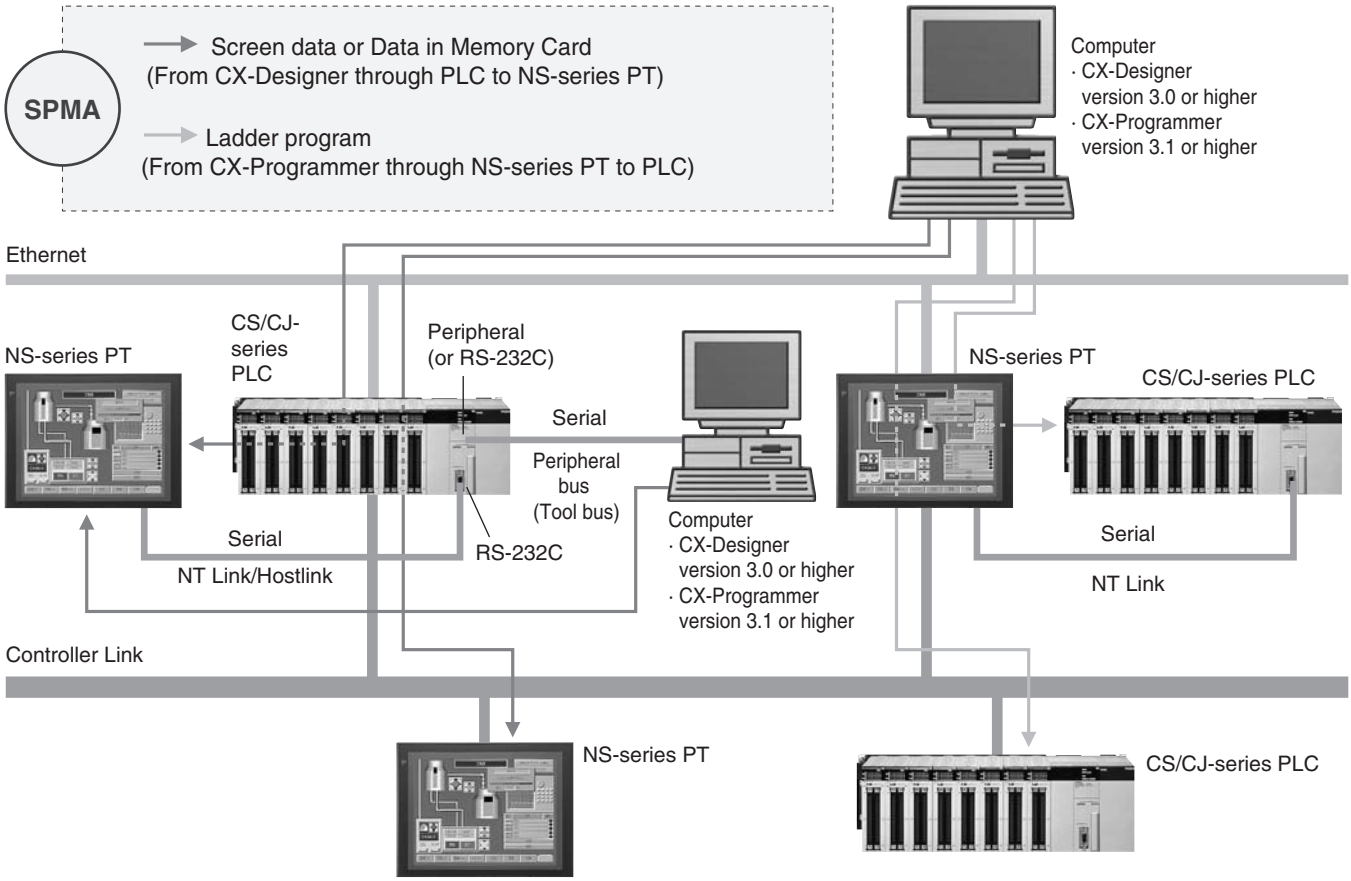
Transferring Screen Data

Data Transfer by Passing Through a PLC or PT!

SPMA (Single Port Multi Access) Function

When transferring screen data from the CX-Designer to the NS-series PT, the data can be transferred through a PLC as long as the PT is connected to the PLC by a serial connection or network connection.

Also, when monitoring/transferring a PLC ladder program from the CX-Programmer, the PLC ladder program can be monitored/transferred through an NS-series PT as long as the PT is connected to the PLC by a serial connection or network connection.



* To use the SPMA function through the PLC, the following software and hardware versions are required.

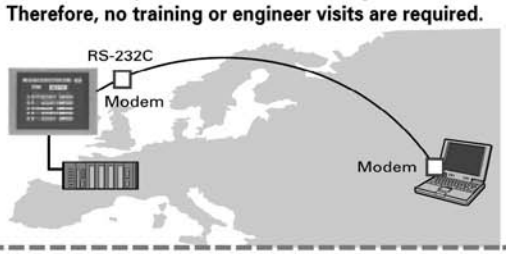
- NS-series PT: System version 3.0 or higher
- CX-Designer: Version 3.0 or higher
- CX-Programmer: Version 3.1 or higher
- PLC: Lot No. 030201 and later

Easy screen data transfer at high speed

Screen transfer through modems is now possible.

- Even a single screen change in a shipped machine involves a risk, because a screen sent by e-mail needs to be transferred to a person familiar with operation. Training workers to understand operation is a hard job. Or service personnel need to visit the site to change screens.

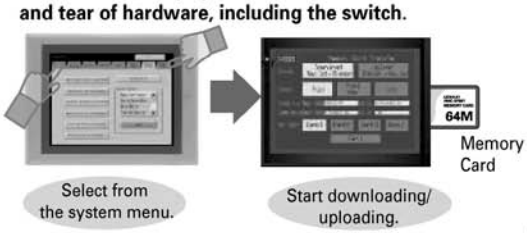
Solution The screens can be transferred from a computer in an office through modems. The maintenance of the screens is possible without touching the device. Therefore, no training or engineer visits are required.



Screen transfers using Memory Cards are possible from the maintenance menu.

- It is very convenient to make backups without using a computer. It is, however, troublesome to operate a DIP switch on the back of the PT each time backups are required.
- You may want to make backups periodically, but worry because the DIP switch pins may break.

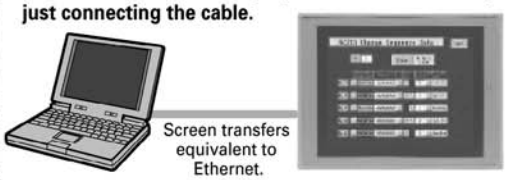
Solution Screen transfers using Memory Cards are possible from the maintenance menu. No physical switch operations are required on the rear panel. Furthermore, easy operation is ensured with no wear and tear of hardware, including the switch.



High-speed screen transfer through USB.

- Most computers now have an USB port, and no serial RS-232C ports are provided.
- You may want to transfer screens more easily at higher speeds.

Solution Data can be transferred over USB through a single cable between the computer and PT. No devices for serial RS-232C and USB conversion are required. Moreover, USB allows high-speed screen transfer by just connecting the cable.



Note: The screen transfer function through the USB will be supported in the near future.

Creating Windows-style screens

Making buttons pop-up with a single property setting

Easily creating pop-up menus

You can easily create your own pop-up menu using the standard command button. When the button is pressed, the pop-up menu will be displayed and the corresponding operation (such as switching screens or setting a value in a specified communications address) can be performed by choosing the item name from the pop-up menu.

Inputting character strings by selecting from a list

List selection object

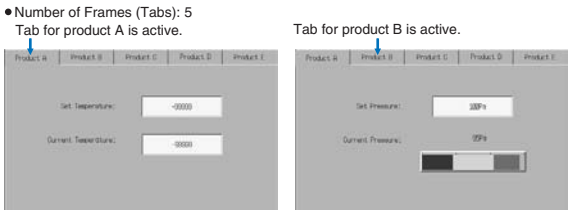
The character strings in the specified PLC addresses or text file are displayed so that the user can select from the list. When a line is selected, the corresponding line number or character string can be written to the PLC. It is possible to display up to 1,024 lines with up to 256 characters in each line.

Switching just part of the screen, Like the Pages of a Notebook

Frame function

It is possible to specify an area in the screen (Frame) that will be switched as a page. Up to 10 frames can be set for one screen. Up to 256 pages can be switched for one frame.

This function can be used for operations such as switching tabs.



Varying the font size, just as you can in a word processor

Windows fonts function

Windows fonts such as Arial or Century can be used for text objects and the font size can be changed.

Using an image, e.g. a picture taken with a digital camera, for the background

Bitmap displays

It is possible to display BMP and JPG files. The files can be specified directly or indirectly.

Background files

It is also possible to arrange BMP and JPG files for the background of the screen.

Using general software

Editing text and bitmap file with your favorite text editor

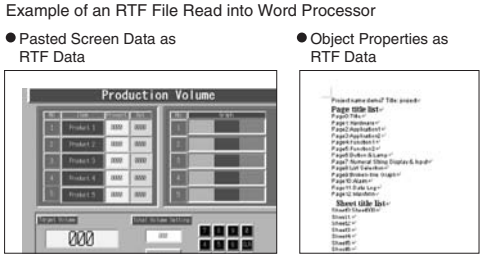
Editor specifying function

The user can select the editor when editing text or bitmap files.

Creating system-related documents

Outputting project information in RTF

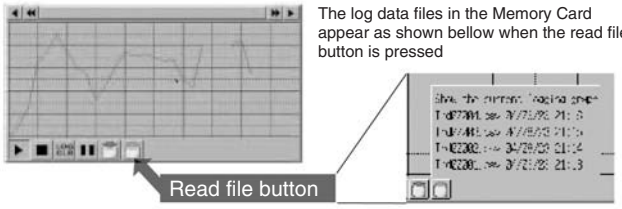
Data such as screen information and object information can be output in an RTF file. The RTF file can be read into Word Processor to produce a system manual.



Using Excel to analyze data, such as the Alarm/Event History, Operation Log, and Error Log, and to create Daily Reports

Memory Card: data logging function

Log Data in a Memory Card can be read on the screen with the read file button. A list fo files with time stamps will appear on the screen. By selecting the desired file, the past log in the Memory Card ban be read.



Using Excel to analyze time-series data and to create daily reports

Memory Card: History Storage Function

The following data can be saved to the Memory Card in CSV format.

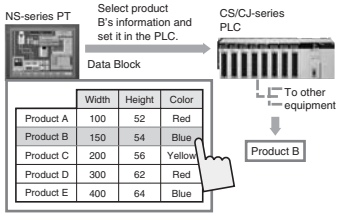
- Alarm/Event History (Alarm/ Event history data)
- Operation Log (Screen operation history data)
- Error Log (Error log data recorded during macro program execution)

Easily utilizing advanced functions

Setting and displaying recipe data from the PT for fast production changeovers

Data block (Recipe) function

Data blocks (recipe function) allow several numeric values and/or character strings to be transferred to/from memory areas, such as PLC data areas. Data blocks can be used to change the system's production setup even faster.



Easily creating screens in table format containing multiple functional objects

Tables

The same kind of functional objects (such as Buttons, Text, or Numeral Display & Input objects) can be created together in a table just by specifying the kind of functional object, number of rows, and number of columns in the table. In addition, the properties for functional objects can all be set together and PLC addresses can be allocated automatically. It is also possible to add headings for each row and column.

Converting the scale for industrial units at the PT

Units setting and scaling function

The display units and scale can be changed Numeral Display & Input objects. Any unit display can be set.

Hide or disable objects on a screen with a single bit to prohibit operation

Control flag (Interlock) function

A bit in the PLC can be used as a control bit to control the display of an object (such as a button or numeral input) or disable/enable an operation.

This can be useful when you want to change data from a PLC without the user noticing this. It can also guide the user to perform actions step by step.

Protecting the system with passwords

Passwords

It is possible to register 5 kinds (levels) of passwords (16 characters max.) for the whole project. Also can set one of 5 passwords for each functional object (which you operate).



Changing the color of an area of the Meter to indicate an error level

Switch display color function

Level Meter and Analogue Meter can be divided into three ranges with a different fill color in each range. It is also possible to indirectly specify each range's color and border values so that the ranges can be changed during operation.

Create customized functionality using script

(Moving functional objects based on the status of PLC bits, performing conditional processing at a given present value, writing to the PLC according to set value arithmetic operations, etc.)

Macro function

Original, user-defined programs (macros) can be added and executed to control projects, screens, and functional objects.

Sharing Screen Data

Using Image library

Select Shape Function

About 1,000 shapes can be used for ON/OFF buttons, Bit lamps, and Word lamps, including shapes such as 7-Segment digits, rotary switches, limit switches, and motors.

Registering Complex Objects such as Graphics to a Library and Reusing Them

Library Register Function

Organize functional objects or fixed objects that you have created and register them in the library so that they can be reused.

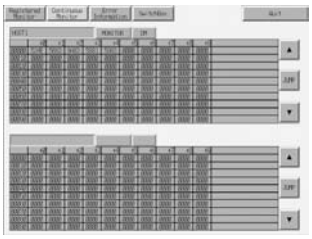
Terminal Software

Monitoring and setting PLC data

Monitoring PLC I/O data for the purpose of device debugging and maintenance

Device Monitor Function

The Device Monitor Function is a standard feature in the NS-series Programmable Terminals. Data in the PLC's I/O memory can be accessed directly (read and written.) The Device Monitor provides functions that can significantly reduce the time needed to set up the system, such as displaying a block of consecutive PLC data area addresses and inputting/verifying parameters in CPU Bus Units and Special I/O Units.



Easily Displaying the Status of Particular Bits in Ladder Programs when Errors Occur

Switch Box Function

The Switch Box Function has been added to the NS-series Programmable Terminals. The Switch Box Function can be used to monitor the status of each bit in a word or a combination of user-selected bits organized like a ladder program section. The Switch Box Function makes it possible to perform basic troubleshooting on the factory floor or debugging of the application even without a computer.

Monitoring Execution of the PLC's Ladder Program

Ladder Monitor Function

Save the NS-EXT01 Ladder Monitor system program on a Memory Card (the NS-EXT01 is sold separately) and install the Memory Card to enable monitoring of a ladder program (I/O bit status monitor, address/instruction search, multiple I/O bit monitor, etc.) being executed in a CS/CJ-series PLC connected by a serial connection. It is also possible to display I/O comments created with the CX-Programmer.

Memory Card: Upload/Download Function

It is possible to download the screen data and system program to Memory Card and upload the same data from the Memory Card. It is also possible to automatically upload the data from the Memory Card to CX-Designer or automatically download the data from Memory Card to PT when the power of PT is turned ON.

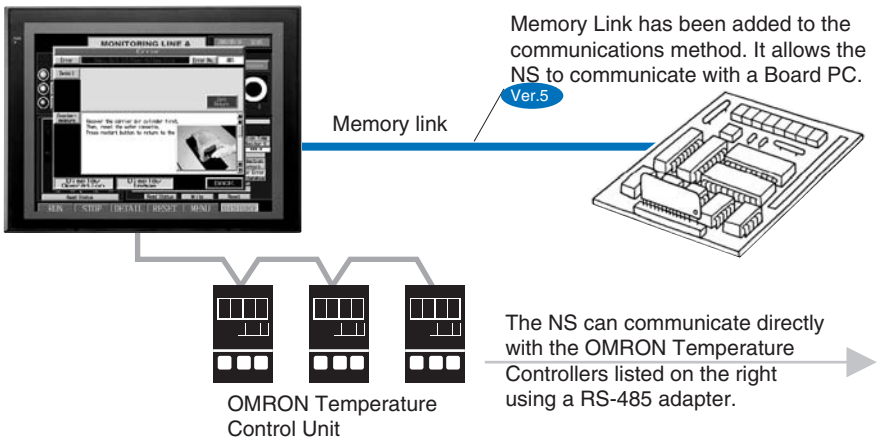
You can partially replace text and pictures from your computer.

FTP (File Transfer Protocol) has been added!

Texts, lists, and recipes can be replaced with the put/get command from your computer! You can even replace BMP files online from your computer easily.



The NS can be connected to a Board PC. The NS can also be directly connected to an OMRON Temperature Controller.



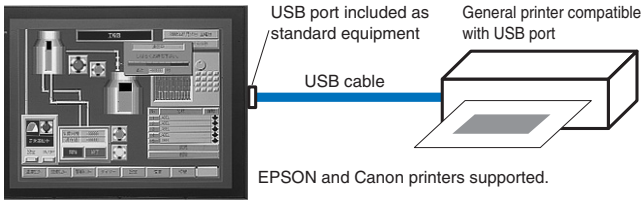
The following models, which have an RS-485 communications port and support CompoWay/F communications, can be connected to the NS.

Unit	Series	Model
Modular Temperature Controllers	E5ZN	E5ZN-SCT24S-500 (terminal unit)
Digital Temperature Controllers	E5AN	E5AN-□□M□-500 + E53-AK03
	E5EN	E5EN-□□M□-500 + E53-AK03
	E5CN	E5CN-□□M□-500 + E53-CNH03 or E53-CN03
	E5GN	E5GN-□□□03□-FLK
Digital Controllers	E5AR	E5AR-QC43DB-FLK
		E5AR-QQ43DW-FLK
		E5AR-CC43DWW-FLK
	E5ER	E5ER-QC43B-FLK
		E5ER-PRQ43F-FLK
		E5ER-QT3DW-FLK
		E5ER-CT3DW-FLK

Printer Support

USB port compatibility with commercially available printers

Hard copies of screens can be printed out in color by USB-compatible printers or to the flash card.



NS5	NS8	NS10	NS12
-	Supported	Supported	Supported

Supported Printers

Manufacturer	Model	NS system version
EPSON	Stylus Photo 830U	v5
	Stylus Photo 870U	v5
	Stylus Photo 900	v5
	Stylus Photo 925	v5
	Stylus Photo 720	v5
	Stylus C62	v5
CANON	PIXMA iP90	v6.20
	PIXMA iP2000	v6.20
	PIXMA iP3000	v6.20
	PIXMA iP4000	v6.20
	PIXMA iP4000R	v6.20
	BJ i80	v5
	BJ i70	v5
	BJC-85	v5

Exchanging data with a PLC over a network (Multihost)

Communicating with a PLC via NT Link, using Ethernet without special PLC Programming

Ethernet communications without programming

NS-series PTs can communicate with a CS/CJ-series PLC (equipped with an Ethernet Unit) through “program-free” communications just like NT Link communications. Data is transferred through Ethernet through a simple PLC address and initial communications setup.

Using data links between the PT and the PLC

Controller Link interface unit

The Controller Link is an FA network that can send and receive large data packets flexibly and easily among OMRON PLCs and IBM PC/AT or compatible computers. The NS12 and NS10 PTs can be connected to the Controller Link network easily via a Controller Link Interface Unit. When a Controller Link network is used, data can be transferred between multiple PLCs and NS12/NS10 PTs without writing ladder programming to manage the communications.

System Configurations

Various connections, such as 1:1, 1:2, 1:N, and M:N, are supported with Ethernet or serial connections

PT:PLC = 1:1

PT:PLC = 1:2

PT:PLC = 1:N

PT:PLC = M:N

Host Registration Function

It is possible to register two or more PLCs as hosts and communicate with the PLCs by specifying the host ID and address.

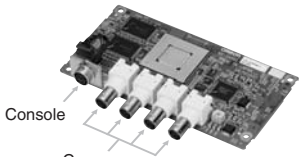
Hardware

Using Video Inputs

Capturing Moving Images from a Video Camera and Image Outputs from a Vision Sensor

Video Input Interface

Four video input interfaces are provided, so four video or CCD cameras can be connected. Up to four images can be displayed simultaneously if the image size is 320x240 pixels.

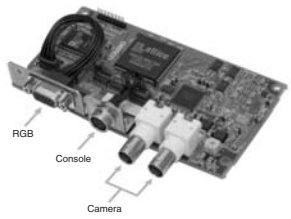


Display PC Screens with the NS-CA002

NS-CA002 RGB/Video Input Unit

(Supported by the NS12-V1/ NS10-V1/NS8-V1)

An analog RGB input terminal is provided in addition to two video input interface terminals. A single video or analog RGB display is possible in user-defined positions and sizes. Touch switches and parts, such as lamps, can be overlapped on the video display. The display of parts will not disappear.



Saving Displayed Video Images to a Memory Card in BMP Format

Image Capture Function

When necessary, the displayed image can be captured and saved in a Memory Card in BMP format. The saved image can then be uploaded from a personal computer via Ethernet or Serial connection. It is also possible to display the saved image on the NS screen again, so that you can compare two or more captured images immediately.

The number of images that can be saved depends on the capacity of Memory Card. As an example, about 50 images from a 640x480 display (about 600 Kbytes each) can be saved in a 30-Mbyte Memory Card.

Image capture data read function

BMP data captured and saved in a Memory Card can be read on the PT. BMP data displayed in thumbnails can be selected and displayed on the captured data display screen that will appear for the command button. If any error occurs, the image when the error accurred can be displayed on the NS screen. This is useful for on-site error analysis.

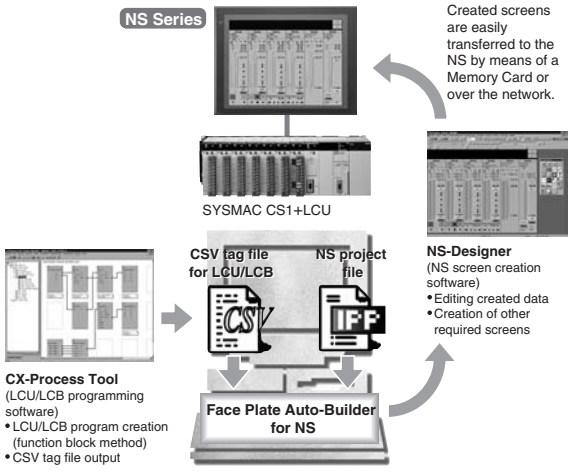
Using for Process Control

Automatically Generating PT Image Data from Tag Information Created with CX-Process

Face Plate Auto-Builder for NS (Sold separately)

Significantly reduces the engineering time required, by combining LCB/ LCU and the NS Series.

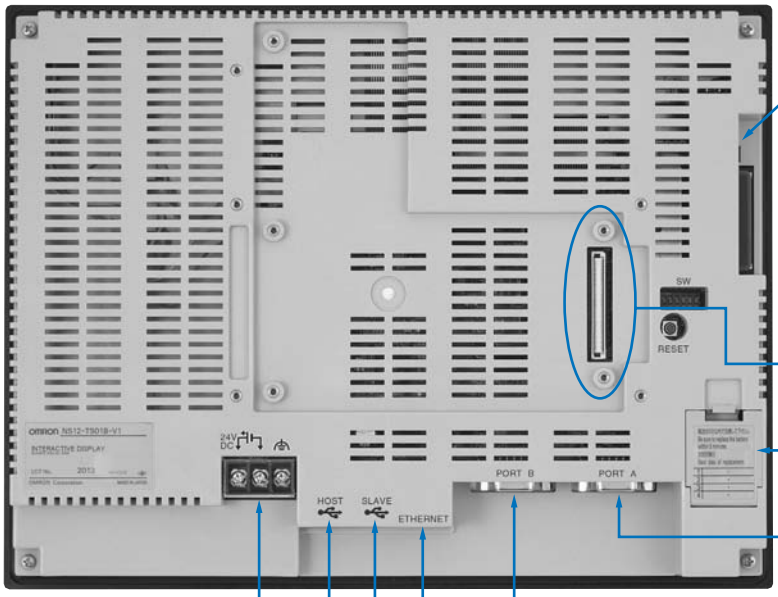
- Automatic generation of control screens and tuning screens. Automatic generation of NS screen data by the software from tag information created with the CX-Process Tool.
- NS communications address allocation, ladder programs, etc., are completely unnecessary.
- Data that has been generated can be freely edited and processed by CX-Designer (NS screen creation software).



High-reliability and advanced functions in the industry's slimmest PT

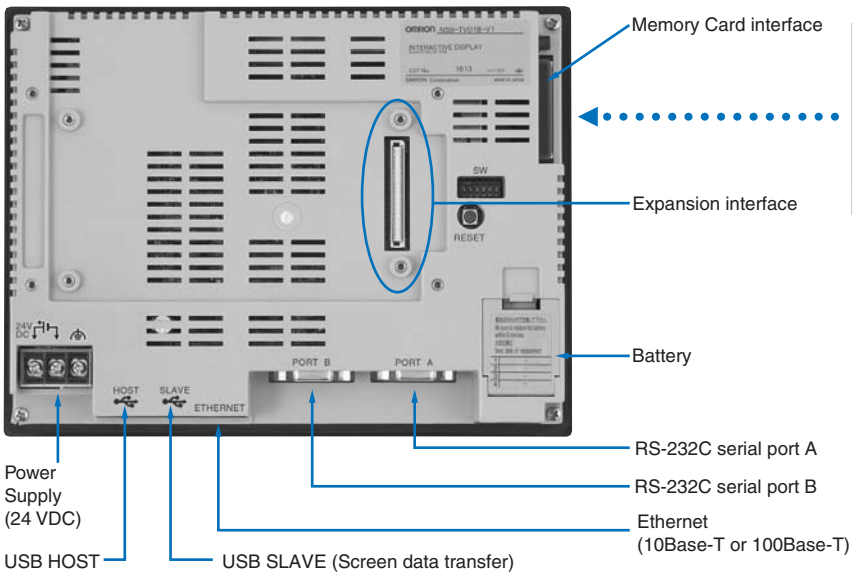
Super-thin 48.5-mm Body for a Slimmer Control Panel

NS12, NS10



- A barcode reader can be connected to the serial port.
  Recommended barcode reader: V520-RH21-6

NS8

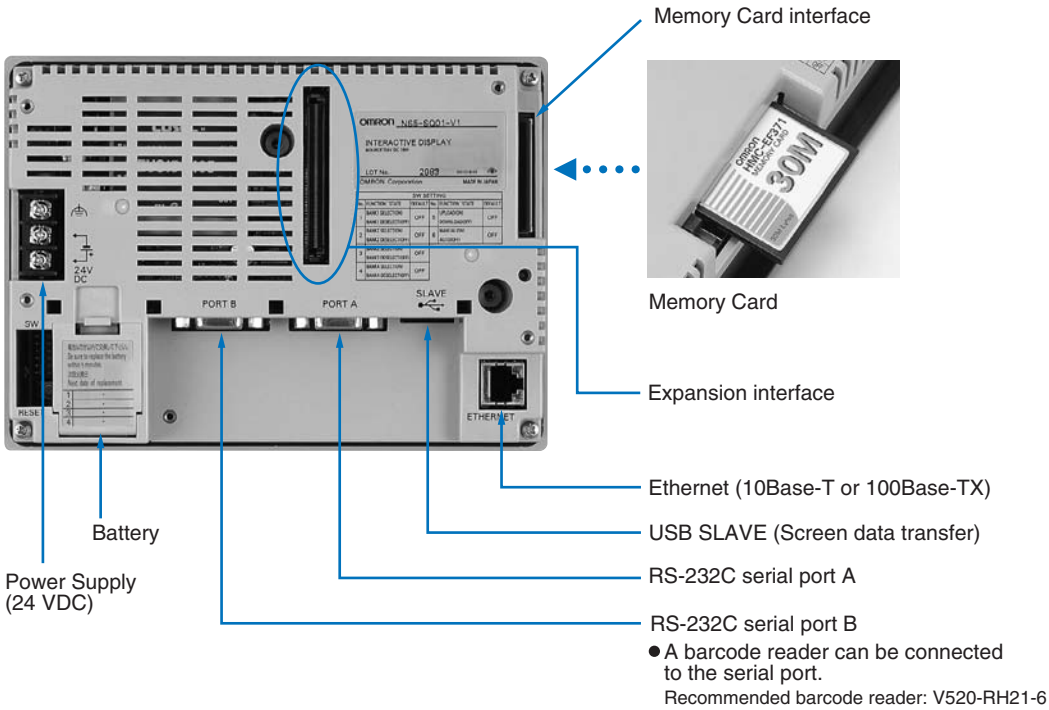


Memory Card

Note: Colors shown in photographs and product names may differ from actual colors and names.

- A barcode reader can be connected to the serial port.
  Recommended barcode reader: V520-RH21-6

NS5



● A barcode reader can be connected to the serial port.
Recommended barcode reader: V520-RH21-6

Built-in Expansion Interface

The NS-series PTs have a built-in Expansion Interface for future expandability.

USB Ports

A printer can be connected to the USB HOST port. Be sure to use USB cables made by OMRON (NS-US52/NS-US22).

NS-series PTs have backlights with the longest life expectancy in the industry.

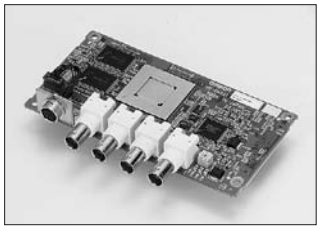
At room temperature, the average life expectancy is 50,000 hours min. for the NS12, NS10, NS5 and 40,000 hours min. for the NS8.

Optional Products

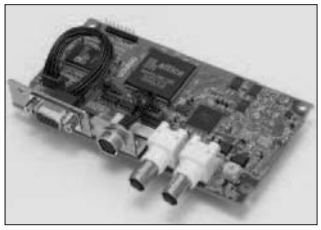
Ladder Monitor program



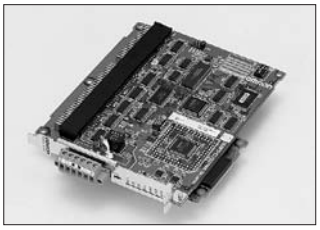
Video Input Unit (with Cover)



RGB/Video Input Unit (with Cover)



Controller Link Interface Unit (with Cover)



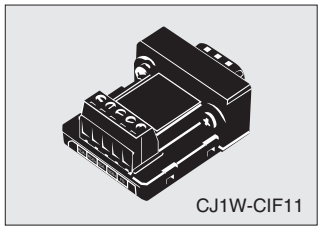
Memory Card



Memory Card Adapter



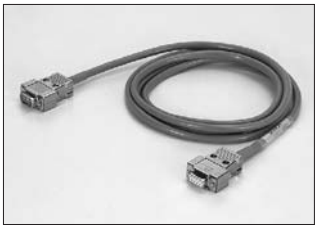
RS-422A Adapter



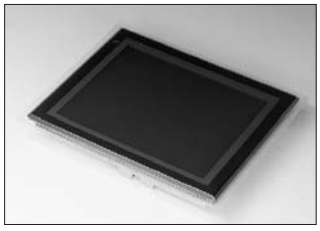
RS-232/RS-422A Conversion Unit



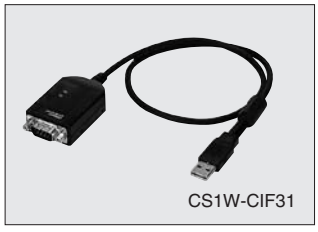
Communications Cable



Protective Cover/Anti-reflection Sheet for NS-series PT



USB Serial Conversion Cable

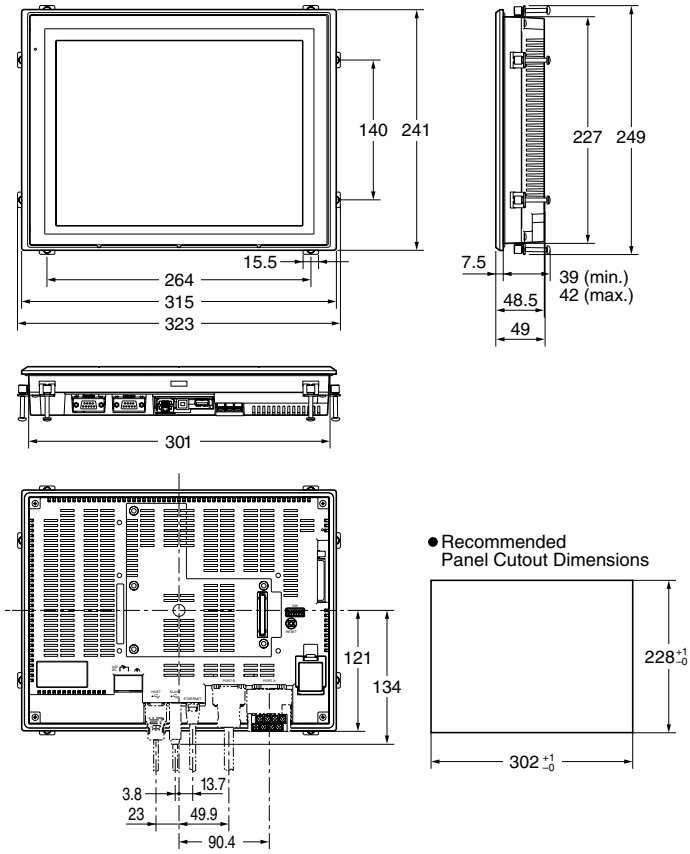


Note: Colors shown in photographs and product names may differ from actual colors and names.

Dimensions

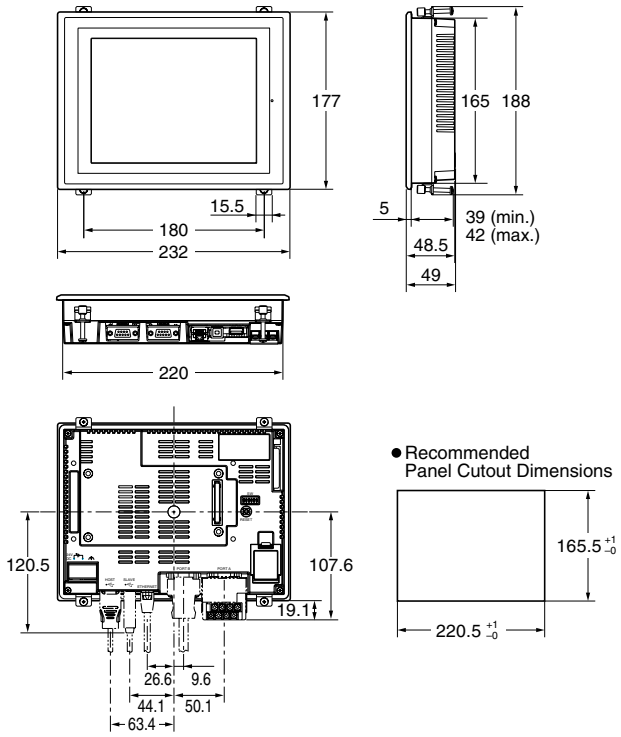
NS12/10

Units: mm



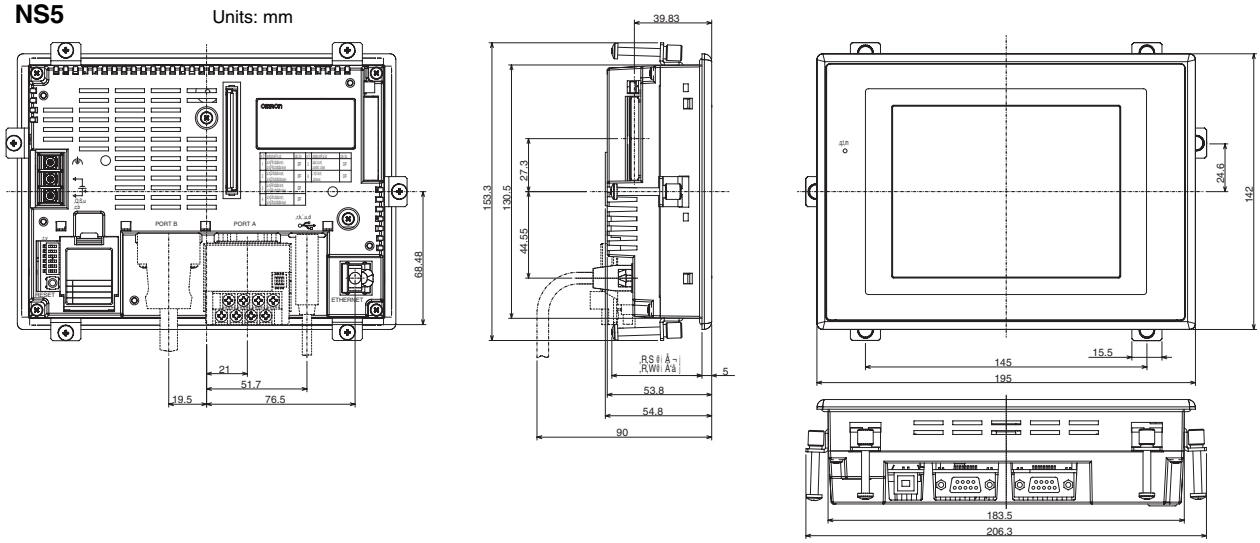
NS8

Units: mm

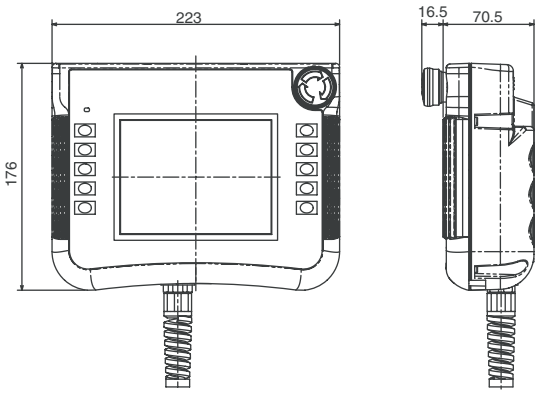


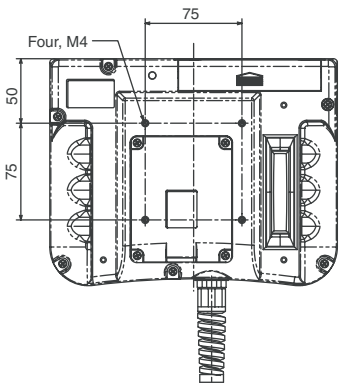
NS5

Units: mm

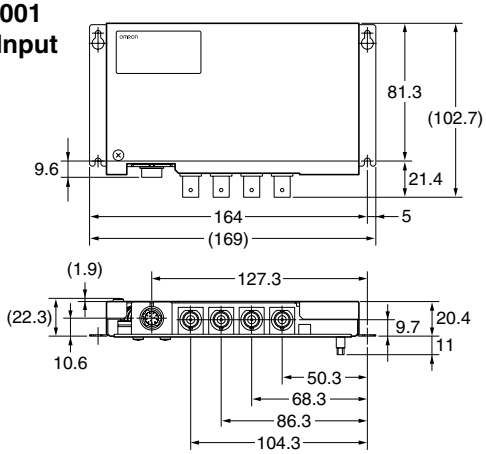


NS5 (STN color Handheld)

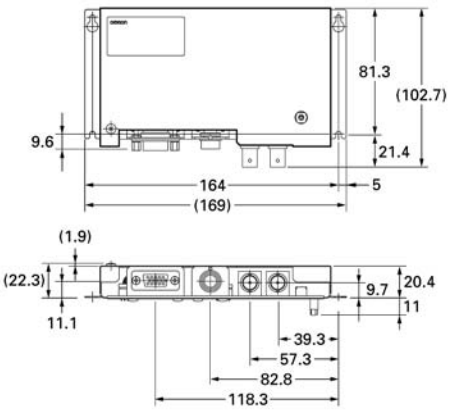




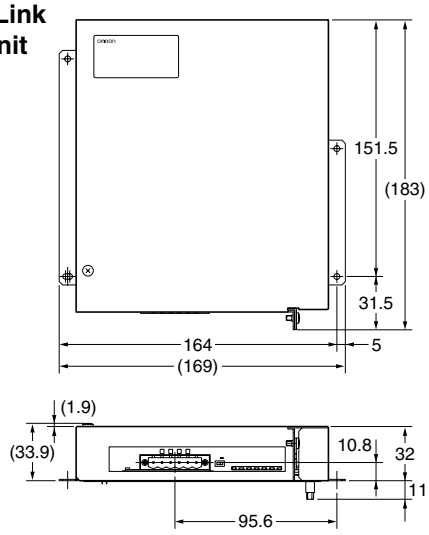
NS-CA001 Video Input Unit
Units: mm



NS-CA002 Video Input Unit
Units: mm



NS-CLK21 Controller Link Interface Unit
Units: mm



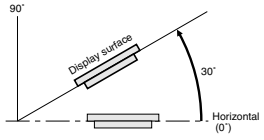
Performance/Specifications

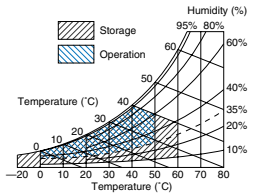
General specifications

Item	Specifications
Rated power supply voltage	24 V DC
Allowable voltage range	20.4 to 27.6 V DC (24 V DC ±15 %)
Power consumption	25 W max.
Ambient operating temperature	0 to 50°C, 55°C for NS5 (See notes 1 and 2.)
Storage temperature	-20 to 60°C (See note 2.)
Ambient operating humidity	35% to 85% (0 to 40 °C) with no condensation 35% to 60% (40 to 50 °C) with no condensation
Operating environment	No corrosive gases.
Noise immunity	Conforms to IEC61000-4-4, 2 kV (power lines)
Vibration resistance (during operation)	Conforms to IEC 60068-2-6, JIS C0040. 10 to 57 Hz, 0.075 mm amplitude, 57 to 150 Hz, 9.8 m/s² 30 min each in X, Y, and Z directions
Shock resistance (during operation)	Conforms to IEC 60068-2-27, JIS C0041. 147 m/s² 3 times each in direction of X, Y, and Z.
Weight	NS12: 2.5 kg max.; NS10: 2.3 kg max.; NS8: 1.8 kg max.; NS5: 1.0 kg max.
Enclosure rating	Front operating panel: IP65F and NEMA4 compliant (See note 3.)
Battery life	5 years (at 25 °C). Replace battery within 5 days after the battery runs low (indicator lights orange).
Applicable standards	cULus and EC directives

Note: 1. The operating temperature is subject to the following restrictions according to the mounting angle.
Mounting angle of 0 to 30× to the horizontal:
Operating temperature range of 0 to 45°C
When a Video Input Unit or a Controller Link Interface Unit is mounted, the ambient operating temperature is 0 to 35°C.
Mounting angle of 30° to 90° to the horizontal: See note 4.

2. Operate the PT within the temperature and humidity ranges shown in the following diagram.





3. May not be applicable in locations with long-term exposure to oil.

4. • Without any Expansion Unit Installed
- NS12-V1/NS10-V1/NS8-V1
Mounting angle of 0° to less than 30° to the horizontal:
Operating temperature range of 0 to 45°C
Mounting angle of 30° to 90° or less to the horizontal:
Operating temperature range of 0 to 50°C
- NS5 -V2
Mounting angle of 0° to 90° or less to the horizontal:
Operating temperature range of 0 to 55°C

• With an Expansion Unit (Video Input Unit or Controller Link Unit) Installed
- NS12-V1/NS10-V1
Mounting angle of 0° to less than 30° to the horizontal:
Operating temperature range of 0 to 35°C
Mounting angle of 30° to 90° or less to the horizontal:
Operating temperature range of 0 to 50°C
- NS8-V1
Mounting angle of 0° to less than 30° to the horizontal:
Operating temperature range of 0 to 35°C
Mounting angle of 30° to less than 90° to the horizontal:
Operating temperature range of 0 to 45°C
Mounting angle of 90° to the horizontal:
Operating temperature range of 0 to 50°C

Characteristics

Display specifications

Item		NS12-V2	NS10-V2	NS8-V2	NS5T*-V2	NS5S*-V2	NS5-M*-V2
Display panel	Display device	High-definition TFT color LCD				STN	
	Number of dots	800 dot horizontal x 600 dot vertical	640 dot horizontal x 480 dot vertical		320 dot horizontal x 240 dot vertical		
	Display color	256 colors					Sixteen shades of gray
	Effective display area	Width 246.0 mm x height 184.5 mm (12.1 inches)	Width 215.2 mm x height 162.4 mm (10.4 inches)	Width 162.2 mm x height 121.7 mm (8 inches)	Width 117.2 mm x height 88.4 mm (5.7 inches)		
	Field of view	Left/right ±60°, Top 45°, bottom 55°	Left/right ±60°, Top 35°, bottom 65°	Left/right ±60°, Top 50°, bottom 60°	Left/right ±70°, Top 70°, bottom 50°	Left/right ±60°, Top 30°, bottom 60°	
Backlight (See note 4.)	Service life	50,000 hours min. (See note 1.)		40,000 hours min. (See note 1.)	75,000 hours min. (see note1.)		50,000 hours min. (See note 1.)
	Brightness adjustment	There are 3 levels that can be set with the touch panel. (See note 2.)					
	Backlight error detection	Error is detected automatically, and the RUN indicator flashes green as notification. (See note 3.)		---			

Note: 1. This is the estimated time before brightness is reduced by half at room temperature and humidity. It is not a guaranteed value. The service life will be drastically shortened if PT is used at low temperatures. For example, using the PT at temperatures of 0°C will reduce the service life to approximately 10,000 hours (reference value).

2. The brightness cannot be adjusted much.

3. This function does not indicate that the service life has been reached. It detects when the backlight is not lit due to a disconnection or other errors. Backlight error detection indicates that all backlights (2) are OFF.

4. Contact your nearest OMRON representative to replace the backlight.

Operating specifications

Item		NS12-V2	NS10-V2	NS8-V2	NS5-T*-V2	NS5-S*-V2	NS5-M*-V2
Touch panel (Matrix type)	Method	Resistive membrane					
	Number of switches	1,900 (50 horizontal x 38 vertical) 16 x 16 dots for each switch	1,200 (40 horizontal x 30 vertical) 16 x 16 dots for each switch	768 (32 horizontal x 24 vertical) 20 x 20 dots for each switch	300 (20 horizontal × 15 vertical) 16 × 16 dots for each switch		
	Input	Pressure sensitive					
	Service life	1,000,000 touch operations					
Standard screen data capacity		60 MB			20 MB		

External Interface specifications

Item	Specification
Memory card interface	One ATA-Compact Flash interface slot. Used to transfer and store screen data and to store history data.
Expansion interface	For Expansion Interface Units Used to install various Interface Units that are currently in development.

Communication specifications

Serial Communication

Item	Specification
Port A	Conforms to EIA RS-232C. D-Sub female 9-pin connector 5-V output (250 mA max.) through pin 6 (See note.)
Port B	Conforms to EIA RS-232C. D-Sub female 9-pin connector 5-V output (250 mA max.) through pin 6 (See note.)

Note: The 5-V outputs of serial ports A and B cannot be used at the same time.

Controller Link (Wired-type) specifications

Item	Specification
Baud rate	2M/1M/500K
Transmission path	Shielded twisted-pair cable (special cable)

Ethernet specifications (NS12-TS01(B) and NS10/8-TV01(B) only

Item	Specification
Conformance standards	Conforms to IEEE 802.3/Ethernet (10Base-T/100Base-T).

Video input specifications

Item	NS-CA001	NS-CA002
Resolution	320 x 240, 640 x 480, or 800 x 600 dots	Composite, user definable RGB, only full screen
Input signal	composite video NTSC or PAL	2 x composite video NTSC or PAL, 1 x RGB
Number of Camera's	4 max.	3 max.

USB specification

Item	Specification
USB rating	USB1.1
Connector	Type A (Host), Type B (Slave)

Display element specifications

Item			Specification		
Display text	Raster font		Displayable characters	Base size	
	Font name	Rough	Alphanumeric characters or Japanese katakana	8 x 8	1 x 1, 1 x 2, 2 x 1, 2 x 2, 3 x 3, 4 x 4, 8 x 8
		Standard	Alphanumeric characters or Japanese, Chinese (Simplified, Traditional) or Korean	8 x 16 16 x 16	1 x 1, 1 x 2, 2 x 1, 2 x 2, 3 x 3, 4 x 4, 8 x 8
		Fine	Alphanumeric characters or Japanese katakana Japanese kanji	16 x 32 32 x 32	1 x 1, 1 x 2, 2 x 1, 2 x 2, 3 x 3, 4 x 4, 8 x 8
	Vector font (text objects only)		Can be specified in CX-Designer. Font, style, and size can be specified		
Text attributes	Color		256 colors (NS5 Monochrome 16 shades of gray)		
	Font style (only when vector font is specified)		Bold or italic		
	Vertical alignment		Top, center, or bottom		
	Horizontal alignment		Left-justified, centered, or right-justified		
Flicker	Objects that can flicker	Functional objects	Up to 10 types can be registered. The flicker speed and flicker range can be set.		
		Fixed objects	Select from 3 types. The flicker speed and flicker range are fixed.		
Numeral units and scale settings			1,000 max.		
Alarm/event settings			5000 max. (with system version 6)		
Display colors			256 colors max. (NS12/10/8 shows BMP in 32,768 colors, NS5 in 4,096 colors, NS5 Monochrome in 16 shades of gray)		

CPU Units (1:1 NT Link Connection)

Model number	Specifications	PLC Model name
CQM1-CPU41-V1/CPU42-V1/CPU43-V1/CPU44-V1	With RS-232C connector (9-pin type)	C-series CQM1
CQM1H-CPU21/CPU51/CPU61		C-series CQM1H
CPM1-10/20CDR-□+CPM1-CIF01	Connect to peripheral port.	C-series CPM1
CPM1A-10/20/30/40CD□-□+CPM1-CIF01		C-series CPM1A
CPM2A-30/40/60CD□□-□+CPM1-CIF01	Connect to RS-232C or peripheral port.	C-series CPM2A
CPM2C-10/20□□□□□□-□(See note 1)	With RS-232C connector (9-pin type)	C-series CPM2C
C200HS-CPU21/CPU23/CPU31/CPU33		C-series C200HS
C200HE-CPU32(-Z) (See note 2) /CPU42(-Z)		C-series C200HE (-Z)
C200HG-CPU33(-Z) (See note 2) /CPU43(-Z) /CPU53(-Z) (See note 2) /CPU63(-Z)		C-series C200HG (-Z)
C200HX-CPU34(-Z) (See note 2) /CPU44(-Z) /CPU54(-Z) (See note 2) /CPU64(-Z) /CPU65-Z/CPU85-Z		C-series C200HX (-Z)
CV500/1000/2000-CPU01-V1 CVM1-CPU01-V2/CPU11-V2/CPU21-V2	With RS-232C connector (switching/9-pin type)	CVM1/CV-series CVM1 or CV500/ CV1000/CV2000

Note: 1. Use an Adapter Cable (CPM2C-CN111 or CS1W-CN114/118), CPM1-CIF01 RS-232C Adapter, or CPM1-CIF11 RS-422A Adapter to connect.
2. A C200HW-COM02(-V1), C200HW-COM04(-V1), C200HW-COM05(-V1), or C200HW-COM06(-V1) Communications Board is required.

CPU Units (1:N NT Link Connection)

Model number	Specifications	PLC Model name
CS1G-CPU42H/CPU43H/CPU44H/CPU45H	With RS-232C connector (9-pin type)	CS-series CS1G
CS1H-CPU63H/CPU64H/CPU65H/CPU66H/CPU67H		CS-series CS1H
CJ1G-CPU42H/CPU43H/CPU44H/CPU45H (See note 1)		CJ-series CJ1G
CJ1H-CPU65H/CPU66H (See note 1)		CJ-series CJ1H
CJ1M-CPU11/CPU12/CPU13/CPU21/CPU22/CPU23 (See note 1)		CJ-series CJ1M
CQM1H-CPU61/51 with a CQM1H-SCB41 Serial Communications Board		C-series CQM1H
C200HE-CPU32(-Z) (See note 2) /CPU42(-Z)		C-series C200HE(-Z)
C200HG-CPU33(-Z) (See note 2) /CPU43(-Z) /CPU53(-Z) (See note 2) /CPU63(-Z)		C-series C200HG(-Z)
C200HX-CPU34(-Z) (See note 2) /CPU44(-Z) /CPU54(-Z) (See note 2) /CPU64(-Z) /CPU65-Z/CPU85-Z		C-series C200HX(-Z)

Note: 1. The CJ1W-SCU41 Serial Communications Unit can also be connected.
2. A C200HW-COM02/COM04/COM05/COM06(-V1) Communications Board is required

Standard Models

Name	Specifications			Model
NS12	TFT, 12", 800 x 600 pixels	Without ethernet	Frame color: Beige	NS12-TS00-V2
			Frame color: Black	NS12-TS00B-V2
		With ethernet	Frame color: Beige	NS12-TS01-V2
			Frame color: Black	NS12-TS01B-V2
NS10	TFT, 10", 640 x 480 pixels	Without ethernet	Frame color: Beige	NS10-TV00-V2
			Frame color: Black	NS10-TV00B-V2
		With ethernet	Frame color: Beige	NS10-TV01-V2
			Frame color: Black	NS10-TV01B-V2
NS8	TFT, 8.4", 640 x 480 pixels	Without ethernet	Frame color: Beige	NS8-TV00-V2
			Frame color: Black	NS8-TV00B-V2
		With ethernet	Frame color: Beige	NS8-TV01-V2
			Frame color: Black	NS8-TV01B-V2
NS5-T	TFT, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-TQ00-V2
			Frame color: Black	NS5-TQ00B-V2
		With ethernet	Frame color: Beige	NS5-TQ01-V2
			Frame color: Black	NS5-TQ01B-V2
NS5-S	STN color, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-SQ00-V2
			Frame color: Black	NS5-SQ00B-V2
		With ethernet	Frame color: Beige	NS5-SQ01-V2
			Frame color: Black	NS5-SQ01B-V2
NS5-M	STN monochrome, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-MQ00-V2
			Frame color: Black	NS5-MQ00B-V2
		With ethernet	Frame color: Beige	NS5-MQ01-V2
			Frame color: Black	NS5-MQ01B-V2
NSH5	STN color, 5.7", 320 x 240 pixels	Without Ethernet	Frame color: Black	NSH5-SQR00B-V2

Software

Name	Specifications	Model
NS-series screen design software for windows	For NS-series Windows 95, 98, Me, 2000, XP, NT 4.0 or XP	CX-Designer, included in CX-ONE

Note: For further information please contact your OMRON representative.

NS series accessories

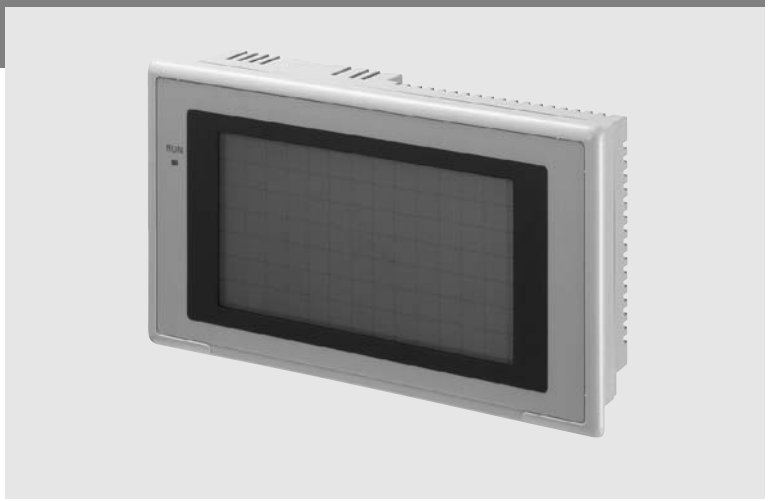
	Specifications		Model
Cable [1]	Screen transfer cable for DOS/V		XW2Z-S002
	USB Host Cable, cable length: 5 m		NS-US52 (5 m)
	USB Host Cable, cable length: 2 m		NS-US22 (2 m)
PT-to-PLC Connecting Cable	PT connection: 9 pins PLC connection:9 pins	Length: 2 m	XW2Z-200T
		Length: 5 m	XW2Z-500T
Accessories	Video input	Inputs: 4 channels NTSC / PAL	NS-CA001
		Inputs: 2 channels NTSC b/ PAL, 1 channel RGB	NS-CA002
	Special cable for the console		F150-VKP (2 m)
			F150-VKP (5 m)
	Controller link interface unit		NS-CLK21
	RS-422A adapter (50 m)		CJ1W-CIF11
	RS-422A adapter (500 m)		NS-AL002
	Anti-reflection sheets (5 surface sheets)	NS12/10	NS12-KBA04
		NS8	NS7-KBA04
		NS5	NT30-KBA04
	Protective anti-reflection covers (5 pack)	NS12/10	NS12-KBA05
		NS8	NS7-KBA05
		NS5	NT31C-KBA05
	Transparent protective covers (5 pack)	NS12/10	NS12-KBA05N
		NS8	NS7-KBA05N
		NS5	NT31C-KBA05N
	Chemical-resistant cover (1 cover)	NS5	NT30-KBA01
	Memory card	15 MB	HMC-EF172
		30 MB	HMC-EF372
		64 MB	HMC-EF672
	Attachment adapter	(NT625C/631/631C series to NS12 series)	NS12-ATT01
		(NT625C/631/631C series to NS12 series)	NS12-ATT01B
		(NT620S/620C/600S series to NS8 series)	NS8-ATT01
		(NT600M/600G/610G/612G series to NS8 series)	NS8-ATT02
	Memory card adapter for pc		HMC-AP001
	Battery		CJ1W-BAT01
	Barcode reader (refer to the catalog for details)		V520-RH21-6

1. Be sure to use cables made by OMRON when connecting NS hardware to a printer. No guarantee of proper operation if other cables are used.

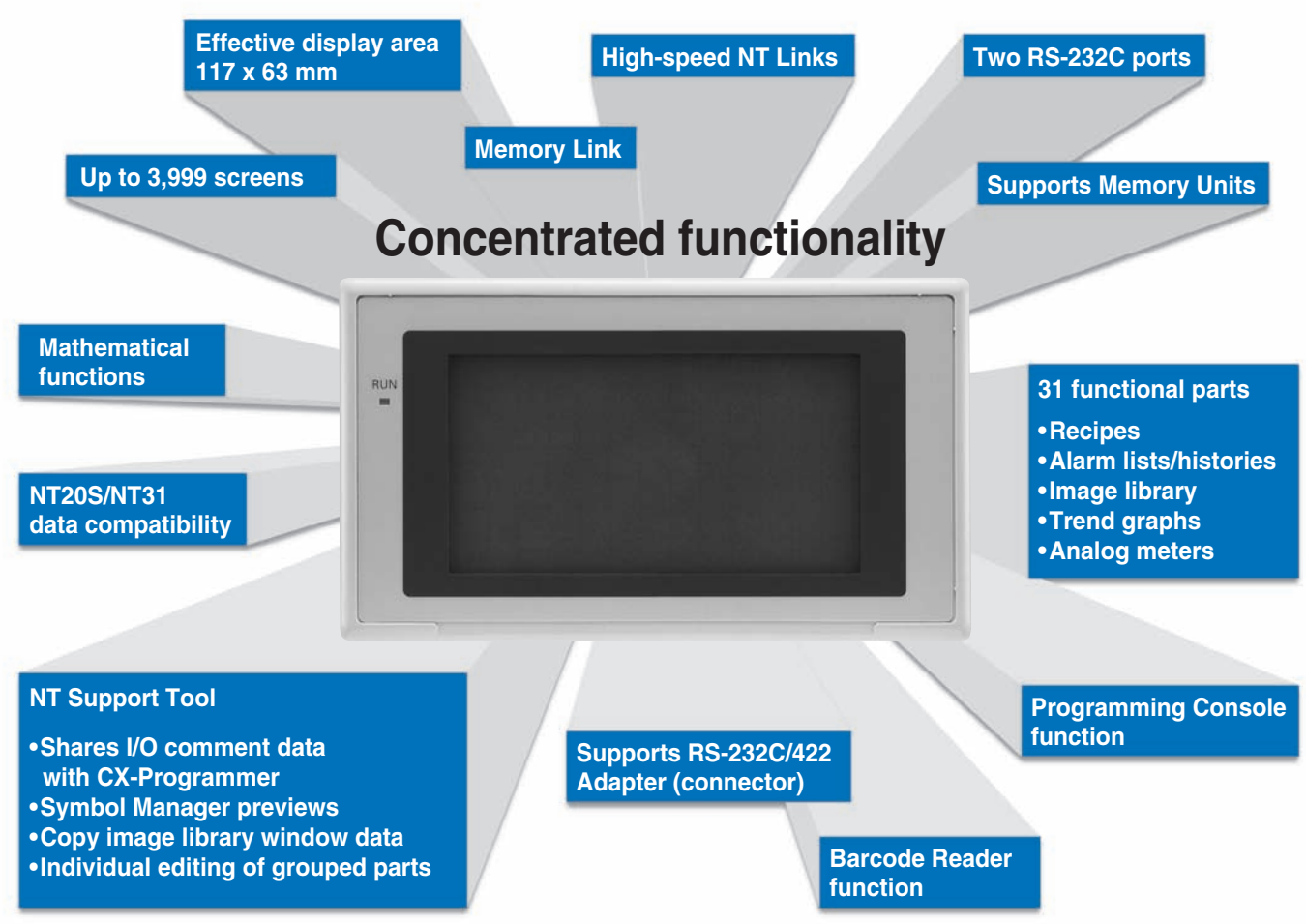
NT21

NT series Touch Screen

Cost effective touch screen terminals to replace function key units and increase the flexibility and operation.



Features



Connectable PLCs for Direct Access

Communications method	C200H	C200HS	C200HX/HG/HE(-Z)	C1000H/C2000H	CS1/CJ1	CV/CVM1 V1	CQM1H	CPM1(A)	SRM1	Computer/SBC
Host link (RS-232C)	CU	CU/CPU (Note 1)	CU/CPU (Note 4)	CU	CU/CPU	CU/CPU	CPU (Note 2)	CPU (Note 5)	CPU	---
1:1 NT Link	---	CPU (Note 1)	CPU (Note 4)	---	---	CPU	CPU (Note 3)	CPU (Note 5)	CPU	---
Memory Link (NTH protocol)	---	---	---	---	---	---	---	---	---	CPU

CPU: Connected to built-in CPU Unit port, CU: Connected to Communications Unit.

Note: 1. The built-in port can be used on the following CPU Unit: C200HS-CPU2□/3□.
2. The built-in port can be used on the following CPU Unit: CQM1H-CPU21/4□.
3. The built-in port can be used on the following CPU Unit: CQM1H-CPU4□.
4. Connection is also possible to a Communications Board. Refer to the communications methods for individual models for details.
5. A CPM1-CIF01 RS-232C Adapter must be purchased separately

Specifications

General Specifications

Item	Specification
Power supply voltage	24 V DC ±15%
Power consumption	7 W max
Noise resistance	Conforms to IEC61000-4-4, Power supply line 2 kV
Vibration resistance	10 to 57 Hz with 0.075 mm single amplitude, 57 to 150 Hz with 9.8 m/s^2 acceleration, for a total of 60 min. in X, Y, and Z directions.
Shock resistance	Peak acceleration 15 G 3 times each in X, Y, and Z directions
Ambient operating temperature	0 to 50°C (with no icing)
Storage temperature	–20 to 70°C (with no icing)
Ambient operating humidity	35% to 85% (with no condensation)(0 to 40°C) 35% to 55% (with no condensation)(40 to 50°C)
Dimensions	190 x 110 x 53.5 mm (W x H x D) (thickness inside panel: 49.0 mm)
Enclosure ratings	Front panel operating section: Equivalent to IP65F, NEMA 4.*
Weight	0.6 kg max.

* Usage may not be possible in places where the unit would be exposed to oil for long periods.

Display Capacity

Item			Specification	
Display elements	Fixed displays		A total of 65,535 per screen (Graphics: Continuous straight lines, rectangles, circles, polygons, arcs, sectors)	With overlapping screens, the total is 524,280 per screen
		Fixed character strings		
		Graphics		
		Marks		
	Numeral displays		256 positions per screen, max. 10-digit disply (2 words)	
	Character string displays		256 positions per screen max. 1,024 display elements for overlapping screens	
	Graph displays		50 positions per screen, capable of displaying signs and percentages	
	Analog meters		50 positions per screen, capable of displaying signs and percentages	
	Trend graphs		One frame per screen, 50 items per frame (8 items max. for data logging)	
	Broken line graphs		One frame per screen, 256 items per frame, 260 points per item	
	Lamps		256 positions per screen	
	Image library images		256 positions per screen	
	Touch switches		256 positions per screen, max. 256 meshes	
	Numeral settings		256 positions per screen (numerical keypad)	Total of 256 positions for both numerical and thumbwheel settings
	Thumbwheel settings		26 positions per screen	
	Character string settings		256 positions per screen	
	Temporary inputs		One position per screen	
	Alarm lists/histories		Four groups per screen	
Screen types	Recipes		One position per screen	
	Normal screens		Display screens registered as normal	
	Overlapping screens		A maximum of eight screens can be displayed overlapping each other	
	Windows		Up to three window screens can be displayed	
	Display history screens		Order of occurence (1,024 screens max.), order of frequency (255 times max.)	
	System startup screen		Displayed when powering ON (or resetting) the PT, and when switching to RUN mode	
	Programming console screen		Emulates PLC programming Console functions, capable of being called from RUN mode.	
Screen attributes			Buzzer, display history, normal background colors, backlight mode, local windows	
Number of screens	Max. number of registered screens		3,999	
	Screen number		0: No display 1 to 3999: User registered screens (normal, overlapping, windows) 9000: System startup screen 9001: Display history screens, order of occurence 9002: Display history screens, order of frequency 9020: Programming console screen 9021 to 9023, 9030: Reserved 9999: Return to previous screen designation	
Screen registration method			By transferring screen data from the NT Support Tool to the PT via serial communications	
			By mounting the Memory Unit and downloading (automatic/manual transfer) data to the PT	
Saving screen data			Flash memory (PT internal image memory)	

Display Specifications

Item			Specification
Display Panel	Display device		Monochrome STN LCD
	Number of dots (resolution)		260 dots horizontally x 140 dots vertically
	Effective display area		117 mm horizontally x 63 mm vertically
	Viewing angle		Left/right direction: 30°, up/down: 30°
	Display color		Black & white (with blue mode)
	Service life		50,000 hours min. (until contrast reduced to 50%)
	Automatic turn-OFF		Can be set to turn OFF in 1 to 255 min or to remain ON with screen saver
Backlight (white cold cathode tube)		Service life	50,000 hours min. (at room temperature, until brightness is reduced to 50%)
		Replace-ment	Non-replaceable

Panel Specifications

Item		Specification
Touch panel	Number of switches	91 (13 horizontally x 7 vertically)
	Input	Pressure-sensitive
	Threshold force for operation	1 N max.
	Life expectancy	1 million operations min.

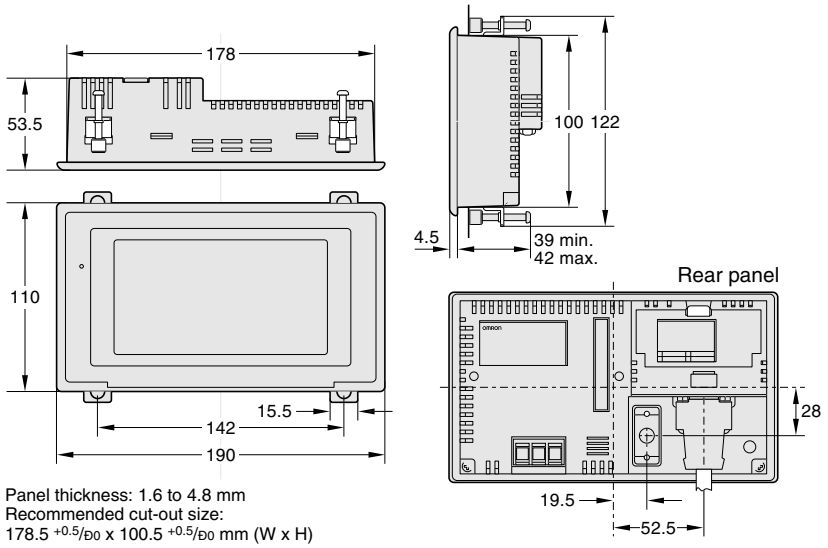
External Interface Specifications

Communication method			Serial port A	Serial port B
NT support Tool			Supported	Not Supported
PLC	Host Link		Supported	Supported
	1:1 NT Link		Supported	Supported
	1:N NT Links		Supported	Supported
	NT Link, PT Programming Console function		Supported	Supported
SBC/personal computer		Memory Links	Supported	Supported
Barcode Reader			Supported	Not Supported

NT21 Standard Models

Product	Specification			Model number
NT21 Pro-grammable Terminal	Monochrome STN	Frame color: beige		NT21-ST121E
		Frame color: black		NT21-ST121B-E
Support Tool	Windows 95, 98, ME, NT, 2000 and XP (Pro)		CD-ROM	NT-ZJCAT1-EV4
Cables	For screen transfer			XW2Z-S002
	For PLC connection	PT: 9-pin PLC: 9-pin	Cable length: 2 m	XW2Z-200T
			Cable length: 5 m	XW2Z-500T
		PT: 9-pin PLC: Mini-peripheral	Cable length: 2 m	NT-CN221
Options	Reflection Protective Sheets	Display area only (5 sheets)		NT20M-KBA04
	Chemical-resistive Cover	Silicon cover		NT20S-KBA01
	Battery	For alarm lists/ histories		C500-BAT08
	Memory Unit	For screen and system data transfer		NT-MF161
	RS-232C/422A Adapter			NS-AL002
	Connector Kit			XM2S-0911-S003

Dimensions



Panel thickness: 1.6 to 4.8 mm
Recommended cut-out size:
178.5 $^{+0.5}/_{0}$ x 100.5 $^{+0.5}/_{0}$ mm (W x H)

NT11

NT series Function Key screens

The NT11, the Slim, Low Cost Operation Terminal that Stands Up Well to Harsh Environments.

- Long-lived Backight
- Simplified Ladder Programming
- Password Screens
- Conforms to NEMA4 and IP65



Main features

Withstands Water and Oil

- Use in many demanding ares even with oil and water

The front panel of the terminal withstands water to NEMA4 and IP65 standards, which means that it can be used even in locations where it may be splashed with water or oil.

Large Keys

- For easy operation by all users

The numeric keys and function keys have been made a generous size for your convenience. They can be operated even when wearing working gloves.

Entry of Numerical Values

The numeric key pad integrated with the display allows the entry of numerical values such as temperatures and production quantities.

Printout of Production Status

Data such as the production status and production results can be printed out, leaving a record on paper which can be used as a daily report.

(The NT11S has a printer port. One screen only is printed.)

“Direct Connection” Communication

- Simplifies Ladder Programming

The NT11S supports two communication methods: the "NT link" (high/low speed), which substantially reduces the size of the program at the host side, and the "Host Link" direct connection method.

The “NT link” method features a particularly high response speed.

Integral Numeric Key Pad

The display, numeric keys, and function keys are all integrated into the front panel, which is convenient for designers. The key layout is ergonomically designed for ease of use.

Password Screens for Security

- To limit access to authorized persons only

Password screens cannot be accessed unless the correct password is entered. This means that the operations that can be performed can be restricted according to the operator.

Key Titles can be Marked on the Function Key Sheet

Key titles can be marked on the function key sheet in accordance with the applications of the keys: the sheet can be taken out from the side face of the terminal. The front panel of the terminal has a water–withstanding construction.

Bar Graphs can be Displayed

Bar graph displays allow the progress of processes to be checked at a glance. (The bars are oriented horizontally.)

Display History Record Helps in Analysis of Machine Faults

When the display history record function is set as a screen attribute, the time, the screen number, and a comment are recorded in the terminal’s memory every time the relevant screen is displayed. This display history can be printed by issuing a print instruction from the host, and is useful for machine fault analysis.

Screen Operations are Easy

Using the support software, screens to be displayed by the terminal can be created as easily as if using a word proces-sing program. This software can be run on an IBM PC/AT or compatible. It contains the system program transfer tool that downloads the system program to the flash ROM.

Main functions

- Fixed displays, numeral display, character display
- Character inversion, flashing, double–width. Character copy, move, delete.
- 8 x 16 dot mark registration (max. 64 marks can be registered)
- Horizontal bar graphs
- Numeral setting
- Password

Easy to Order

Since the communication interface, image memory, and flash ROM that downloads the system program are incorporated in the NT11 body, placing orders is a simple matter.

The front panel is available in beige or black

Long–life Backlight

Since LEDs are used for the backlight, it is very long–lived and rarely needs to be changed.

Specifications

General Specifications

Power supply voltage	24 V DC ±15%
Allowable power supply voltage range	20.4 to 27.8 V DC (24 V DC –15 %, +10 %)
Power consumption	15 W max.
Noise resistance	Common mode (between power supply and panel): 1000 Vp–p Normal mode: 300 Vp–p Pulse width: 100 ns to 1 ms Pulse rise time: 1 ns
Vibration resistance	10 to 57 Hz with 0.75 mm double amplitude and 57 to 150 Hz with 1G acceleration for a total of 30min. in X, Y, and Z directions.
Shock resistance	Peak acceleration 15 G 3 times each in X, Y, and Z directions
Ambient operating temperature	0 to + 50 °C
Ambient operating humidity	35 to 85 % RH (with no condensation)
Operating environment	No corrosive gases.
Storage temperature	–20 to +70 °C (with no freezing)
Enclosure ratings	Front panel: Equivalent to IP65, NEMA4
Weight	1.0 kg max.

Display/Panel Specifications

Note: In order to improve the performance of displays, liquid crystal devices may be changed without notice.

Display screen	Dot matrix of STN liquid crystal display panel - Number of dots: 160x64 - Effective display area: 100 x 40 mm - Life expectancy: 50,000 hours minimum - View angle (left/right direction): ±20°	Backlight - LED - Life expectancy: 50,000 hours minimum - Automatic turn–off: can be set to turn off in 10 minutes or 1 hour, or to remain on.
Indicators	- POWER indicator (Green LED): Lit while power is being supplied. - RUN indicator (Green LED): Lit during operation	
Switch	- 22 switches - Life expectancy: 1 million operations minimum	

Display Capacity

Note: Note: In order to improve the performance of displays, liquid crystal devices may be changed without notice.

Display characters		Normal characters (8 16 dots): Alphanumerics and symbols Marks (8 16 dots): User–defined, 64 max.
Number of characters		displayed Normal–size: 20 horizontally 4 lines vertically max.
Enlargement function		Double width
Display elements	Character string displays	8 positions per screen
	Numeral displays	8 positions per screen
	Graph displays	4 positions per screen
	Numeral settings	8 positions per screen
Screen attributes	Display history	Order of frequency, 256 screens
	Password screen	Ensures security: screens for which this attribute is set can only be displayed if the correct password is input.
	Menu screen	Four items per screen
Screen types		Normal screen: Displays screen registered as normal.
Max. number of registered screens		250
Screen registration method		Transfer screen data created using an IBM PC/AT personal computer to the PT.
Screen saving method		Saved to flash memory: 32KB (downloading method)

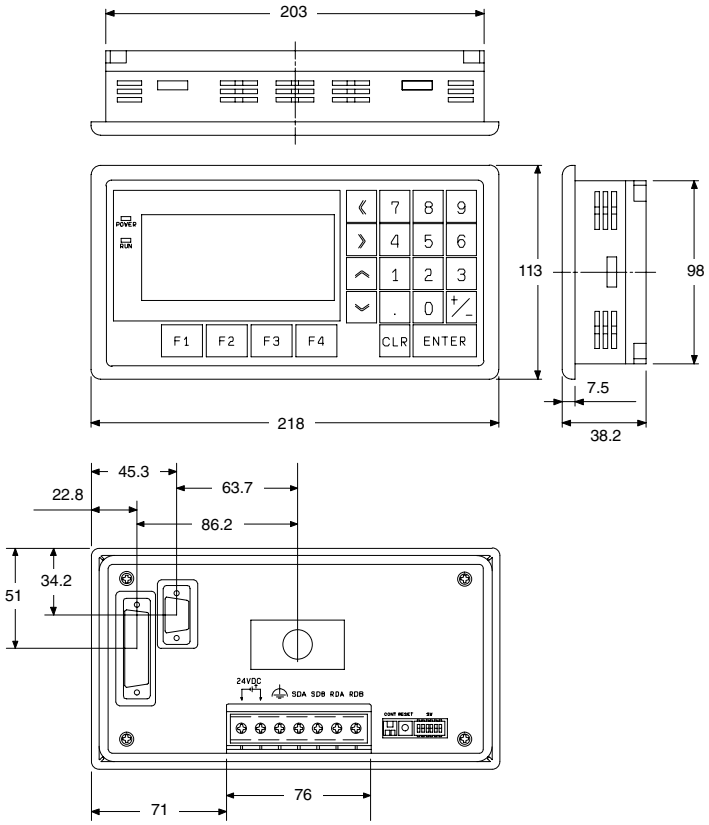
Special Features

Printing function	Printing of display history data Printing of daily reports (printing format registered by the users)
Maintenance functions	Self–test for memory, switches, etc. Status setting confirmation for communications and other conditions. Simple communications confirmation

Ordering Information

Product		Specification	Model
Programmable Terminal	Host link direct connection, NT link method	Ten–key type (frame color: beige)	NT11–SF121-EV1
		Ten–key type (frame color: black)	NT11–SF121B-EV1
Support Software		3.5” FD (for IBM PC/AT)	NT–ZJCAT1-EV4

Dimensions

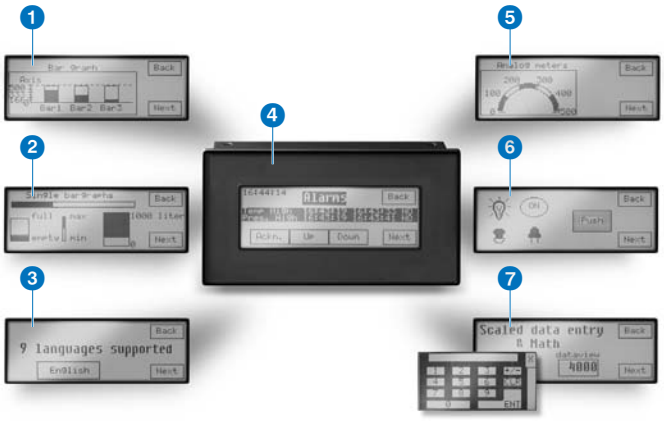

203
POWER
RUN
7
8
9
4
5
6
1
2
3
0
+/-
F1
F2
F3
F4
CLR
ENTER
113
98
7.5
38.2
218
45.3
22.8
63.7
86.2
51
34.2
24VDC
SDA SDB RDA RDB
71
76

NT3S

NT-XS series Touch Screen



- 4.1“ monochrome STN LCD with LED backlight (long lifetime)
- Maximum of two universal (RS232/485/422) serial ports to connect multiple devices with different protocols at the same time
- Drivers for most PLCs, Inverters and Servo Controllers
- Multiple data entry objects per screen with individual limit setting and math operations
- Support for floating point data
- Wizards for rapid application development of standard bitmapped objects
- Real-time and historical alarms (historical alarms in RTC models only)
- Trend graph for defined tags (RTC models only)
- Saves recipes data in non-volatile memory
- Windows® based programming software NT-XS for free!
- IP65 design, CE / cULus Class 1Div. 2 certification



1 2 On the NT3S you can show different kind of bar graphs. Single bar graphs can be filled in different directions and multiple bar graphs with legend can easily be created with a simple wizard.

3 Up to nine languages can be used in the NT3S. This means you can for instance make the text buttons variable. This way you can design one project with different languages so you can use it in different countries.

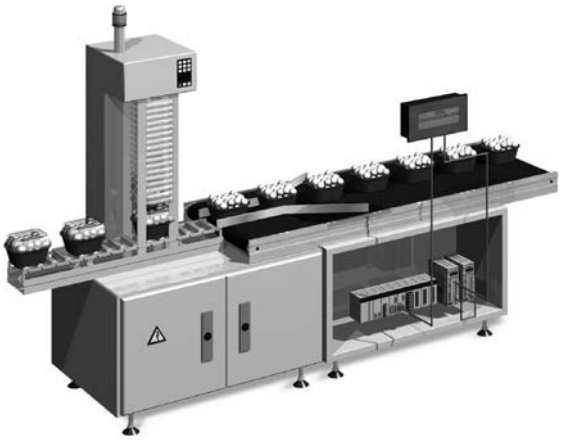
4 You can monitor up to 256 alarms in 16 different groups with the NT3S. Alarms can be shown with text, time, date and status. Acknowledgement can be prohibited by password.

5 Analogue meters can also monitor values of connected devices. You can set the range, angle, and “colours” to your wish.

6 You can create your own buttons and lamps by making use of bitmaps or by choosing one from the library. You can set the “colour”, filling and label.

7 Showing and entering data is easy with the NT3S. Data can be shown in the desired format (HEX, BCD etc.). Entering data is performed with a pop-up keypad.

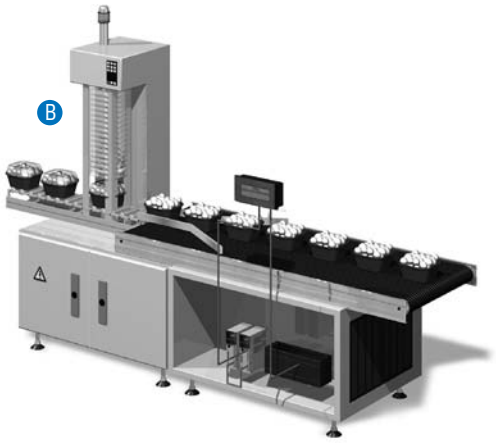
A



A

A typical application for the NT3S is a machine where an Omron PLC and Intelligent Servo Drives are used. The NT3S can be used to communicate with both the PLC and the Servo Drives. This means setting parameters, reading and writing variables like speed, torque, distance and actual position. It is also possible to move data from the PLC to the Servo Drive (e.g. to change acceleration times). The NT3S gives you the advantage of being able to communicate with the drives without using a bus-system, so a smaller and less expensive PLC can be used.

B



B

You can also use the NT3S to connect Omron Inverters to another PLC brand. In this solution the NT3S can communicate with the third party PLC* and at the same time the NT3S can change data in the Omron Inverters. Inverter settings can be changed directly from the screen but also from the PLC program. The NT3S acts as a gateway between the different protocols. This way you can save a lot of time developing the communication between the PLC and the Omron Drives.

C

Connecting multiple NT3S terminals to one Omron PLC is a good solution for long machine lines where local setting or monitoring is needed. You can connect a maximum of 8 screens to one PLC. By using the multiple NT3S terminals next to one more advanced HMI like the Omron NS series, you can have a high functional solution with local operation possibility against few extra costs.

* Please contact your local Omron representative for a list of available drivers

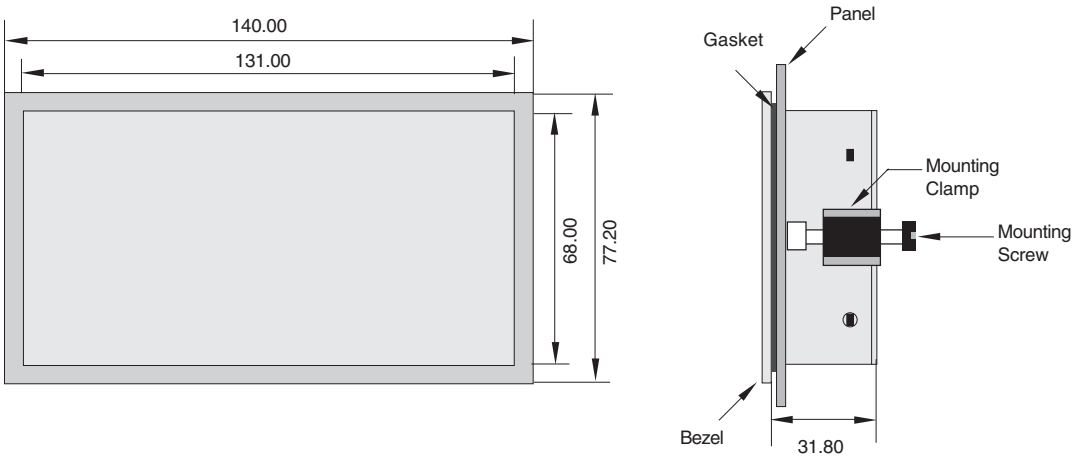
C



Specifications

Model	NT3S-ST126B-E	NT3S-ST124B-E	NT3S-ST123B-E	NT3S-ST121B-E
Type of display	LCD 4.1 inch, STN, Monochrome display			
Dimensions (W x H x D, mm)	140 X 77 X 35			
Effective display area	98 X 35 mm (4.1 inch)			
Display colour	Green LCD, Monochrome			
Communication	2x RS232	1x RS2321x RS485/422/232		2x RS485/422/232
RTC	-		Supported	
Power supply	24V DC +/-15%			
Touch panel	Analog Resistive			
Obtained standards	CE, cULus			
Display graphics	Rectangle, Rounded Rectangle, Circle, Oval, Line, Bitmaps			
No. of display characters (standard characters)	32 characters x 8 lines			
No. of registered screens	65000 max. (limited by memory capacity)			
Screen data capacity (standard)	120 Kb			
Internal memory	1 kWords data memory, 1 kWords retentive, 64 words system memory			
Printer connection	Supported			
Backlight life	LED, min 50.000 hours			
Multi-vendor support	Supports most third party PLCs			

Dimensions (mm)



Software

Name	Specifications	Model
NT2S and NT3S support software for windows	For all models of these NT-XS series	NT-XS (free downloadable from our website)

Note: For further information please contact your OMRON representative.

NTXS accesories

Cables for	Specification	Model
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 2 m	NT2S-CN212-V1
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 5 m	NT2S-CN215-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 2 m	NT2S-CN222-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 5 m	NT2S-CN225-V2
NT2S-SF121/125 and NT3S	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN223-V2
NT2S-SF122/SF123/SF126/SF127	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN224-V1
NT2S-SF121/125 and NT3S	Serial Port PLC and NT2S/NT3S,2M	NT2S-CN232-V1
NT2S-SF121/125 and NT3S	Serial Port PLC and NT2S/NT3S,5M	NT2S-CN235-V1
NT2S-SF122/SF126	Serial Port PLC and NT2S/NT3S,2M	NT2S-CN242-V1

NT2S

NT-XS series Function Key Screens



The NT2S series Terminals are designed as a human machine interface for simple control tasks. Their small dimensions and low installation depths ensure that they will fit into any machine.
Of the six NT2S types, four can be connected directly to the peripheral port and two can be connected to OMRON PLCs via an RS-232C port.

- Easy programming
- Small size and installation depth
- IP65 protection
- Real-time clock
- Printer connection
- Excellent value for money

Performance Data (Max. Values)

	NT2S-SF121B-EV2	NT2S-SF125B-E	NT2S-SF122B-EV2	NT2S-SF126B-E	NT2S-SF123B-EV2	NT2S-SF127B-E
Programmable	Yes	Yes	Yes	Yes	No (PLC controlled)	No (PLC controlled)
Terminal size (W,H,D)	109x60x36 mm	107x107x36	109x60x36 mm	107x107x36	109x60x36 mm	107x107x36
Display size	56x11 mm	56x11 mm	56x11 mm	56x11 mm	56x11 mm	56x11 mm
Number of screen pixels	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character	5x7 pixel/character
Number of lines/characters	2/16	2/16	2/16	2/16	2/16	2/16
Number of function/control keys	6	20	6	20	6	20
Memory	24 kB for applications	24 kB for applications	24 kB for applications	24 kB for applications	PLC memory is used	PLC memory is used
Max. screen pages	250	250	250	250	Depending on PLC memory	Depending on PLC memory
Number input	Yes	Yes	Yes	Yes	Yes	Yes
Bar graph	Yes	Yes	Yes	Yes	Yes	Yes
Trend/line diagram	-	-	-	-	-	-
Alarm handling	-	-	-	-	-	-
Real-time clock/date	Yes	Yes	-	-	-	-
Printer interface	Yes	Yes	Yes	Yes	-	-

Communication

Host Link	Yes (RS-232C)	Yes (RS-232C)	Yes (peripheral port)	Yes (peripheral port)	Yes (peripheral port)	Yes (peripheral port)
1:1 NT Link	-	-	-	-	-	-
1:n NT Link	-	-	-	-	-	-
ASCII protocol	-	-	-	-	-	-

System Configuration

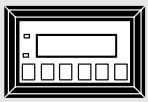
Host Link

Data is exchanged quickly between the Control Terminal and an OMRON PLC using the Host Link protocol.

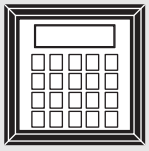
The RS-232C communication method can be used.

The following OMRON PLC systems feature the Host Link protocol:

- CPM1 family
- CPM2 family
- CQM1 family
- CJ1
- CS1



NT2S-SF121B



NT2S-SF125B

Miniature Peripheral port



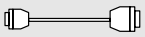
NT2S-CN223-V2
for CS1,CJ1, CQM1H

RS232C port

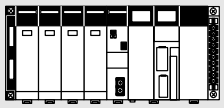


RS-232C cable
for CPM1A, CPM2C
(CIF adapter required)

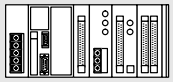
Peripheral port



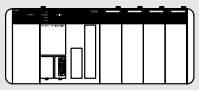
CN212-V1/215-V1
for CPM1A, CPM2A



CS1



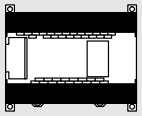
CJ1



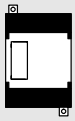
CQM1H



CPM2C

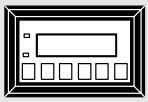


CPM2A

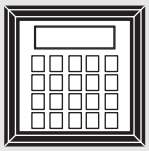


CPM1A

Power supply: 24 VDC, external



NT2S-SF122B
NT2S-SF123B

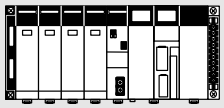


NT2S-SF126B
NT2S-SF127B

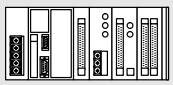
Miniature peripheral port



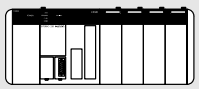
NT2S-CN224-V1



CS1



CJ1



CQM1H

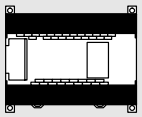


CPM2C

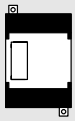
Peripheral port



NT2S-CN222-V1
NT2S-CN225-V2



CPM2A



CPM1A

Power supply: from the PLC, via port connection

Product Overview

Model code	NT2S-SF121B-EV2	NT2S-SF125B-E	NT2S-SF122B-EV2	NT2S-SF126B-E	NT2S-SF123B-EV2	NT2S-SF127B-E
	- Programmable using software - Real-time clock - Printer port - PLC connection via RS-232C port - Supply voltage 24 V		- Programmable using software - Printer port - PLC connection via peripheral port - Supply voltage connection via peripheral port		- Functions are controlled using the PLC - PLC connection via peripheral port - Supply voltage connection via peripheral port	
Display size (WxHxD)	108x60x43 mm	108x108x43 mm	108x60x43 mm	108x108x43 mm	108x60x43 mm	108x108x43 mm
Number of screen pixels	5x7 pixel/character					
Number of lines/characters	2/16	2/16	2/16	2/16	2/16	2/16
Number of function/control keys	6	20	6	20	6	20
Memory	24 kB Flash memory for applications				PLC memory is used	
Supply voltage	24 V DC	24 V DC	---			
Degree of protection	IP65F (front side)					

Specifications

Model code	NT2S-SF121B-EV2	NT2S-SF125B-E	NT2S-SF122B-EV2	NT2S-SF126B-E	NT2S-SF123B-EV2	NT2S-SF127B-E
Function keys						
Key type	Membrane keyboard					
Key function	As well as fixed or system functions, functions can be assigned dynamically using software (Softkeys), while global, i.e. screen-independent, keys can also be defined					
Display elements						
Characters	5x7 pixel/character					
Image colours	Monochrome					
Character display attributes	Normal, flashing (entire screen)					
Display specification						
Display	- LED backlit LCD Module, 2x16 characters, 5x7 pixel/character - Character size 4.35 mm - Extended ASCII character set (semi-graphic)					
Function displays	2 status LEDs[1], programmable via PLC					
Display capacity						
String display	Entire display area can be used					
Numeric display	Entire display area can be used					
Bar graph display	Entire display area can be used					
Character string input	-					
Alarm list	-					
Time display	Either by output from Controller real-time clock or output from Terminal's integrated real-time clock		From Controller			
Screen page						
Number of stored screen pages	Max. 250				-	
Screen page numbers	1..250				-	
Storing of screen pages	Transfer of data from a PC to the Terminal				All programming in the PLC	
General						
Battery backup	Data backup in EEPROM				-	
Supply voltage	24 V DC ± 10%		via PLC			
Power consumption	approx. 1.5 W		-			
Immunity	Between power supply and panel: 1700 Vss Normal: 480 Vss Pilse width 100 ns..1 µs Pulse rise time 1 ns					
Vibration resistance (in operation)	10..61.2 Hz with 0.1 mm amplitude 61.2..150 Hz with an acceleration of 1.5 g in X, Y and Z directions 4 times for 8 minutes each					
Shock resistance (in operation)	147 m/s², 3x in X, Y and Z directions					
Ambient temperature	0 °C..50 °C					
Ambient humidity	35%..85%					
Operating environment	No corrosive gases					
Storage temperature	-20 °C..60 °C					
Degree of protection	Front side: IP65F, Rear side: IP20					
Approvals	CE, cULus Class 1 Div. 2					
Weight	150 g	230 g	135 g	205 g	130 g	200 g
Host Link Direct communication						
Communication method	RS-232C or Peripheral port		Peripheral port			
Communication protocol	C series SYSWAY (1:1)					
Communication settings	Start/stop synchronisation Communication speed: 9600 bps Data length: 7 bits Stop bit: 2 bits Parity: even					
Connection	1 x 9-pin D-Sub female for PLC 1 x 9-pin D-Sub female for PC/Printer, SW download/printer		1 x 9-pin D-Sub male for PLC 1 x 9-pin D-Sub female for PC/Printer		1x9-pin D-sub male for PLC	
Number of devices	1					
Printer						
Communication method	ASCII protocol printer				No	
Connection	Serial RS-232C port				No	

1. The NT2S-SF125/126/127B-E do not have status LEDs

Programming and Accessories

Software

Name	Specifications	Model
NT2S and NT3S support software for windows	For all models of these NT-XS series	NT-XS (free downloadable from our website)

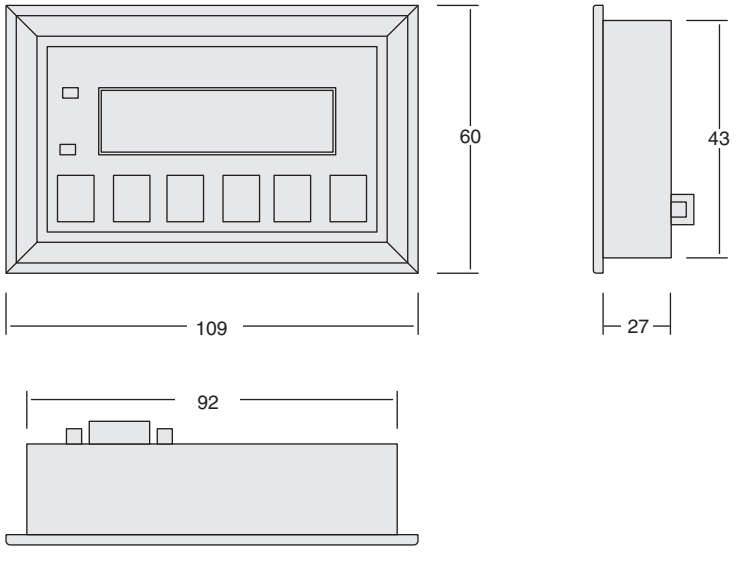
Note: For further information please contact your OMRON representative.

NTXS accesories

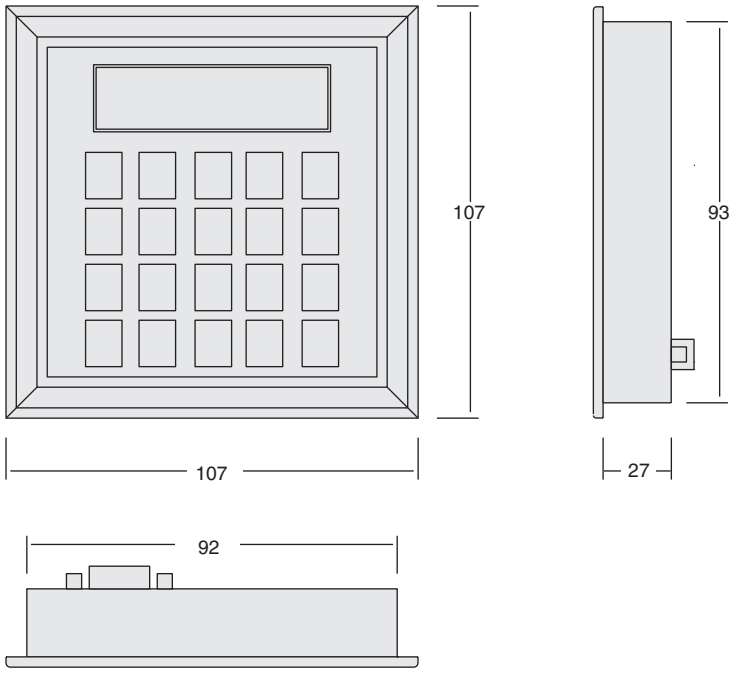
Cables for	Specification	Model
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 2 m	NT2S-CN212-V1
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 5 m	NT2S-CN215-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 2 m	NT2S-CN222-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 5 m	NT2S-CN225-V2
NT2S-SF121/125 and NT3S	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN223-V2
NT2S-SF122/SF123/SF126/SF127	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN224-V1
NT2S-SF121/125 and NT3S	Serial Port PLC and NT2S/NT3S,2M	NT2S-CN232-V1
NT2S-SF121/125 and NT3S	Serial Port PLC and NT2S/NT3S,5M	NT2S-CN235-V1
NT2S-SF122/SF126	Serial Port PLC and NT2S/NT3S,2M	NT2S-CN242-V1

Dimensions (mm)

NT2S-SF121B-EV2
NT2S-SF122B-EV2
NT2S-SF123B-EV2



NT2S-SF125B-E
NT2S-SF126B-E
NT2S-SF127B-E



NT-AL001

RS-232C/RS-422A Adapter

The NT-AL001 converts signals between RS-232C and RS-422A.
Use the NT-AL001 to connect 1:N NT Link communications, to connect to multivendor communications, or anytime signal conversion is required.



Specifications

General Specifications

Item	Specification
Model number	NT-AL001
Ambient operating temperature	0 to 55°C
Ambient operating humidity	10% to 90% (with no condensation)
Rated power supply voltage	+5 V ±10% (supplied from pin 6 of RS-232C connector)
Rated power supply current	150 mA max.
Surge current	0.8 mA max.
Insulation resistance	20 MΩ min. (at 500 V DC) between RS-422A signal lines and functional ground terminal
Dielectric strength	1,500 V AC between RS-422A signal lines and functional ground terminal for 1 min, leakage current: 10 mA max.
Operating environment	No corrosive gases
Ambient storage temperature	–20 to 75°C
Vibration resistance	Conforms to JISC 0911, 80 min each in X, Y, and Z directions
Shock resistance	Conforms to JISC 0912, 15G for 3 times each in X, Y, and Z directions
Weight	200 g

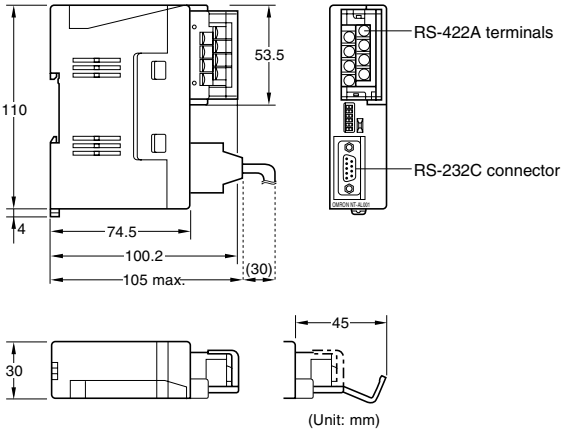
RS-232C Interface

Item	Specification
Baud rate	64 kbps max.
Transmission distance	2 m max.
Connector	D-Sub, 9-pin connector (female)

RS-422A Interface

Item	Specification
Baud rate	64 kbps max. (depends on RS-232C baud rate)
Transmission distance	500 m max.
Terminals	8-terminal removable terminal block, M3.0 terminals

Dimensions



30 x 114 x 100.2 mm (W x H x D) with RS-422A terminal cover removed.
30 x 114 x 119.5 mm (W x H x D) with RS-422A terminal cover in place.

Ordering Information

HMI

NS series

Name	Specifications			Model
NS12	TFT, 12", 800 x 600 pixels	Without ethernet	Frame color: Beige	NS12-TS00-V2
			Frame color: Black	NS12-TS00B-V2
		With ethernet	Frame color: Beige	NS12-TS01-V2
			Frame color: Black	NS12-TS01B-V2
NS10	TFT, 10", 640 x 480 pixels	Without ethernet	Frame color: Beige	NS10-TV00-V2
			Frame color: Black	NS10-TV00B-V2
		With ethernet	Frame color: Beige	NS10-TV01-V2
			Frame color: Black	NS10-TV01B-V2
NS8	TFT, 8.4", 640 x 480 pixels	Without ethernet	Frame color: Beige	NS8-TV00-V2
			Frame color: Black	NS8-TV00B-V2
		With ethernet	Frame color: Beige	NS8-TV01-V2
			Frame color: Black	NS8-TV01B-V2
NS5-T	TFT, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-TQ00-V2
			Frame color: Black	NS5-TQ00B-V2
		With ethernet	Frame color: Beige	NS5-TQ01-V2
			Frame color: Black	NS5-TQ01B-V2
NS5-S	STN color, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-SQ00-V2
			Frame color: Black	NS5-SQ00B-V2
		With ethernet	Frame color: Beige	NS5-SQ01-V2
			Frame color: Black	NS5-SQ01B-V2
NS5-M	STN monochrome, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-MQ00-V2
			Frame color: Black	NS5-MQ00B-V2
		With ethernet	Frame color: Beige	NS5-MQ01-V2
			Frame color: Black	NS5-MQ01B-V2
NSH5	STN color, 5.7", 320 x 240 pixels	Without Ethernet	Frame color: Black	NSH5-SQR00B-V2

NT series

Name	Specifications			Model
NT21	STN monochrome	Frame color: Beige		NT21-ST121-E
		Frame color: Black		NT21-ST121B-E
NT11	STN monochrome	Ten-key type	Frame color: Beige	NT11–SF121-EV1
			Frame color: Black	NT11–SF121B-EV1

NT-XS series

Name	Specifications			Model
NT2S	STN monochrome	Programmable	6-key type, Frame color: Black	NT2S-SF121B-EV2
				NT2S-SF122B-EV2
		PLC controlled		NT2S-SF123B-EV2
		Programmable	20-key type, Frame color: Black	NT2S-SF125B-E
				NT2S-SF126B-E
		PLC controlled		NT2S-SF127B-E
NT3S	STN monochrome	Programmable	2 x RS-232/CMOS, No RTC, No RS485	NT3S-ST126B-E
			RS-232/CMOS on one port, RS-232/CMOS/485/422 on second port, No RTC	NT3S-ST124B-E
			RS-232/CMOS on one port, RS-232/CMOS/485/422 on second port with RTC	NT3S-ST123B-E
			RS-232/CMOS/485/422 on both ports with RTC	NT3S-ST121B-E

Support Software

NS series PTs

Name	Specifications	Model
NS-series Screen Design Software for Windows	For NS-series PTs Windows 95, 98, Me, 2000, XP, NT 4.0 or XP	NS-NSDC1 included in CX-One
Cable to transfer screens	IBM PC/AT or compatible	XW2Z-S002

NT(-XS) series PTs

Name	Specifications	Model
NT-series Support Software for Windows	For NT-series PTs Windows 95, 98, Me, 2000 or NT 4.0	NT-Shell
Memory Unit to transfer screens	For NT31, NT31C, NT631, or NT631C	NT-MF261
Printer cable for NT Series	To print hardcopies of screens	NT-CNT121
NT2S and NT3S support software for Windows	For all models of these NT-XS series	NT-XS (free downloadable from our website)

Options

NS series accessories

	Specifications		Model
Cable [1]	Screen transfer cable for DOS/V		XW2Z-S002
	USB Host Cable, cable length: 5 m		NS-US52 (5 m)
	USB Host Cable, cable length: 2 m		NS-US22 (2 m)
PT-to-PLC Connecting Cable	PT connection: 9 pins PLC connection:9 pins	Length: 2 m	XW2Z-200T
		Length: 5 m	XW2Z-500T
Accessories	Video input	Inputs: 4 channels NTSC / PAL	NS-CA001
		Inputs: 2 channels NTSC b/ PAL, 1 channel RGB	NS-CA002
	Special cable for the console		F150-VKP (2 m)
			F150-VKP (5 m)
	Controller link interface unit		NS-CLK21
	RS-422A adapter (50 m)		CJ1W-CIF11
	RS-422A adapter (500 m)		NS-AL002
	Anti-reflection sheets (5 surface sheets)	NS12/10	NS12-KBA04
		NS8	NS7-KBA04
		NS5	NT30-KBA04
	Protective anti-reflection covers (5 pack)	NS12/10	NS12-KBA05
		NS8	NS7-KBA05
		NS5	NT31C-KBA05
	Transparent protective covers (5 pack)	NS12/10	NS12-KBA05N
		NS8	NS7-KBA05N
		NS5	NT31C-KBA05N
	Chemical-resistant cover (1 cover)	NS5	NT30-KBA01
	Memory card	15 MB	HMC-EF172
		30 MB	HMC-EF372
		64 MB	HMC-EF672
	Attachment adapter	(NT625C/631/631C series to NS12 series)	NS12-ATT01
		(NT625C/631/631C series to NS12 series)	NS12-ATT01B
		(NT620S/620C/600S series to NS8 series)	NS8-ATT01
		(NT600M/600G/610G/612G series to NS8 series)	NS8-ATT02
	Memory card adapter for pc		HMC-AP001
	Battery		CJ1W-BAT01
	Barcode reader (refer to the catalog for details)		V520-RH21-6

1 Be sure to use cables made by OMRON when connecting NS hardware to a printer. No guarantee of proper operation if other cables are used.

NT series accessories

Product	Specification			Model number
Cables	For screen transfer			XW2Z-S002
	For PLC connection	PT: 9-pin PLC: 9-pin	Cable length: 2 m	XW2Z-200T
			Cable length: 5 m	XW2Z-500T
		PT: 9-pin PLC: Mini-peripheral	Cable length: 2 m	NT-CN221
Options	Reflection Protective Sheets	Display area only (5 sheets)		NT20M-KBA04
	Chemical-resistive Cover	Silicon cover		NT20S-KBA01
	Battery	For alarm lists/histories		C500-BAT08
	Memory Unit	For screen and system data transfer		NT-MF161
	RS-232C/422A Adapter			NS-AL002
	Connector Kit			XM2S-0911-S003

NTXS accesories

Cables for	Specification	Model
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 2 m	NT2S-CN212-V1
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 5 m	NT2S-CN215-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 2 m	NT2S-CN222-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 5 m	NT2S-CN225-V2
NT2S-SF121/125 and NT3S	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN223-V2
NT2S-SF122/SF123/SF126/SF127	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN224-V1
NT2S-SF121/125 and NT3S	Serial Port PLC and NT2S/NT3S,2M	NT2S-CN232-V1
NT2S-SF121/125 and NT3S	Serial Port PLC and NT2S/NT3S,5M	NT2S-CN235-V1
NT2S-SF122/SF126	Serial Port PLC and NT2S/NT3S,2M	NT2S-CN242-V1

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. V04E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

Software

CX-One			
	Introduction		628
	Configuration	CX-Integrator	630
	PLC Programming	CX-Programmer	631
		CX-Simulator	634
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	Motion	CX-Motion	638
		CX-Position	639
		CX-Motion NCF	640
		CX-Motion MCH	641
		CX-Drive	642
	Regulation	CX-Process Tool	643
		CX-Thermo	644
	HMI	CX-Designer	645
	Network & Fieldbus	CX-PROFIBUS	647
	PC Specifications		648
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PC based visualisation			
		CX-OPC	653
		CX-Lite	654
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	PC Specifications and Ordering Information		657

OMRON

Smart Platform

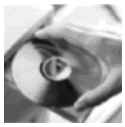
Smart Platform, Omron's new integrated automation architecture, demonstrates Omron to be one of the most innovative players in the market. Designed to simplify machine automation, the goal of Smart Platform is to allow increasingly complex machines to be developed, commissioned and maintained easily, allowing you time to 'just create'.

Driven by the need to make connectivity as simple and flexible as possible, Omron's Smart Platform creates a harmonious combination of sensing, control, motion and regulation devices. It enables users to mix and match their preferred solutions without the need to worry about hierarchy or other communication issues.

The Smart Platform concept is built around three major advantages for the user:

- One software
- One connection
- One minute

One software.



This single programming and configuration environment is an integrated software management tool called CX-One that enables the user to build, configure and program networks, PLCs, HMIs, motion control systems, drives, temperature controllers and sensors. The result of a single software is to reduce complexity of the configuration and allow automation systems to be programmed or configured with minimal training.

One connection.



From a single connection point either locally, through networks or from a modem connection the Omron 'Smart Platform' devices on your machine can programmed or parameterised. This allows remote access or servicing of your complete machine to become a reality. The same transparent communications architecture also allows Omron devices to easily communicate together passing and sharing information and enabling more effective modular machine design.

One minute.



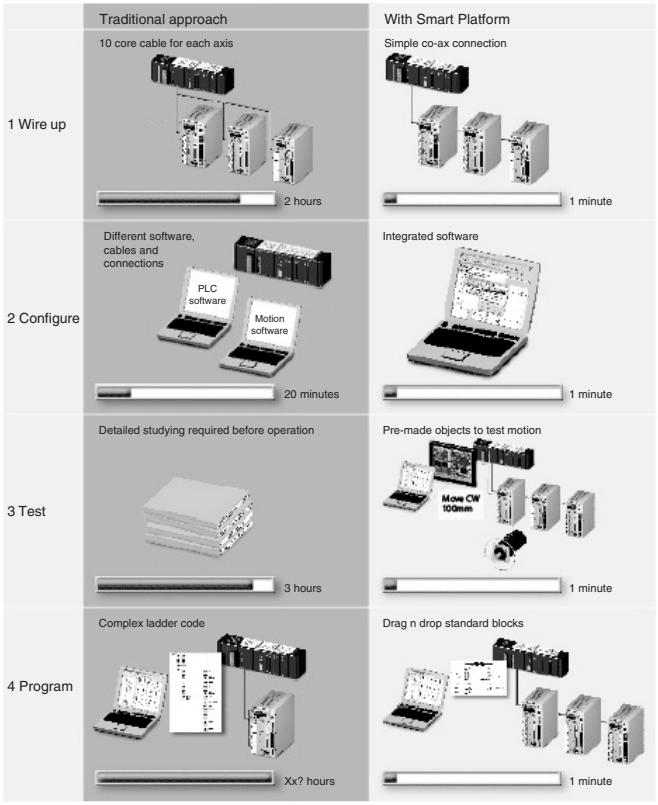
SMART Active Parts greatly increase the functionality & information that is available to operators through Omrons' HMI. Written and tested for you by Omron's control experts these "drag and drop" visualization objects are called Smart and Active because they automate the communication from the NS HMI-series to all connected Omron products. (e.g. 'read actual speed' of an inverter, view a scene from a vision sensor, represent a temperature controllers etc.).

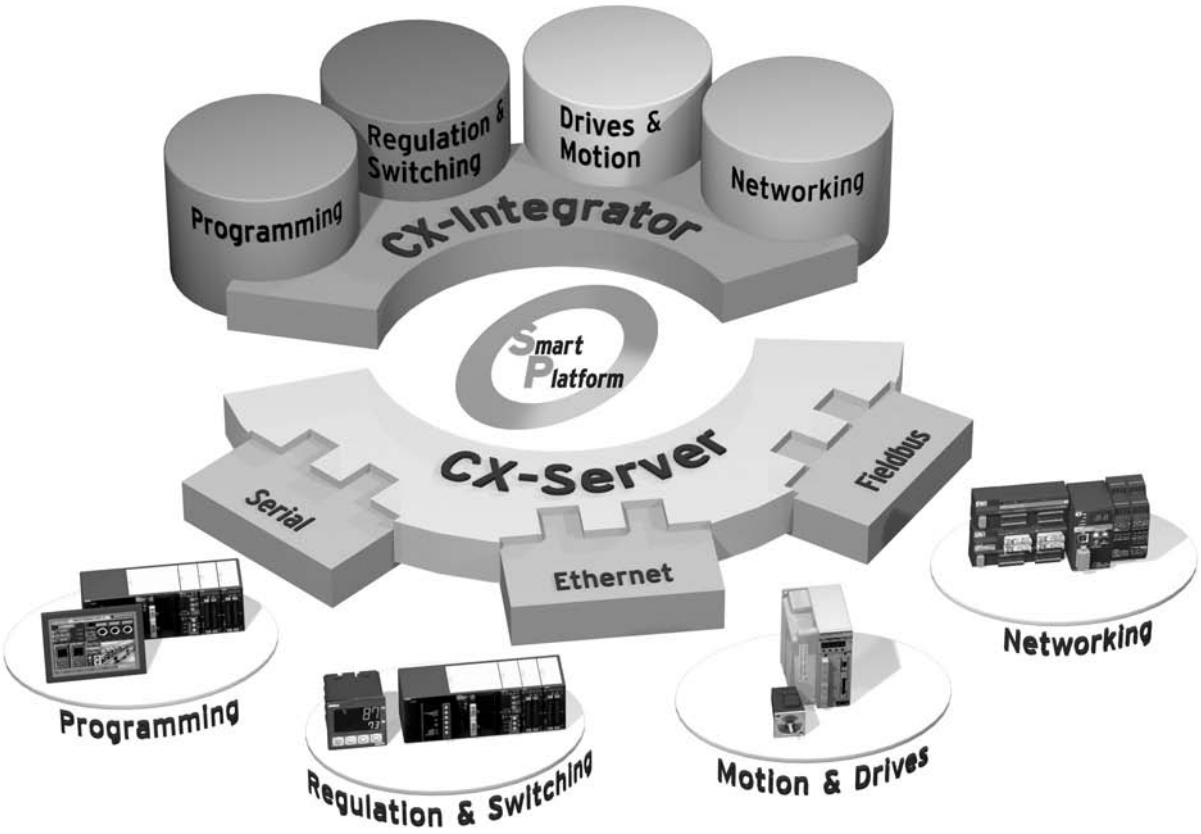
Function Blocks offer similar 'drag & drop' programming and functionality ('read actual speed' of an inverter, change a scene from a vision sensor, configure a temperature controllers) but they are used within the PLC. They can be programmed in Ladder or Structured Text, and can contain up to 16 layers of 'nested' function blocks (Function Block inside Function Block).

For further information about Smart Platform go to http://www.smartplatform.info

Just create

Motion control applications are perceived to be difficult and complex to setup, program and test, as need highly skilled people to get simple movements. However if you are to offer any flexibility in your machine then you must implement electronic motion control !





CX-One - one software

CX-One covers all your requirements for complete machine automation

Programming

- CX-Programmer (PLC programming)
- CX-Simulator (PLC simulation)
- CX-Designer (HMI programming)

Motion & Drives

- CX-Motion – for motion controllers with analogue output
- CX-Position – for PTP controllers with pulse output
- CX-Motion – NCF for PTP controllers with motion bus MUI
- CX-Motion – MCH advanced motion with motion link MUI
- CX-Drive – for inverters and servo-drives

Regulation and Switching

- CX-Process for PLC process units
- CX-Thermotools for stand-alone temperature controllers

Networks

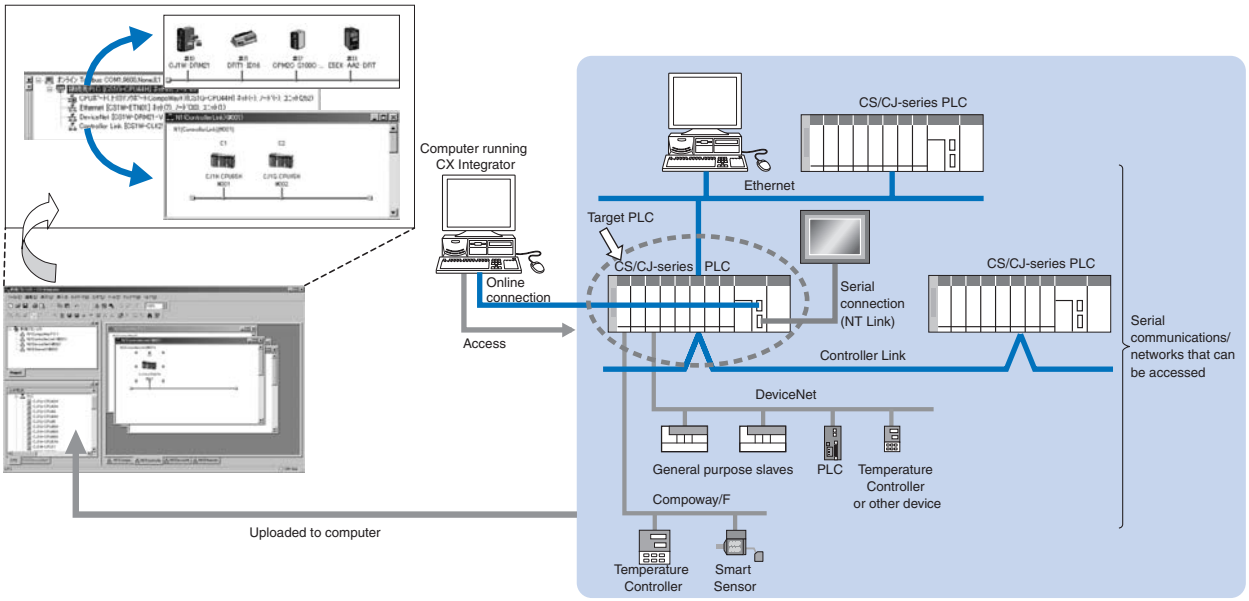
- CX-Integrator (DeviceNet + Ethernet + Controller link)
- CX-profibus: all profibus modules

Configuration

CX-Integrator

The CX-Integrator the main configuration software for CX-One. It enables easy performance of many operations, such as monitoring the connection status of various networks, setting parameters, and diagnosing networks. The CX-Integrator can be placed online manually or automatically with the Omron CS/CJ-series PLC's through which the user can upload, download or monitor network or specific device parameters for each network.

Direction connection using serial communications (for temperature control or sensing applications) is possible without going through a PLC. The serial Compoway/F network configuration can be uploaded or automatic connection is possible. Furthermore, parameters in slaves on the networks can be set, edited, uploaded, and downloaded. Whenever required, network configuration information can be saved in files. The configuration information in previously saved files can be later compared to the actually current configuration.



PLC
Omron's range of CS and CJ PLC's can be fully programmed and configured. Also if the PC is connected to a CS or CJ PLC Omron utilize advanced communication functionality to allow unparallel access to all other networks, fieldbus system, serial networks through the PLC allowing 'One Connection' to all networks or Devices on the machine.

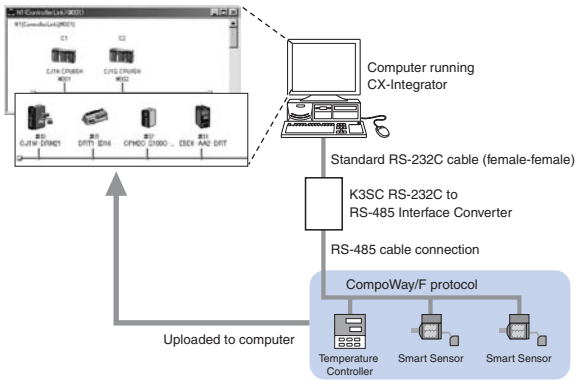
DeviceNet
DeviceNet networks and the devices on the network can be created, configured, copy&pasted, and on-line functionality includes upload/download/verify, monitoring and maintenance functions.

Files can be saved for easy reuse in other projects.

Networks
Ethernet and Omron Controller-Link peer-peer networks can be created, configured, copy&pasted, and on-line functionality includes upload/download/verify, monitoring and maintenance functions

HMI
NS-Series HMI terminals can be created, and the programmed either directly, or through PLC's or simply across Ethernet networks to ensure that a 'single connection' is all that is needed.

Sensing and regulation
Stand-alone or serially networked temperature control or sensing devices can be programmed or configured from CX-Integrator. Also parameters can be uploaded, downloaded, stored and retrieved.



PLC Programming

CX-Programmer

Reduce application development and testing time and increase machine functionality with CX-Programmer.

Programming software for SYSMAC CS, CJ, C, and CVM1/CV series PLC ladder programs

CX-Programmer provides one common PLC software platform for all types of Omron PLC controllers – from micro PLC's up to Duplex processor systems. It allows easy conversion and re-use of PLC code between different PLC types, and the full re-use of control programs created by older generation PLC programming software.
Many powerful documentation features are available to clearly document the intended use and operation of the control code can be stored inside the PLC. An advanced 'project comparison' function is included to allow in-detail comparison between the PLC project and the PC project.
Easy integration with other Omron software products allows sharing of Tag comments to reduce mistakes, reduce development time and increase ease of use.
Maintenance features allow easy searching of contacts and coils with a single click, thereby allowing fast identification of the cause of machine or line stoppages while monitoring, display, and debugging functions reduce engineering time and implementation costs.
Advanced data trace and time chart monitoring reduces maintenance and troubleshooting time. This can then be used to either fine-tune the performance of the machine, or reduce and optimize the cycle time of the machine.

Powerful, Easy-to-use Functions

Powerful, Easy-to-use Ladder Editor

The ladder create, search, and jump operations can be executed with a single keystroke for efficient programming and debugging. Also, the various comment functions make ladder programs mucheasier to read and search.

- Program with single key inputs. No mouse required.
- Use the cross reference popup function to check a bit or output's ON/OFF status in real time.
- When the program is input, the software automatically performs a circuit check and output-duplication check to prevent input mistakes.
- With one keystroke, jump to a desired location in the program fromthe search results or program check results displayed in the output window.
- Input various comments (such as rung comments, I/O comments, and circuit comments) to make the program easier to read and search.



Cross reference popup
Displays the real-time status ofthe bit or output at the cursor location. It is also possible to jump to the displayed location.



Output duplication check
A output-duplication check is performed automatically when the program is input. Relevant locations are listed and it is pos-sible to jump to those locations.

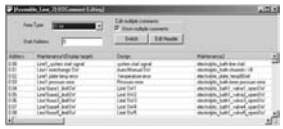
Displaying Comments at the Cursor Position

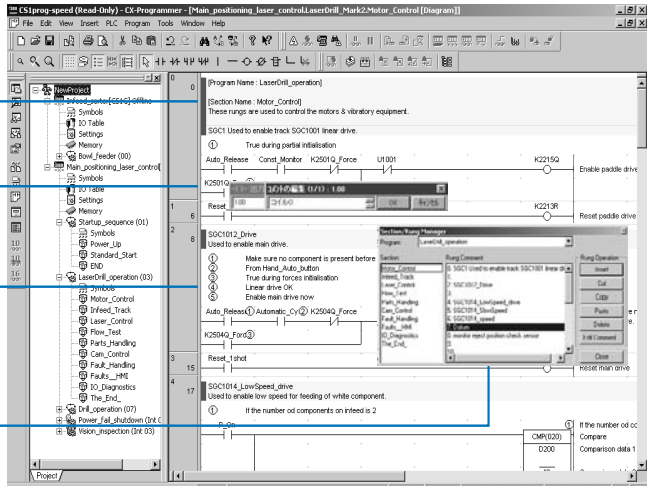
The symbol comment at the cursor position and corresponding address are displayed at the bottom of Ladder View to improve program legibility.



Switching between Multiple Comments

Multiple symbol comments (up to 16) can be registered for a single address. This function enables different comments for a single program—for designing, factory, each engineer, or each language—and makes the program easier to understand for the corresponding purpose.





Rung comment list
The rung comment jump function makes the program easier to search.

Circuit comment, circuit comment list
Circuit comments can be displayed or hidden. Comments attached as notes can be checked when necessary.

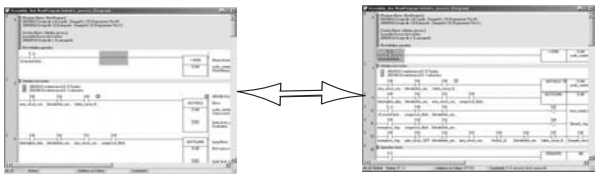
I/O comments
It is possible to display/hide the I/O comments and set attributes such as the number of dis-played lines.

Rung comment list/jump
Program contents can be checked in a list like a table of contents. It ispossible to jump to a listed location.

Software

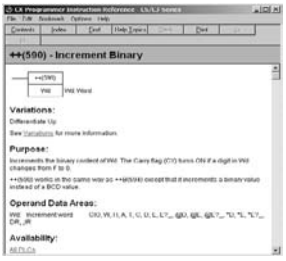
Display Special Instructions Vertically or Horizontally

The user can select whether to display special instructions vertically or horizontally, improving display and printing efficiency.



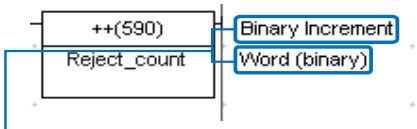
Complete Help and Guidance Functions

The help and guidance function provides helpful support when inputting or creating a program.



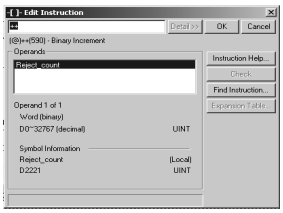
Complete instruction help

The help function can be checked immediately when inputting instructions.



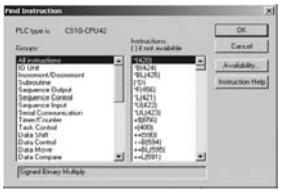
Instruction name and operand description

The instruction name and operand meaning can be displayed in the Ladder Window. (These displays can also be hidden.)



Input help function (Details dialog)

Information on the operand's allowed data areas and setting ranges can be displayed immediately.



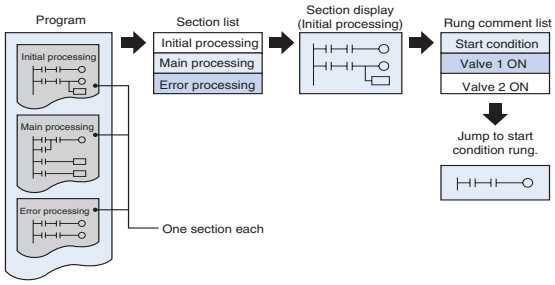
Inputting instructions by instruction group

Instructions can be selected from a list organized by instruction functions.

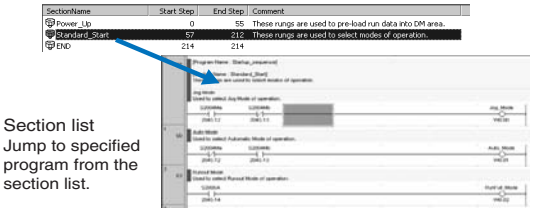
Program Structure

Detailed Debugging can be performed while displaying the overall program flow.

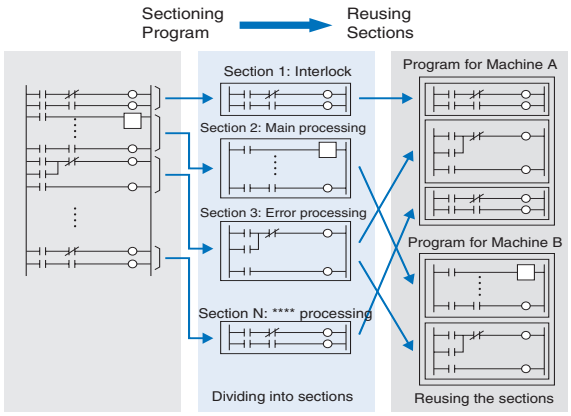
Program section displays can be further divided when creating or displaying the program. In the following example, the program is created in sections based on processing and it is possible to jump to a specified processing program (section) from the section list.



It is possible to jump to a specified section while viewing the overall program in a section list.

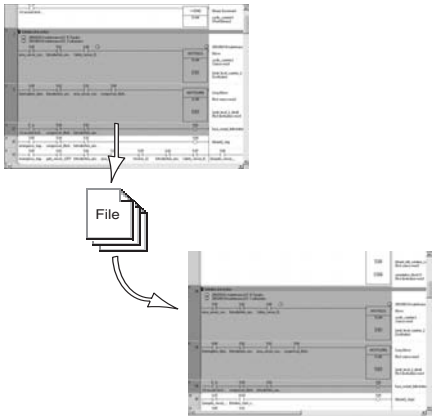


Sectioning Program and Reusing Sections



Improved Ladder Program Reusability

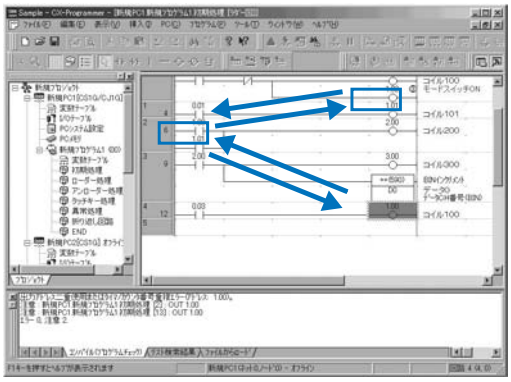
Parts of the program can be saved or additions can be loaded in section, ladder rung, or symbols table units. This allows programs to be easily split into smaller parts, and then integrated, thereby improving reusability of the program.



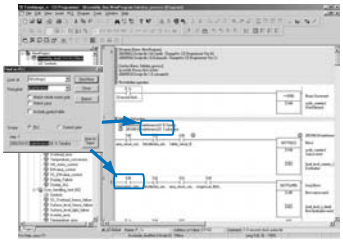
Online Debugging

A Complete Set of Debugging Functions reduces Debugging Time.

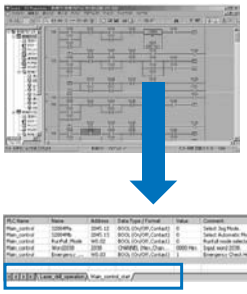
- Trace-back searches (searching for bits/outputs with the same address) and consecutive addresss earches can be performed with a single keystroke.
- Enter the search item by dragging and dropping the item in the ladder window.
- Different parts of the ladder program can be monitored simultaneously with a 2-way or 4-way split screen.
- The I/O monitor function can group locations being monitored, such as steps and processes that are beingdebugged.



Trace-back Search
Search for the output corresponding to the bit address at the cursor location or search for the bit corresponding to the output at the cursor location.



"All" has been added as a target of searching. Any strings can be entered as a keyword for searching.





2-way or 4-way Monitor
Powerful split-screen monitoring function allows simultaneous monitoring of different parts of the ladder program, an overview and detailed view of a ladder program rung, etc.

I/O Monitor Function (Watch Window)

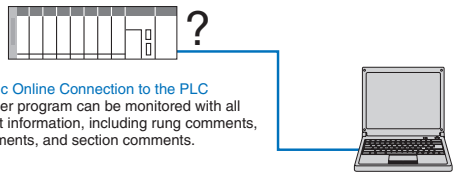
- Group different locations that need to be monitored for each process or piece of machinery being debugged.
- Various data displays are available, such as decimal, hexadecimal, signed, and floating-point.
- Registered addresses can be sorted and monitored.
- Registered addresses are automatically saved to a file. It isn't necessary to register the addresses again the next time debugging is performed.



Easily Search Usages Overview on Ladder Diagrams
The usage overview can be launched from the a popup menu or Ladder View. This enables the user to easily check the usage of addresses at the cursor position and to easily check the usage of contacts/coils.

Automatic Online Connections to PLCs make OnlineMonitoring Easy

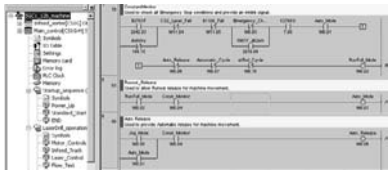
The CX-Programmer automatically detects the PLC model, uploads the PLC program and various parameters, and starts the ladder monitor function.



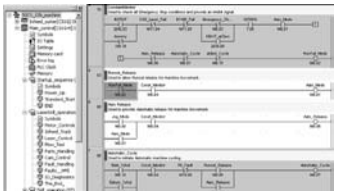
Automatic Online Connection to the PLC
The ladder program can be monitored with all comment information, including rung comments, I/O comments, and section comments.

Online Debugging Functions

- Check continuity efficiently with the ladder wrap-around monitor.
- The online editing function allows several consecutive rungs to be edited at the same time.



Ladder Wrap-around Monitor
Long ladder rungs are wrapped around to another line before connecting to the right bus bar.

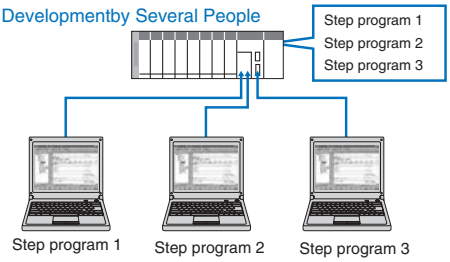


Online Editing
Consecutive ladder rungs can be edited together online. Before edited contents are written to the PLC, a program check is performed automatically and the results are displayed.

Simultaneous Online Debugging by Several People

Program development and online debugging can beperformed by two or more people at the same time, so debugging time can be reduced dramatically.

Program Developmentby Several People



PLC Programming

CX-Simulator

Online debugging of virtual PLCs in the computer

Simulated ladder program execution in a virtual CS/CJ series PLC

Allows program debugging in a single PLC before the actual system has been assembled. Reduces the total lead time required for machine/equipment development and startup.

Key Features

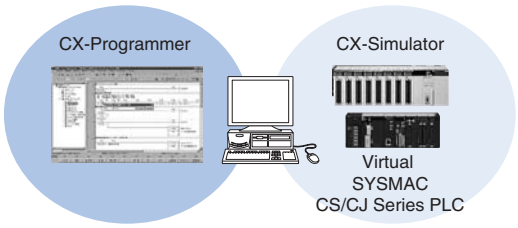
A debugging environment equivalent to the actual PLC system environment can be achieved by simulating the operation of a CS/CJ Series PLC with a virtual PLC in the computer. CX-Simulator makes it possible to evaluate program operation, check the cycle timand reduce debugging time before the actual equipment is assembled.

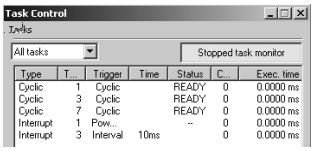
Ladder program debugging in a computer

Monitor and debug program execution without the actual PLC.

The developed program can be executed in a virtual PLC within the computer and debugged with the CX-Programmer, just like the actual PLC.

- All of the debugging functions can be used, including the ladder monitor, I/O monitor, online editing, force setting/resetting bits, differential monitor, and data tracing.
- The cycle time can be checked without the actual PLC system.
- Interrupt tasks can also be started.





Checking execution times

The virtual cycle time can be checked in advance. Each task can also be started and stopped and each task's cycle time can be checked.

Execute just the required parts of structured/sectional programsand monitor the status of I/O.

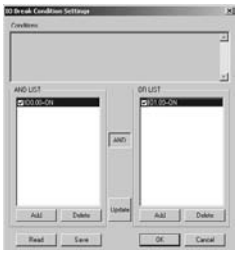
Perform efficient debugging operations that cannot be performed in the actual PLC, such as executing single steps, executing single cycles, and inserting break points.

- With the step execution and cycle execution functions, the contents of I/O memory can be monitored in the middle of program execution or after execution of a single cycle.
- Program execution can be stopped when I/O memory data satisfies preset conditions, so that the I/O memory data at that point can be checked.
- A starting point and break point can be specified to execute and debug just that part of the program.



Debug Console

Various execution methods can be selected, such as step execution and cycle execution.



I/O Break Condition Settings

Stop program execution when the specified I/O memory conditions are satisfied, so that the contents of I/O memory at that point can be checked easily.

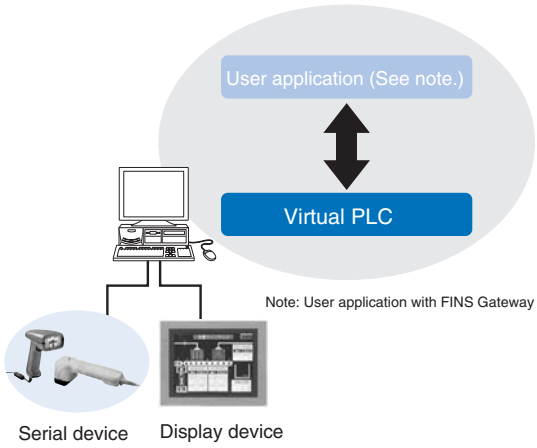


Virtual External Inputs

Several methods can be used to create and replay virtual external inputs.

The operation of equipment and machinery can be simulated in the PLC as virtual external inputs from several sources.

- Reproducing Virtual External Inputs
  When I/O memory data satisfy preset conditions, specified I/O bits and words can be set to desired values after a set time delay (I/O Condition Tool).
- Reproducing External Inputs
  Virtual external input data from various sources can be reproduced in the virtual PLC. (Some data sources are operation logs of force-set/force-reset bits and changed I/O memory data, data trace data acquired from an actual PLC, and cyclic data files created in spread sheet software.)





I/O Condition settings



Message communications display function

Complete Debugging with Peripheral Devices

Total system debugging can be carried out by performing communications tests with peripheral devices (serial devices, displays, etc.) and user applications that communicate with the PLC.

- Communications can be debugged with external serialdevices connected to the computer's COM port.
- Communications can be tested with Programmable Controllers through NT Link.
- Messages sent by the network communications program canbe checked. Messages (frames) sent by the TXD (TRANS-MIT), SEND/RECV (NETWORK SEND/RECEIVE), and CMND (DELIVER COMMAND) instructions can be displayed at the computer.

PLC Programming

CX-Protocol

Create serial communications protocols to communicate with standard serial devices

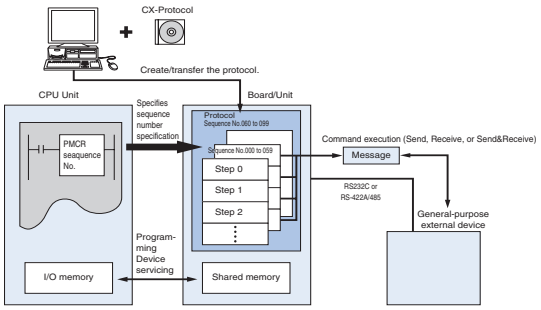
Easily configure serial communications protocols for any devices without complex ladder programming.

Key Features

The CX-Protocol software creates data communications procedures (protocol macros) to exchange data between standard serialdevices and the PLC (Serial Communications Unit or Board).

What is a Protocol Macro?

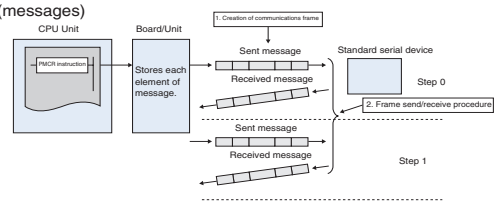
A protocol macro defines the communications protocol for communications between the PLC and any serial device that has an RS-232C port or RS-422A/RS-485 port and uses half-duplex or full-duplex communications with start-stop synchronization. Serial communications can be processed without a ladder program routine once the protocol macro has been written to the Serial Communications Unit or Board (CS/CJ Series Unit/Board, C200HX/C200HG/C200HE Board, or CQM1H Board) and the PMCR instruction hasbeen executed from the CPU Unit's ladder program.



Overview of Protocol Macros

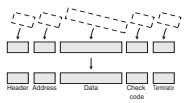
The protocol macro function can be broadly divided into the following two functions.

1. Creation of communications frames (messages)
2. Creation of procedures to send/receive those communications frames (messages)



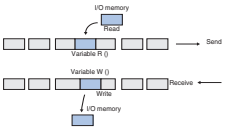
1. Creating communications frames (messages)

1) Communications frames (referred to as "messages" here), which can be understood by general-purpose external devices, can be created according to the communications specifications.



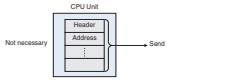
Note: In general, the data area of a send message contains acommand code and data. The data area of a receive message contains a response code.

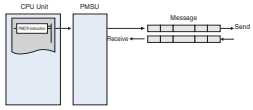
2) Variables for reading data from (or writing data to, if receiving) the I/O memory data areas in the CPU Unit, can be integrated into the messages.

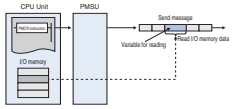


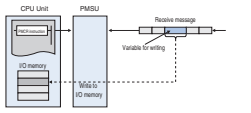
This function has the following advantages:

- Ladder program processing will not be necessary at the CPU Unit when, for example, sending messages after arranging them all in data memory.
- The components of the previously created messages are stored in memory at the Unitor Board, not the CPU Unit. When sendingor receiving data, the CPU Unit only has to execute the PMCR instruction.
- When handling one part of the I/O memory data, if the variable required for reading that data has been integrated into a send message, the Unit or Board will automatically read the required data from the I/O memory of the CPU Unit when the PMSU sends the message. Similarly, when writing data from one part of a received message into I/O memory, if the variable required to read the data has been integrated into the reception settings message, the Unit or Board will automatically write the data at the designated position in the message into I/O memory when the Unit or Board receives the message.



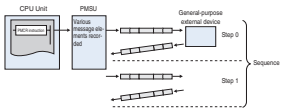




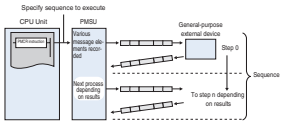


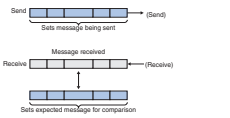
2. Creating procedures to send/receive the communications frames (messages)

1) This function enables all the processing needed to send or receive a message to be handled as one step, and possesses all the commands (step commands), such as Send, Receive, Send&Receive and Wait, that are needed for each step.



2) This step can be set so that the next process (step/end) depends on the processing result of the previous step. In particular, it is possible to set the sequence so that the next process depends on the contents of one or several set receive messages.





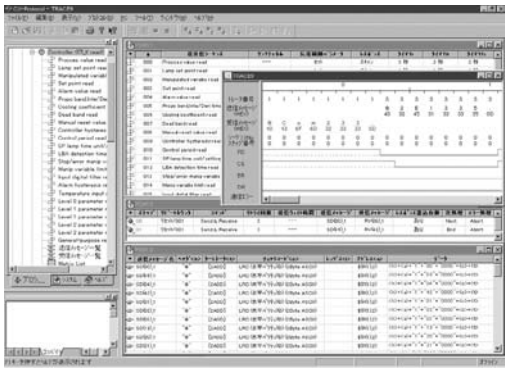
Note 1: A send message created with aprotocol macro will perform settings for messages that are actually sent.

Note 2: A receive message created with protocol macro will set an expected message for comparison with messages that are actually received.

Developing Communication Protocols

Supports a Wide Range of Communication Protocols

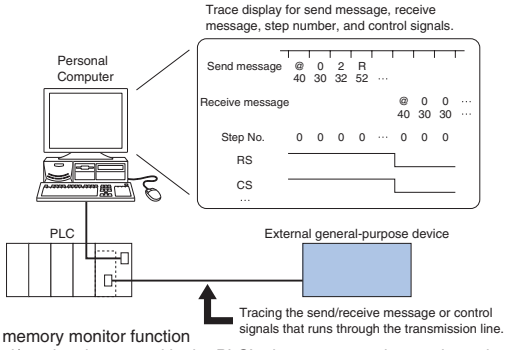
- Send frames and receive frames can be created according to the communications frame (message) specifications of external devices. In addition, variables for exchanging data with the PLC can be incorporated in send and receive frames.
- Supports error check code calculation, frame length calculation during transmission processes, and numeric data conversion between ASCII and hexadecimal.
- Repeat variables can be used, 1:N communications are supported, and write destinations can be switched.
- Supports send and receive time monitoring functions as well as retry processing, so the required communications error processing can be specified easily.
- The interrupt function can send an interrupt to the CPU Unit when receiving data, so high-speed data processing can be performed.
- Expected reception data can be registered and processing can be switched based on the received data.



Complete Set of Debugging Functions

Sequences can be evaluated, saved, and printed with send/receive message tracing.

- Trace function
  With a CS/CJ Series PLC, up to 1,700 characters of time-sequential transmission or reception data, which the Board or Unit exchanges with external devices, can be traced. Tracing allows the user to determine which messages were transmitted or received in each step number. The results of tracing can be saved as data in project files or printed.



- I/O memory monitor function
  Send/receive data stored in the PLC's data areas can be moni-tored.

Standard System Protocols

Protocols to exchange Data with OMRON Control Devices area Standard Feature.

Data exchange protocols for 13 kinds of OMRON control devices, such as Temperature Controllers and Bar Code Readers, are provided. The standard system protocols can be copied easily and customized.

Connected component		Model	Send/receive sequences
CompoWay/F Master		OMRON components equipped with CompoWay/F Slave functions	Sending CompoWay/F commands and receiving responses
Controllers/ Temperature Controllers	Small Digital Controller with Communications Functions (53 × 53 mm)	E5CK	Present value read, set point read, manipulated variable read, etc. Set point write, alarm write, PID parameter write, etc.
	Temperature Controllers with Digital Indications (96 × 96 mm or 48 × 96 mm)	E5□J-A2H0	
	Digital Controllers with Communications Functions (96 × 96 mm)	ES100□	
	High-density Temperature Controller with Communications Functions	E5ZE	
Digital Panel Meters with Communications Output (custom specification)		K3T□	Display value read, comparison value read, write, etc.
Bar Code Readers	Laser Scanner version	V500	Read start, data read, read stop, etc.
	CCD version	V520	
Laser Micrometer		3Z4L	Measurement condition set, continuous measurement start, etc.
Machine Vision Systems	High speed, high precision, low cost version	F200	Measurement, continuous measurement, etc.
	High-precision Inspection/Positioning	F300	
	Character Inspection Software/ Positioning Software	F350	Measurement, positioning, inspection, character inspection, etc.
ID Controllers	Electromagnetic coupling	V600	Carrier data read, autoread, write to carrier, etc.
	Microwave	V620	
Hayes modem AT command		MD24FB10V MD144FB5V ME1414B2	Initialize modem, dial, transfer data, etc.

Motion

CX-Motion

Creates programs to control the motion controller and monitors controller status

Provides the ideal environment for motion control support, from motion controller program development to full system operation.

Key Features

The CX-Motion software can be used to create, edit, and print the various parameters, position data, and motion control programs (G code) required to operate Motion Controllers, transfer the data to the Motion Control Units, and monitor operation of the Motion Control Units. Increase productivity in every step of the motion control process, from development of the motion control program to system operation.

Motion Control Programs

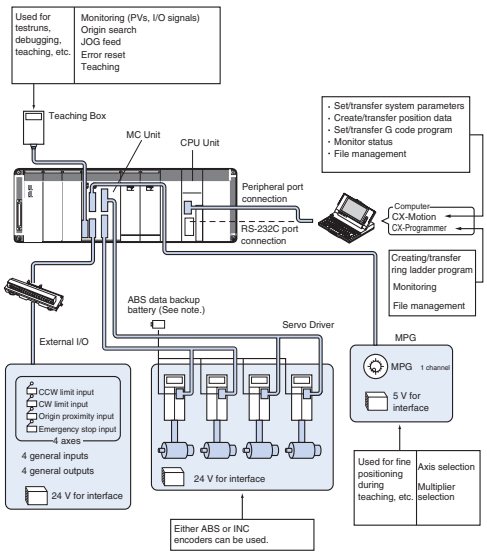
Easily create motion control G Code programs and parameters.

CX-Motion can create all of the data needed in the Motion Control Unit, such as parameters, position data, and the program. The program can be input in either G code or mnemonics.

- When the Unit is connected online, data can be transferred,verified, and saved.
- Data for different Units can be registered and managed as separate projects.



System Configuration with CS1W-MC421/221



Note: A data backup battery is required when an ABS encoderis used.

Operation Monitor

Powerful support during startup and operation

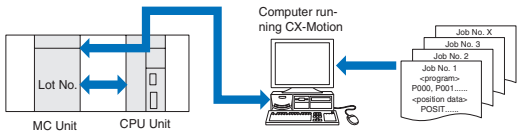
The MC Unit Monitoring function can display vital information at the computer, such as the present position, task being executed, I/O status, error displays, and servo system trace data.

- Up to 20 errors that have occurred in the Motion Control Unit can be stored and displayed (CS1W-MC421/221 and CV500-MC421/221 Motion Control Units only).

Automatic Loading Function

Ideal for flexible, small-lot production lines

Various programs and position data can be stored on disks for the computer running the CX-motion software and the required program/position data can be substituted into the Motion Control Unit when necessary. More than 100 different application programs can be used in this way. A wide variety of programs can be available for execution if the computer is used to storedata for the MC Unit.



Motion

CX-Position

Set, transfer, store, and print position control unit data and monitor operation online

Increase productivity in all position control tasks, from design and startup to system maintenance.

Key Features

The CX-Position software simplifies every aspect of position control, from creating/editing the data used in Position Control Units (NC Units) to communicating online and monitoring operation. The software is equipped with functions that can improve productivity, such as automatically generating project data and reusing existing data.

Creating and managing data

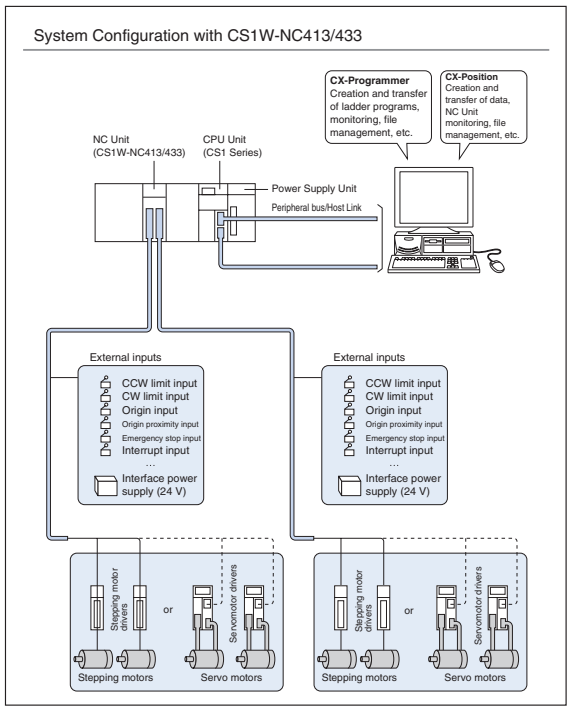
Data can be created for various applications

The CX-Position enables data for multiple NC Units on up to 1,000 PLCs to be handled as 1 project. Data is displayed in tree format and the data for an NC Unit can be moved or copied (overwritten) between PLCs in the project tree. This feature allows data to be edited and re-used in other PLCs or NC Units.

- The CX-Position can read information from NC Units connected online and automatically generate project data.
- Data created for a C200HW-NC□□□ using the SYSMAC-NCT can be imported and used as data for the CS1W-NC□□□ or CJS1W-NC□□□.



System Configuration with CS1W-NC413/433



NC Monitor

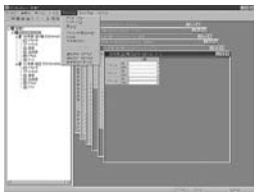
Display the NC units' present positions, error codes, sequence numbers, and I/O status.

The sequence numbers and present positions can be dis-played for up to 4 Units. In addition, the contents of the operating memory area and operating data area can be monitored and the error log can be displayed.

Communications

Communicate with NC units through the network.

It is possible to communicate with NC Units through the Fins-Gateway. Depending on the FinsGateway driver version, HostLink or Ethernet. can be used to perform online operations (monitoring operation or transferring/verifying parameters,sequences, etc.) with the NC Unit.



Motion

CX-Motion NCF

Configures mechatrolink II network

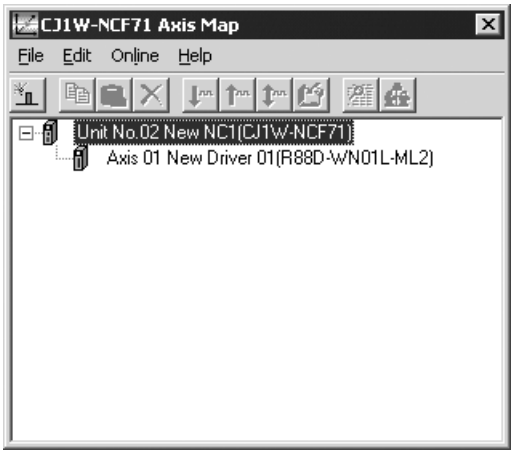
Provides easy configuration for the mechatrolink II network and devices on the network

Key Features

Since the actual motion programming for the NCF unit is created in the PLC (using either the Omron library of "PLC-Open" motion function blocks or customer specific function blocks) the NCF software is used to easily configure & monitor the mechatrolink II network and the devices installed on the network.

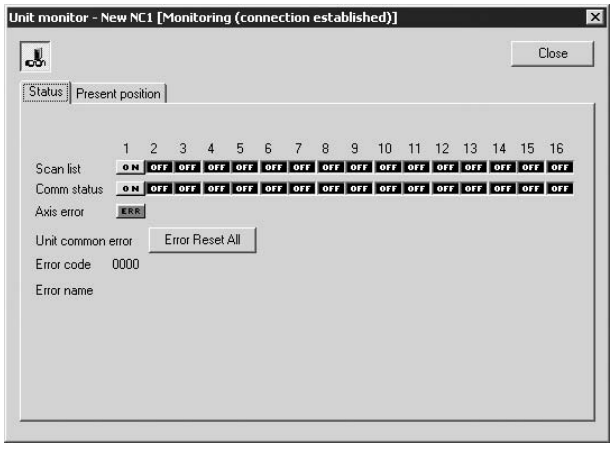
Mechatrolink network configuration

Configuration of mechatrolink networks allows easy creation of devices & ability to copy & paste to reduce development effort.



Mechatrolink network monitoring

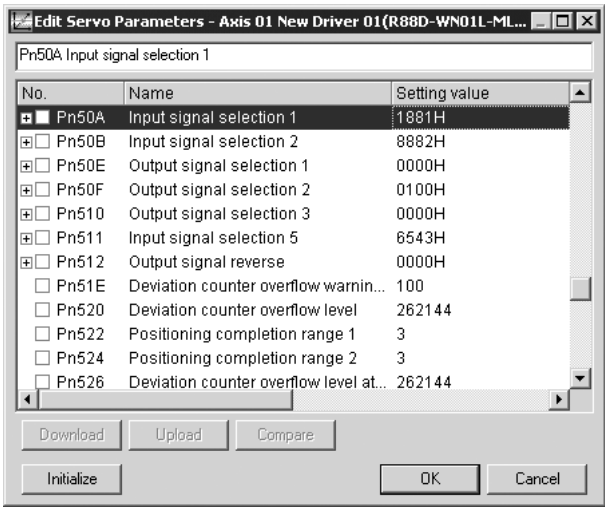
Monitoring of network and devices to allow fast fault-finding and easy maintenance of network based motioncontrol systems.



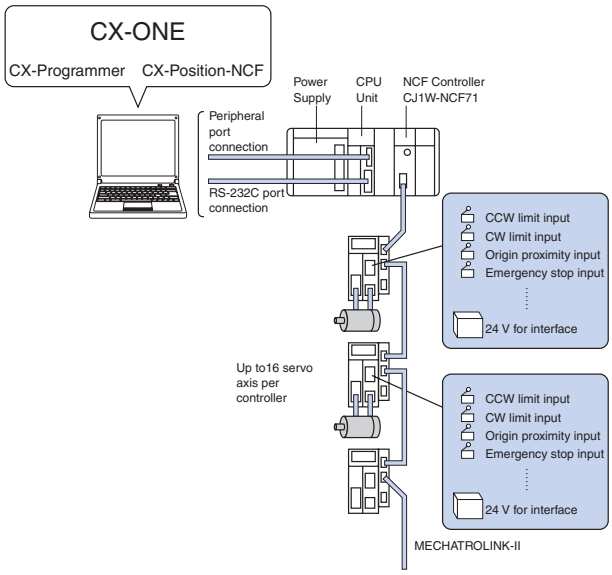
Device configuration

Allows detailed configuration of the parameters of all devices on the mechatrolink II network.

- Device configurations can be copied and pasted to reduce development effort
- Exportated to CSV file



System configuration with CJ1W-NCF71



CX-Motion MCH

Reduce the complexity of advanced motion control.

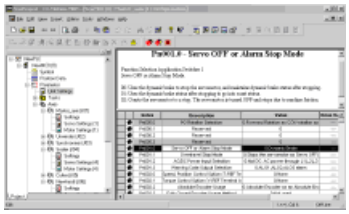
Programming and configuration for Mechatrolink II based MCH motion controller.

Key Features

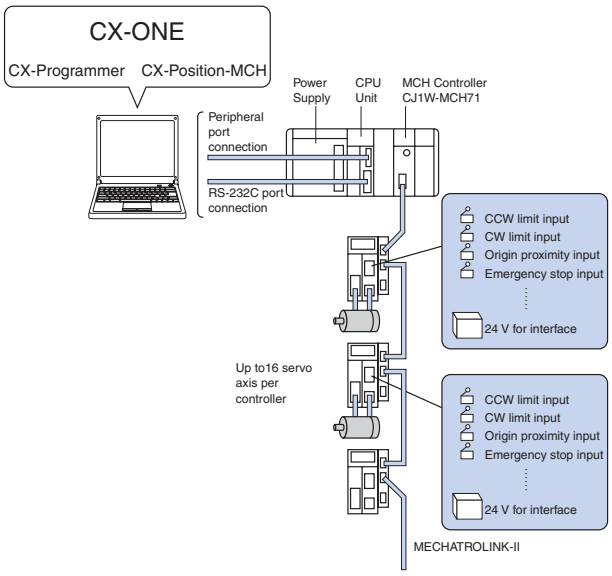
Create powerful motion solutions quickly using this integrated configuration and programming software for Mechatrolink II based systems.

Mechatrolink and device configuration

Configuration of Mechatrolink networks allows easy creation of devices and the ability to copy&paste configurations to reduce development.

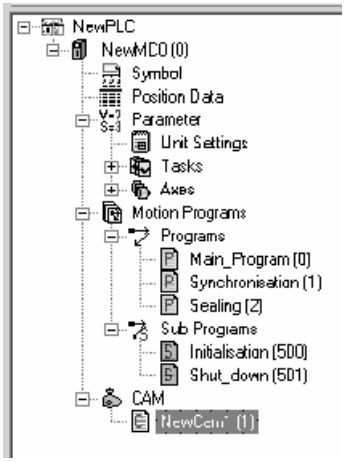


System configuration



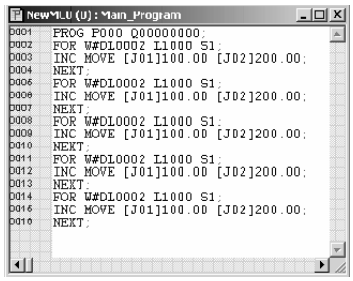
Motion programming

Easy programming using a familiar 'workspace editor' to allow easy representation of all configurations and programming for each MCH unit.



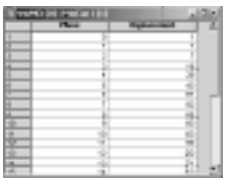
Each MCH supports upto 32 axis of motion, to allow easy programming the programs can be split into 'Main' and 'Sub' programs. These program modules can easily be imported and exported to other projects, or to libraries to reduce the total development time.

Programming is carried out using standard 'Basic' type of language to allow easy creation of programs. A common symbol table also allows easier programming of larger systems.



Specific instructions allow key motion functionality to be used easily.

CAM profiles are also integrated into MCH software and are created by importing the CAM able information from a CSV file, typically created from excel or CAM creation software.



Motion

CX-Drive

One software tool for inverters & servos

reduce the time and complexity of configuring, commissioning and maintaining servos or inverters with a single software tool.

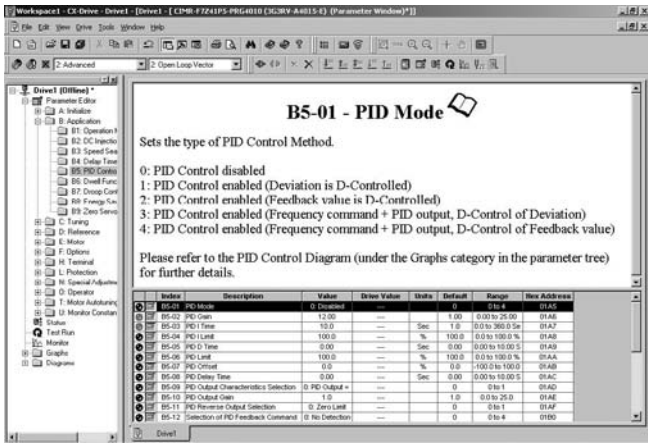
Key Features

Programming

The complete current range of Omron Yaskawa inverters and servos is covered in this software with full access to all parameters (with 3 different operator levels available). An easy overview of parameters is also included which includes filters to show values that are:

- Different from default
- Different from inverter
- Invalid setting

Graphical overviews are available to further assist with configuration of some more detailed parameters such as jump frequencies, v/f profiles and analogue setting.



Comissioning and Maintenance

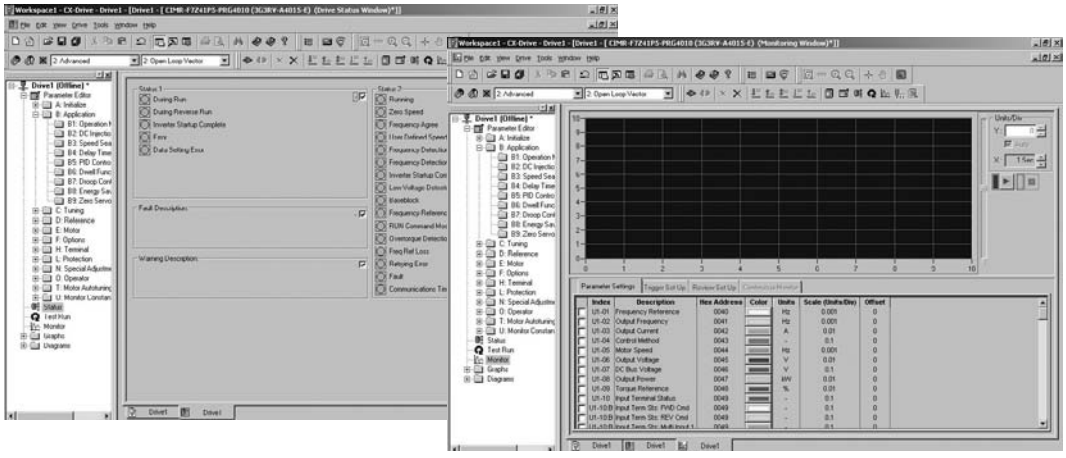
To increase the ease of maintenance, connection can be either directly to the device, through PLC, across networks or remotely via modem. Specific 'test run' windows are offered to graphically represent inverter settings to allow easy optimisation of settings.

A monitoring window allows muti-traces with seperate scaling and offset for each trace, and combines powerful triggering options and the ability to save/review trace files. These features allow you to precisely monitor inverter and servo performance during the test run, commissioning, and maintenance phases. The status and configuration of the digital I/O can also be graphically displayed to allow easy 'at a glance' setting and monitoring.

CX-Drive is part of the Omron CX-software suite and uses a common communications platform, called CX-Server. This allows a single point multiple access to all configurable Omron components on your machine for programming, configuring or monitoring. Inverters or servos can be accessed across network or through other devices such as Programmable Logic Controllers. This single connection point can be serial, network or modem, so allowing complete remote access to components such as inverters and servos of the whole machine from anywhere in the world!

Products covered

Inverters	MV (V7) E7 F7 L7
Servos	R88D W-series Smart Step SGDH SGDH-Linear



Order code	
CX-Drive	One software tool for inverters & servos

Regulation

CX-Process Tool

Creates, transfers, runs, and debugs function blocks for loop control units/boards.

Easy Engineering Solutions for advanced PLC based process control

Key Features

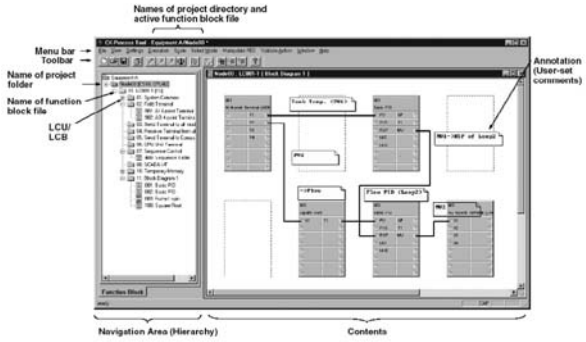
The CX-Process Tool software simplifies every aspect of loop control, from creating/transferring function blocks to running the Boards/Units and debugging (tuning PID parameters, etc.) operation.

Creating Programs

Function Block Diagrams can be created easily.

Function block programs can be created easily by pasting function blocks in the window and making software connections with the mouse.

- Control Blocks, Operation Blocks, and Field Terminal Blocks are available, so all of the required functions can be performed just by arranging the function blocks.
- Comments (user-set character strings) can be pasted in the function block diagrams.

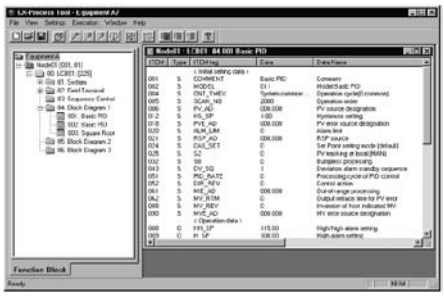


Transferring Programs

Programs can be changed Online.

The entire program, individual blocks, and individual ITEMs can be downloaded from or uploaded to the LCU/LCB.

- When there is a change in an individual block or ITEM, the change can be made while the LCU/LCB continues running.
- Block diagram information can also be downloaded/uploaded (LCU version V2 or higher only).

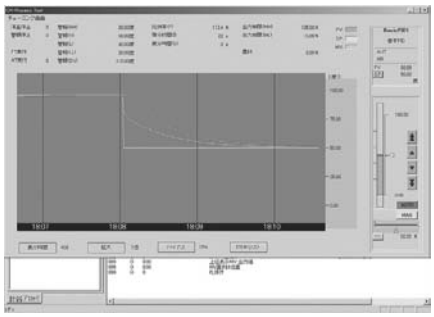


Debugging

Operation can be checked and tuned easily.

All of the ITEM data in a block can be monitored and the operation of a function block's connections can be checked.The PV, SP, and MV trends can be monitored and adjusted in the Tuning Screen.

- A function block's analog signal values can be displayed and forcibly changed and the operation of each function block can be stopped and restarted.
- Run/Stop commands can be executed (Hot or Cold Start).

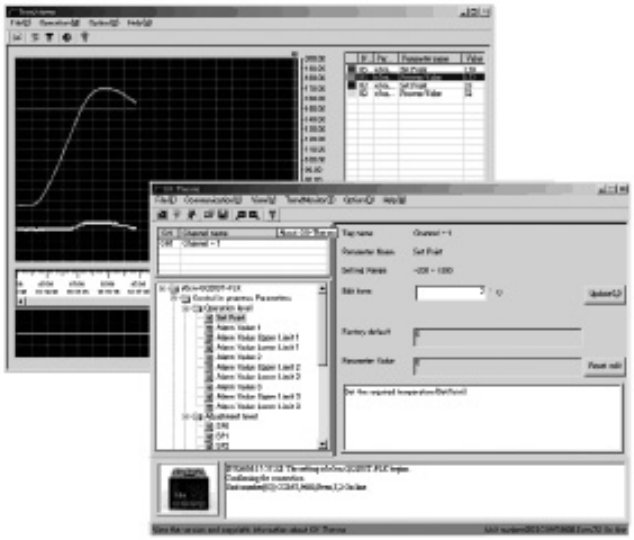


Regulation

CX-Thermo

Monitoring/setting support software for E5CN- and E5ZN-series Temperature Controllers providing easy setup, online data logging, and realtime monitoring.

- Enables creating, editing, and batch-downloading parameters from a personal computer, reducing the wor required to set parameters
- Support Online Monitoring:
  Monitoring data for up to 31 Temperature Controllers at the same time
  (The Temperature Controllers must be from the same series.)
- Supports parameter masks for hiding unused parameters (E5CN only).



Main features

- New parameter configuration software for temperature controllers.
- Off-line configuration mode with full upload and download capability.
- On-line monitoring of setpoint, process value, manipulated value and multi-point value on your PC
- Sophisticated live logging and trending facility for testing and recording key parameter values
- Multi-drop capability.
- File handling to save instrument configurations in several different file formats.
- Besides Auto-tuning also a "personal" Fine-tuning facility for optimisation according to your specific process response preferences.

Other features

- Remote configuration of multiple controllers and intelligent signal processors in an easy-to-use Windows based package.
- Comprehensive help system, including introduction to the Omron Control Components.
- CX-Thermo can connect to the E5ZN and nex E5CN temperature controllers. In the near future the new E5AN/E5EN and E5□R will be supported as well.

Specification

Supported products	E5ZN E5CN E5AN E5□R
Connections	Direct serial (1:1, 1:N), modem, GSM modem, through Omron PLC

List of Models

Model	Name
EST2-2C-MV1	CX-Thermo Support Software

Note: The old models of E5CN Temperature Controller (manufactured in March 2004 or earlier) are not supported.

CX-Designer

Efficient development process for screen creation, simulation and project deployment.

The CX-Designer is used to create screen data for NS-series Programmable Terminals. The CX-Designer can also check the operation of the created screen data on the computer.

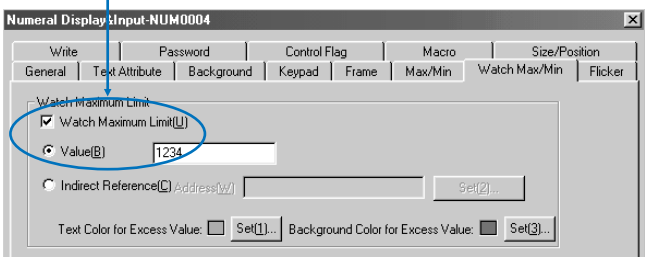
Screen Creation

Develop Screens More Efficiently with Easy-to-use Support Software. The CX-Designer has about 1,000 standard functional objects with associated graphics and advanced functions, so even first-time users can create screens easily just by arranging functional objects in a screen.

The CX-Designer is also equipped with a variety of functions that make it easy to create screens for common applications. Screen development is far more efficient with the CX-Designer.

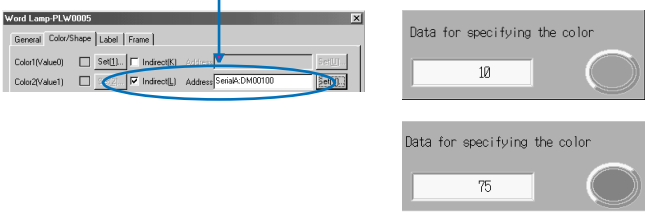
- Color Change when the Upper or Lower Limit Is Exceeded

The upper limit can be monitored just by checking the box and setting the upper limit value.

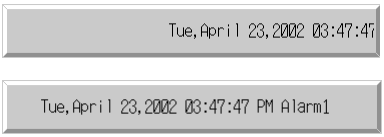


- Indirect Specification of the Display Color (Dynamic Display) with the Color Code (0 to 255)

The color can be specified indirectly by checking the box and setting the address being used for indirect specification.



- Flow Text Display for Alarm/Event Messages

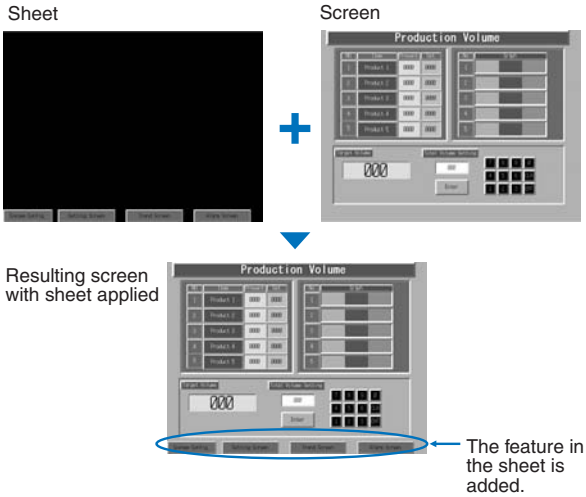


Screen templates

Make one common screen (sheet) that overlaps other screens (to save having to recreate the same part, such as a menu, in every screen).

- Sheets

A feature that is common to several screens can be registered as a sheet. The common feature can be added to any screen just by applying the corresponding sheet to the screen. (Up to 10 sheets can be created for one project.)



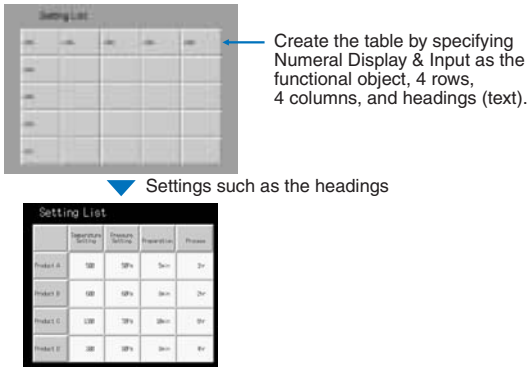
Making Table Form Objects

Speed up creating tables containing similar functional objects.

- Tables

The same kind of functional objects (such as Buttons, Text, or Numeral Display & Input objects) can be created together in a table just by specifying the kind of functional object, number of rows, and number of columns in the table. In addition, the properties for functional objects can all be set together and PLC addresses can be allocated automatically.

It is also possible to add headings for each row and column.



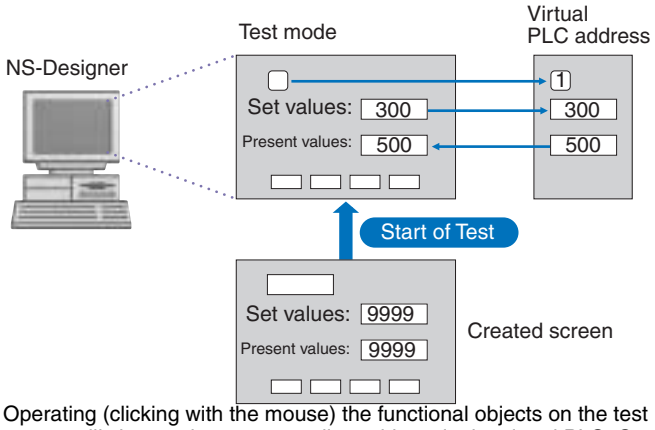
Software

The Operation of Screen Data Can Be Confirmed Easily on a Personal Computer

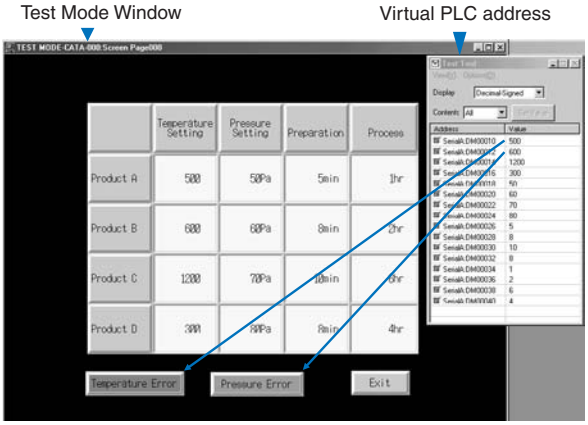
Check the operation of functional objects (buttons, lamps, numeral displays, etc. on a personal computer.

- Simulation via the “Test Function”

When a test is started, a test screen and virtual PLC will be displayed on the computer.



Operating (clicking with the mouse) the functional objects on the test screen will change the corresponding address in the virtual PLC. Conversely, changing the content of a virtual PLC address will change the corresponding functional objects. It is also possible to confirm pop-up screens. This function can be used to confirm the actual operation of a screen during the edition.



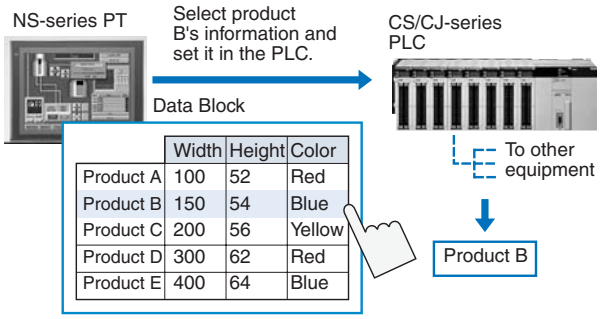
The test function enables debugging screens without NS and PLC Hardware.

- Validation

Validation checks functional objects against checkpoints (such as PLC addresses setting miss), and detected errors are listed. The listed errors can be checked before transferring the screen data to the PT.

Built-in Recipe Function for Fast Production Changeovers

Data blocks (recipe function) allow several numeric values and/or character strings to be transferred to/from memory areas, such as PLC data areas. Data blocks can be used to change the system’s production setup even faster.



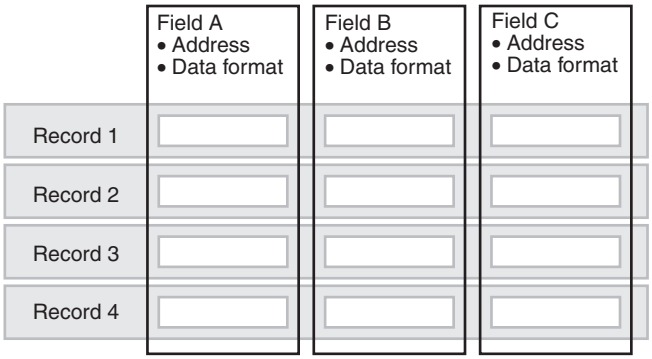
	Width	Height	Color
Product A	100	52	Red
Product B	150	54	Blue
Product C	200	56	Yellow
Product D	300	62	Red
Product E	400	64	Blue

- Register Recipes Easily by Writing Product Information in Data Blocks.

The Data Block (recipe) function consists of records and fields. Set the communications address and data format for each field. The records contain the data for each field.

For example, when production conditions are assigned to the fields, write the values for the product in that record so that the values required for production of the product will be transferred to the PLC.

Using this function can drastically reduce the time required to switch the production arrangement. This function also helps avoid production problems from errors such as recipe transmission mistakes.

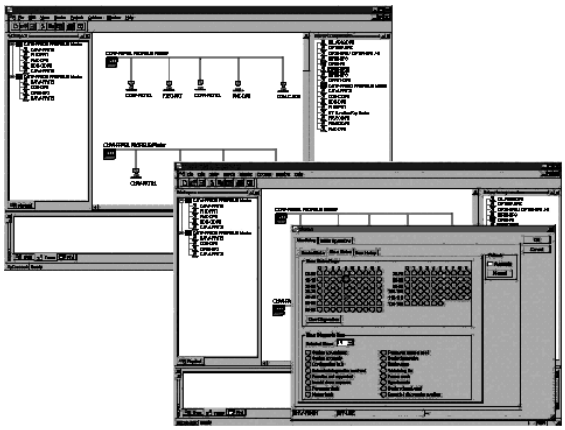


PROFIBUS configurator

CX-PROFIBUS

Advanced configuration tool that uses FDT/DTM (Field Device Tool and Device Type Manager) Technology

- The PROFIBUS-DP network topology and system characteristics are defined and then downloaded in the OMRON PROFIBUS Master Unit
- Configuration can be done remotely, via other networks as Ethernet or ControllerLink
- Can be used with all OMRON masters



Function

The configuration software package for the OMRON PROFIBUS-DP master is used to define:

- The configuration of the bus system connected.
- Configuration- and parameter data of all connected slave stations.
- Overall bus communication settings.

All configuration data can be prepared off-line and downloaded remotely.

After the initial configuration has been downloaded, the software package can be used for:

- Addition / deletion of slave units or -modules.
- Monitoring the PROFIBUS system status.
- Troubleshooting communication problems.

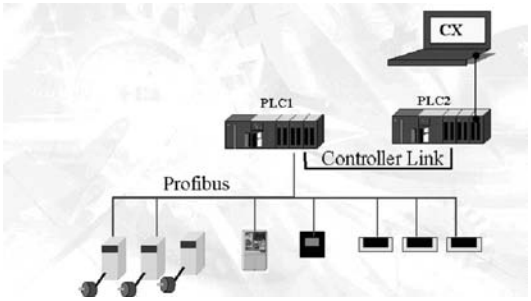
It is not possible to use other (general-purpose) PROFIBUS-DP Configurator software packages for this purpose

More about FDT/DTM and OMRON CX-PROFIBUS

FDT is a frame application that provides a standard communication interface between software components that support the field devices and systems. These so-called DTMs, can be used in all configuration tools who follow the FDT specification.

The DTM is the management component for a field device or system. It provides all configuration, diagnostics and maintenance information and even graphical user dialogs of the specific device. OMRON's CX-PROFIBUS configuration package is a FDT frame application that includes all DTM's for OMRON PROFIBUS masters and slaves. DTM's of other vendors devices can be added. Also a Generic slave DTM for field devices that only provide a GSD-file for configuration is available.

System Configuration



PC Specifications

CX-Integrator

Specifications

Item		Specification			
Model		Provided in the CX-One FA Integrated Tool Package (CXONE-AL@@C-E).			
Setup media		CD-ROM			
Applicable computers (with FinsGateway)	Computer	IBM PC/AT or compatible			
	CPU	Pentium 133 MHz or better for Windows 98 SE or NT 4.0 with service pack 6a			
	OS	Microsoft Windows 98 SE, Me, 2000, or XP Microsoft Windows NT version 4.0 service pack 6a Note: CX-Integrator cannot be used with Windows 95.			
	Memory	64 MB min. for Windows 98 SE or NT 4.0 with service pack 6a			
	Hard disk drive	100 MB min. of available space			
	Monitor	SVGA, 800 x 600 pixels or better Note: Use the small font size.			
	CD-ROM drive	At least one required.			
	Communications port	At least one RS-232C or USB port (See note.) Note: The USB port on a computer can be connected to if the CJ1W-CIF31 USB-Serial Conversion Cable is used. (The driver software included with the CJ1W-CIF31 must be installed on the computer.)			
PLCs that can be used as relay PLC for online connections Note: A relay PLC is the PLC to which the CX-Integrator is connected online.	Series	Device type (See note.)	CPU Unit model		
	CS Series	CS1H	CS1H-CPU67/66/65/64/63(-V1)		
		CS1G/CJ1G	CS1G-CPU45/44/43/42(-V1)		
		CS1G-H	CS1G-CPU45H/44H/43H/42H		
		CS1H-H	CS1H-CPU67H/66H/65H/64H/63H		
		CS1D-H	CS1D-CPU67H/65H Note: When using a pre-Ver. 1.1 CS1D-H CPU Unit, use it as if it were a CS1H-H CPU Unit.		
		CS1D-S	CS1D-CPU67S/65S/44S/42S		
	CJ Series	CS1G/CJ1G	CJ1G-CPU45/44		
		CJ1M	CJ1M-CPU23/22/21/13/12/11		
		CJ1G-H	CJ1G- CPU45H/44H/43H/42H		
		CJ1H-H	CJ1H-CPU67H/66H/65H		
	Note: To connect the computer running CX-Integrator directly as a CompoWay/F slave, set the Device type to *CompoWay/F Device*.				
Connecting to the Relay PLC	Either of the following can be used.				
	Serial communications	Direction connection is possible to any of the following serial ports on a CS/CJ-series PLC. • CPU Unit peripheral port (Toolbus or Host Link) • CPU Unit RS-232C port (Toolbus or Host Link) • Serial Communications Board or Serial Communications Unit RS-232C port or RS-422A/485 port (Host Link) **Note:** Automatic online connection is possible for serial communications ports. (The user does not have to set the computer communications settings.) The communications settings will be automatically set to those of the PLC. Connection is possible to a serial port on the CPU Unit, a Serial Communications Board, or a Serial Communications Unit. For PLC serial ports, however, only the Toolbus or Host Link serial communications modes can be used and the baud rate must be 9600, 19200, 38400, or 115200 bits/s.			
	FINS network communications	Direction connection is possible through any of the following networks on a CS/CJ-series PLC. • Ethernet (Ethernet, Ethernet FINS/TCP, or FinsGateway) • Controller Link (Controller Link or FinsGateway) • SYSMAC LINK (SYSMAC LINK or FinsGateway)			
PLCs that are accessible as target PLCs Note: The target PLC is the PLC actually being accessed, e.g., to upload/download the PLC's network configurations.	Series	Device type	CPU Unit model		
	CS Series	CS1H	CS1H-CPU67/66/65/64/63(-V1)	Note: CompoWay/F cannot be used with a built-in serial port on the CPU Unit.	
		CS1G/CJ1G	CS1G-CPU45/44/43/42(-V1)		
		CS1G-H	CS1G-CPU45H/44H/43H/42H	Note: A CPU Unit with unit version 3.0 or later must be used when using CompoWay/F with a built-in serial port on the CPU Unit	
		CS1H-H	CS1H-CPU67H/66H/65H/64H/63H		
		CS1D-H	CS1D-CPU67H/65H Note: When using a pre-Ver. 1.1 CS1D-H CPU Unit, use it as if it were a CS1H-H CPU Unit.	Note: CompoWay/F cannot be used with a built-in serial port on the CPU Unit.	
		CS1D-S	CS1D-CPU67S/65S/44S/42S		
	CJ Series	CS1G/CJ1G	CJ1G-CPU45/44		
		CJ1M	CJ1M-CPU23/22/21/13/12/11	Note: A CPU Unit with unit version 3.0 or later must be used when using CompoWay/F with a built-in serial port on the CPU Unit	
		CJ1G-H	CJ1G-CPU45H/44H/43H/42H		
		CJ1H-H	CJ1H-CPU67H/66H/65H		
	Note: The CS/CJ-series PLC must have a lot number of 030201 or later (manufactured 1 February 2003 or later) to start the CX-Designer and transfer screen data to an NS-series PT from the CX-Designer through the PLC. The following PLCs can be used: CS1G-H, CS1H-H, CS1D-S, CJ1M, or CJ1H-H. (The CS1D-H cannot be used.)				

Item	Specification	
Supported communications	The following communications are possible for a directly connected target PLC.	
	Supported network communications	Ethernet (Access is possible only to CS/CJ-series PLCs, NS-series PTs, and computers with FinsGateway on the Ethernet network. For CVM1/CV-series PLCs, only display functions are supported.) Controller Link (Access is possible only to CS/CJ-series PLCs, NS-series PTs, and computers with FinsGateway on the Controller Link network.) For C200H-series PLCs and CVM1/CV-series PLCs, only display functions are supported.) Note: When the Controller Link Network Diagnosis application is being used, it is possible to monitor and troubleshoot PLC models in the Controller Link network other than CS/CJ-series PLCs. SYSMAC LINK (Monitoring is possible only to CS/CJ-series PLCs, NS-series PTs, and computers with FinsGateway on the SYSMAC LINK network.) DeviceNet (CS/CJ-series DeviceNet Units, C200H DeviceNet Master Units, or CVM1/CV-series DeviceNet Master Units) Note: A C200H-DRM21-V1 or CVM1-DRM21-V1 DeviceNet Master Unit can be used through a CS/CJ-series DeviceNet Unit.
	Supported serial communications	CompoWay/F (CS/CJ-series CPU Units must be unit version 3.0 or later.) Serial Communications Boards and Serial Communications Units must be unit version 1.2 or later. Only slaves for which CPS files are installed on the computer can be accessed. NT Links (Connection is possible only for NS-series PTs with model numbers ending in V1 or later.)
	Note: Accessing PLC Communications Across Network Layers If relay network routing tables are set, a PLC on a different network layer than the network of the PLC connected to the CX-Integrator can be set as the target PLC.	
Online Connection Information Window	When the target PLC is online, Communications Units connected to the target PLC (referred to here as simple “Communications Units”) are displayed as follows:. Target Device, Target PLC CPU Unit model (network address) (node address) • CPU Unit name [model] (network address) (-) (serial port FINS unit address) • Communications Unit name [model] (network address) (node address) (unit number) • Communications Unit name [model] (network address) (node address) (unit number) Communications configuration information can be uploaded by right-clicking a Communications Unit and selecting ***Transfer – Network to PC***.	
Communications monitoring functions	Ethernet	Node information for FINS communications (CPU Unit model, Ethernet Unit mode, node address, and network address)
	Controller Link	Information on nodes participating in the Controller Link network (CPU Unit model, Controller Link Unit mode, node address, and network address) The following functions are also possible if the Controller Link Network Diagnostic Tool is started. Configuration node diagnosis (network participation status, current Controller Link Unit errors, current CPU Unit errors, and differences from node files), setting diagnosis (e.g., DM Area parameter setting consistency), line disconnection information diagnosis, transmission status diagnosis, node status (displaying current error status and error log), error log collection, and node file editing (node names, connection order, and Repeater Units)
	SYSMAC LINK	Information on nodes participating in the SYSMAC LINK network (CPU Unit model, Controller Link Unit mode, node address, and network address)
	DeviceNet	Information on nodes connected to DeviceNet for which EDS files are installed on the computer (DeviceNet Unit model, slave model, master/slave node addresses)
	CompoWay/F	Information on nodes connected to a serial port in serial gateway mode or protocol macro mode for which CPS files are installed on the computer (CompoWay/F SLAVE model and CompoWay/F node address). Note: CS/CJ-series CPU Units with unit version 3.0 or later or Serial Communications Boards/Units with unit version 1.2 or later must be used.
	NT Link	Information on nodes connected to 1:N NT Links (NS-series PT model and NT Link unit number) Note: Automatic detection of NS-series PTs connected serially to a CS/CJ-series PLC is also possible. (The NT Link Automatic Setting Function automatically changes the setting of the PLC’s serial port to match those of the NS-series PT.)
Setting functions	Ethernet	Ethernet Unit settings (CPU Bus Unit System Settings)
	Controller Link	User-set data link tables
	SYSMAC LINK	Controller Link and SYSMAC LINK Unit settings (in allocated DM Area words), including automatically set data link parameters (transferred to the startup node set as the target PLC)
	DeviceNet	DeviceNet Unit master parameters (remote I/O allocations, connection settings, device information check, communications cycle time, etc.) Slave parameters
	CompoWay/F	CompoWay/F slave parameters (except for Temperature Controllers) Note: Parameters for CompoWay/F-compatible Temperature Controllers are set using the CX-Thermo, started as an application. PLC serial port communications settings (CPU Unit: part of PLC Setup, Serial Communications Boards/Units: allocated DM Area words)
	NT Link	None
	FINS networks, such as Ethernet, Controller Link, SYSMAC LINK, and DeviceNet	Routing tables (FINS local routing tables and FINS network routing tables) Note: The FINS local routing table is transferred to the target PLC.
Verification functions	Verifying communications/network configurations Verifying component parameters	
Operations	The following operations are possible for the CPU Unit at the target PLC. Creating, editing, and transferring I/O tables Displaying current errors and error logs Changing the operating mode Transferring or verifying a manually set data link table Transferring or verifying a routing table (FINS local routing table)	

Files Created by the CX-Integrator

Files	Contents	Details
Project files (.cin)	Connection information to relay PLC, all network configurations for target PLC, and parameters for DeviceNet masters, DeviceNet slaves, and CompoWay/F slaves	These files are used offline to check network configurations and parameters and for other purposes, such as printing. Each file consists of the following: Device type setting information of the relay PLC Communications Unit models connected to the target PLC (Ethernet Units, Controller Link Units, SYSMAC LINK Units, DeviceNet Units, and Serial Communications Boards/Units) Device models connected to the above CPU Units or Communications Units via communications (DeviceNet slaves, CompoWay/F slaves, NS-series PTs, etc.) Parameters for DeviceNet Master Unit and Device parameters and DeviceNet slaves (for all devices for which EDS files are installed on the computer including slaves from other manufacturers) Parameters for CompoWay/F slaves (for all components for which CPS files are installed on the computer (except for Temperature Controllers) Controller Link network parameters Controller Link and SYSMAC LINK Unit allocated DM Area words settings, including automatically set data link parameters Ethernet Unit CPU Bus Unit System Settings Serial Communications Board/Unit serial communications settings Note: Routing tables (local network tables and relay network tables) and user-set data link tables are not included in project files.
Network configuration files	DeviceNet network structure files (.npf)	Network configuration for one DeviceNet network connected directly to the target PLC (including master and slave parameters) Note: These are the same as the DeviceNet network structure files (.npf) created with DeviceNet Configurator version 2. Files created with DeviceNet Configurator version 2 can be imported/exported.
	Controller Link node files (.crg)	Network configuration for Controller Link networks connected directly to the target PLC
Component parameter files	DeviceNet device parameter files (.dvf)	Parameters for individual DeviceNet devices (master or slave) Note: These are the same as the DeviceNet device parameter files (.dvf) created with DeviceNet Configurator version 2. Files created with DeviceNet Configurator version 2 can be imported.
	CompoWay/F component parameter files (.xml)	Parameters for individual CompoWay/F slaves (except for Temperature Controllers) CPU Unit parameters (parts of PLC Setup: serial communications settings) Controller Link or SYSMAC LINK network parameters Controller Link and SYSMAC LINK Unit allocated DM Area words settings, including automatically set data link parameters Ethernet Unit CPU Bus Unit System Settings Serial Communications Board/Unit serial communications settings
Data link table files	Controller Link data link table files (.cl3)	Controller Link user-set data link tables Note: These are the same as the Controller Link data link table files (.cl3) created with the CX-Net. Files created with the CX-Net can be imported.
	SYSMAC LINK data link table files (.sl3)	SYSMAC LINK user-set data link tables Note: These are the same as the SYSMAC LINK data link table files (.sl3) created with the CX-Net. Files created with the CX-Net can be imported.
Routing table files	FINS local routing table files (.rtg)	Routing tables of the target PLC Note: These are the same as the FINS local routing table files (.rtg) created with the CX-Net. Files created with the CX-Net can be imported.
	FINS network routing table files (.rt3)	Routing tables for all PLCs on networks to which the target PLC belongs Note: These are the same as the FINS network routing table files (.rt3) created with the CX-Net. Files created with the CX-Net can be imported.

Note: With DeviceNet only, the following files can also be exported and saved.
EDS files (.eds)
The device list saved in CSV format (.csv)
The I/O comments saved in CSV format (.csv)
The device parameters of an OMRON DeviceNet Master Unit saved as an Open Network Controller DRM_UNIT (virtual unit) file
The device parameters of an OMRON DeviceNet Master Unit saved as a NetX Server (NetX Server for DeviceNet) file

Note: The CX-Integrator does not support files created in the DeviceNet Configurator Ver. 1.0 file format.

CX-ONE

Personal computer Requirements

Item	System Requirement*			
Operating System (OS)*1 Japanese or English version	Microsoft® Windows® 98SE	Microsoft® Windows® NT (Service Pack 6a)	Microsoft® Windows® 2000 (Service Pack 3 or higher)/ Windows® Me	Microsoft® Windows® XP
Main Unit	IBM AT compatible machine Pentium-class CPU 133MHz or higher. Pentium III 1GHz or higher is recommended.	IBM AT compatible machine Pentium-class CPU 133MHz or higher. Pentium III 1GHz or higher is recommended.	IBM AT compatible machine Pentium-class CPU 150MHz or higher. Pentium III 1GHz or higher is recommended.	IBM AT compatible machine Pentium-class CPU 300MHz or higher. Pentium III 1GHz or higher is recommended.
Memory	256MB or higher required*2			
Hard drive	To install entire CX-One, about 1.6GB or more free space is required.			
Display	High quality display with SVGA (800 x 600) or higher and 256 colors or more.			
Optical drive	CD-ROM drive			
Communication port	At least 1 RS-232C port*3			
Others	For online user registration via the Internet, you need appropriate hardware such as modem and access right for the Internet.			

*1 About operating System for CX-One:
This product does not run on Microsoft Windows95 or other OS version than the specified System requirement.
If you have such an operating System on a client computer, you must upgrade the operating System before installing this product. Note that required System and capacity of hard drive depend on your System environment.

*2 The required memory depends on the Support Software consisting CX-One. For details, see user's manuals.

*3 RS-232C port is required for connection with a PLC using CX-One Support Software. If you have only USB port on your Personal computer, use USB-RS-232C conversion cable (CS1W-CIF31).

Software List to be Installed

Shown below are CX-One Support Software installed with CX-One.

CX-One Support Software	Description	Required free space on hard drive	Remarks
CX-Programmer	Software to create and debug programs for SYSMAC CS/CJ series, C series, or CVM1/C series.	ca. 250MB	If necessary
CX-Integrator	Software to start up and configure FA networks such as Controller Link, DeviceNet, and CompoWay/F.	ca. 100MB	
CX-Position	Software to create and monitor various data for SYSMAC CS/CJ series NC Unit.	ca. 15MB	
CX-Motion	Software to create various data for MC Unit of SYSMAC CS/CJ series, alpha series, and CV series and to create and monitor MC programs.	ca. 40MB	
CX-Motion-NCF	Software to create and monitor various data for SYSMAC CS/CJ series NCF Unit.	ca. 100MB	
CX-Designer	Software to create screen data for programmable terminal NS series.	ca. 550MB	
CX-Process Tool	Software to create and debug instrument block programs for loop control Unit board, process, and loop CPU Unit of SYSMAC CS/CJ series.	ca. 65MB	
Face Plate Auto-Builder for NS	Software to automatically generate NS series project files for monitoring and tuning of a loop controller.	ca. 50MB	
CX-Protocol	Software to create data transmission procedure (protocol) with an external universal device that is connected to a serial communications board/Unit of SYSMAC CS/CJ series and SYSMAC alpha series.	ca. 20MB	
CX-Simulator	Software to debug programs for SYSMAC CS/CJ series without the CPU Unit by simulating the CPU operation on a Personal computer.	ca. 40MB	
CX-Thermo	Software to configure and adjust parameters for devices (Components such as temperature controller).	ca. 20MB	
Switch Box	Utility software to support PLC debugging. Input/output status and current values of address in a user-specified PLC can be monitored and modified easily.	ca. 5MB	
PLC Support Software	A group of Components that are commonly used by software that consists CX-One, such as CX-Programmer and CX-Integrator.	ca. 300MB	Always installed
CX-Server	Middleware required for communications between CX-One Support Software and OMRON's Components such as PLC, indicator, or temperature controller.		

Note: To install entire CX-One Support Software, about 1.6GB of free space is required for your Personal computer's hard drive. Make sure that sufficient free space is available.

Ordering information

Part number	Description
CXONE-AL01C-E-UP	CX-One single user upgrade
CXONE-AL03C-E-UP	CX-One 3 user upgrade
CXONE-AL10C-E-UP	CX-One 10 user upgrade
CXONE-AL01C-E	CX-One single user
CXONE-AL03C-E	CX-One 3 user
CXONE-AL10C-E	CX-One 10 user
CXONE-AL30C-E	CX-One OEM site license

PC-based visualisation

CX-OPC

OPC- an open communications standard

Reduce your data integration costs with the use of open software.

Key features
CX-OPC connects the OMRON PLC systems to the information world, - SCADA, MES or Microsoft environment using the open standard OPC client.

These products allow easy visualisation of machine information, through standard ready-to-use (graphical) components to create production and machine statistic reports or simple control applications.

No specialised knowledge of PLC systems or networks is needed to use these products. Any VBA or Visual Basic user can use OPC successfully.

The products represent a substantial time saving compared with conventional programming.



General Data

	Specification
Supported PLC systems	CS1, CJ1, C20, CXxK, CXxH, CXxp, SRM1, CPM, CQM1, CQM1H, C200H/-HS/-HX/-HG/-HE, C1000H, C2000H, CV/CVM1
Communication	• Peripheral port and Host Link port via COMx (RS-232C) • Controller Link, SYSMAC NET, SYSMAC Link • Ethernet • Modem
Supported Software	• MS Excel 97 and later • MS Visual Basic 5 and later • MS Visual C++ 6.0 • SCADA supporting OPC 2.04 • MES applications using OPC 2.04

Product Overview

	Description	Model code
Program	OPC server to serial connection single application	**CX-OPC-EVx.xx-S**
	OPC server to serial connection 3 applications	**CX-OPC-E03Vx.xx-S**
	OPC server to serial connection 10 applications	**CX-OPC-E10Vx.xx-S**
	OPC server to serial+ network connection single application	**CX-OPC-EVx.xx-N**
	OPC server to serial + network connection 3 applications	**CX-OPC-E03Vx.xx-N**
	OPC server to serial + network connection 10 applications	**CX-OPC-E10Vx.xx-N**

Functions

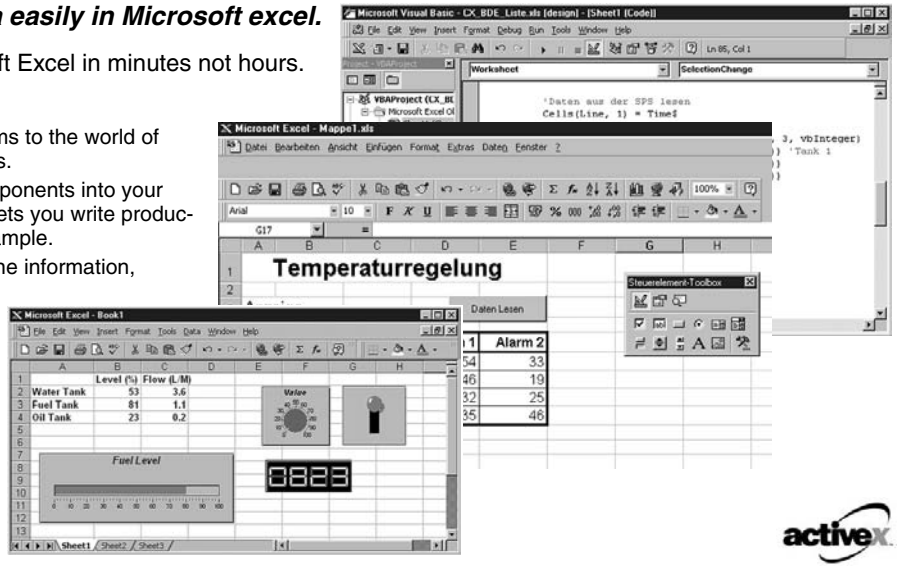
Program integration	• Integration in VBA and Visual Basic via ActiveX® components • The interoperability of CX-Server OPC has been tested with numerous commercially available OPC clients
Application	Application-based display of PLC and OPC Server data with the features of MS Office products as well as VBA and Visual Basic
OPC functions	• Synchronous or Asynchronous communication • Reading from cache or device • Subscription update rates starting from 100 milliseconds
Standard controls	• 7 Segment- and Display control to display data in multiple formats • Toggle button, Rotary Knob, Thumbwheel control and LED Indicator to write a value with a single click and to visualize the value at the same time • Linear- and Rotational Gauge that can display data in a graphical way • Data Logging, Timer and Linker controls to log data, trigger actions and connect third party ActiveX® controls

PC-based visualisation

CX-Lite

See your machine or production data easily in Microsoft excel.

Display machine or process data in Microsoft Excel in minutes not hours.



Key features

CX-Server Lite connects the OMRON PLC systems to the world of Microsoft Office, Microsoft Programming lanuages.

By simply importing the CX-Server ActiveX® components into your application you can create a link to the PLC that lets you write production parameters and read production data, for example.

These products allow easy visualisation of machine information, through standard ready-to-use (graphical) components to create production and machine statistic reports or simple control applications.

No specialised knowledge of PLC systems or networks is needed to use these products. Any VBA or Visual Basic user can use CX-Server Lite easily and successfully.

The products represent a substantial time saving compared with conventional programming.

General Data

	Specification
Supported PLC systems	CS1, CJ1, C20, CXxK, CXxH, CXxp, SRM1, CPM, CQM1, CQM1H, C200H/-HS/-HX/-HG/-HE, C1000H, C2000H, CV/CVM1
Communication	• Peripheral port and Host Link port via COMx (RS-232C) • Controller Link, SYSMAC NET, SYSMAC Link • Ethernet • Modem
Supported Software	• MS Excel 97 and later • MS Visual Basic 5 and later • MS Visual C++ 6.0

Product Overview

	Description	Model code
Program	Microsoft Excel interface to serial connection only single application	**CX-LITE-EVx.xx-S**
	Microsoft Excel interface to serial connection 3 applications	**CX-LITE-E03Vx.xx-S**
	Microsoft Excel interface to serial connection 10 application	**CX-LITE-E10Vx.xx-S**
	Microsoft Excel interface to serial+ network connection single application	**CX-LITE-EVx.xx-N**
	Microsoft Excel interface to serial + network connection 3 applications	**CX-LITE-E03Vx.xx-N**
	Microsoft Excel interface to serial + network connection 10 application	**CX-LITE-E10Vx.xx-N**

Functions

Program integration	• Integration in VBA and Visual Basic via ActiveX® components • Supports the use of ActiveX® components of other suppliers
Application	Application-based display of PLC and OPC Server data with the features of MS Office products as well as VBA and Visual Basic
OPC functions	• Synchronous or Asynchronous communication • Reading from cache or device • Subscription update rates starting from 100 milliseconds
Standard controls	• 7 Segment- and Display control to display data in multiple formats • Toggle button, Rotary Knob, Thumbwheel control and LED Indicator to write a value with a single click and to visualize the value at the same time • Linear- and Rotational Gauge that can display data in a graphical way • Data Logging, Timer and Linker controls to log data, trigger actions and connect third party ActiveX® controls

PC-based visualisation

CX-Supervisor

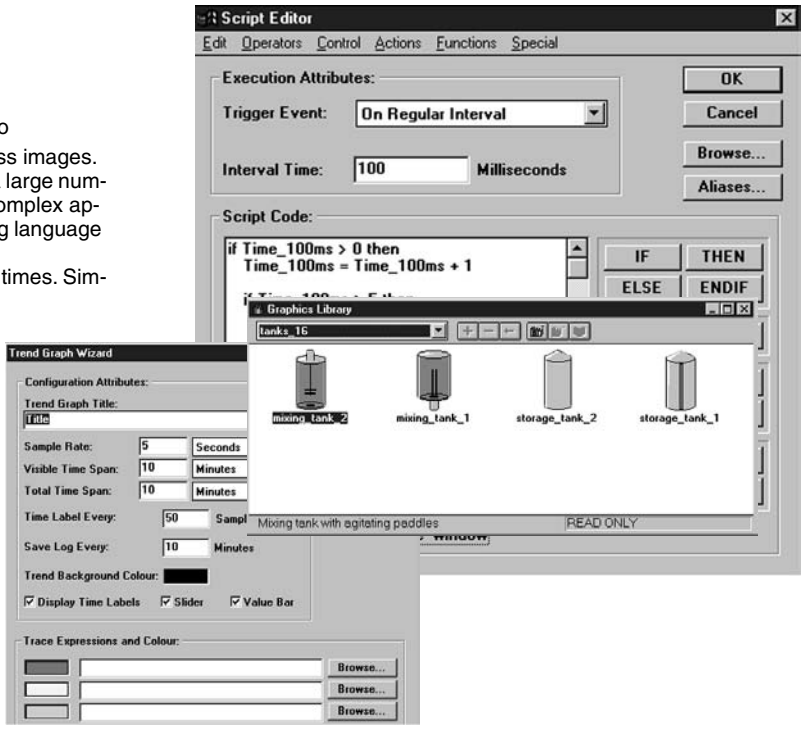
SCADA for your machine

PC based HMI for demanding machine applications

Key features

Process visualising with outstanding price/performance ratio

- Powerful functions can be used to create animated process images.
- Simple applications can be created rapidly with the aid of a large number of predefined functions and libraries, and even very complex applications can be generated with the powerful programming language (Scripts).
- A clear, straightforward structure minimises familiarisation times. Simple, intuitive handling and high user friendliness
- Versatile test and documentation facilities.
- OPC allows connections to Version 2 OPC Servers.
- Database support for SQL, ODBC, MS Access, MS Excel, dBase, CSV and more.
- Importing ActiveX® components makes it possible to create flexible applications and extend functionality.



General Data

	Specification
Number of process points	8,000
Number of process images	No limit
Supported PLC systems	CS1, CJ1, SRM1, CPM, C20, CXxK, CXxH, C20P, CQM1, CQM1H, C200H/-HS/-HX/-HG/-HEC500, C1000H, C2000H, CV/CVM1
Supported OMRON controllers	E5AF-A/-H, E5EF-A/-H/-BA/-BAH, E5AJ-A, E5AK-A/-PRR, E5EK-A/-PRR, E5AX-LA/-MA/-PRR
Communication	• Peripheral port and SYSMAC NET Host Link interface via COMx • SYSMAC Link • Controller Link • Ethernet • Modem • DDE • OPC (Client) • ActiveX®

Product Overview

	Description	Model code
Program	Developmet package	CX-SUPERVISOR-VX.XX
	Runtime CD + runtime token (3.5' floppy disc)	CX-SUPERVISOR-RUN-TOK-Vx.xx
	Runtime CD + runtime dongle (parallel port)	CX-SUPERVISOR- RUN-HL-Vx.xx
	Runtime CD + USB key	CX-SUPERVISOR-RUN-USB-Vx.xx
	Runtime token only (3.5' floppy disc)	CX-SUPERVISOR-TOK-Vx.xx
	Runtime dongle only (parallel port)	CX-SUPERVISOR-HL-Vx.xx
	Runtime USB key only	CX-SUPERVISOR-USB-Vx.xx
	Demo version limited to 2 hours runtime.	CX-SUPERVISOR-DEMO2-Vx.xx

Functions

Programming types	• Predefined functions and graphic elements (libraries, animation editor) • Script language for solving complex control and data processing tasks • VBA and JAVA scripts can be imported • Active components can be incorporated with the ActiveX® property browser • HTML texts can be imported/displayed with Internet Explorer functionality (V.5.0 or higher)
Edit options	Toolbars for creating and aligning graphic elements; libraries with a wide choice of predefined modules (Wizard function) Project Editor: Manages the process images you have created Points Editor: Creates and manages process points and internal variables Animation Editor: Assigns display variables, colour changes, movement etc. to graphic objects Alarm Editor: Assigns alarm limits/ranges to process points and internal variables Data block Editor: Creates and manages Data block files, online downloading to the PLC Script Editor: A powerful programming language with graphic and mathematical functions and commands for program control, file management etc.
Mathematical functions	trigonometric, logarithmic and arithmetic functions
Math operators	+, -, *, /, %, =, <, >, <=, >=, !=, ==
Logical operations	AND, OR, NOT, TRUE, FALSE
Conditional program execution	IF-THEN-ELSE/ELSEIF, SELECT CASE
Display functions	Variables, text, date, time, comprehensive object animation options
Graphic functions	Straight line, rectangle, polygon, circle (outline or filled-in); bar chart, trend chart, scatter graph, display instruments, bitmap, OLE
Special functions	Keyboard input, write/read CSV file, program launch, Data block manager, alarms, password entry/verification with different authorisation levels, DDE/NetDDE/COM/DCOM/OPC-link to other WINDOWS applications, data logging, parameter transfer with ActiveX® events.
Documentation	• User-definable comments on all process points and internal variables • Printout of process images, variables lists, scripts etc.
Test options	Error Logger, Debugger

PC-Based visualization

Computer hardware and software requirements

Supported operating systems		Windows 2000, XP and NT4.0 (Service Pack 5 and later)
Processor		Min. Pentium with 200 MHz or higher, Recommended 800 MHz or higher with Multithreading.
Memory requirements	Hard disk	40 MB of free memory space
	RAM	Min. 64 MB, 256 MB recommended
Screen		VGA graphic, SVGA graphic with 1024x768 or higher recommended
Peripheral connections[1]		1.44 MB disk drive COMx serial port Mouse Parallel printer port (any WINDOWS supported printer)

[1] Peripheral connection only needed for CX-Supervisor

Ordering Information

Part number	Description
CX-SUPERVISOR-VX.XX	Developmet package
CX-SUPERVISOR-RUN-TOK-Vx.xx	Runtime CD + runtime token (3.5' floppy disc)
CX-SUPERVISOR- RUN-HL-Vx.xx	Runtime CD + runtime dongle (parallel port)
CX-SUPERVISOR-RUN-USB-Vx.xx	Runtime CD + USB key
CX-SUPERVISOR-TOK-Vx.xx	Runtime token onloy (3.5' floppy disc)
CX-SUPERVISOR-HL-Vx.xx	Runtime dongle only (parallel port)
CX-SUPERVISOR-USB-Vx.xx	Runtime USB key only
CX-SUPERVISOR-DEMO2-Vx.xx	Demo version limited to 2 hours runtime.
CX-LITE-EVx.xx-S	Microsoft Excel interface to serial connection only single application
CX-LITE-E03Vx.xx-S	Microsoft Excel interface to serial connection 3 applications
CX-LITE-E10Vx.xx-S	Microsoft Excel interface to serial connection 10 application
CX-LITE-EVx.xx-N	Microsoft Excel interface to serial+ network connection single application
CX-LITE-E03Vx.xx-N	Microsoft Excel interface to serial + network connection 3 applications
CX-LITE-E10Vx.xx-N	Microsoft Excel interface to serial + network connection 10 application
CX-OPC-EVx.xx-S	OPC server to serial connection single application
CX-OPC-E03Vx.xx-S	OPC server to serial connection 3 applications
CX-OPC-E10Vx.xx-S	OPC server to serial connection 10 application
CX-OPC-EVx.xx-N	OPC server to serial+ network connection single application
CX-OPC-E03Vx.xx-N	OPC server to serial + network connection 3 applications
CX-OPC-E10Vx.xx-N	OPC server to serial + network connection 10 application

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. P14E-EN-03A

In the interest of product improvement, specifications are subject to change without notice.

Information

Discontinued Products

OMRON continuously updates its lineup of products. As a consequence, the production of older products that no longer meet market requirements, or which can be replaced by a next generation of products, will be discontinued. The following tables list the products that have been or will be discontinued.

Note: Refer to information in this and other relevant catalogs and manuals for information on the recommended replacement product.

Programmable Controllers

Name	Discontinued models	Recommended replacement
CJ Series	CJ1G-CPU44 CJ1G-CPU45	CJ1G-CPU44H CJ1G-CPU45H
	CJ1W-AD081	CJ1W-AD081-V1
	CJ1W-CLK21	CJ1W-CLK21-V1
	CJ1W-SCU21 CJ1W-SCU41	CJ1W-SCU21-V1 CJ1W-SCU41-V1
CPM1 Series	CPM1-20EDR	CPM1A-20EDR1
	CPM1-□0CDR-□	CPM1A-□0CDR-□-V1
CPM1A Series	CPM1A CPU Unit	CPM1A-V1
	CPM1A-20EDR	CPM1A-20EDR1
CPM2B Series	CPM2B-S001M-DRT	CPM2B-S001M-DRT-V1
CPM2C Series	CPM2C-CIF01	CPM2C-CIF01-V1
CQM1H/CQM1 Series	CQM1-CPU□	CQM1H-CPU□
	CQM1-LSE01/02	Ask your OMRON representative
	CQM1-SEN01	---
	CQM1-TU001	---
	CQM1H-CPU42	CQM1H-CPU51 + CQM1H-AVB41
	CQM1H-CPU43	CQM1H-CPU51 + CQM1H-PLB21
	CQM1H-CPU44	CQM1H-CPU51 + CQM1H-ABB21
CS Series	CS1D-LCB05D	CS1D-CPU65P CS1D-CPU67P
	CS1G-CPU□□ (E)V1 CS1H-CPU□□ (E)V1	CS1G-CPU□□H CS1H-CPU□□H
	CS1W-AD041 CS1W-AD081	CS1W-AD041-V1 CS1W-AD081-V1
	CS1W-CLK11	CS1W-CLK12-V1
	CS1W-CLK12 CS1W-CLK52	CS1W-CLK12-V1 CS1W-CLK52-V1
	CS1W-CLK21	CS1W-CLK21-V1
	CS1W-DRM21	CS1W-DRM21-V1
	CS1W-ETN11	CS1W-ETN21
	CS1W-FLN12	CS1W-FLN22
	CS1W-HCP22 CS1W-HCA22 CS1W-HIO01	CS1W-HCP22-V1 CS1W-HCA22-V1 CS1W-HIO01-V1
	CS1W-MC221 CS1W-MC421	CS1W-MC221-V1 CS1W-MC421-V1
	CS1W-PTS01	CS1W-PTS01-V1
	CS1W-SCB21 CS1W-SCB41 CS1W-SCU21	CS1W-SCB21-V1 CS1W-SCB41-V1 CS1W-SCU21-V1
Memory Cassette for Teaching Box	CVM1-MP702 CVM1-MP703	CVM1-MP702-V1 CVM1-MP703-V1
CVM1/CV500 Series	CVM1-PRS21-V1 CVM1-PRO01 CVM1-MP201-V1	CVM1-PRS21-V2 CVM1-PRO01-V1 CVM1-MP201-V2
Floppy Disk Drive	CV500-FDD01/02	---
Memory Card Adapter	CV500-MCA01	---
GPC CV-series System Memory Cassette	CV500-MP311(-E)	WS02-CXPC□-□V□
SYSNET Link Unit	CV500-SNT31	Ask your OMRON representative
CV500 Unit	CV500-VP213(-E) CV500-VP217(-E) CV500-VP223(-E) CV500-VP227(-E) CV500-FHD01(-E) CV500-FHD02(-E) CV500-HDD11-V1 CV500-MR261/-MP602 CV500-BC105 CV500-CN116 CV500-ISX01 CV500-ISP01/02 CV500-ISB01/02	---

Name	Discontinued models	Recommended replacement
MC Support Software	CV500-ZN3AT1-E CV500-ZN3DV1 CV500-ZN3PC1	WS02-MCTC1-JV□ WS02-MCTC1-EV□
C1000H/C2000H/C500 CPU Unit	C1000H-CPU01-V1 C1000H-CPU01-EV1 C1000H-CPU01-E2V1 C2000H-CPU01-V1 C2000H-CPU01-EV1 C2000H-CPU01-E2V1 C500-CPU11-V1/-E2V1 C500-CPUK1 3G2C3-CPU11-EV1	CS1G-CPU42H/43H CS1G-CPU44H/45H CVM1-CPU01-V2/EV2 CVM1-CPU11-V2/EV2 CVM1-CPU21
C120 Unit (Input/Output/ Dummy/Spacer)	C120-DUM01 C120-IA121/-IA222 C120-ID212 C120-OC223 C120-OD211/-OD212 C120-SP001	CJ Series
C200H Series	C200H-APS01/02	Ask your OMRON representative
	C200H-ETL01(-E)	---
	C200H-FIM01	---
	C200H-FIM02 FIMC2-SET02	CJ Series
	C200H-ID□□□-N C200H-OD□□□-N C200H-MD□□□-N	C200H-ID□□□ C200H-OD□□□ C200H-MD□□□
Microwave ID Sensor Unit/ ID Adapter	C200H-IDS21 C500-IDS21/-IDS22 C500-IDA22	CS1W-SCU21-V1 CS1W-SCB21/41-V1
C200HS Series CPU Unit	C200HS-CPU01(-E) C200HS-CPU03(-E) C200HS-CPU21(-E) C200HS-CPU23(-E) C200HS-CPU31(-E)	CS Series CJ Series C200HX/HG/HE
	C200HS-CPU01-(E)C C200HS-CPU21-(E)C C200HS-CPU33-(E)C	CS Series CJ Series C200HG-CPU43(-Z) C200HG-CPU43-(Z)E C200HW-PA204S C200HW-PD024
SYSNET Link Unit	C200HS-SNT32	Ask your OMRON representative
SYSMAC C200HX/HG/HE PC Card Unit Ethernet Set	C200HW-PCS01-V1 C200HW-PCS01-EV1	CS Series
	C200HW-PCS01-V2	CS Series
C200HX Series CPU Unit	C200HX-CPU34D C200HX-CPU64D	C200HX-CPU34 C200HX-CPU64
Open PLC	C200PC-CPU01-R C200PC-CPU15-G	---
	C200PC-CPU01-R-V1 C200PC-CPU15-G-V1, and peripheral devices	---
C-Series Optical Host Link Unit (for Large-size PLCs)	C500-LK101-(P)V1 C500-LK103(-P) 3G2A5-LK101-(P)EV1	C200H-LK101-PV1
GPC C Series Ladder-type System Memory Cassette	C500-MP303-EV2	SYSMAC Support Software
Voice Unit/Voice Memory Unit	C500-OV001 C500-MP501-H C500-MP501-T C500-MP503-T C500-MP504-T C200H-OV001 C200H-CN224	---
SYSNET Link Unit	C500-SNT31-V4	Ask your OMRON representative
C**□ Series	C□□H C□□K C□□P	CPM2A CPM1A
Logic I/O Package	FIT10-MF301	---
FIT10 Voice Package	FIT10-MF321	---
FIT10 Terminal Package	FIT10-MF331-V2	---
FIT10 NC Package	FIT10-MF341-V2	---

Name	Discontinued models	Recommended replacement
Memory Card for CS/CJ Series	HMC-EF171/-EF371	HMC-EF372
	HMC-EF172	HMC-EF372
	HMC-EF571	HMC-EF672
	HMC-EF861	HMC-EF372
Memory Card for CV/CVM1	HMC-EP161	HMC-EE151
Memory Card	HMC-ES251/551	HMC-ES252/552
Memory for P5R/V8/M5R	ROM-G/-GA/-F5 RAM-F	---
Memory	ROM-ID-B	ROM-IB ROM-JD-B
SP10/SP16/SP20	SP10-ETL01 SP16-ETL01 SP20-ETL01	---
H-PCF Optical Fiber Cable Tester Set/Master Fiber Set	S3200-CAT2700/2702	---
	S3200-CAT3200/3201 S3200-CAT3202/ S3200-CAT2000/2001H S3200-CAT2002/2822	---
H-PCF Optical Fiber Cable Tester Heat Unit	S3200-CAT2820/2821	---
H-PCH Optical Connector	S3200-COCF2511/2011	S3200-COCF2571/2071
	S3200-COCH62M S3200-COCF62M/62F	---
Optical Connector Assembly Tool	S3200-CAK1062	---
SYSNET Power Supply	S3200-CPS05	Ask your OMRON representative
SYSNET Optical Fiber Cable	S3200-FH-L-C22T-□□□	---
H-PCF Optical Fiber Cable Some models)	S3200-HBCB101/102/103 S3200-HBCB501/502 S3200-HCCB101N/102N S3200-HCCB501N/502N	S3200-HCCB101/102/103 S3200-HCCB501/502
H-PCF Cable for SYSNET (Without Connector)	S3200-HCLB101/102/103 S3200-HCLB501/502 S3200-HCLO101/102/103 S3200-HCLO501/502	S3200-CN102-□□-□□ S3200-CN-□□-□□
SYSNET Line Server	S3200-LSU03-V1/-01E	Ask your OMRON representative
SYSNET NSB	S3200-NSB03-V2/11-E	Ask your OMRON representative
SYSNET NSU	S3200-NSUA1-10/-00E	Ask your OMRON representative
SYSNET Bridge	S3200-NSUG4-10/-00E	Ask your OMRON representative
C500 Series and other Units	T1000H-LK203 T1000H-IP006-V1 T1000H-TLK01 3G2T4-ID218 3G2T4-OA122/222 3G2T4-OC221/223/224 3G2T4-OD214/412/413 3G2T8-CN150 3G2T9-IP005-V2 3G2T9-PRO30 C500-DA101-T T200H-CPU01 T200H-ID212 T200H-OA221 T200H-OC225 T200H-OD212 C200HS-TLK01	CVM1 Series CS Series
	3G2A5-LD211	---
	C500-LD211	---
Cassette Interface Unit	3G2A5-CMT01(-E)	---
Programming Console	3G2A6-PRO20-E	---
GPC C2000 Series Ladder-type System Memory Cassette	3G2C5-MP304-EV3	SYSMAC Support Software
SYSMAC LINK Support Board	3G8F4-SLK21 (for PC98)	3G8F7-SLK21 (for PCI bus) 3G8F5-SLK21 (for ISA bus)
Controller Link Support Board	3G8F5-CLK11(-E)	3G8F7-CLK12 (-E)
NSB for SYSNET	3G8F5-SNT31	Ask your OMRON representative
Controller Link Support Board	3G8F7-CLK21(-E) 3G8F7-CLK12(-E) 3G8F7-CLK52(-E)	3G8F7-CLK21- (E)V1 3G8F7-CLK12- (E)V1 3G8F7-CLK52- (E)V1

Note: The contents of the above table may differ slightly from similar information provided on the Internet.

Wiring Devices

Name	Discontinued models	Recommended replacement
CompoBus/S Slave	SRT1 Series Only SRT2-supporting models	SRT2 Series

Note: The contents of the above table may differ slightly from similar information provided on the Internet.

I/O Relay Terminals

Name	Discontinued models	Recommended replacement
G700 Remote Terminal	G700-EOD32-1 G700-SOC04(-C)	---
G730-□□□□C (Remote Sensor Terminal 4-point/8-point)	G730-ID04C(-A/-B) G730-ID08C(-B)	SRT2-ID08S/-ND08S
G730-M/N Master Module Unit/ G730 Harness Adapter for Master Module	G730-MID32-B G730-MOD32(-A/-B) G730-NID32(-B) G730-NOD32(-B) G730-Y10(-1)	---

Note: The contents of the above table may differ slightly from similar information provided on the Internet.

Connectors

Name	Discontinued models	Recommended replacement
FA Connectors	SC-4F4/-4F	SC-4F4D/-4FD
Servo Relay Units	XW2B-20J6-1	XW2B-20J6-1B
	XW2B-40J6-2	XW2B-40J6-2B
	XW2B-20J6-3	XW2B-20J6-3B

Programmable Terminals

Name	Discontinued models	Recommended replacement
NS Series Ladder Monitor for Programmable Terminal	NS-EXT01	NS-EXT01-V2
	NS-EXT01-HMC	NS-EXT01-V2HMC
	NS-EXT01-L03	NS-EXT01-V2L03
	NS-EXT01-L10	NS-EXT01-V2L10
NS Series Memory Expansion Board	NS-MF081 NS-MF161	---
Programmable Terminal NS Series	NS7-SV00(B) NS7-SV01(B)	NS8-TV10(B)-V1 NS8-TV11(B)-V1
	NS8-TV0□□-V1	NS8-TV1□□-V1
	NS10-TV00(B) NS10-TV01(B)	NS10-TV00(B)-V1 NS10-TV01(B)-V1
	NS12-TS00(B) NS12-TS01(B)	NS12-TS00(B)-V1 NS12-TS01(B)-V1
Programmable Terminal NT10S	NT10S-SF121(-E) NT10S-SF122(-E)	---
	NT10S-ZA□□□	---
Programmable Terminal NT11S	NT11S-SF121(B)	NT11-SF121(B)-EV1
	NT11S-ZA3AT-EV1	NT-ZJCAT1-EV4
Connecting Cable for NT Series	NT20M-CNP222/712	---
Key Sheet for NT20M	NT20M-CKF01	---
NT20M Expansion I/O Unit	NT20M-IF001	---
	NT20M-MD211	---
NS-Designer Version Software	NS-NSDC1-JV1	NS-NSDC1-V6
	NS-NSDC1-JV2 NS-NSDC1-EV2	NS-NSDC1-V6
	NS-NSDC1-V3	NS-NSDC1-V6
	NS-NSDC1-V4	NS-NSDC1-V6
NT30/620 System Installer	NT-ZS3AT-EV1 NT30-ZS3DV-V1 NT620-ZS3AT-EV1 NT620-ZS3AT-EMV1 NT620-ZS3PC-V1	NT-ZJCAT1-EV4 NT-ZJCMX1-V4
Programmable Terminal Korean-version NT30C/620C (with black casing only)	NT30C-ST141B-EK NT620C-ST141B-EK	NT31C-ST141-EKV1 NT631C-ST141-EKV1
Programmable Terminal NT31/NT31C	NT31-ST121(B)-(E)V2	NT31-ST122(B)-(E)V2
	NT31C-ST141(B)-(E)V2	NT31C-ST142(B)-(E)V2
Key Sheet for NT600M	NT600M-CKF01	---
Dust-proof Chemical-resistant Cover for NT600M	NT600M-KBA02	---
NT600M Communications Interface	NT600M-LPM31	---
NT600M Expansion I/O Unit	NT600M-MD211	---
Communication System ROM for NT600M	NT600M-SMR05	---
NT600MS System ROM (Host Link)	NT600MS-SMR31	---
Programmable Terminal NT600MV/NT610C	NT600MV-DT211 NT600MV-SMR06V	---
	NT610C-DT151(B)-V2	NT631C-ST152(B)-V2
NT610C Water- and Oil-resistant Kit	NT610C-KBA03	---
Programmable Terminal NT610C/NT610G	NT610C-SMR□□	---
	NT610G-DT211	NS8-TV10-V1
Image Memory Board for NT610G	NT610G-MF151/251 NT610G-MF551/161	---
System ROM for NT610G	NT610G-SMR01/02/03/08	---
	NT610G-SMR31/32/33/34	---

Name	Discontinued models	Recommended replacement
Programmable Terminal NT612G Series	NT612G-DT211(B)	NT620S-ST211(B) NS10-TV00(B)-V1 NS8-TV10-V1
Programmable Terminal NT625C Series	NT625C-ST152(B)	NT631C-ST152(B)-V2

Note: The contents of the above table may differ slightly from similar information provided on the Internet.

Software

Name	Discontinued models	Recommended replacement
Open Network Controller Optional Software Data Collection and Distribution Software	ITNC-DL1Q-EF	ITNC-DL1Q-ECD-V2
	ITNC-DL1Q-F	ITNC-DL1Q-CD-V2
Open Network Controller Optional Software Website and Mail Service Software	ITNC-WE1Q-EF	ITNC-RK1Q-ECD
FINS Gateway Version2 LAN Time	SFGW-RT-V2(E) SFGW-RT-HLV2(E)	SFGW-RT-2003(E)
	SFGW-SDK-V2(E)	SFGW-SDK-2003(E)
SYSMAC-CPT	WS01-CPTC1-J WS01-CPTF1-J WS01-CPTB1-E	CX-Programmer WS02-CXPC□
CX-Programmer	WS02-CXPC1-E-V3□ WS02-CXPC1-EUP-V3□	WS02-CXPC1-E-V□□ WS02-CXPC1-EUP-V□□
	WS02-CXPC1-JV3 WS02-CXPC2-JV3	WS02-CXPC1-JV□ WS02-CXPC2-JV□
	WS02-CXPC1-JV4	WS02-CXPC1-JV□
CX-Process	WS02-LCTC1-E□□	WS02-LCTC1-EV□□□
	WS02-LCTC1-J□	WS02-LCTC1-JV□□
	WS02-LCTC1-JV3	WS02-LCTC1-JV□
	WS02-LCTC1-EV3	WS02-LCTC1-EV□
MC Support Tool	WS02-MCTC1-J WS02-MCTC1-E	WS02-MCTC1-JV□ WS02-MCTC1-EV□
MC Support Software CX-Position	WS02-NCTC1-J WS02-NCTC1-E	WS02-NCTC1-JV□ WS02-NCTC1-EV□
Face Plate Auto-Builder for NS	WS02-NSFC1-J WS02-NSFC1-E	WS02-NSFC1-JV□ WS02-NSFC1-EV□

Note: The contents of the above table may differ slightly from similar information provided on the Internet.

Field Network Devices

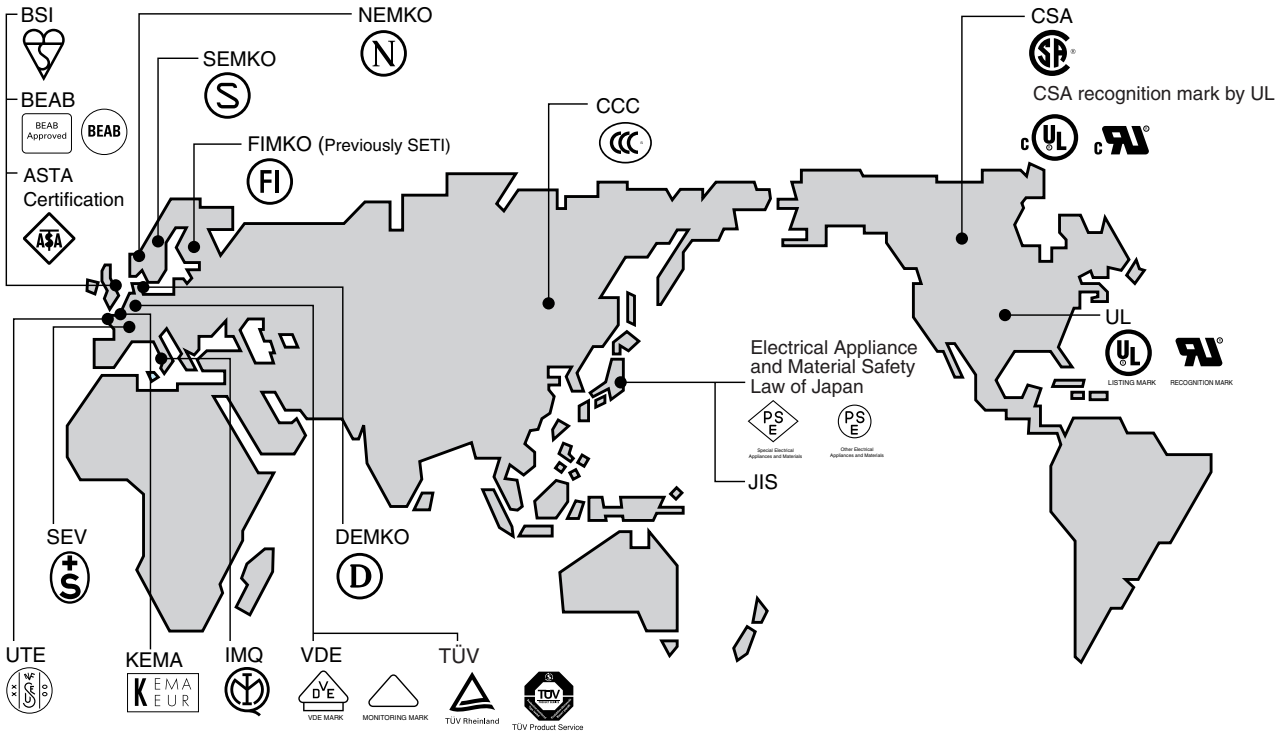
Name	Discontinued models	Recommended replacement
Remote Terminal	DRT1-ID16T(A) DRT1-ID16T(A)-1 DRT1-OD16T(A) DRT1-OD16T(A)-1 DRT1-MD16T(A) DRT1-MD16T(A)-1	DRT2-ID16TA DRT2-ID16TA-1 DRT2-OD16TA DRT2-OD16TA-1 DRT2-MD16TA DRT2-MD16TA-1
	DRT1-ID32ML DRT1-ID32ML-1 DRT1-OD32ML DRT1-OD32ML-1 DRT1-MD32ML DRT1-MD32ML-1	DRT2-ID32ML DRT2-ID32ML-1 DRT2-OD32ML DRT2-OD32ML-1 DRT2-MD32ML DRT2-MD32ML-1
Battery Unit	3G8B3-BA000	---
DeviceNet Configurator PC Card-type	3G8E2-DRM21-E	3G8E2-DRM21-EV1
DeviceNet Configurator	3G8F5-DRM21-E	3G8F7-DRM21-E + WS02-CFDC1-E

The contents of the above table may differ slightly from similar information provided on the Internet.

Standards

National Standards

Note: For detailed information about applicable standards, refer to the relevant catalog.



International Standards

International Standards consist of the IEC standards for electricity and the ISO standards for other areas.

IEC (International Electrotechnical Commission)

- The IEC is a standardization commission founded in 1908 to promote unification and coordination of international standards relating to electricity. It is headquartered in Geneva, Switzerland.
- Based on reports from member nations on the latest science technologies in those nations, IEC standards are issued as technological standards relating to electricity. Established international safety standards provided by various countries and accepted worldwide are based on IEC standards.
- Among the authoring committees for IEC standards is the CISPR (International Special Committee on Radio Interference). This committee is responsible to author standards for EMC (Electro-Magnetic Compatibility).
- In order to simplify approval procedures for electrical devices and promote smooth international trade, there is an international scheme called CB Scheme (Certification Body Scheme), which is authorized by IEC standards. Based on the CB Scheme, safety tests on electrical devices are conducted and certificates are issued if the devices are proved to meet IEC standards.

ISO (International Organization for Standardization)

The ISO is a standardization commission that officially started activities in 1947 to promote unification and coordination of international standards in all fields (such as machinery and management) except for electricity, which is covered by the IEC. The ISO issues ISO standards, and is headquartered in Geneva, Switzerland.

North America

UL (Underwriter's Laboratories Inc.)

LISTING MARK

RECOGNITION MARK

- A nonprofit organization established in 1894 by the American association of fire insurance companies.
  Underwriters Laboratories (abbreviated to UL hereafter) conducts approval testing on all kinds of electrical products. In many U.S. cities and states, UL approval is legally required on all electrical items sold. In order to obtain UL approval on an electrical product, all major internal components also require UL approval.
- UL offers two classifications of approvals, the listing mark and the recognition mark.
  A Listing Mark constitutes an approval of a complete and final product. Products display the Listing Mark shown at the left above.
  A Recognition Mark constitutes an approval of a product built into a device or machine. Products display the Listing Mark shown at the right above.

- Since October 1992, UL has been approved as a CO (council organization) and TO (test organization) by the SCC (Standard Council of Canada). This authorizes UL to conduct safety tests and certify products conforming to Canadian standards. The above marks are UL marks for products certifying that the products meet Canadian standards.
- The designs of the listing marks and recognition marks have been revised as shown below. These marks have been effective since November 1998. The previous marks are valid until November 2007.

LISTING MARKS

	Marks for US	Marks for Canada	Marks for US and Canada
Previous mark			
New mark			

RECOGNITION MARKS

	Marks for US	Marks for Canada	Marks for US and Canada
Previous mark			
New mark			

CSA (Canadian Standards Association)

- This association descended from a nonprofit, non-government standardization organization established in 1919. In addition to industrial standardization, the association now carries out safety testing on electrical products.
- Specification authoring: The Canadian Standards Association
- Product testing and certification: CSA International
- CSA approval is known as “certification,” and consequently, CSA-approved equipment is referred to as “certified equipment.” Products display the mark shown below.

Europe

EN (Europäische Norm = European Standard)

- Of the EN standards, EN6xxxx standards are based on IEC standards and EN55xxx standards are based on IEC-CISPR standards. Other EN5xxxx standards are unique European standards not found in IEC standards.
- The marks of the Certification Bodies based on the EN standards in individual countries are shown below.

VDE (Verband der Elektrotechnik Elektronik Informationstechnik e. V.), Germany

VDE MARK

MONITORING MARK

TÜV (Technischer Überwachungs Verein e. V.), Germany

TÜV Rheinland

TÜV Product Service

DEMKO (Danmarks Elektriske Materielkontrol), Denmark

NEMKO (Norges Elektriske Materiellkontroll), Norweign

FIMKO (Finlands Material Kontroll), Finland

BSI (British Standards Institution)
(applicable to industrial products), United Kingdom

BEAB (British Electrotechnical Approvals Board)
(applicable to home electronics products), United Kingdom

BEAB Approved

BEAB

ASTA (ASTA Certification Services)
(applicable to general products), United Kingdom

KEMA (Keuring van Electrotechnische Materialen Nederland B. V.), Netherlands

KEMA EUR

UTE (Union Technique De Electricite), France

IMQ (Istituto Italiano del Marchio di Qualita), Italy

SEMKO (Svenska Elektriska Materielkontroll Anstalten), Sweden

SEV (Schweizerischer Electrotechnischer Verein), Switzerland

EC (European Community) Directives



CE MARKING

- EC directives are officially announced to direct the establishment of laws and regulations for the member countries of the EU (European Union).
- Under one of the EC Directives called the New Approach Directive that covers the Machinery Directive, Low Voltage Directive, and EMC Directive, and other directives, a product must comply with all applicable directives to display the CE marking. Evaluation of compliance with the directives is based on EN standards released as Harmonized Standards in the Official Journal of the European Communities.

China

CCC (China Compulsory Certification) Mark



CCC MARK

- When China joined the WTO (World Trade Organization) in 2001, the certification system for export products and the certification system for nationally distributed products were combined into a new system called the China Compulsory Certification System. The new system was officially announced on 3 December 2001 and started operation on 1 May 2002. From 1 May 2003, importing to or selling products in China is prohibited for any products that have not been certified under the new system.
- Items for compulsory certification: 19 groups divided into totally 132 product categories are specified as initial items.
- Applicable standards: GB (Guojia Biaozhun) Chinese National Standards (Electrical standards are based on IEC standards.)
- Compulsory Certification Mark: Displaying the CCC Mark is required.

Shipping Standards

There are more than 20 maritime societies in the world that independently establish standards and undertake certification activities. There is also an international organization called the IACS (International Association of Classification Societies). At present, the IACS has 10 members and two associate members. The member societies of the IACS certify and register approximately 90% of the ships in the world.

The ship class is specified by the owner of the ship and the manufacturer undergoes certification according to the request of the owner. Certification for a ship class is closely related to maritime insurance. Only ships that are certified for a specific ship class will be handled by underwriters. Ships without a class will not be underwritten.

It is thus necessary for all automated devices on a ship to comply with the maritime standards of each country according to the request of the owner.

Although common requirements for results from test implemented by the various maritime societies is recognized between societies, there are differences in standards between societies that make mutual certification impossible. The required maritime standards must thus be meet, and to register with two or more ship classes requires certification in all of the classes.

Members of the IACS

- ABS (American Bureau of Shipping), USA
- BV (Bureau Veritas), France
- CCS (China Classification Society), China
- DNV (Det Norske Veritas), Norway
- GL (Germanischer Lloyd), Germany
- KR (Korean Register of Shipping), Korea
- LR (Lloyd's Register of Shipping), United Kingdom
- NK (Nippon Kaiji Kyokai), Japan
- RINA (Registro Italiano Navale), Italy
- RS (Russian Maritime Register of Shipping), Russia

Associate Members of the IACS

- CRS (Croatian Register of Shipping), Croatia
- IRS (Indian Register of Shipping), India

Other Maritime Societies

- CR (China Corporation Register of Shipping), China

Japan

Electrical Appliance and Material Safety Law of Japan



Special Electrical Appliances and Materials



Other Electrical Appliances and Materials

- Laws governing electrical appliances and materials were revised on 1 April 2001 with the Electrical Appliance and Material Safety Law and previous laws were abolished. New marks were also implemented with the new law. The law covers 112 special items and 340 other items.
- Paragraph 2 in the Ordinance Concerning Technical Requirements for Electrical Appliances and Materials establishes technical standards (IEC-J) in line with IEC standards.

JIS (Japanese Industrial Standards)

- National standards in Japan are established according to the Industrial Standardization Law. Particularly from 1995, many standards have been established in line with international IEC and ISO standards.

Enclosure Ratings (as of July 2002)

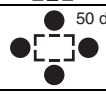
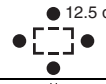
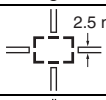
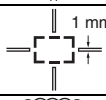
Note: The following test methods were used for IP-□□ standards. Confirm protection prior to application using the environment and operating conditions that will exist in the actually application.

IEC (International Electrotechnical Commission) Standards (IEC 529)

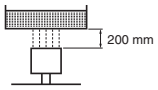
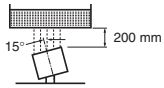
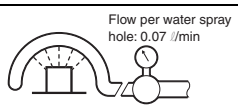
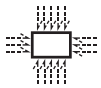
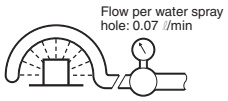
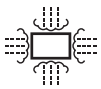
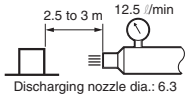
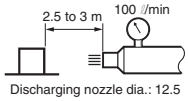
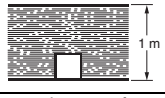
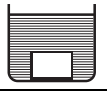
IP - □ □
1 2

Protection Specification Code
(International Protection) (IEC529)

1. Protection Against Solid Foreign Objects

Grade	Protection	
0		No protection
1		Full penetration of hard object with 50-mm diameter (e.g., hand) not allowed.
2		Full penetration of hard object with 12.5-mm diameter (e.g., finger) not allowed.
3		Full penetration of wire or hard object with 2.5-mm diameter not allowed.
4		Full penetration of wire or hard object with 1.0-mm diameter not allowed.
5		Ingress of dust to the extent that would interfere with normal operation or safety not allowed.
6		Totally protected against ingress of dust.

2. Protection Against Harmful Ingress of Water

Grade	Protection	Criteria	Examination method
0	No particular protection	No protection again ingress of water.	No test
1	Protection against water drops 	Protected against vertically falling drops of water.	Spray water downwards in vertical direction for 10 minutes usng a water-dripping test device. 
2	Protection against water drops 	Protected against vertically falling drops of water with enclosure tilted 15° from the vertical.	Tilt by 15° and spray water for 10 minutes (2.5 minutes in each direction) using a water-dripping test device. 
3	Protection against water spray 	Protected against sprays to 60° from the vertical.	Spray water up to 60° in both directions from the vertical axis for 10 minutes using the test device shown below. 
4	Protection against water splashes 	Protected against water splashed from all directions; limited ingress permitted.	Spray water from all directions for 10 minutes using the test device shown below. 
5	Protection against water jets 	Protected against adverse affect from low-pressure jets of water from all direction.	Spray water from all directions for one minute per m² of external surface area and for a total time of no less than 3 minutes using the test device shown below. 
6	Protection against water jets 	Protected against ingress of water strong jets of water from all directions.	Spray water from all directions for one minute per m² of external surface area and for a total time of no less than 3 minutes using the test device shown below. 
7	Protection against immersion under water 	Protected against the effects of immersion under water at the specified depth and for the specified period of time.	Submerge for 30 minutes at the depth of 1 m (if the device is 850 mm or less in height). 
8	Protection against prolonged immersion under water 	Protected against long periods of immersion under water.	Test according to the conditions agreed upon between the manufacturer and user.

JEM (Japan Electrical Manufacturers Association Standards) Standards (JEM 1030)

IP - □ □ □
1 2 3

3. Protection Against Oil

Grade	Protection	Criteria
F	Oil proof	Protected against improper operation due to oil drops or spray from any direction.
G	Oil resistant	Protected against penetration of oil drops or spray from any direction.

NEMA (National Electrical Manufactures Association)

Conversion from NEMA to IEC529 (Reverse conversion is not possible.)

NEMA250	IEC60529
1	IP10
2	IP11
3	IP54
3R	IP14
3S	IP54

NEMA250	IEC60529
4, 4X	IP56
5	IP52
6, 6P	IP67
12, 12K	IP52
13	IP54

Note: Based on the Appendix A of the NEMA Standard. Classification of the NEMA enclosure rating differs from that of the IEC529 in corrosion resistance, rust resistance, and watertightness.

Quality Management System (ISO9001) (July 2002)

Beyond simple product quality to a global enterprise-wide quality assurance system.

Quality Management System (ISO9001)

The Quality Management System (ISO9001) is an international standard for quality control and quality assurance established by the ISO (International Organization for Standardization). It sets forth the requirements for an enterprise-wide quality assurance system.

Quality Assurance Certification

For ISO9001 certification, considerations such as the structure of planning, design, and production, and the soundness of the quality assurance system are evaluated. An enterprise that conforms to the standards can receive a certificate of approval.





Internationally Accepted Standards

For overseas trade, including exports to EU markets, ISO9001 certification is internationally expected. Varying standards among countries complicate the smooth flow of products across borders, so ISO9001 is used to provide formal unified standards for participating EU countries.

Quality Assurance Considerations

One of OMRON's management principles is to maximize customer satisfaction.

Management Principles

- **Maximizing Customer Satisfaction**
  Maximizing customer satisfaction by offering superior products and services based on a Quality First approach.
- **Constant Challenges**
- **Shareholder Confidence**
- **Respect for the Individual**
- **Good Corporate Citizenship**
- **Highly Ethical Enterprise Activities**

These management principles determine the fundamental quality objectives as follows:

Fundamental Quality Objectives

- Achieving a level of quality that will provide customer satisfaction.
- Establishing a quality system based on ISO9001 and upgrading support.
- Maintaining quality assurance with the participation of all employees.

ISO9001 Certification Status

OMRON has been obtaining ISO9001 certification for all of its groups, and the following table shows the certification status. OMRON continues to put effort into a quality assurance system that will maintain its high standards of reliability worldwide.

Companies with ISO9001 Certification (Only Companies and Offices Related to Control Components Are Listed

Company/Office name	Date certified
OMRON CORPORATION IAB COMPANY FA Systems Div. H.Q. MISHIMA FACTORY	June 1994
OMRON CORPORATION IAB COMPANY Sensing Devices and Components Div. H.Q. AYABE FACTORY	December 1999
OMRON CORPORATION ECB COMPANY Electronic & Mechanical Components Division H.Q. Manufacturing Development Center	December 1992
OMRON CORPORATION AYABE FACTORY	October 1993
OMRON CORPORATION Automotive Electronic Components Division	March 2000
OMRON CORPORATION ECB COMPANY Semiconductor Division H.Q. MINAKUCHI FACTORY	April 1995
OMRON OKAYAMA CO.,LTD.	September 1994
OMRON ASO CO., LTD.	December 1994
OMRON TAKEO CO., LTD.	December 1993
OMRON IZUMO CO., LTD.	February 1994
OMRON KUMAMOTO CO., LTD.	April 1994
OMRON KURAYOSHI CO., LTD.	September 1993
OMRON SANYO CO., LTD.	July 1994
OMRON IIDA CO., LTD.	December 1995
OMRON ICHINOMIYA CO., LTD.	September 1993
OMRON (SHANGHAI) CO.,LTD. (CHINA)	December 1996
OTE ENGINEERING INC.	May 2000
OMRON MANUFACTURING OF THE NETHERLANDS B.V.	October 1993
OMRON ELECTRONICS MANUFACTURING OF GERMANY G.m.b.H.	December 1997
OMRON ELECTRONICS LTD. (UNITED KINGDOM)	October 1993
OMRON ELECTRONICS B.V. (NETHERLANDS)	January 1994
OMRON ELECTRONICS A.G. (SWITZERLAND)	April 2000
OMRON ELECTRONICS N.V./S.A. (BELGIUM)	September 1994
OMRON ELECTRONICS G.m.b.H. (GERMANY)	April 1996
OMRON EUROPE B.V. EUROPEAN LOGISTICS CENTER (NETHERLANDS)	June 1994
OMRON ELECTRONICS Ges.m.b.H. (AUSTRIA)	February 1999
OMRON ELECTRONICS Lda./S.A. (PORTUGAL/SPAIN)	August 1996
OMRON ELECTRONICS S.r.l. (ITALY)	April 1996
OMRON ELECTRONICS O.Y. (FINLAND)	February 1996
OMRON ELECTRONICS S.a.r.l. (FRANCE)	April 2001
OMRON ELECTRONICS LTD. (UNITED KINGDOM)	October 1997
OMRON ELECTRONICS PTY.LTD. (AUSTRALIA)	July 1996
OMRON ELECTRONICS CO.,LTD. (THAILAND)	May 2000
SHANGHAI OMRON AUTOMATION SYSTEM CO.,LTD.	April 2000
OMRON MANUFACTURING OF AMERICA, INC.	January 1997
OMRON MALAYSIA SDN. BHD.	April 1994
PT OMRON MANUFACTURING OF INDONESIA	May 1994
SHANGHAI OMRON CONTROL COMPONENTS CO.,LTD.	January 2002
OMRON ELECTRONIC COMPONENTS LTD. (SHENZHEN)	January 2002
OMRON ELECTRONIC COMPONENTS LTD. (UNITED KINGDOM)	August 1992
OMRON AUTOMOTIVE ELECTRONICS KOREA, CO.,LTD.	December 1999
OMRON DUALTEC AUTOMOTIVE ELECTRONICS INC. (CANADA)	May 1997
OMRON AUTOMOTIVE ELECTRONICS, INC. (USA)	May 1997

Environmental Management System (ISO14001) (July 2002)

Configuring a system that constantly reduces environment impact by utilizing environmentally friendly products and business activities.

Environmental Management System (ISO14001)

In contrast to ISO9001, which relates to the Quality Management System, ISO14001 deals with requirements for the Environmental Management System for enterprises and groups. Obtaining ISO14001 certification aims at reducing environment impact throughout the entire organization, and takes into consideration factors such as compliance with laws and regulations, disposal of waste materials, and saving energy.



In addition, it requires a commitment to preventing pollution and to continually improving the Environmental Management System and performance (with reductions in environmental impact).

Obtaining ISO14001 certification is becoming a condition for participation in business internationally, somewhat like an global business passport.

Considerations in Technological Development

OMRON is putting effort into developing technology for reducing environmental impact under the headings of the 4 R's: Reject, Reduce, Reuse, and Recycle.

- Reject (Not using materials that involve legal regulations or health issues)
- Reduce (Reducing environmental impact)
- Reuse (Reusing products, parts, and wrapping materials)
- Recycle (Reusing recyclable materials)

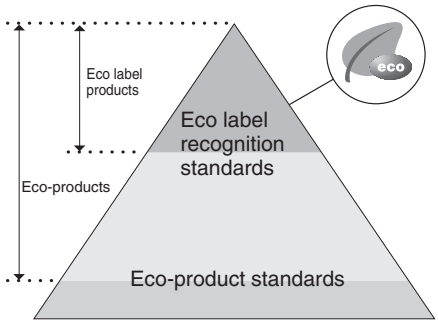
Technology for Lead-free Products

- **Lead-free Solder**
  From the standpoint of reliability and mass production, lead-free solder materials using Sn-Ag-Cu or Sn-Cn with trace elements added have been selected.
- **Construction Technology**
  The lead-free soldering temperature is approximately 30 degrees higher than that of existing technology. Therefore, equipment with little temperature fluctuation has been installed for reflow and flow processing. For hand soldering, special soldering guns have been installed, and equipment process control standards and operational standards have been provided.
- **Lead-free Plating**
  Plating that ensures product functionality and performance has been selected from among the possible Sn-Cu, pure Sn, and Sn reflow materials for relay, switch and connector terminal plating based on soldering reliability, whisker-prevention, long-term connection reliability, and heat resistance.

Eco-product Recognition Standards

In 1998, OMRON established an eco-product recognition system conforming to ISO14021. That system has since been revised as described below.

- Eco-products up to 2001
  Seventy-two products were recognized as eco-products under the following eco-label standards.
  - Products that reduced power consumption by 30% or more
  - Products that reduced resource consumption by 30% or more
  - Products that directly aimed at contributing to environmental considerations
- Eco-products from 2002 Onwards
  Products that reduced environmental impact as much as possible at every stage of the product cycle, including planning, development, and design.
- Products Recognized with Eco Labels from 2002 Onwards
  - From among the eco-products, these are products that met the established recognition standards. The categories of recycling, reuse, and rejection of environmentally damaging materials were newly added to the existing eco label standards.
  - Existing eco-products meet the eco label recognition standards.
- Relationship between Eco-products and Products Recognized with the Eco Label



Relationship between Eco-products and Products Recognized with the Eco Label

- OMRON's Eco Label



There are three types of eco labels: Type I, which is determined by third-party standards, such as Japan's Eco Mark or Germany's Blue Angel; Type II, which is a self-declared mark determined by OMRON's independent standards; and Type III, in which the environmental capacity is indicated in data sheets and other documents. OMRON's eco-product recognition system conforms to Type II.

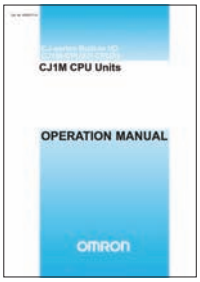
OMRON Activities toward ISO14001 Certification

OMRON established a system in April 1995 to promote the ISO14000 Series. The following sites have been certified.

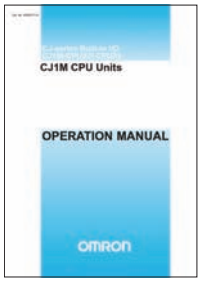
Companies with ISO14001 Certification (Only Sites Related to Control Components Are Listed)

Company/Office name	Certification organization	Date certified
OMRON CORPORATION MISHIMA FACTORY	BVQI	September 1997
OMRON CORPORATION AYABE FACTORY	BVQI	November 1996
OMRON CORPORATION MINAKUCHI FACTORY	BVQI	June 1997
OMRON IIDA CO., LTD.	JQA	October 1998
OMRON ICHINOMIYA CO., LTD.	BVQI	December 1996
OMRON TAKEO CO., LTD.	JACO	February 1998
OMRON SANYO CO., LTD.	JQA	January 1999
OMRON OKAYAMA CO., LTD.	BVQI	August 1997
OMRON IZUMO CO., LTD.	JACO	January 1998
OMRON ASO CO., LTD.	BVQI	September 1997
OMRON KURAYOSHI CO., LTD.	JACO	September 1997
OMRON KUMAMOTO CO., LTD.	JACO	August 1997
OMRON KYOTO TAIYO CO., LTD.	BVQI	March 1998
OMRON TAIYO CO., LTD.	BVQI	September 2000
SHANGHAI OMRON AUTOMATION SYSTEM CO.,LTD.	SCEMS	November 1998
OMRON MANUFACTURING OF THE NETHERLANDS B.V.	LRQA	November 1996
OMRON ELECTRONICS MANUFACTURING OF GERMANY G.m.b.H.	LRQA	April 1999
OMRON (SHANGHAI) CO.,LTD.	SCEMS	December 1998
OTE ENGINEERING INC.	SGS	February 1999
OMRON MANUFACTURING OF AMERICA, INC.	TÜV	May 1999
OMRON MALAYSIA SDN. BHD.	SIRIM	December 1998
PT OMRON MANUFACTURING OF INDONESIA	BVQI	August 1997
SHANGHAI OMRON CONTROL COMPONENTS CO.,LTD.	EIQA	February 1999
OMRON DUALTEC AUTOMOTIVE ELECTRONICS INC.	SGS	April 1999
OMRON AUTOMOTIVE ELECTRONICS, INC.	SGS	March 1999
OMRON AUTOMOTIVE ELECTRONICS KOREA, CO.,LTD.	KMA-QA	March 1999
OMRON ELECTRONICS COMPONENTS LTD.	BSI	February 1998

Technical Documentation



	Product	Title	Model code
Compact PLCs	CPM1/CPM1A/CPM2A/CPM2C/SRM1(-V2) Programmable Controllers	Programming Manual	W353-E1
	CPM1A Programmable Controllers	Operation Manual	W317-E1
	CPM2A Programmable Controllers	Operation Manual	W352-E1
	CPM2B Programmable Controller	Operation Manual	W371-E1
	CPM2B-S001M-DRT Programmable Controller CPM2B-S001M-DRT	Operation Manual	W399-E1
	CPM2C Programmable Controllers	Operation Manual	W356-E1
	CPM2C-S100C/S110C/S100C-DRT/S110C-DRT Programmable Controller	Operation Manual	W377-E1
	CP1H Programmable Controllers	Operation Manual	W450-E1
	CP1H Programmable Controllers	Programming Manual	W451-E1
Modular/Rack PLCs	CS/CJ Series Programmable Controllers, Instructions	Reference Manual	W340-E1
	CS/CJ Series Programming Consoles	Operation Manual	W341-E1
	CS Series Programmable Controllers	Operation Manual	W339-E1
	CS1D Duplex System	Operation Manual	W405-E1
	CJ series Programmable Controllers	Operation Manual	W393-E1
	CS/CJ Series Programmable Controllers	Programming Manual	W394-E1
	CJ1M series Built-in I/O	Operation Manual	W395-E1
	C200H-AD003/DA003/DA004/MAD01 Analog I/O Units	Operation Manual	W325-E1
	CS/CJ Series Analog I/O Units	Operation Manual	W345-E1
	CS/CJ series Process I/O Units	Operation Manual	W368-E1
	C200H-TC Temperature Control Units	Operation Manual	W225-E1
	CJ1W-TC Temperature Control Units	Operation Manual	W396-E1
	CS Series Loop Control Boards	Operation Manual	W406-E1
	CS Series Loop Control Board Function Block	Reference Manual	W407-E1
	C200H-CT021 High-speed Counter Unit	Operation Manual	W311-E1
	CS1W-CT High-speed counter units	Operation Manual	W902-E2
	CJ1W-CT021 High-speed Counter Unit	Operation Manual	W401-E1
	CJ1W-CTL41-E 4-Channel Counter Unit	Operation Manual	W02E-EN
	CS1W-NC Position Control Units	Operation Manual	W376-E1
	CJ1W-NC Position Control Units	Operation Manual	W397-E1
	CJ1W-NCF71 Position Control Units	Operation Manual	W426-E1
	C200H-MC402 Motion Control Unit	Operation Manual	W903-E2
	CS1W-MC421/221 Motion Control Units	Operation Manual	W359-E1
	CS1W-MCH71 Motion Control Unit	Operation Manual	W419-E1
	CJ1W-MCH71 Motion Control Unit	Operation Manual	W435-E1
Communication	FINS Commands	Reference Manual	W227-E1
	CS/CJ Series Communications Commands	Reference Manual	W342-E1
	USB-serial Conversion Cable CS1W-CIF31	User's Manual	W417-E1
	CJ Series Simple Communications Unit	Operation Manual	W400-E1
	CS1W-SCB/SCU Serial Communications Boards, Units	Operation Manual	W336-E1
	C200H-ASC11/ASC21/ASC31 ASCII Units	Operation Manual	W306-E1
	CS/CJ Series 100Base-TX Ethernet Units	Setup Manual	W420-E1
	CS/CJ Series 100Base-TX Ethernet Units	Operation Manual	W421-E1
	CS Duplex Series 100Base-TX Ethernet Units	Operation Manual	W430-E1
	CJ Series CPU Units with Ethernet Functions	Operation Manual	W441-E1
	Controller Link PLC Units	Operation Manual	W309-E1
	Controller Link	Installation Guide	W422-E1
	Optical Ring Contoller Link Units	Operation Manual	W370-E1
	3G8F7-CLK Controller Link Support Boards for PCI Bus	Operation Manual	W383-E1
	3G8F7-CLK Controller Link Support Boards for PCI Bus	Installation Guide	W388-E1
	GP-IB Interface Unit CS1W-GPI01	Operation Manual	W410-E1
Remote I/O	SmartSlice GRT1-DRT DeviceNet Communication Unit	Operation Manual	W454-E1
	SmartSlice GRT1-PRT PROFIBUS Communication Unit	Operation Manual	W04E-EN
	SmartSlice GRT1 Series Slice I/O Units	Operation Manual	W455-E1
	CS1W-DRM21(-V1),CJ1W-DRM21 DeviceNet Units	Operation Manual	W380-E1
	C200HW-DRT21, CQM1-DRT21, DRT1 Series DeviceNet Slaves	Operation Manual	W347-E1
	DRT2 Series DeviceNet Slaves	Operation Manual	W404-E1
	CompoBus/S SRM21+SRT-Series	Operation Manual	W266-E1
	CS/CJ Series PROFIBUS-DP Master Units	Operation Manual	W409-E2
	CJ1W-PRT21 PROFIBUS-DP Slave Unit	Operation Manual	W408-E2
	C200HW-PRM21 PROFIBUS-DP Master Unit	Operation Manual	W349-E2
	C200HW-PRT21 PROFIBUS-DP Slave Unit	Operation Manual	W901-E2
	C200HW-CORT21-V1 CANopen Slave Unit	Operation Manual	W904-E2
	CJ1W-CORT21 User-defined CAN Unit	Operation Manual	W03-EN



	Product	Title	Model code
Programmable Terminals	NT3S	Brochure	SFGP-NT3S
	NTXS Programmable Terminals	Users Manual	V03E-E1
	NT2S Programmable Terminal	Folder	V900-E2
	NT11S Programmable Terminal	Operation Manual	V029-E1
	NT11S Programming Terminal Supprt Tool	Operation Manual	V030-E1
	NT11S Programmable Terminal	Catalogue	V031-E1
	NT-series Support Tool for Windows 95/98 Version 3.2	Operation Manual	V053-E1
	NT21 Programmable Terminal (Cleaning Version)	Setup Manual	V068-E1
	NT21,NT31/31C,NT631/631C Programmable Terminal	Reference Manual	V069-E1
	NT21 Programmable Terminal	Folder	V071-E1
	NS-series Programmable Terminal	Setup Manual	V072-E1
	NS-series Programmable Terminal	Programming Manual	V073-E1
	NS-series NS Designer	Operation Manual	V074-E1
	NS-series Macro Reference Manual	Operation Manual	V075-E1
	NS12,10,7 Advanced Programmable Terminal	Pamphlet	V078-E1
	NS-series Quick Start Manual	Setup Manual	V081-E2
	NS-series Programmable Terminal -V1	Setup Manual	V083-E1
	NS-series Host Connection Manual	Setup Manual	V085-E1
	RGB and Video Input Unit Manual	Setup Manual	V086-E1
	CX-Designer	Operation Manual	V088-E1
	Hand-held Programmable Terminal	Operation Manual	V090-E1
	CX-Designer	Instruction Manual	V098-E1
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	ASCII Library I/F Toolkit	Operation Manual	W360-E2
	CS/CJ Series CX-Simulator	Operation Manual	W366-E1
	CX-Process Tool Software	Operation Manual	W372-E1
	CX-Process Monitor Software	Operation Manual	W373-E1
	DeviceNet Configurator (Ver.2)	Operation Manual	W382-E1
	CX-Server OPC	User's Manual	W402-E2
	CX-Server Lite	User's Manual	W403-E2
	Face Plate Auto-Builder for NS 110	Operation Manual	W418-E1
	CX-Process Monitor Plus Ver.1.0	Operation Manual	W428-E1
	CX-Position WS02-NCTC1-EV2	Operation Manual	W433-E1
	SYSMAC CX-Motion-NCF Programmable Controller	Operation Manual	W436-E1
	CX-One	Setup Manual	W444-E1
	CX-Integrator	Operation Manual	W445-E1
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