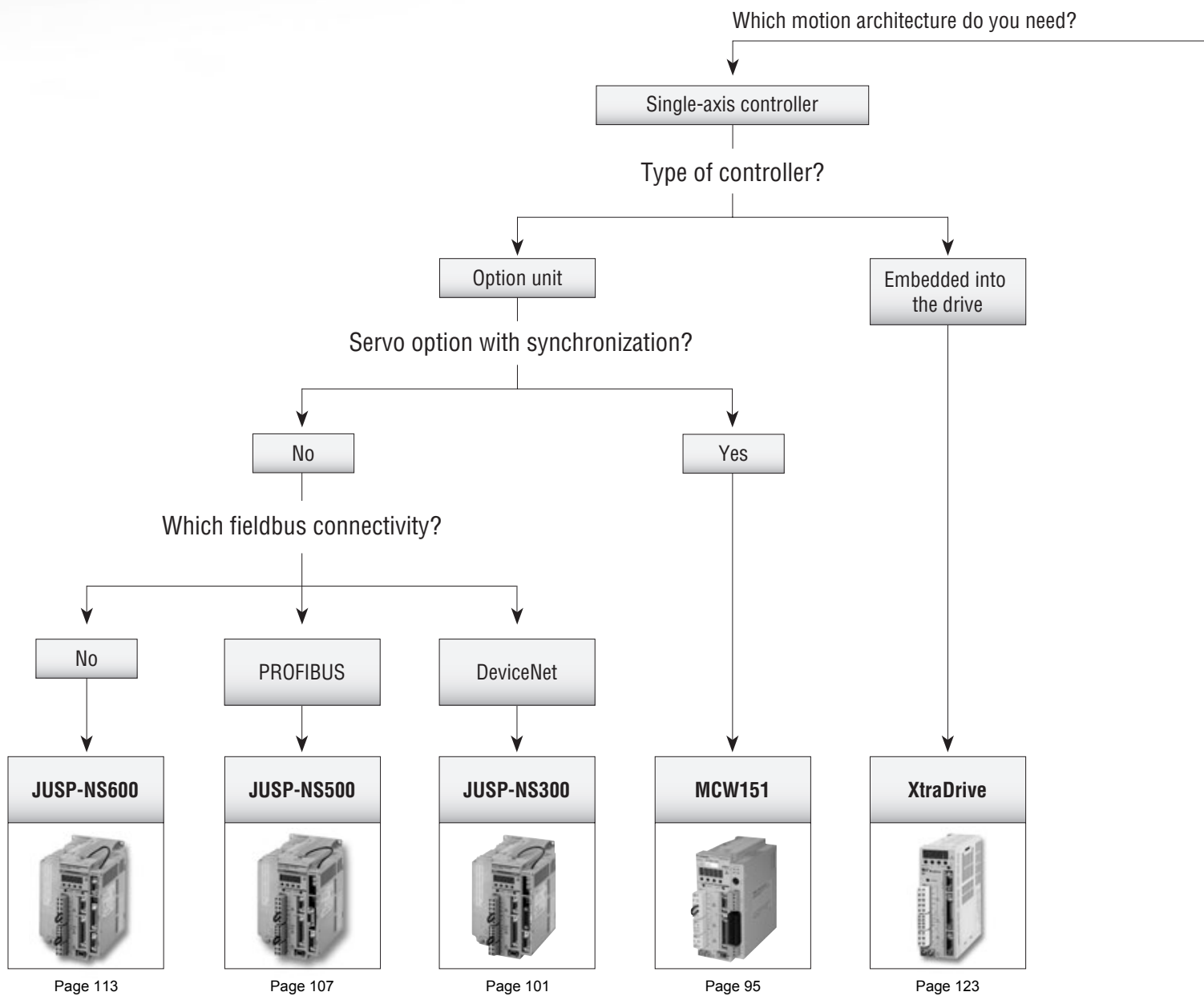
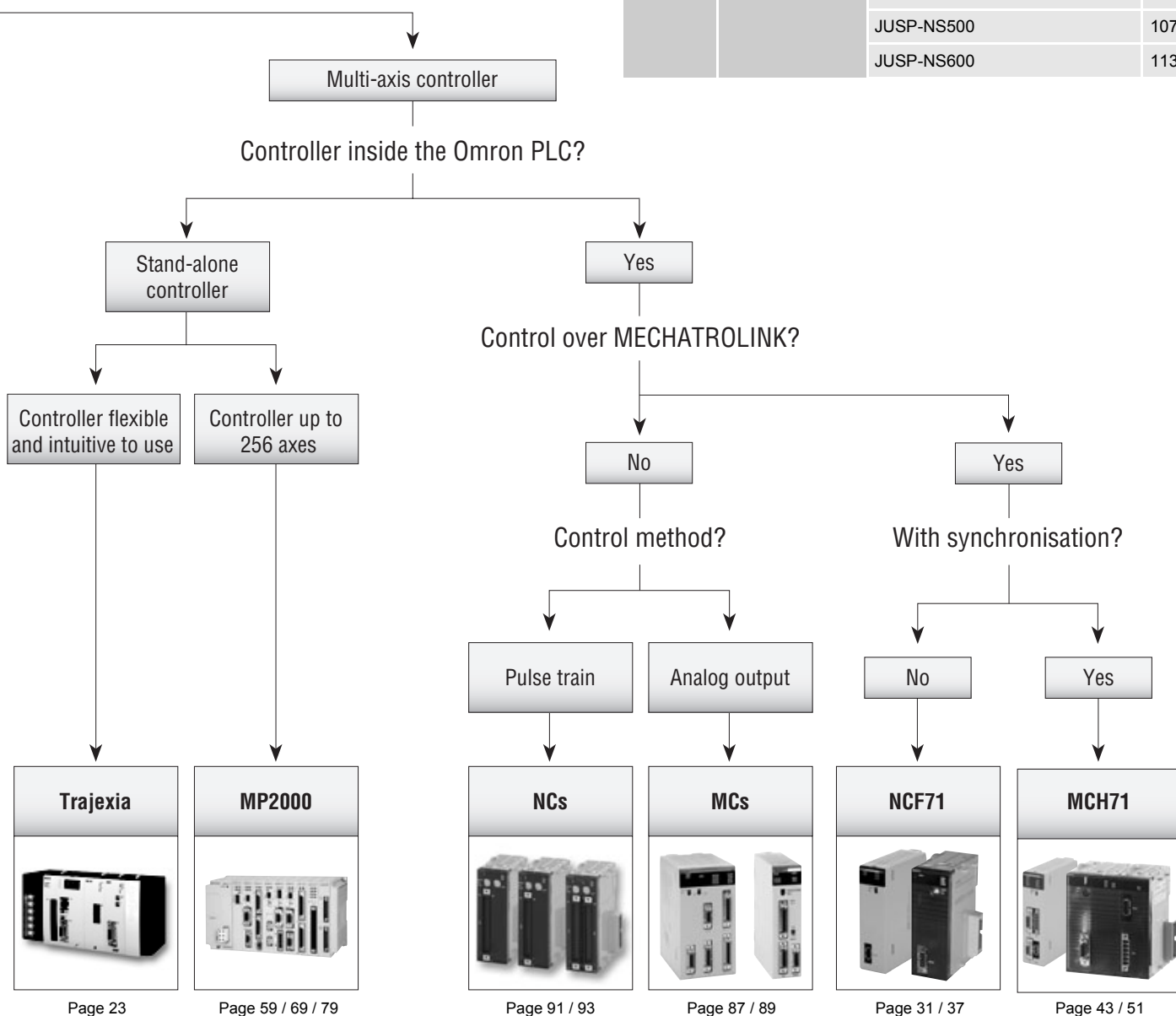


# Motion controllers



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## Selection table

| Multi-axes motion controllers |                                                                                                        |                                                                                    |                                                                                     |
|-------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                               |                       |  |  |
| Model                         | Trajexia                                                                                               | C1W-MCH71                                                                          | C1W-NCF71                                                                           |
|                               | Flexible concept of advanced motion control over MECHATROLINK-II motion bus and traditional interfaces | Advanced motion controller over MECHATROLINK-II motion bus                         | Point-to-point positioning controller over MECHATROLINK-II motion bus               |
| <b>Axes control method</b>    | MECHATROLINK-II motion bus, analogue output and pulse-train                                            | MECHATROLINK-II motion bus                                                         | MECHATROLINK-II motion bus                                                          |
| <b>Number of axes</b>         | 16 servos + 8 inverters                                                                                | 30 real and 2 virtual axes                                                         | 16                                                                                  |
| <b>Applicable servo drive</b> | Sigma II                                                                                               | Sigma II                                                                           | Sigma II                                                                            |
| <b>Application</b>            | Advanced motion, e-cam, e-gearbox, phase shift, registration                                           | Advanced motion, e-cam, ELS, phase shift, registration                             | From simple PTP to multi axis PTP coordinated systems.                              |
| <b>Servo control mode</b>     | Position, speed and torque                                                                             | Position, speed and torque                                                         | Position, speed and torque                                                          |
| <b>PLC series</b>             | Stand alone motion solution. Ethernet, PROFIBUS-DP, DeviceNet and CANopen connectivity                 | CJ1 and CS1 PLCs                                                                   | CJ1 and CS1 PLCs                                                                    |
| <b>Page</b>                   | 23                                                                                                     | 43 / 51                                                                            | 31 / 37                                                                             |

| Servo-based motion controllers |                                                                                    |                                                                                    |
|--------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                |  |  |
| Model                          | MCW151                                                                             | XtraDrive                                                                          |
|                                | Advanced motion in a compact package                                               | All in one! Servo drive and motion controller integrated                           |
| <b>Axes control method</b>     | Direct connection to servo drive                                                   | Integrated into the servo drive                                                    |
| <b>Connectivity</b>            | DeviceNet, PROFIBUS, Hostlink                                                      | PROFIBUS                                                                           |
| <b>Digital I/O</b>             | 8 DI, 6 DO, 2 registration inputs, 1 encoder IN 1 pulse OUT + Servo IOs            | Servo inputs + expansion available                                                 |
| <b>Application</b>             | Advanced motion, e-cam, e-gearbox, phase shift, registration                       | Advanced motion                                                                    |
| <b>Servo control mode</b>      | Position, speed and torque. Open loop pulse train for additional axis              | Position, speed and torque.                                                        |
| <b>Applicable servo drive</b>  | Sigma-II                                                                           | XtraDrive                                                                          |
| <b>Page</b>                    | 95                                                                                 | 123                                                                                |

| Multi-axes motion controllers |                                                                                   |                                                                                    |                                                                                     |
|-------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                               |  |  |  |
| Model                         | MCs                                                                               | NCs                                                                                | MP2000                                                                              |
|                               | CS1 solution for advanced motion control                                          | Point-to-point positioning controller                                              | High performance motion controller for a wide array of applications                 |
| <b>Axes control method</b>    | Analogue output                                                                   | Pulse train output                                                                 | MECHATROLINK-II motion bus, analogue output, and pulse-train                        |
| <b>Number of axes</b>         | 4                                                                                 | 1, 2, 4                                                                            | up to 256                                                                           |
| <b>Applicable servo drive</b> | Sigma II                                                                          | SmartStep, Sigma II                                                                | Sigma-II                                                                            |
| <b>Application</b>            | Advanced motion, e-cam, ELS, phase shift, registration                            | Point-to-point applications                                                        | Advanced motion, e-cam, ELS, phase shift, registration                              |
| <b>Servo control mode</b>     | Close loop position and speed                                                     | Open loop position with linear interpolation                                       | Position, speed and torque                                                          |
| <b>PLC series</b>             | CS1                                                                               | CJ1 and CS1 PLCs                                                                   | Stand-alone and PC-based controllers                                                |
| <b>Page</b>                   | 87 / 89                                                                           | 91 / 93                                                                            | 59 / 69 / 79                                                                        |

| Servo-based motion controllers |                                                                                    |                                                                                     |                                                                                      |
|--------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
|                                |  |  |  |
| Model                          | JUSP-NS300                                                                         | JUSP-NS500                                                                          | JUSP-NS600                                                                           |
|                                | Position controller over DeviceNet                                                 | Position controller over PROFIBUS-DP                                                | Position controller over serial link                                                 |
| <b>Axes control method</b>     | Direct connection to servo drive                                                   | Direct connection to servo drive                                                    | Direct connection to servo drive                                                     |
| <b>Connectivity</b>            | DeviceNet                                                                          | PRIFIBUS                                                                            | RS-485/RS-422                                                                        |
| <b>Digital I/O</b>             | Uses the servo I/O and adds 2 additional DO and 1 DI                               | Uses the servo I/O and adds 2 additional DO and 1 DI                                | Uses the servo I/O and adds 8 additional DI and 6 DO                                 |
| <b>Application</b>             | Point-to-point with registration capability                                        | Poin- to-point with registration capability                                         | Point-to-point with registration capability                                          |
| <b>Servo control mode</b>      | Position, speed                                                                    | Position, speed                                                                     | Position, speed                                                                      |
| <b>Applicable servo drive</b>  | Sigma-II                                                                           | Sigma-II                                                                            | Sigma-II                                                                             |
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TJ1-

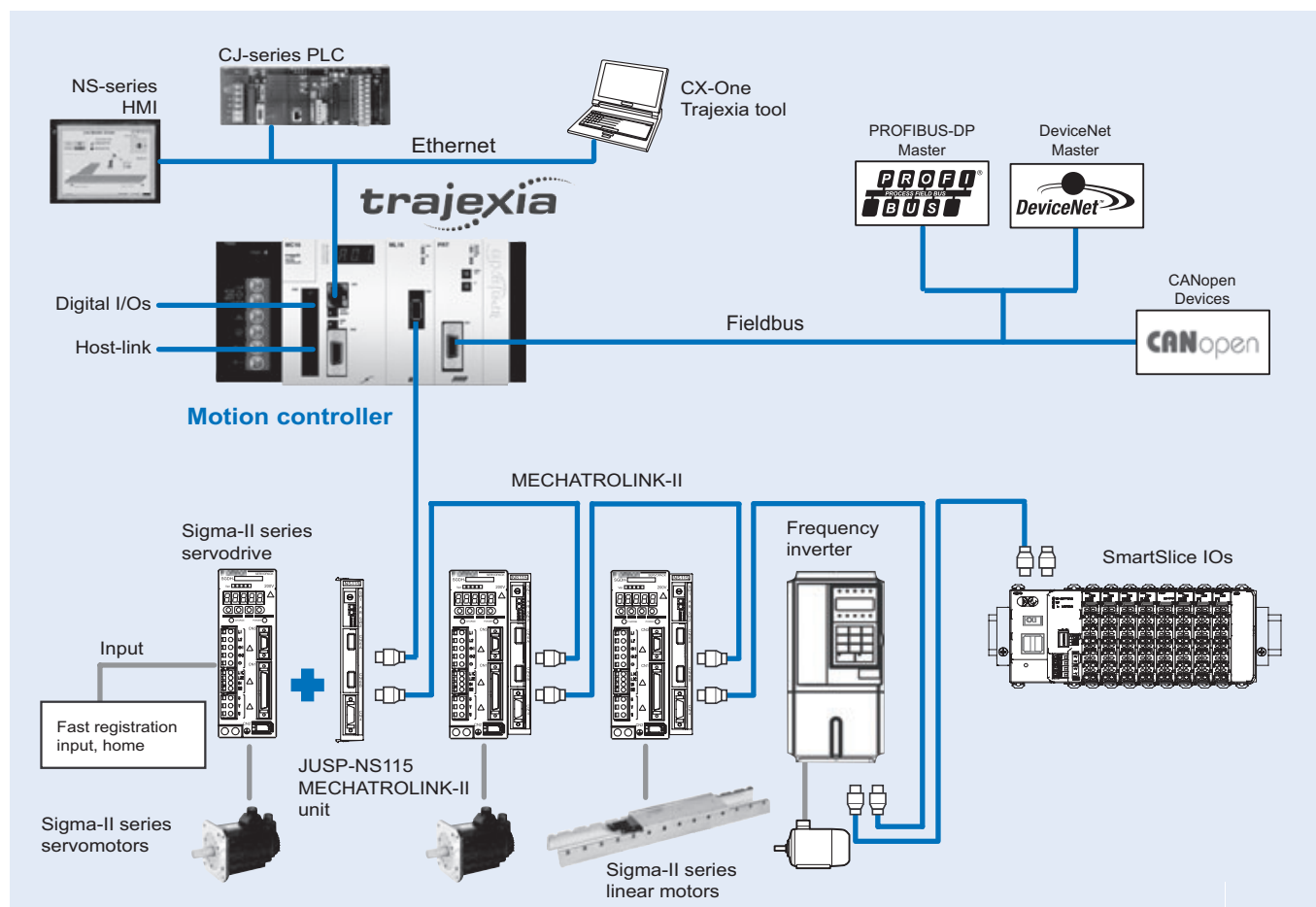
# Trajexia Motion Controller

## Stand-Alone Advanced Motion Controller Using MECHATROLINK-II Motion Bus

- 16 axes advanced motion coordination over a robust and fast motion link: MECHATROLINK-II
- Supports position, speed and torque control
- Each axis can run complex interpolated moves, e-cams and e-gearboxes
- Advanced debugging tools including trace and oscilloscope functions
- Hardware registration input for each servo axis
- Control of servos, inverters and I/Os over a single motion network
- Multi-tasking controller capable of running up to 14 tasks simultaneously
- Open communication - Ethernet built-in, PROFIBUS-DP, DeviceNet and CANopen as options



## System Configuration



## Specifications

### Trajexia General Specifications

| Item                          | Details                                                                                                                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Model                         | TJ1-□                                                                                                                           |
| Ambient operating temperature | 0 to 55°C                                                                                                                       |
| Ambient operating humidity    | 10 to 90%RH                                                                                                                     |
| Ambient storage temperature   | -20 to 70°C                                                                                                                     |
| Ambient storage humidity      | 90% max. (with no condensation)                                                                                                 |
| Atmosphere                    | No corrosive gases                                                                                                              |
| Vibration resistance          | 10 to 57 Hz: (0.075 mm amplitude)<br>57 to 100 Hz Acceleration: 9.8 m/s <sup>2</sup> , in X, Y and Z directions for 80 minutes. |
| Shock resistance              | 143 m/s <sup>2</sup> , 3 times each X, Y and Z directions.                                                                      |
| Insulation resistance         | 20 MOhm                                                                                                                         |
| Dielectric strength           | 500 Volt                                                                                                                        |
| Protective structure          | IP20                                                                                                                            |
| International standards       | CE, EN 61131-2, cULus, Lloyds (cULus approval pending for TJ1-MC04 and TJ1-ML04) RoHS compliant                                 |

### Trajexia Motion Control Units

| Item                                   | Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Model                                  | TJ1-MC16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Number of axes                         | 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Number of inverters and I/O modules    | 8 maximum (Inverters in speed or torque mode)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Number of MECHATROLINK-II master units | Up to 4 MECHATROLINK-II master units (see below TJ1-ML16/ML04) can be connected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Cycle time                             | Selectable 0.5 ms, 1 ms or 2 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Programming language                   | BASIC-like Motion language                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Multi-tasking                          | Up to 14 tasks running simultaneously                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Built-in Digital I/O                   | 16 Inputs and 8 Outputs, for general purpose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Measurement units                      | User definable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Available memory for user programs     | 500KB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Data storage capacity                  | Up to 2 MB flash data storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Saving program data, motion controller | SRAM with battery backup and Flash-ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Saving program data, personal computer | Trajexia Motion Perfect software manages a backup on the hard disk of the personal computer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Communication ports                    | 1 Ethernet port and 2 serial ports                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Firmware update                        | Via Trajexia software tool                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Ethernet port                          | Electrical characteristics<br>Connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                        | Conform to IEEE 802.3 (100BaseT)<br>RJ45 Ethernet connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Serial port                            | Electrical characteristics<br>Connector<br>Synchronization<br>Baud rate<br>Transmission format<br>Transmission mode<br>Transmission protocol<br>Galvanic isolation<br>Communication buffers<br>Flow control<br>Terminator<br>Cable length                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                        | Conform 1 port to RS232C and 1 port to RS485/RS422A (selectable by switch)<br>SUB-D9 connector (Counterpart included in the package)<br>Start-stop synchronization (asynchronous)<br>1200 / 2400 / 4800 / 9600 / 19200 / 38400 bps<br>Databit Length 7 or 8 bit<br>Stop Bit 1 or 2 bit<br>Parity Bit Even/Odd/None<br>Point-to-multipoint (1:N)<br>RS-232C (1:1) Host Link master protocol,<br>Host Link slave protocol,<br>ASCII general-purpose<br>RS-422A (1:N) Host Link master protocol,<br>Host Link slave protocol,<br>ASCII general-purpose<br>RS-485 (1:N) ASCII general-purpose<br>RS422A port<br>254 bytes<br>None<br>Yes, selectable by switch<br>15 m for RS232 and 500 meter for RS422/485 |

### Trajexia MECHATROLINK-II Master Units

| Item                                              | Specifications                                                                                                       |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Model                                             | TJ1-ML16                                                                                                             |
| Controlled devices with MECHATROLINK-II interface | Junma MLII, Sigma-2 and Sigma-3 Servo drives, SmartSlice I/Os, other I/O units and V7, F7 and G7 Frequency inverters |
| Electrical characteristics                        | Conforms to MECHATROLINK standard                                                                                    |
| Communication ports                               | 1 MECHATROLINK-II master                                                                                             |
| Transmission speed                                | 10Mbps                                                                                                               |
| Communication cycle                               | 0.5 ms, 1ms or 2ms                                                                                                   |
| Stations slave types                              | Axes or Servo drives<br>Frequency inverters<br>I/O Modules                                                           |
| Number of stations per master / Cycle time        | Max.16 Stations / 2ms<br>Max.8 Stations / 1ms<br>Max.4 Stations / 0.5 ms (Only Sigma-3 drives)                       |
| Transmission distance                             | Max.50 meters without using repeater                                                                                 |

**Trajexia PROFIBUS Slave Unit**

| Items               | Specifications                                                       |
|---------------------|----------------------------------------------------------------------|
| Model               | TJ1-PRT                                                              |
| PROFIBUS standard   | Conforms to PROFIBUS-DP standard EN50170 (DP-V0)                     |
| Communication ports | 1 PROFIBUS-DP Slave                                                  |
| Transmission speed  | 9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 and 12000 kbps |
| Node numbers        | 0 to 99                                                              |
| I/O size            | 0 to 120 words (16bit), configurable, for both directions            |
| Galvanic isolation  | Yes                                                                  |

**Trajexia DeviceNet Slave Unit**

| Items               | Specifications                                           |
|---------------------|----------------------------------------------------------|
| Model               | TJ1-DRT                                                  |
| PROFIBUS standard   | Conforms to DeviceNet standard of CIP edition 1          |
| Communication ports | 1 DeviceNet Slave                                        |
| Transmission speed  | 125, 250 and 500 Kbps, auto-detect                       |
| Node numbers        | 0 to 63                                                  |
| I/O size            | 0 to 32 words (16bit), configurable, for both directions |
| Galvanic isolation  | Yes                                                      |

**Trajexia CANopen Unit**

| Items                       | Specifications                                                                                                                  |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Model                       | TJ1-CORT                                                                                                                        |
| Electrical Characteristics  | Conforms to CAN 2.0 B                                                                                                           |
| Communication ports         | 1 CANopen                                                                                                                       |
| Transmission speed          | 20, 50, 125 and 500 Kbps                                                                                                        |
| Implemented CiA Standards   | DS301, DS302                                                                                                                    |
| PDO Support                 | 8 TPDO and 8 RPDO                                                                                                               |
| PDO Mapping                 | Each PDO can be mapped into TJ1-MC16/04 VR, Table, Analogue and digital IO. BASIC commands assign mapping and start address (*) |
| CANopen slave configuration | Any SDO message can be sent using BASIC during start-up and operation                                                           |
| CANopen network states      | CANopen network can be set to Pre-operational and Operational using BASIC                                                       |
| CANopen slave emergencies   | Available using BASIC command                                                                                                   |
| Galvanic isolation          | Yes                                                                                                                             |

**Note:** (\*) TJ1-MC16/04 CPUs support a total of 256 digital IO points and 36 Analogue IO points.

**Trajexia Flexible Axis Unit**

| Items              |                                      | Specifications                                                                                           |
|--------------------|--------------------------------------|----------------------------------------------------------------------------------------------------------|
| Model              |                                      | TJ1-FL02                                                                                                 |
| Number of axes     |                                      | 2                                                                                                        |
| Control method     |                                      | ±10V Analogue Output in closed loop or pulse train output in open loop                                   |
| Encoder            | Position/speed Feedback              | 2 Incremental and Absolute encoders                                                                      |
|                    | Absolute encoder standards supported | SSI 200 kHz, EnDat 1 MHz and Tamagawa                                                                    |
|                    | Encoder Input maximum frequency      | 6 MHz                                                                                                    |
|                    | Encoder/Pulse Output max. frequency  | 2 MHz                                                                                                    |
| Auxiliary I/Os     |                                      | 2 Fast registration Inputs, 2 definable inputs, 2 Enable output, 4 position switch outputs or axes reset |
| Galvanic isolation |                                      | Yes                                                                                                      |

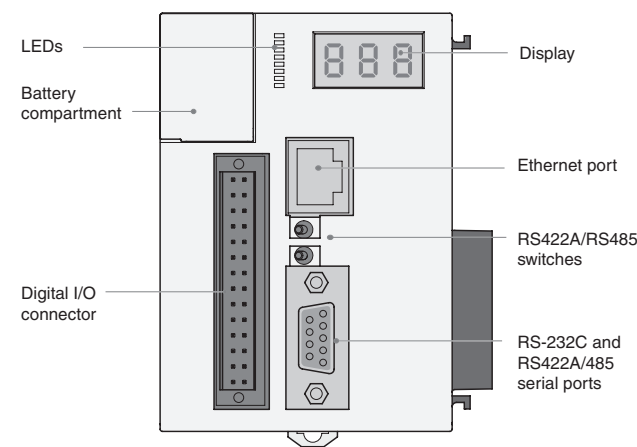
**SmartSlice MECHATROLINK-II Interface Unit**

| Item                         | Specifications                                                 |
|------------------------------|----------------------------------------------------------------|
| Model                        | GRT1-ML2                                                       |
| Electrical characteristics   | Conform to MECHATROLINK standard                               |
| Communication cycle          | 0.5, 1 or 2 ms                                                 |
| Power supply                 | 24Vdc                                                          |
| Number of connectable Slices | Up to 64 slices with a maximum amount of 128 bytes (*)         |
| IO mapping                   | Automatic analogue and digital IO mapping into TJ1-MC16/04 CPU |
| Slice unit configuration     | Not supported                                                  |
| Supported slice units        | See ordering information section                               |

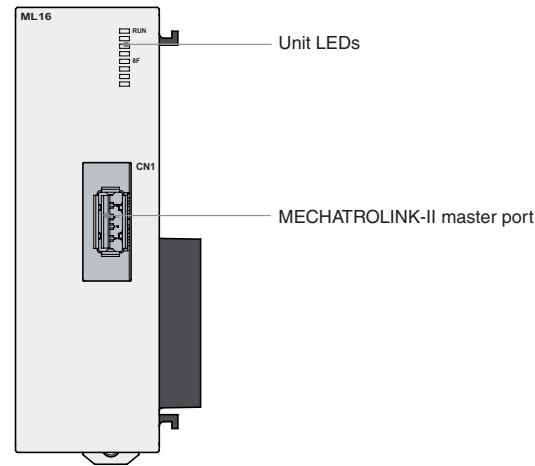
**Note:** (\*) TJ1-MC16/04 CPUs support a total of 256 digital IO points and 36 Analogue IO points.

Nomenclature

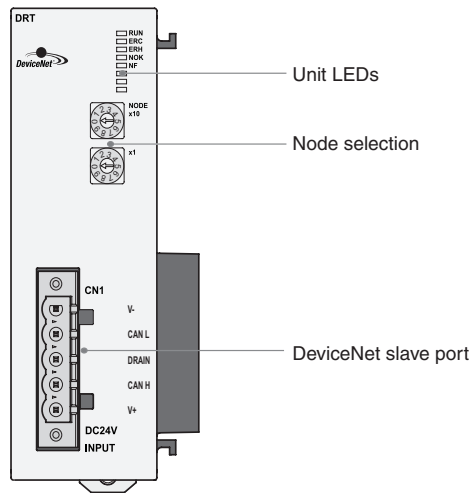
Trajexia Motion Controller Unit - TJ1-MC16/04



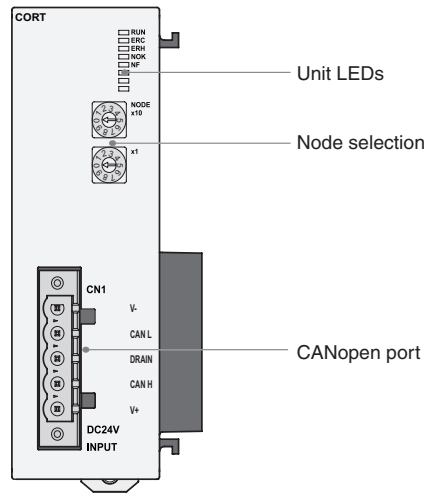
Trajexia MECHATROLINK-II Master Unit - TJ1-ML16/04



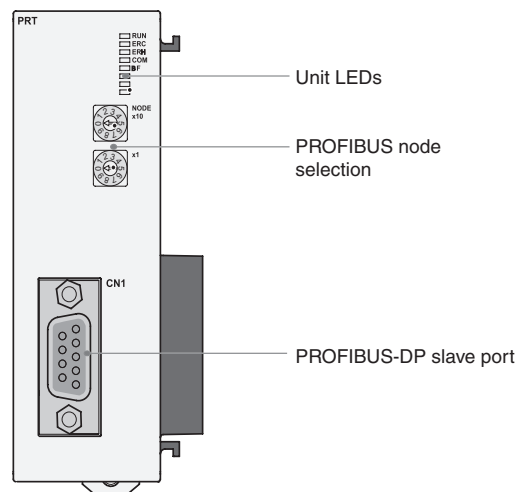
Trajexia DeviceNet Slave Unit - TJ1-DRT



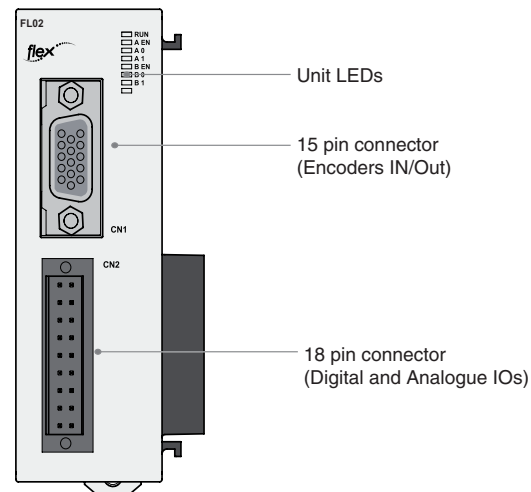
Trajexia CANopen Unit - TJ1-CORT



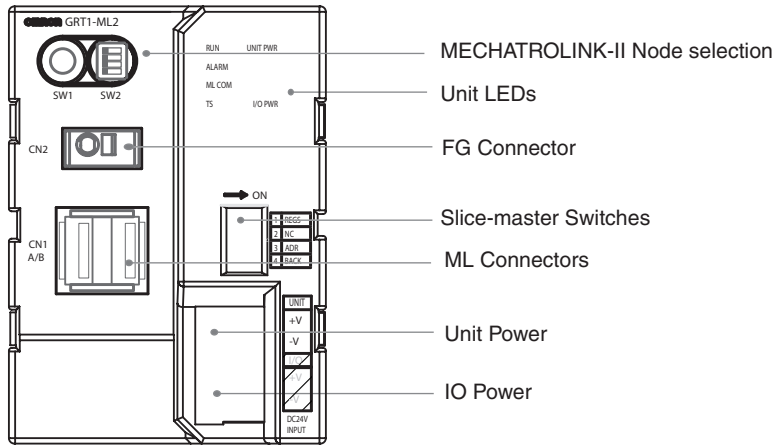
Trajexia PROFIBUS-DP Unit - TJ1-PRT



Trajexia Flex Axis Unit - TJ1-FL02

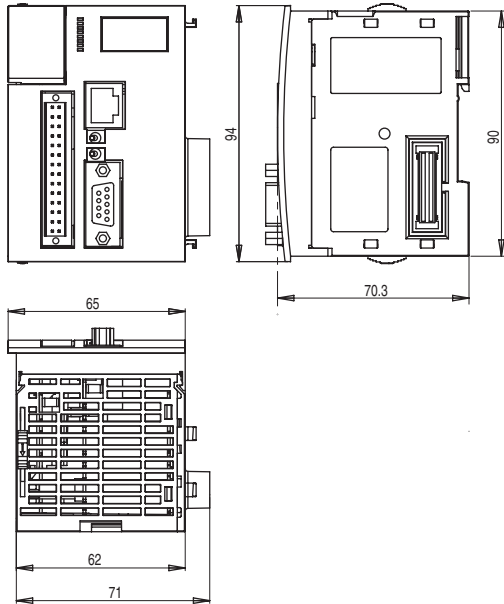


SmartSlice MECHATROLINK-II Interface Unit - GRT1-ML2

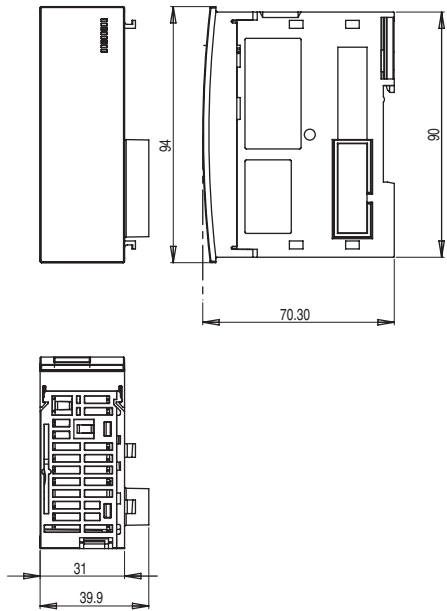


Dimensions

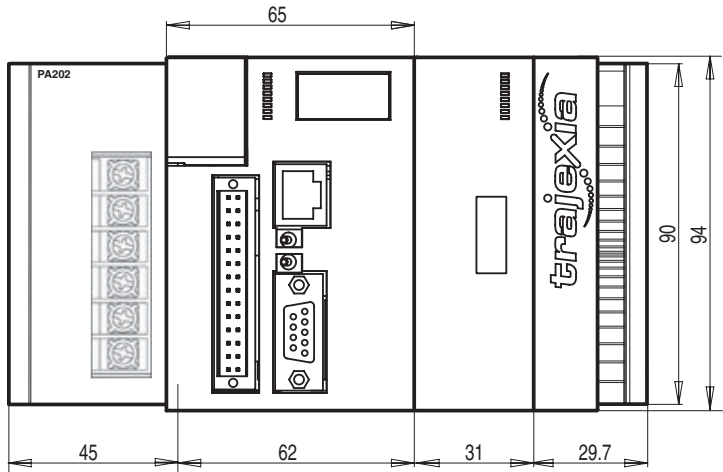
Trajexia Motion Controller - TJ1-MC16/04



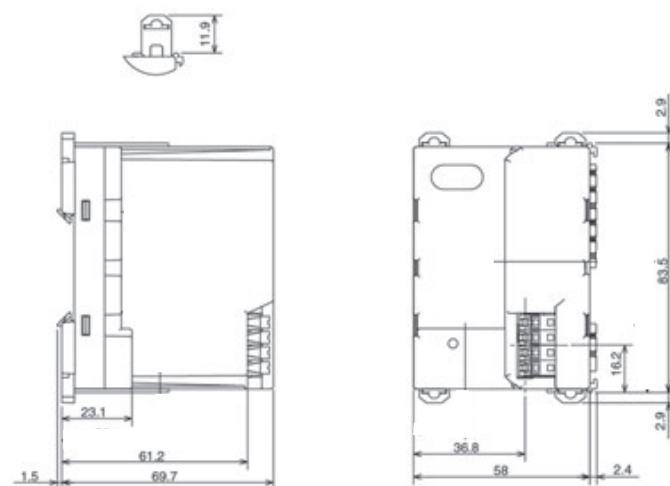
Trajexia Modules - TJ1-ML16/04, -PRT, -DRT, -CORT, -FL02



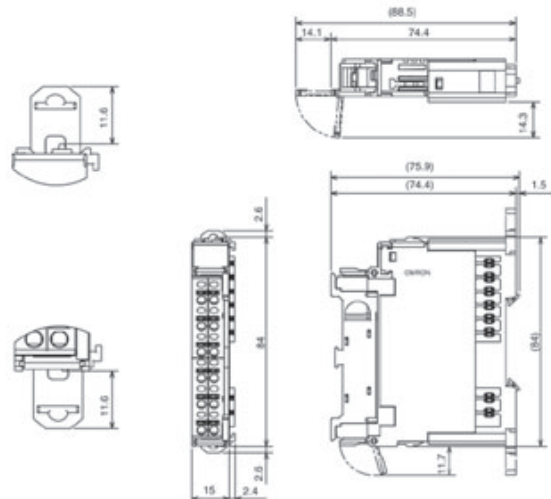
Trajexia System - CJ1W-PA202 + TJ1-MC16 + One Module + TJ1-TER



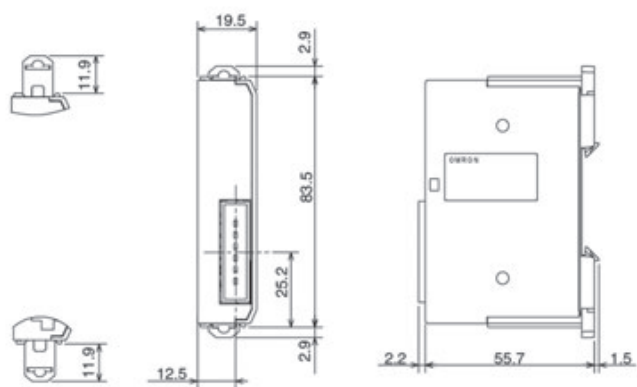
SmartSlice Communication unit - GRT1-ML2



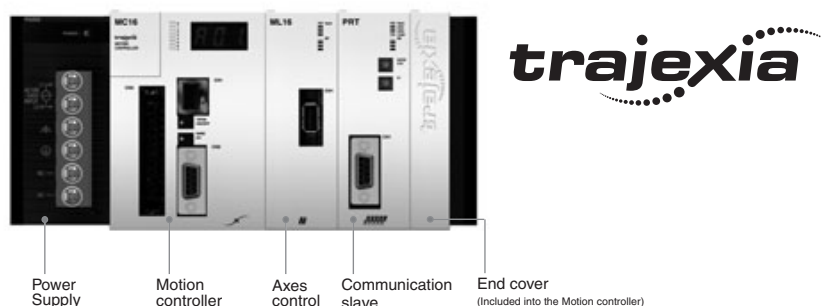
SmartSlice I/O units - GRT1\_



SmartSlice End unit - GRT1-END



## Ordering Information



## Trajexia motion controller

| Name                                                                                          | Model      |
|-----------------------------------------------------------------------------------------------|------------|
| Trajexia Motion Controller Unit, up to 4 axes. (Trajexia end cover unit TJ1-TER is included)  | TJ1-MC04   |
| Trajexia Motion Controller Unit, up to 16 axes. (Trajexia end cover unit TJ1-TER is included) | TJ1-MC16   |
| Power Supply for Trajexia system, 100-240V AC                                                 | CJ1W-PA202 |
| Power Supply for Trajexia system, 24V DC                                                      | CJ1W-PD022 |

## Trajexia - Axes control modules

| Name                                                     | Model    |
|----------------------------------------------------------|----------|
| Trajexia MECHATROLINK-II Master Unit (up to 4 stations)  | TJ1-ML04 |
| Trajexia MECHATROLINK-II Master Unit (up to 16 stations) | TJ1-ML16 |
| Trajexia Flexible Axis Unit (for 2 Axes)                 | TJ1-FL02 |

## Trajexia - Communication modules

| Name                            | Model    |
|---------------------------------|----------|
| Trajexia DevicNet slave unit    | TJ1-DRT  |
| Trajexia PROFIBUS-DP slave unit | TJ1-PRT  |
| Trajexia CANopen unit           | TJ1-CORT |

## MECHATROLINK-II - Related devices

## Servo System &amp; Frequency Inverters

| Name                                                    | Remarks                                                                                                             | Model         |
|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------|
| MECHATROLINK-II interface unit for Servos and Inverters | For Sigma-II series Servo drives. (Firmware version 39 or later)                                                    | JUSP-NS115    |
|                                                         | Junma servo drives with MECHATROLINK-II port built-in the drive                                                     | SJDE-□□ANA-OY |
|                                                         | For Varispeed V1000 Inverter. Release by 2008<br>(For Inverter's version supported contact your Omron sales office) | SI-T3         |
|                                                         | For Varispeed V7 Inverter<br>(For Inverter's version supported contact your Omron sales office)                     | SI-TV7        |
|                                                         | For Varispeed F7, G7 Inverter<br>(For Inverter's version supported contact your Omron sales office)                 | SI-T          |

**Note:** Refer to Motion & Drives catalogue for detailed specs and ordering information

## SmartSlice IOs system

| Function                                       | Specification                                 | Model       |
|------------------------------------------------|-----------------------------------------------|-------------|
| SmartSlice Interface unit                      | SmartSlice MECHATROLINK-II interface unit     | GRT1-ML2    |
| End plate, one unit required per bus interface |                                               | GRT1-END    |
| 4 NPN inputs                                   | 24 V DC, 6 mA, 3-wire connection              | GRT1-ID4    |
| 4 PNP inputs                                   | 24 V DC, 6 mA, 3-wire connection              | GRT1-ID4-1  |
| 8 NPN inputs                                   | 24 V DC, 4 mA, 1-wire connection + 4xG        | GRT1-ID8    |
| 8 PNP inputs                                   | 24 V DC, 4 mA, 1-wire connection + 4xV        | GRT1-ID8-1  |
| 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  |
| 4 PNP outputs with short-circuit protection    | 24 V DC, 500 mA, 3-wire connection            | GRT1-OD4G-1 |
| 8 NPN outputs                                  | 24 V DC, 500 mA, 1-wire connection + 4xV      | GRT1-OD8    |
| 8 PNP outputs                                  | 24 V DC, 500 mA, 1-wire connection + 4xG      | GRT1-OD8-1  |
| 8 PNP outputs with short-circuit protection    | 24 V DC, 500 mA, 1-wire connection + 4xG      | GRT1-OD8G-1 |
| 2 relay outputs                                | 240 V AC, 2A, normally-open contacts          | GRT1-ROS2   |
| 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   |

**Note:** Refer to Automation Systems catalogue for detailed specs and accessories information



## MECHATROLINK-II Cables

| Name                       | Remarks              | Model          |
|----------------------------|----------------------|----------------|
| MECHATROLINK-II cables     | 0.5 meter            | JEPMC-W6003-A5 |
|                            | 1 meter              | JEPMC-W6003-01 |
|                            | 3 meters             | JEPMC-W6003-03 |
|                            | 5 meters             | JEPMC-W6003-05 |
|                            | 10 meters            | JEPMC-W6003-10 |
|                            | 20 meters            | JEPMC-W6003-20 |
|                            | 30 meters            | JEPMC-W6003-30 |
| MECHATROLINK-II terminator | Terminating resistor | JEPMC-W6022    |
| MECHATROLINK-II Repeater   | Network repeater     | JEPMC-REP2000  |

## Other IO modules

| Name                       | Remarks                                                    | Lenght | Model          |
|----------------------------|------------------------------------------------------------|--------|----------------|
| MLII IO modules            | 64-point digital input and 64-point digital output (24VDC) | -      | JEPMC-IO2310   |
|                            | Analogue input: -10V to +10V, 4 channels                   | -      | JEPMC-AN2900   |
|                            | Analogue output: -10V to +10V, 2 channels                  | -      | JEPMC-AN2910   |
| I/O Cable for JEPMC-IO2310 | With connector on the IO2310 side                          | 0.5    | JEPMC-W5410-05 |
|                            |                                                            | 1.0    | JEPMC-W5410-10 |
|                            |                                                            | 3.0    | JEPMC-W5410-30 |

## Computer Software

| Specifications                                      | Model     |
|-----------------------------------------------------|-----------|
| Trajexia Motion Perfect and CX-Drive V1.4 or higher | TJ1-Tools |

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

CJ1W-NCF71 - MECHATROLINK-II

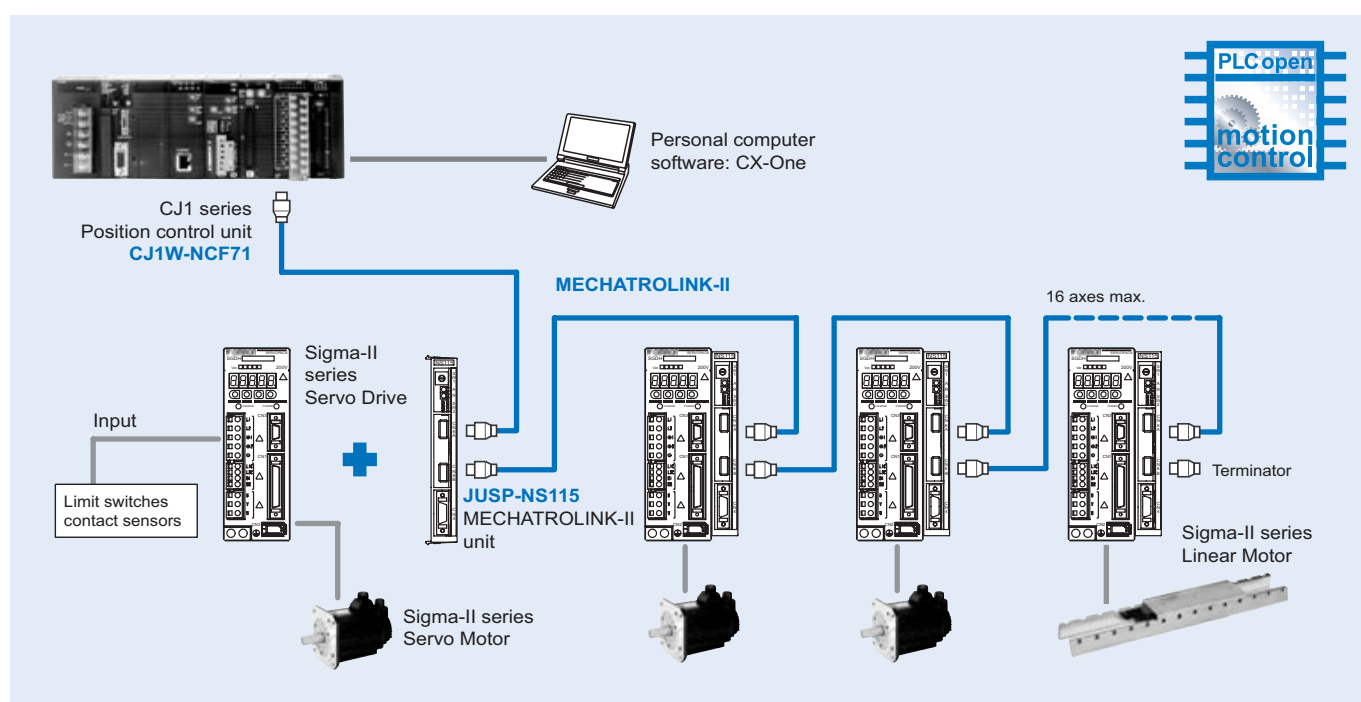
# Position control unit

## Multi-axes position controller via 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.
- Programming languages: ladder, function blocks.
- Smart active parts for OMRON HMI's terminals reduce engineering time.
- Access to the complete system from one point. Network setup, servo drives configuring and monitoring, and PLC programming.



## System configuration



## Specifications

### Position control unit

|                               |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                  |                                                       | <b>CJ1W-NCF71</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Classification                |                                                       | CJ-series CPU bus unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Applicable PLCs               |                                                       | CJ-series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                               |                                                       | CJ-series V. 3.0 or later in order to use function blocks (recommended CJ1G-CPU45 or CJ1H-CPU□)                                                                                                                                                                                                                                                                                                                                                                                             |
| 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.<br>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.<br>Default setting: pulses                                                                                                                                                                                                                                                                                                                                                                                    |
|                               | Speed command unit for position control               | Command units/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                               | Acceleration/deceleration speeds for position control | 10,000 command units/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                               | 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 <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                               | Speed command range for speed control                 | -199.999% to 199.999%<br>The upper limit is restricted by the maximum speed of the servo motor.                                                                                                                                                                                                                                                                                                                                                                                             |
|                               | Torque command range for torque control               | -199.999% to 199.999%<br>The upper limit is restricted by the maximum torque of the servo motor.                                                                                                                                                                                                                                                                                                                                                                                            |
| 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                                  | <ul style="list-style-type: none"> <li>• Origin search: establishes the origin using the specified search method.</li> <li>• Present position preset: changes the present position to a specified position to establish the origin.</li> <li>• Origin return: returns the axis from any position to the established origin.</li> <li>• Absolute encoder origin: establishes the origin using a servo motor that has an absolute encoder, without having to use an origin search.</li> </ul> |
|                               | 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                                        | <ul style="list-style-type: none"> <li>• Deceleration stop: decelerates the moving axis to a stop.</li> <li>• Emergency stop: positions the moving axis for the number of pulses remaining in the deviation counter and then stops the axis.</li> </ul>                                                                                                                                                                                                                                     |
|                               | Linear interpolation                                  | Up to 8 axes can be interpolated by using two interpolators (4 axes per interpolator)<br>Available in unit version 1.1 or higher                                                                                                                                                                                                                                                                                                                                                            |
|                               | Acceleration/deceleration curves                      | Sets either a trapezoidal (linear) curve, an exponential curve, or an S-curve (moving average).                                                                                                                                                                                                                                                                                                                                                                                             |
| Auxiliary functions           | 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<br>(can be used as external origin inputs)                                                                                                                                                                                                                                                                                                                                                                   |
| Programming methods           | Standard ladder                                       | Directly over NCF unit memory area                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                               | Function blocks                                       | Using standard PLC open function blocks                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                               | Smart active parts                                    | Use of OMRON HMI's smart active parts optimizes CPU usage and engineering time                                                                                                                                                                                                                                                                                                                                                                                                              |
| Internal current consumption  |                                                       | 360 mA or less for 5 VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Weight                        |                                                       | 95 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

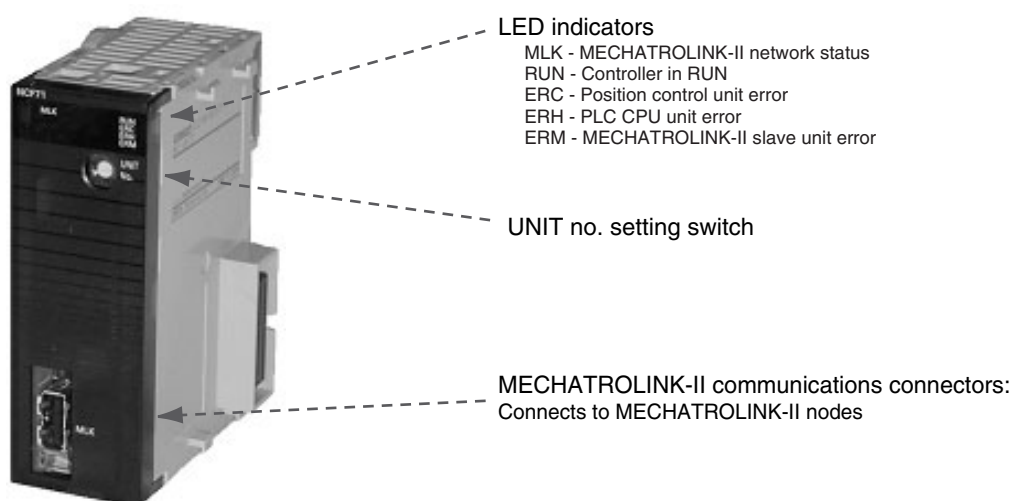


## JUSP-NS115 - MECHATROLINK-II interface unit

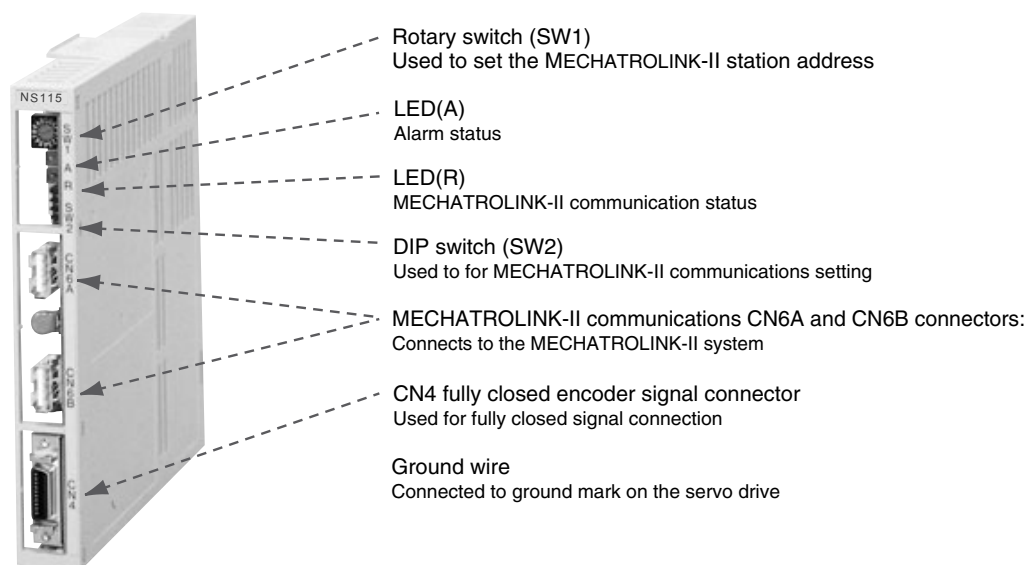
| Item                               | Details                                      |                                                                                                                                       |
|------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 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 / 0.5 ms or more. MECHATROLINK-II communications                                                                               |
| Command format                     | Operation specification                      | Positioning using MECHATROLINK-I/II communications.                                                                                   |
|                                    | Reference input                              | MECHATROLINK-I/II communications<br>Commands: position, speed, torque, 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 | Encoder pulse output in the servo drive      | 5 V differential line-driver output (complies with EIA standard RS-422A)                                                              |
|                                    | Fully closed encoder pulse signal            | A quad B line-driver                                                                                                                  |
|                                    | Maximum receivable frequency for servo drive | 1 Mpps                                                                                                                                |
|                                    | Power supply for fully closed encoder        | To be prepared by customer.                                                                                                           |
| Input signals in the servo drive   | Signal allocation changes possible           | Forward/reverse run prohibited, zero point return deceleration LS<br>External latch signals 1, 2, 3<br>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

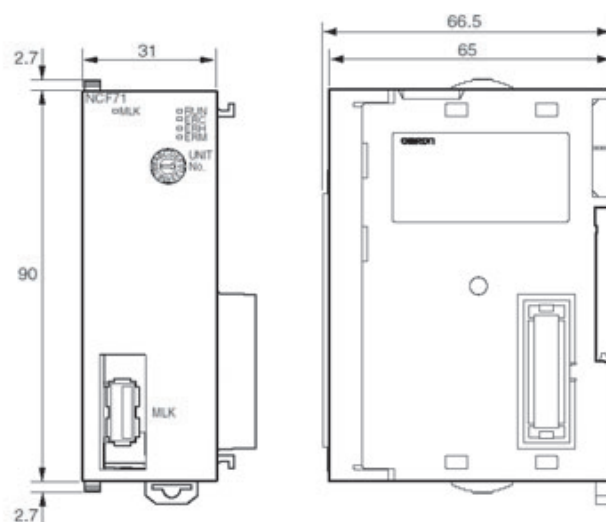


## JUSP-NS115 - MECHATROLINK-II interface unit

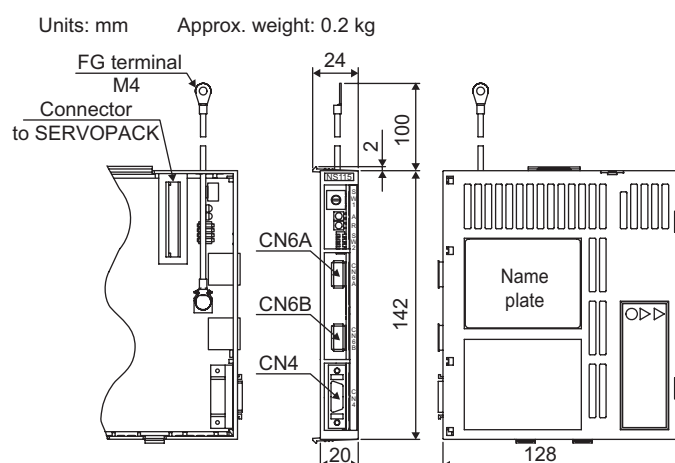


## Dimensions

### CJ1W-NCF71 - position control unit

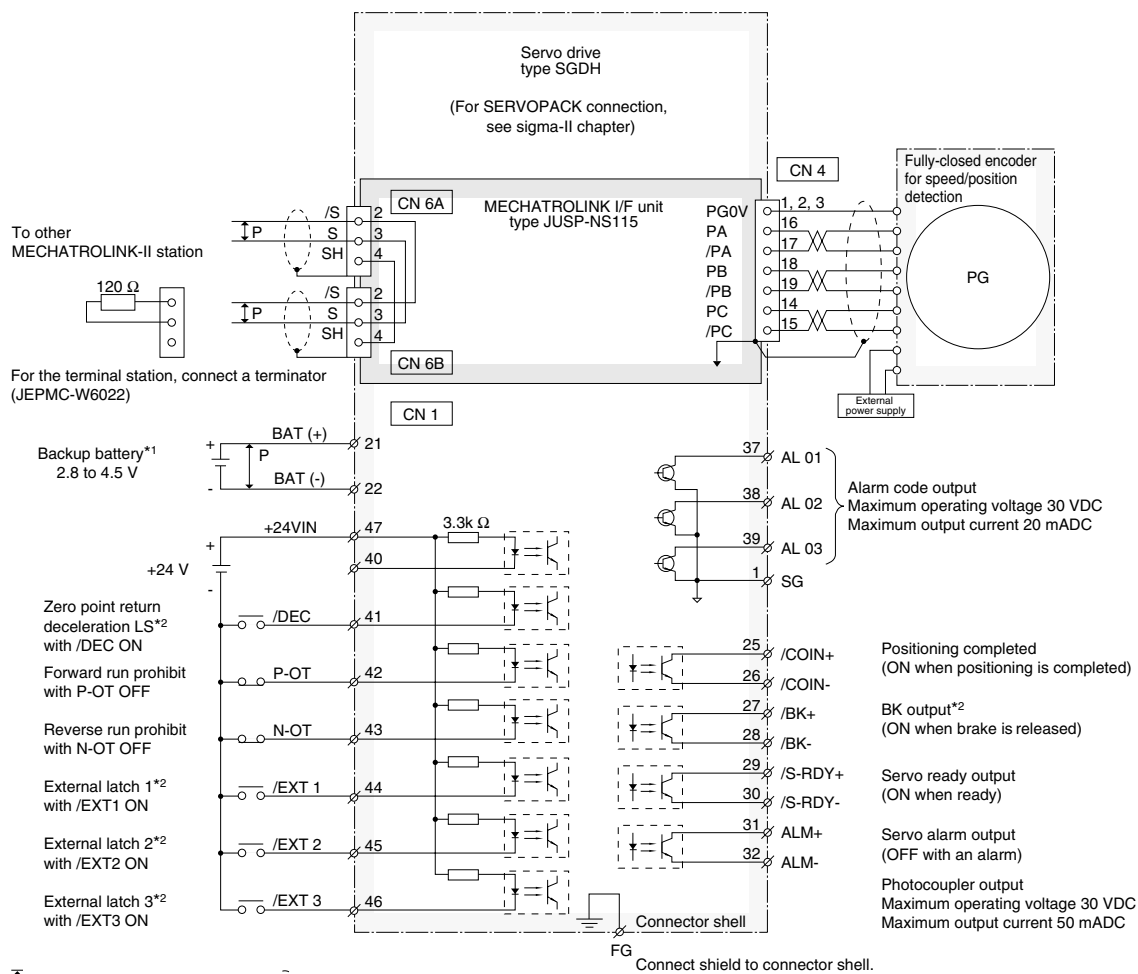


### JUSP-NS115 - MECHATROLINK-II interface unit



## Installation

## MECHATROLINK-II interface connections



\*1 Connect when using an absolute encoder and when the battery is not connected to CN8.  
\*2 Set the signal assignment with the user constants.

## Ordering information

### Position controller unit

| Name                                     | Model      |
|------------------------------------------|------------|
| MECHATROLINK-II position controller unit | CJ1W-NCF71 |

## MECHATROLINK-II related devices

| Name                           | Remarks                                                             | Model          |
|--------------------------------|---------------------------------------------------------------------|----------------|
| MECHATROLINK-II interface unit | For Sigma-II series servo drives.<br>(Firmware version 38 or later) | JUSP-NS115     |
| MECHATROLINK-II terminator     | Terminating resistor                                                | JEPMC-W6022    |
| MECHATROLINK-II cables         | 0.5 meter                                                           | JEPMC-W6003-A5 |
|                                | 1 meter                                                             | JEPMC-W6003-01 |
|                                | 3 meters                                                            | JEPMC-W6003-03 |
|                                | 5 meters                                                            | JEPMC-W6003-05 |
|                                | 10 meters                                                           | JEPMC-W6003-10 |
|                                | 20 meters                                                           | JEPMC-W6003-20 |
|                                | 30 meters                                                           | JEPMC-W6003-30 |

## Servo system

**Note:** Refer to servo systems section for more information

## Computer software

| Specifications               | Model  |
|------------------------------|--------|
| CX-One version 1.1 or higher | CX-One |

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

CS1W-NCF71 - MECHATROLINK-II

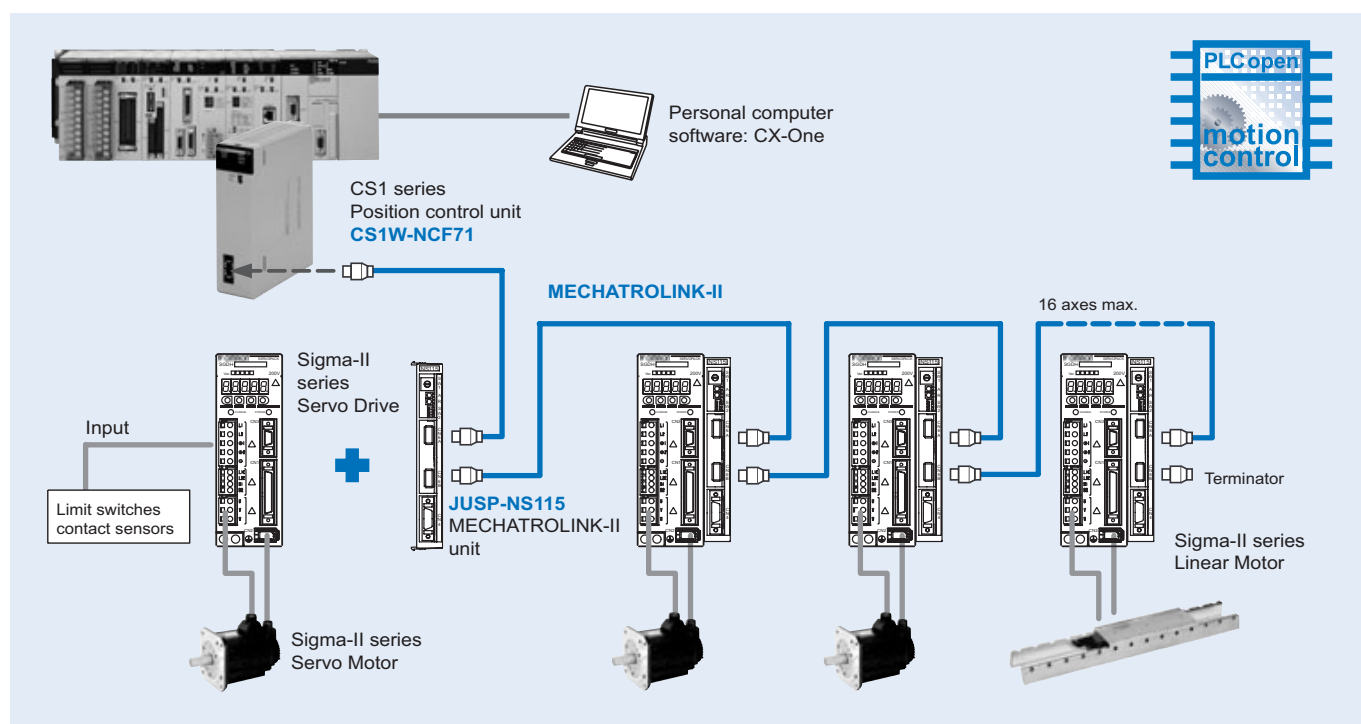
# Position control unit

## 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.
- Programming languages: ladder, function blocks.
- Smart active parts for OMRON HMI's terminals reduce engineering time.
- Access to the complete system from one point. Network setup, servo drives configuring and monitoring, and PLC programming.



## System configuration





## Specifications

### Position control unit

|                               |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                  |                                                       | <b>CS1W-NCF71</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Classification                |                                                       | CS-series CPU bus unit                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Applicable PLCs               |                                                       | CS-series                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                               |                                                       | CS-series (V. 3.0 or later if use of function blocks is needed)                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 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):<br>CIO, Work, Auxiliary, Holding, DM, or EM Area.<br>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.<br>Default setting: Pulses                                                                                                                                                                                                                                                                                                                                                                                   |
|                               | Speed command unit for position control               | Command units/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                               | Acceleration/deceleration speeds for position control | 10,000 command units/s <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                               | 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 <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                               | Speed command range for speed control                 | -199.999% to 199.999%<br>The upper limit is restricted by the maximum speed of the servo motor.                                                                                                                                                                                                                                                                                                                                                                                            |
|                               | Torque command range for torque control               | -199.999% to 199.999%<br>The upper limit is restricted by the maximum torque of the servo motor.                                                                                                                                                                                                                                                                                                                                                                                           |
| 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                                  | <ul style="list-style-type: none"> <li>• Origin search: Establishes the origin using the specified search method.</li> <li>• Present position preset: Changes the present position to a specified position to establish the origin.</li> <li>• Origin return: Returns the axis from any position to the established origin.</li> <li>• Absolute encoder origin: Establishes the origin using a Servomotor that has an absolute encoder, without having to use an origin search.</li> </ul> |
|                               | 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                                        | <ul style="list-style-type: none"> <li>• Deceleration stop: Decelerates the moving axis to a stop.</li> <li>• Emergency stop: Positions the moving axis for the number of pulses remaining in the deviation counter and then stops the axis.</li> </ul>                                                                                                                                                                                                                                    |
|                               | Linear interpolation                                  | Up to 8 axes can be interpolated by using two interpolators (4 axes per interpolator)<br>Available in unit version 1.1 or higher                                                                                                                                                                                                                                                                                                                                                           |
|                               |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 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.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| External I/O                  | Backlash compensation                                 | Compensates for the amount of play in the mechanical system according to a set value.                                                                                                                                                                                                                                                                                                                                                                                                      |
|                               |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Programming methods           | 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<br>(can be used as external origin inputs)                                                                                                                                                                                                                                                                                                                                                                  |
|                               | Standard ladder                                       | Directly over NCF unit memory area                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                               | Function blocks                                       | Using standard PLC open function blocks                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                               | Smart active parts                                    | Use of OMRON HMI's smart active parts optimizes CPU usage and engineering time                                                                                                                                                                                                                                                                                                                                                                                                             |
| Internal current consumption  |                                                       | 360 mA or less for 5 VDC                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Weight                        |                                                       | 188 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

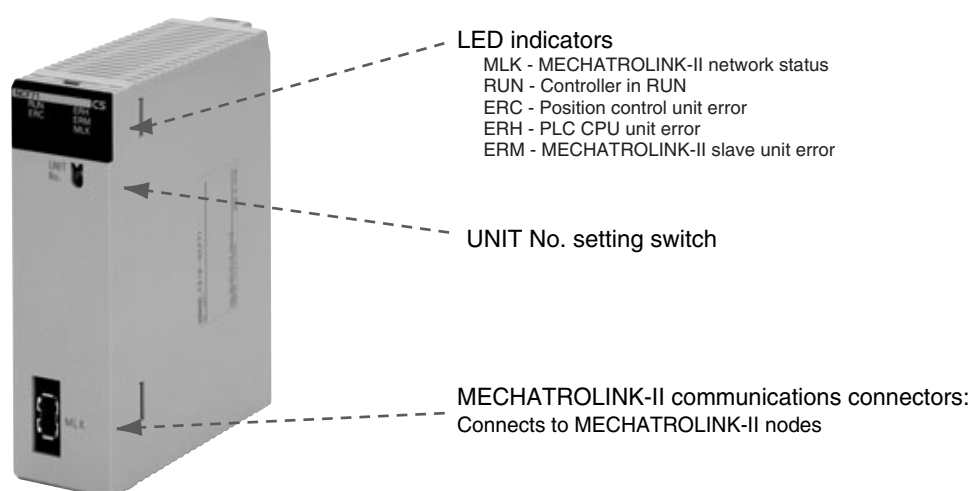


## JUSP-NS115 - MECHATROLINK-II interface unit

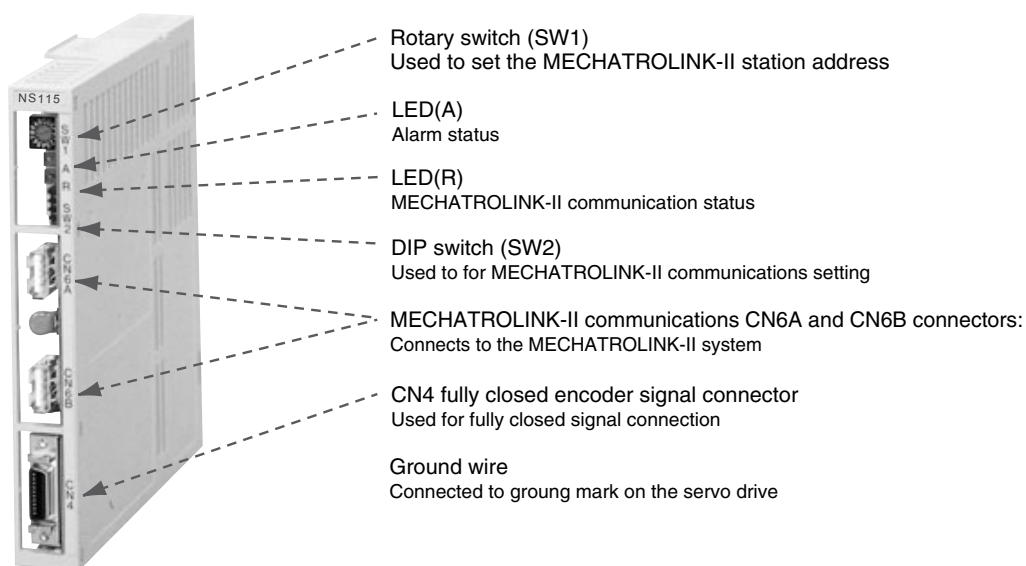
| Item                               | Details                                      |
|------------------------------------|----------------------------------------------|
| Type                               | JUSP-NS115                                   |
| Applicable servo drive             | SGDH-□□□□E models (version 38 or later)      |
| Installation method                | Mounted on the SGDh servo drive side: CN10.  |
| Basic specifications               | Power supply method                          |
|                                    | Power consumption                            |
| MECHATROLINK-II communications     | Baud rate / transmission cycle               |
| Command format                     | Operation specification                      |
|                                    | Reference input                              |
| Position control functions         | Acceleration/deceleration method             |
|                                    | Fully closed control                         |
| Fully closed system specifications | Encoder pulse output in the servo drive      |
|                                    | Fully closed encoder pulse signal            |
|                                    | Maximum receivable frequency for servo drive |
|                                    | Power supply for fully closed encoder        |
| Input signals in the servo drive   | Signal allocation changes possible           |
|                                    |                                              |
| Internal functions                 | Position data latch function                 |
|                                    | Protection                                   |
|                                    | LED indicators                               |

## Nomenclature

## CJ1W-NCF71 - position control unit

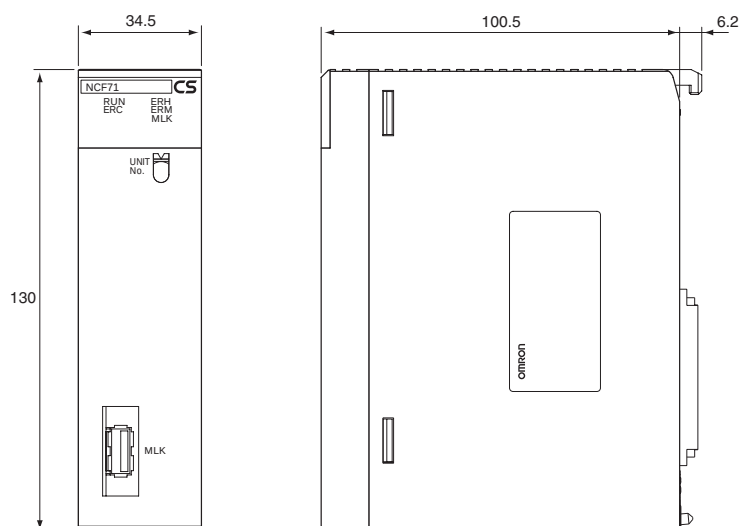


## JUSP-NS115 - MECHATROLINK-II interface unit

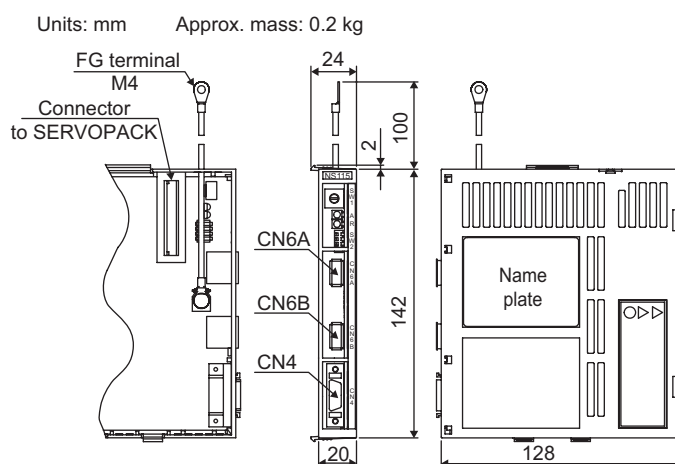


## Dimensions

### CS1W-NCF71 - position control unit

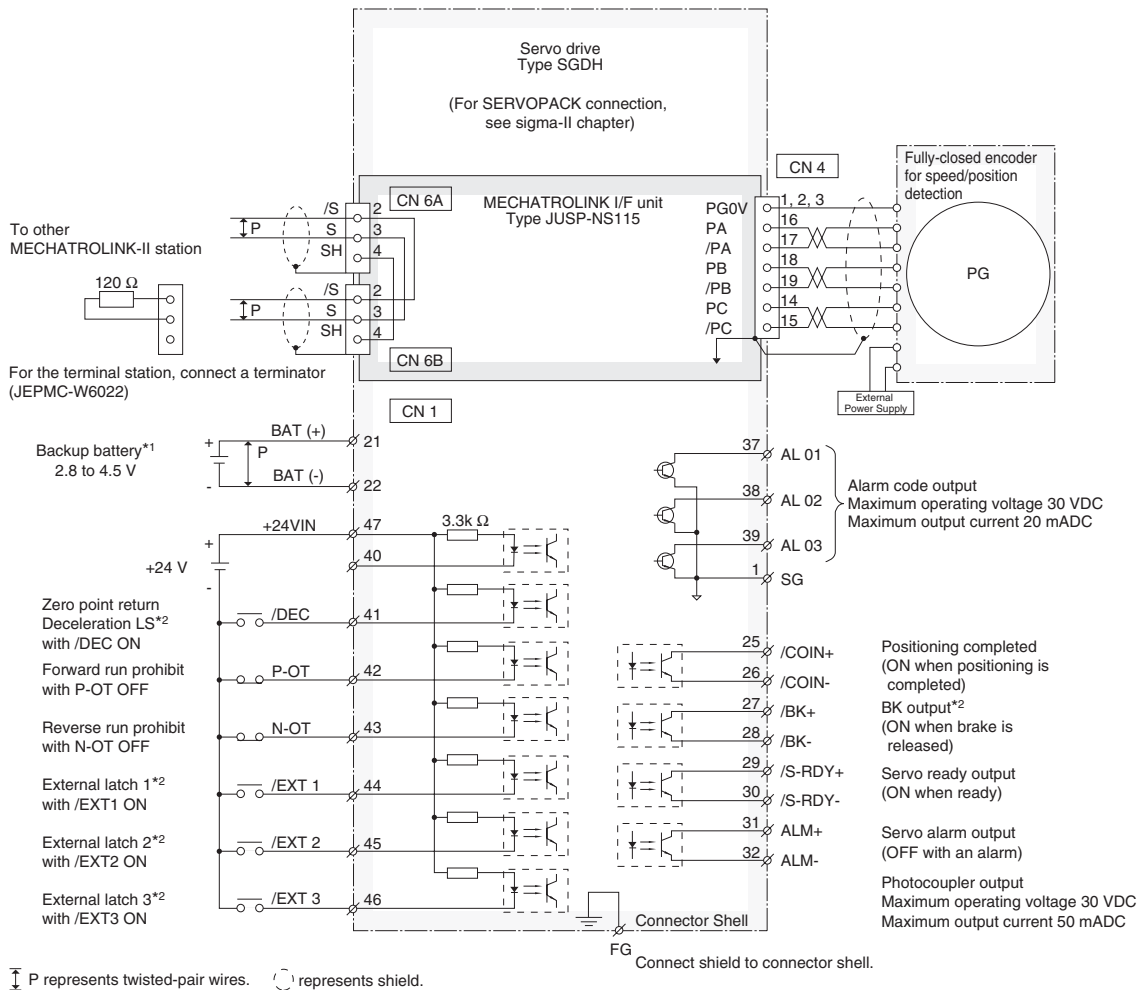


### JUSP-NS115 - MECHATROLINK-II interface unit



## Installation

### MECHATROLINK-II interface connections



\*1 Connect when using an absolute encoder and when the battery is not connected to CN8.  
\*2 Set the signal assignment with the user constants.

## Ordering information

### Position controller unit

| Name                                     | Model      |
|------------------------------------------|------------|
| MECHATROLINK-II position controller unit | CS1W-NCF71 |

### MECHATROLINK-II related devices

| Name                           | Remarks                                                             | Model          |
|--------------------------------|---------------------------------------------------------------------|----------------|
| MECHATROLINK-II interface unit | For Sigma-II series servo drives.<br>(Firmware version 38 or later) | JUSP-NS115     |
| MECHATROLINK-II terminator     | Terminating resistor                                                | JEPMC-W6022    |
| MECHATROLINK-II cables         | 0.5 meter                                                           | JEPMC-W6003-A5 |
|                                | 1 meter                                                             | JEPMC-W6003-01 |
|                                | 3 meters                                                            | JEPMC-W6003-03 |
|                                | 5 meters                                                            | JEPMC-W6003-05 |
|                                | 10 meters                                                           | JEPMC-W6003-10 |
|                                | 20 meters                                                           | JEPMC-W6003-20 |
|                                | 30 meters                                                           | JEPMC-W6003-30 |

### Servo system

**Note:** Refer to servo systems section for more information.

### Computer software

| Specifications               | Model  |
|------------------------------|--------|
| CX-One version 1.1 or higher | CX-ONE |

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

CJ1W-MCH71 - MECHATROLINK-II

# Motion control unit

## Multi-axes motion control via high-speed MECHATROLINK-II

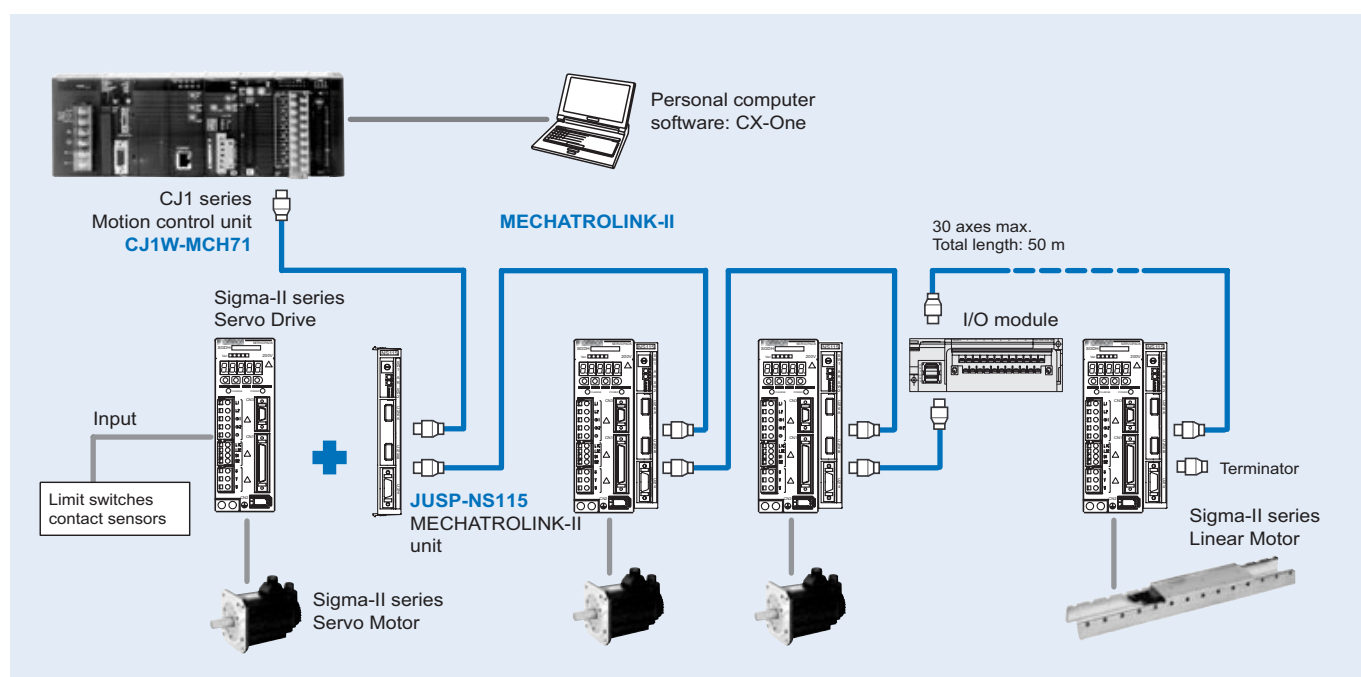
- Up to 30 axes controlled with minimum wiring
- High-speed bus MECHATROLINK-II is specially designed for motion control
- Supports position, speed and torque control
- Electronic CAM profiles and axes synchronization
- Hardware registration input for every axis
- Program control commands, like multi-task, parallel programming and various arithmetic operations for maximum program efficiency
- Smart active parts for OMRON HMIs
- 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

|                                                                 |                                     |                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                                                    |                                     | <b>CJ1W-MCH71</b>                                                                                                                                                                                                                                                                                                                  |
| 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, various I/O units and inverters V7, F7, G7 with MECHATROLINK-II interface (for inverter version support contact your OMRON sales office)                                                                                                           |
| Programming language                                            |                                     | BASIC type motion control language                                                                                                                                                                                                                                                                                                 |
| Controlled axes                                                 |                                     | 32 max, including 30 physical or virtual axes and 2 virtual axes                                                                                                                                                                                                                                                                   |
| Automatic/manual mode                                           |                                     | Automatic mode: mode for executing programs in the unit<br>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.<br>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 selectable speed.                                                                                                                                                                                                                                                       |
|                                                                 | Origin search                       | Determines the machine origin in the direction set in the system parameters.<br>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 per program                                                                                                                                                                                                                                 |
|                                                                 | 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 or from the PLC                                                                                                                                                                                                                                                              |
|                                                                 | 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                                     | Unit BIT area                       | Uses one unit number (25 words). Used for unit and tasks: 11 to 25 words (depending on the number of tasks)                                                                                                                                                                                                                        |
|                                                                 | Unit data area                      | Uses one unit number (100 words). Used for unit and tasks: 32 to 74 words (depending on the number of tasks)                                                                                                                                                                                                                       |
|                                                                 | Axes BIT area                       | Axes: 0 to 64 words (depending on the maximum axis number used). User configurable.                                                                                                                                                                                                                                                |
|                                                                 | Axes data area                      | Axes: 0 to 128 words (depending on the maximum axis number used). User configurable.                                                                                                                                                                                                                                               |
|                                                                 | General purpose                     | General I/O: 0 to 1,280 words (depending on the settings). User configurable.                                                                                                                                                                                                                                                      |
| 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 VDC (21.6 to 26.4 VDC)                                                                                                                                                                                                                                                                                                          |
| Internal current consumption                                    |                                     | 0.6 A or less for 5 VDC                                                                                                                                                                                                                                                                                                            |
| Weight (not including connectors)                               |                                     | 300 g max.                                                                                                                                                                                                                                                                                                                         |

## MECHATROLINK-II, Servo drive interface unit (JUSP-NS115)

| 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 Mbps / 1 ms or more. MECHATROLINK-II communications                                                                                |
| Command format                     | Operation specification                      | Positioning using MECHATROLINK-I/II communications.                                                                                   |
|                                    | Reference input                              | MECHATROLINK-I/II communications<br>Commands: position, speed, torque, 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 | Encoder pulse output in the servo drive      | 5 V differential line-driver output (complies with EIA standard RS-422A)                                                              |
|                                    | Fully closed encoder pulse signal            | A quad B line-driver                                                                                                                  |
|                                    | Maximum receivable frequency for servo drive | 1 Mpps                                                                                                                                |
|                                    | Power supply for fully closed encoder        | To be prepared by customer.                                                                                                           |
| Input signals in the servo drive   | Signal allocation changes possible           | Forward/reverse run prohibited, zero point return deceleration LS<br>External latch signals 1, 2, 3<br>Forward/reverse torque control |
|                                    | Position data latch function                 | Position data latching is possible using phase C, and external signals 1, 2, 3                                                        |
| Internal functions                 | Protection                                   | Parameters damage, parameter setting errors, communications errors, WDT errors, fully closed encoder detecting disconnection          |
|                                    | LED indicators                               | A: alarm, R: MECHATROLINK-I/II communicating                                                                                          |



## MECHATROLINK-II, 64 Point I/O module (IO2310)

| Items               | Specifications                                                                                                                                                                                                                     | Appearance                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model               | JEPMC-IO2310                                                                                                                                                                                                                       |  |
| I/O signals         | Input: 64 points, 24 VDC, 5mA, sink/source mode input<br>Output: 64 points, 24 VDC, 50mA when all points ON, (the max. rating is 100mA per point)<br>sink mode output (NPN)<br>Signal connection method: connector (FCN360 series) |                                                                                       |
| Module power supply | 24VDC (20.4 V to 28.8 V)<br>Rated current: 0.5 A<br>Inrush current: 1 A                                                                                                                                                            |                                                                                       |
| Weight              | 590 g                                                                                                                                                                                                                              |                                                                                       |

## MECHATROLINK-II, counter module (PL2900)

| Items                    | Specifications                                                             | Appearance                                                                            |
|--------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                    | JEPMC-PL2900                                                               |  |
| Number of input channels | 2 (1 can be used with MCH)                                                 |                                                                                       |
| Functions                | Pulse counter, notch output                                                |                                                                                       |
| Pulse input method       | Sign (1/2 multipliers), A/B (1/2/4 multipliers), UP/DOWN (1/2 multipliers) |                                                                                       |
| Max. counter speed       | 1200 kpps (x 4 multiplier)                                                 |                                                                                       |
| Pulse input voltage      | 3/5/12/24 VDC                                                              |                                                                                       |
| External power supply    | 24 VDC, 120 mA or less                                                     |                                                                                       |
| Weight                   | 300 g                                                                      |                                                                                       |

## MECHATROLINK-II, pulse output module (PL2910)

| Items                     | Specifications                                                                                                                              | Appearance                                                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                     | JEPMC-PL2910                                                                                                                                |  |
| Number of output channels | 2                                                                                                                                           |                                                                                       |
| Functions                 | Pulse positioning, JOG run, zero-point return                                                                                               |                                                                                       |
| Pulse output method       | CW, CCW pulse, sign                                                                                                                         |                                                                                       |
| Max. output speed         | 500 kpps                                                                                                                                    |                                                                                       |
| Pulse output voltage      | 5 VDC                                                                                                                                       |                                                                                       |
| Pulse interface circuit   | Open collector output<br>5VDC, 10mA/circuit                                                                                                 |                                                                                       |
| External control signal   | Digital input: 8 points/module, 5 VDC x 4 points, 24 VDC x 4 points<br>Digital output: 6 points/module, 5 VDC x 4 points, 24 VDC x 2 points |                                                                                       |
| Weight                    | 300 g                                                                                                                                       |                                                                                       |



## MECHATROLINK-II Repeater

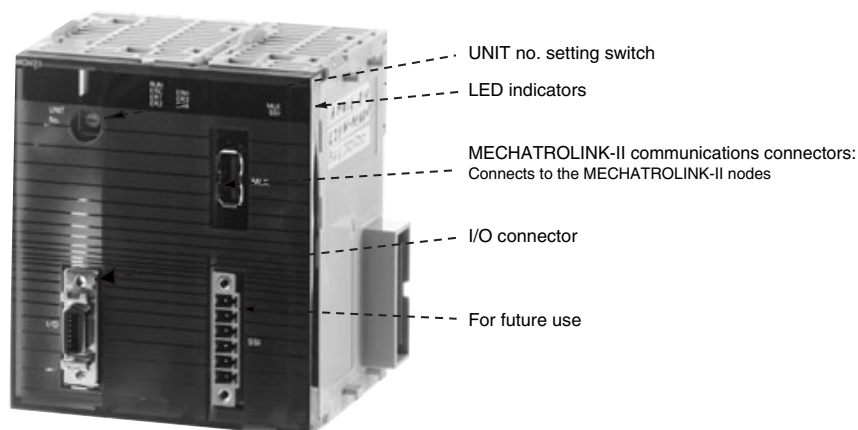
| Items                   | Specifications                                                                                                                                                                                                                                                                                                                                                                           | Appearance                                                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                   | JEPMC-REP2000                                                                                                                                                                                                                                                                                                                                                                            |  |
| Communication type      | MECHATROLINK-II                                                                                                                                                                                                                                                                                                                                                                          |                                                                                     |
| Cable length            | Between controller and repeater: 50 m., after repeater: 50 m                                                                                                                                                                                                                                                                                                                             |                                                                                     |
| Max. connected stations | Total stations on both sides of repeater: 30<br>(limited to the max. number of connectable stations of the controller (e.g., 30 stations for the CJ1W-MCH71))                                                                                                                                                                                                                            |                                                                                     |
| Restrictions            | Between controller and repeater<br>- Total cable length ≤ 30m: 15 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤ 50m: 14 stations max. including I/O and servo, etc.<br>After repeater:<br>- Total cable length ≤ 30m: 16 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤ 50m: 15 stations max. including I/O and servo, etc. |                                                                                     |
| Power supply            | 24 VDC, 100 mA                                                                                                                                                                                                                                                                                                                                                                           |                                                                                     |
| Weight                  | 340 g                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |
| Dimensions (mm)         | 30x160x77 (HxWxD)                                                                                                                                                                                                                                                                                                                                                                        |                                                                                     |

## MECHATROLINK-II, frequency inverter interface units

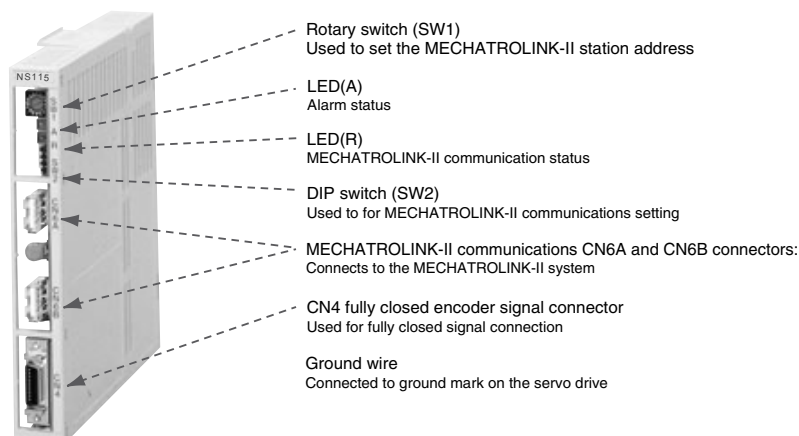
| Item                           | Details                                                                                                                                              |                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Type                           | SI-T/V7                                                                                                                                              | SI-T                                                               |
| Applicable inverter            | CIMR-V7 / 3G3-MV<br>(firmware 5740 or newer)                                                                                                         | CIMR-G7 / CIMR-F7<br>(firmware 656x/for G7 / 4011 or newer for F7) |
|                                | Contact your OMRON sales office for information about firmware compatibility                                                                         |                                                                    |
| Installation method            | Mounted on the inverter                                                                                                                              |                                                                    |
| Power supply                   | Supplied from the inverter                                                                                                                           |                                                                    |
| MECHATROLINK-II communications | 10 MHz, 0.5 ms to 8 ms for MECHATROLINK-II                                                                                                           |                                                                    |
| Operation                      | Read and write registers, read monitors, inverter operation, speed reference, torque reference (G7/F7 only).                                         |                                                                    |
| Inputs and outputs             | The inputs and outputs in the inverter can be read and set by the MLII master                                                                        |                                                                    |
| Connectors                     | ML-II bus connector. DPRAM connector for the inverter                                                                                                |                                                                    |
| Switches                       | Rotary switch for ML-II address (low byte)<br>Dip switch for: ML-II address (high bit). ML-II/ML-I selection. 17 byte/32 byte data length selection. |                                                                    |

## Nomenclature

### CJ1W-MCH71 - motion control unit

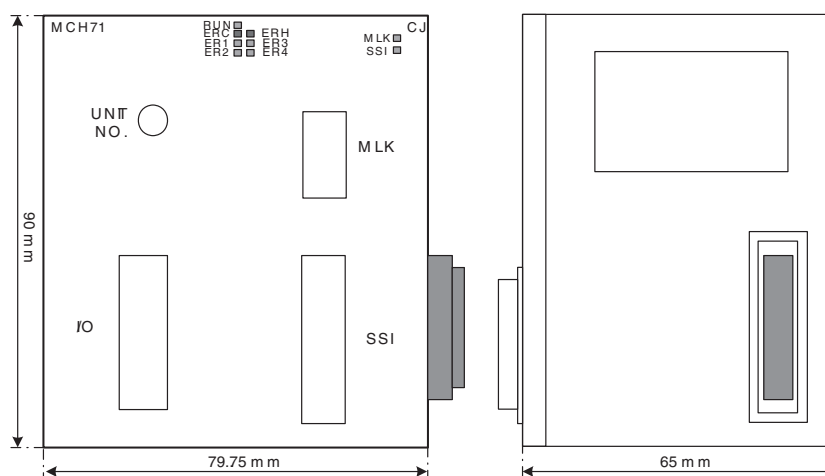


### JUSP-NS115 - MECHATROLINK-II interface unit

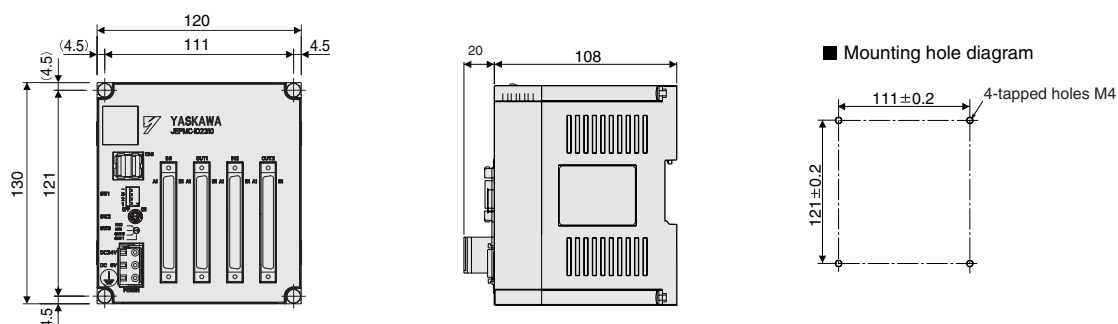


## Dimensions

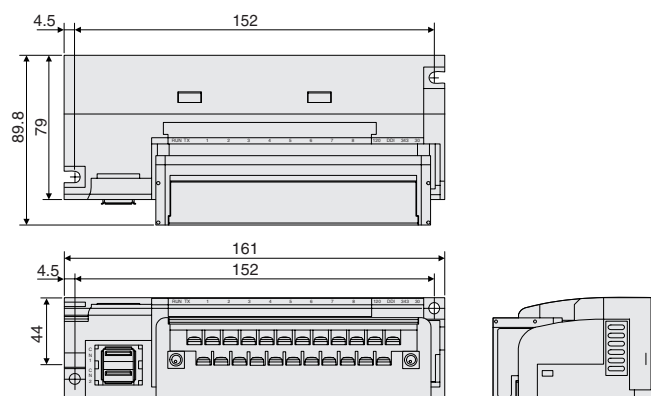
**CJ1W-MCH71 - motion control unit**



## IO2310 I/O module

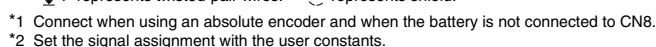


## I/O modules PL2900, PL2910





### MECHATROLINK-II interface connections



## Ordering information

### Motion controller

| Name                                | Model      |
|-------------------------------------|------------|
| MECHATROLINK-II motion control unit | CJ1W-MCH71 |

### MECHATROLINK-II - related devices

| Name                            | Remarks                                                                                         | Model          |
|---------------------------------|-------------------------------------------------------------------------------------------------|----------------|
| Distributed I/O modules         | 64 point input and 64-point output                                                              | JEPMC-IO2310   |
|                                 | Reversible counter: 2 channels                                                                  | JEPMC-PL2900   |
|                                 | Pulse output: 2 channels                                                                        | JEPMC-PL2910   |
| MECHATROLINK-II cables          | 0.5 meter                                                                                       | JEPMC-W6003-A5 |
|                                 | 1 meter                                                                                         | JEPMC-W6003-01 |
|                                 | 3 meters                                                                                        | JEPMC-W6003-03 |
|                                 | 5 meters                                                                                        | JEPMC-W6003-05 |
|                                 | 10 meters                                                                                       | JEPMC-W6003-10 |
|                                 | 20 meters                                                                                       | JEPMC-W6003-20 |
|                                 | 30 meters                                                                                       | JEPMC-W6003-30 |
| MECHATROLINK-II terminator      | Terminating resistor                                                                            | JEPMC-W6022    |
| MECHATROLINK-II interface units | For Sigma-II series servo drives. (Firmware version 38 or later)                                | JUSP-NS115     |
|                                 | For Varispeed V7 inverter<br>(for inverter version support contact your OMRON sales office)     | SI-T/V7        |
|                                 | For Varispeed F7, G7 inverter<br>(for inverter version support contact your OMRON sales office) | SI-T           |
| MECHATROLINK-II repeater        | When 17 or more axes are connected to the MECHATROLINK-II the repeater is required              | JEPMC-REP2000  |

### I/O cables

|                      | Remarks                           | Length m | Model          |
|----------------------|-----------------------------------|----------|----------------|
| I/O cable for IO2310 | With connector on the IO2310 side | 0.5      | JEPMC-W5410-05 |
|                      |                                   | 1.0      | JEPMC-W5410-10 |
|                      |                                   | 3.0      | JEPMC-W5410-30 |

### Servo system

**Note:** Refer to servo systems section for detailed information

### Frequency inverters

**Note:** Refer to frequency inverters section for detailed information

### Computer software

| Specifications               | Model  |
|------------------------------|--------|
| CX-One version 1.1 or higher | CX-One |

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

CS1W-MCH71 - MECHATROLINK-II

# Motion control unit

## Multi-axes motion control via high-speed MECHATROLINK-II

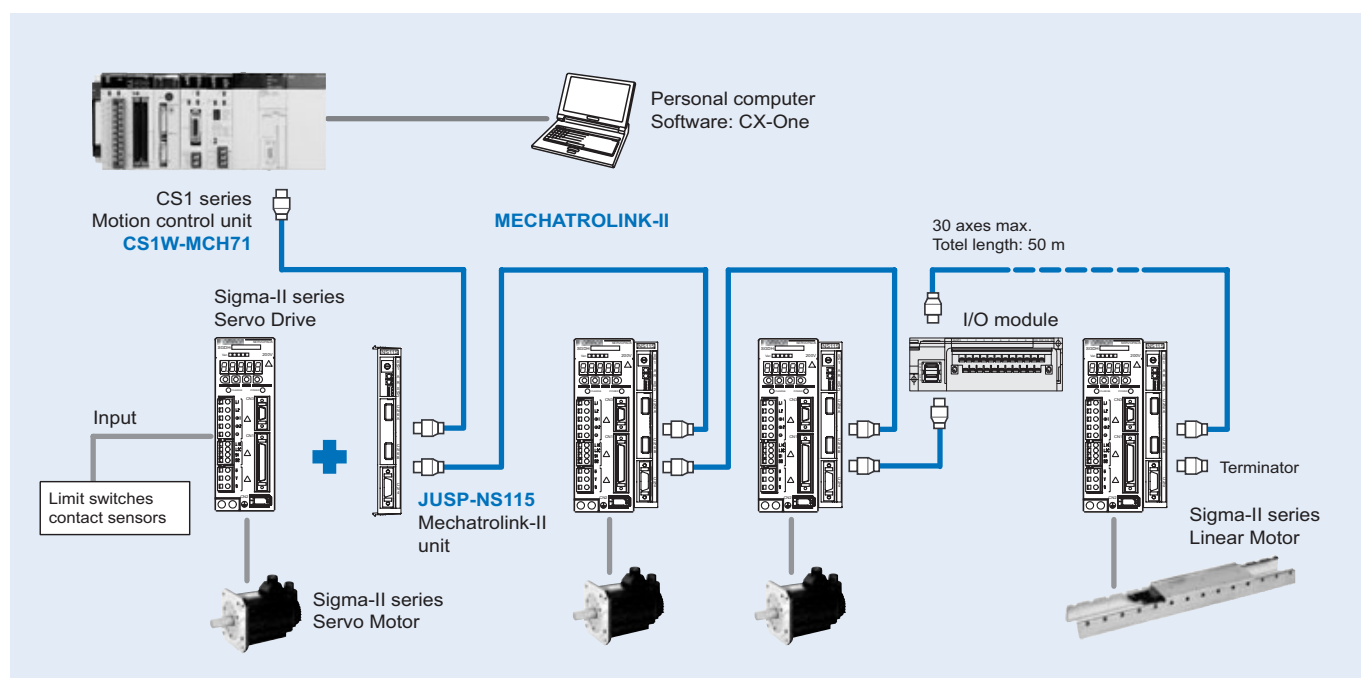
- Up to 30 axes controlled with minimum wiring
- High-speed bus MECHATROLINK-II is specially designed for motion control
- Supports position, speed and torque control
- Electronic CAM profiles and axes synchronization
- Hardware registration input for every axis
- Program control commands, like multi-task, parallel programming and various arithmetic operations for maximum program efficiency
- Smart active parts for OMRON HMIs
- 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

|                                                                 |                                     |                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                                                    |                                     | <b>CS1W-MCH71</b>                                                                                                                                                                                                                                                                                                                  |
| Classification                                                  |                                     | CS-series CPU bus unit                                                                                                                                                                                                                                                                                                             |
| Applicable PLCs                                                 |                                     | CS-series, (CS1□-CPU□□H)                                                                                                                                                                                                                                                                                                           |
| Backplanes on which MC unit can be mounted                      |                                     | CPU backplane or CS-series expansion I/O backplane                                                                                                                                                                                                                                                                                 |
| Control method                                                  |                                     | MECHATROLINK-II (position, speed and torque control)                                                                                                                                                                                                                                                                               |
| Controlled devices                                              |                                     | Sigma-II series servo drives (ver. 38 or later) with MECHATROLINK-II Interface, various I/O units and inverters V7, F7, G7 with MECHATROLINK-II interface (for inverter version support contact your OMRON sales office)                                                                                                           |
| 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<br>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.<br>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 selectable speed.                                                                                                                                                                                                                                                       |
|                                                                 | Origin search                       | Determines the machine origin in the direction set in the system parameters.<br>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 per program                                                                                                                                                                                                                                 |
|                                                                 | 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 or from the PLC                                                                                                                                                                                                                                                              |
|                                                                 | 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                                     | Unit BIT area                       | Uses one unit number (25 words). Used for unit and tasks: 11 to 25 words (depending on the number of tasks)                                                                                                                                                                                                                        |
|                                                                 | Unit data area                      | Uses one unit number (100 words). Used for unit and tasks: 32 to 74 words (depending on the number of tasks)                                                                                                                                                                                                                       |
|                                                                 | Axes BIT area                       | Axes: 0 to 64 words (depending on the maximum axis number used). User configurable.                                                                                                                                                                                                                                                |
|                                                                 | Axes data area                      | Axes: 0 to 128 words (depending on the maximum axis number used). User configurable.                                                                                                                                                                                                                                               |
|                                                                 | General purpose                     | General I/O: 0 to 1,280 words (depending on the settings). User configurable.                                                                                                                                                                                                                                                      |
| 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 VDC (21.6 to 26.4 VDC)                                                                                                                                                                                                                                                                                                          |
| Internal current consumption                                    |                                     | 0.8 A or less for 5 VDC; 0.3 A or less for 24 VDC                                                                                                                                                                                                                                                                                  |
| Weight (not including connectors)                               |                                     | 300 g max.                                                                                                                                                                                                                                                                                                                         |

## MECHATROLINK-II, servo drive interface unit (JUSP-NS115)

| 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                          |                                                                                     |
|                                    | Power consumption                            |                                                                                     |
| MECHATROLINK-II communications     | Baud rate / transmission cycle               |                                                                                     |
| Command format                     | Operation specification                      |                                                                                     |
|                                    | Reference input                              |                                                                                     |
| Position control functions         | Acceleration/deceleration method             |                                                                                     |
|                                    | Fully closed control                         |                                                                                     |
|                                    | Encoder pulse output in the servo drive      |                                                                                     |
| Fully closed system specifications | Fully Closed Encoder Pulse Signal            |                                                                                     |
|                                    | Maximum Receivable Frequency for Servo Drive |                                                                                     |
|                                    | Power Supply for Fully Closed Encoder        |                                                                                     |
|                                    | Input signals in the servo drive             |                                                                                     |
| Internal functions                 | Position data latch function                 |                                                                                     |
|                                    | Protection                                   |                                                                                     |
|                                    | LED indicators                               |                                                                                     |

## MECHATROLINK-II, 64 point I/O module (IO2310)

| Items               | Specifications                                                                                                                                                                                                                     | Appearance                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model               | JEPMC-IO2310                                                                                                                                                                                                                       |  |
| I/O signals         | Input: 64 points, 24 VDC, 5 mA, sink/source mode input<br>Output: 64 points, 24 VDC, 50 mA when all points ON, (the max. rating is 100 mA per point) sink mode output (NPN)<br>Signal connection method: connector (FCN360 series) |                                                                                       |
| Module power supply | 24 VDC (20.4 V to 28.8 V)<br>Rated current: 0.5 A<br>Inrush current: 1 A                                                                                                                                                           |                                                                                       |
| Weight              | 590 g                                                                                                                                                                                                                              |                                                                                       |

## MECHATROLINK-II, counter module (PL2900)

| Items                    | Specifications                                                             | Appearance                                                                            |
|--------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                    | JEPMC-PL2900                                                               |  |
| Number of input channels | 2 (1 can be used with MCH)                                                 |                                                                                       |
| Functions                | Pulse counter, notch output                                                |                                                                                       |
| Pulse input method       | Sign (1/2 multipliers), A/B (1/2/4 multipliers), UP/DOWN (1/2 multipliers) |                                                                                       |
| Max. counter speed       | 1200 kpps (x 4 multiplier)                                                 |                                                                                       |
| Pulse input voltage      | 3/5/12/24 VDC                                                              |                                                                                       |
| External power supply    | 24 VDC, 120 mA or less                                                     |                                                                                       |
| Weight                   | 300 g                                                                      |                                                                                       |

## MECHATROLINK-II, pulse output module (PL2910)

| Items                     | Specifications                                                                                                                              | Appearance                                                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                     | JEPMC-PL2910                                                                                                                                |  |
| Number of output channels | 2                                                                                                                                           |                                                                                       |
| Functions                 | Pulse positioning, JOG run, zero-point return                                                                                               |                                                                                       |
| Pulse output method       | CW, CCW pulse, sign                                                                                                                         |                                                                                       |
| Max. output speed         | 500 kpps                                                                                                                                    |                                                                                       |
| Pulse output voltage      | 5 VDC                                                                                                                                       |                                                                                       |
| Pulse interface circuit   | Open collector output<br>5 VDC, 10 mA/circuit                                                                                               |                                                                                       |
| External control signal   | Digital input: 8 points/module, 5 VDC x 4 points, 24 VDC x 4 points<br>Digital output: 6 points/module, 5 VDC x 4 points, 24 VDC x 2 points |                                                                                       |
| Weight                    | 300 g                                                                                                                                       |                                                                                       |



## MECHATROLINK-II repeater

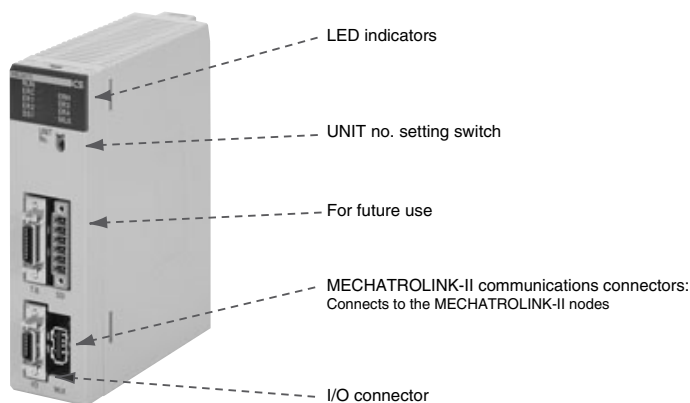
| Items                   | Specifications                                                                                                                                                                                                                                                                                                                                                                       | Appearance                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                   | JEPMC-REP2000                                                                                                                                                                                                                                                                                                                                                                        |  |
| Communication type      | MECHATROLINK-II                                                                                                                                                                                                                                                                                                                                                                      |                                                                                     |
| Cable length            | Between controller and repeater: 50 m., after repeater: 50 m                                                                                                                                                                                                                                                                                                                         |                                                                                     |
| Max. connected stations | Total stations on both sides of repeater: 30<br>(limited to the max. number of connectable stations of the controller (e.g., 30 stations for the CJ1W-MCH71))                                                                                                                                                                                                                        |                                                                                     |
| Restrictions            | Between controller and repeater<br>- Total cable length ≤30m: 15 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤50m: 14 stations max. including I/O and servo, etc.<br>After repeater:<br>- Total cable length ≤30m: 16 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤50m: 15 stations max. including I/O and servo, etc. |                                                                                     |
| Power supply            | 24VDC, 100 mA                                                                                                                                                                                                                                                                                                                                                                        |                                                                                     |
| Weight                  | 340 g                                                                                                                                                                                                                                                                                                                                                                                |                                                                                     |
| Dimensions (mm)         | 30x160x77 (HxWxD)                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |

## MECHATROLINK-II, frequency inverter interface units

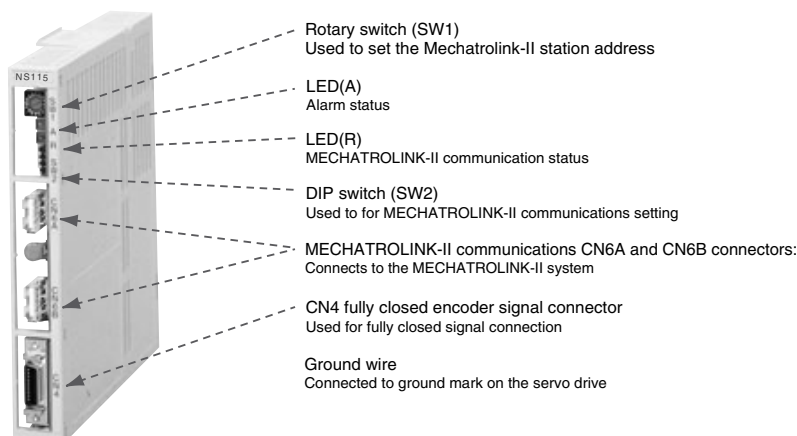
| Item                           | Details                                                                                                                                              |                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Type                           | SI-T/V7                                                                                                                                              | SI-T                                                               |
| Applicable inverter            | CIMR-V7 / 3G3-MV<br>(firmware 5740 or newer)<br>Contact your OMRON sales office for information about firmware compatibility                         | CIMR-G7 / CIMR-F7<br>(firmware 656x/for G7 / 4011 or newer for F7) |
| Installation method            | Mounted on the inverter                                                                                                                              |                                                                    |
| Power supply                   | Supplied from the inverter                                                                                                                           |                                                                    |
| MECHATROLINK-II communications | 10MHz, 0.5ms to 8ms for MECHATROLINK-II                                                                                                              |                                                                    |
| Operation                      | Read and write registers, read monitors, inverter operation, speed reference, torque reference (G7/F7 only).                                         |                                                                    |
| Inputs and outputs             | The inputs and outputs in the inverter can be read and set by the MLII master                                                                        |                                                                    |
| Connectors                     | ML-II bus connector. DPRAM connector for the inverter                                                                                                |                                                                    |
| Switches                       | Rotary switch for ML-II address (low byte)<br>Dip switch for: ML-II address (high bit). ML-II/ML-I selection. 17 byte/32 byte data length selection. |                                                                    |

## Nomenclature

### CS1W-MCH71 - motion control unit

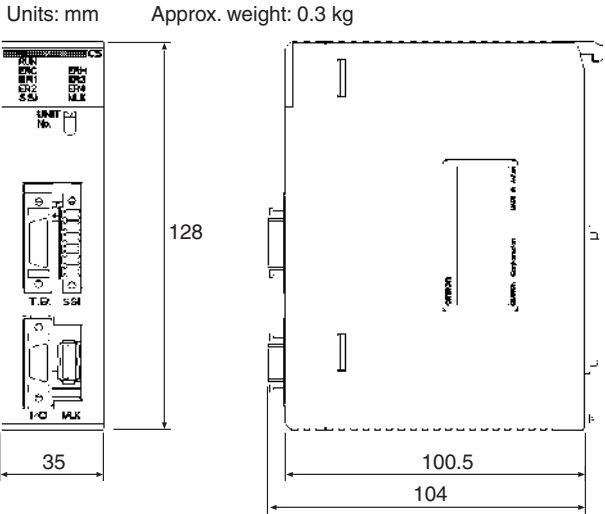


### JUSP-NS115 - MECHATROLINK-II interface unit

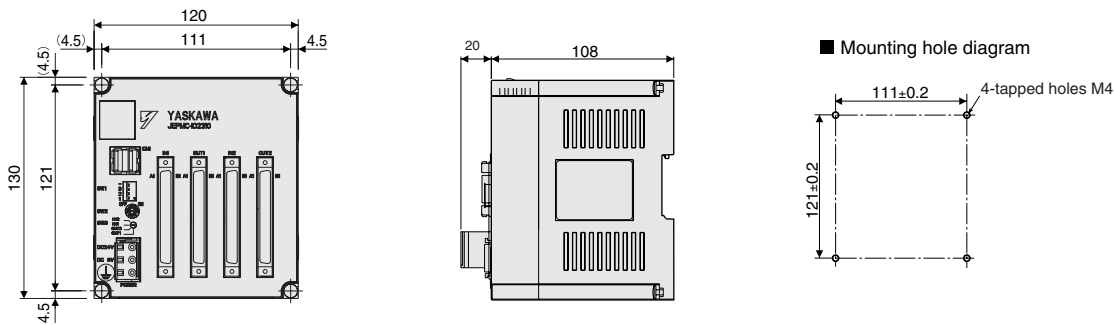


Dimensions

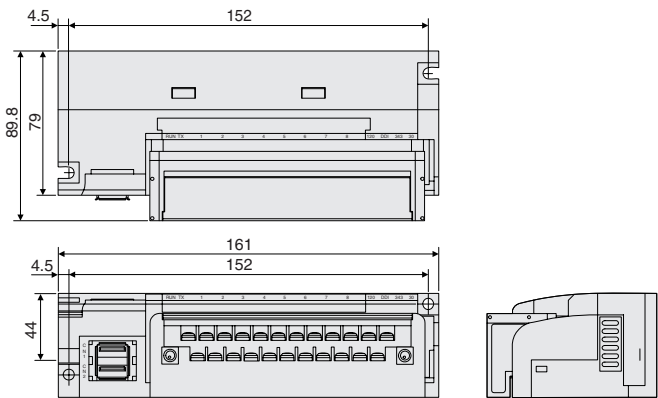
CS1W-MCH71 - motion control unit



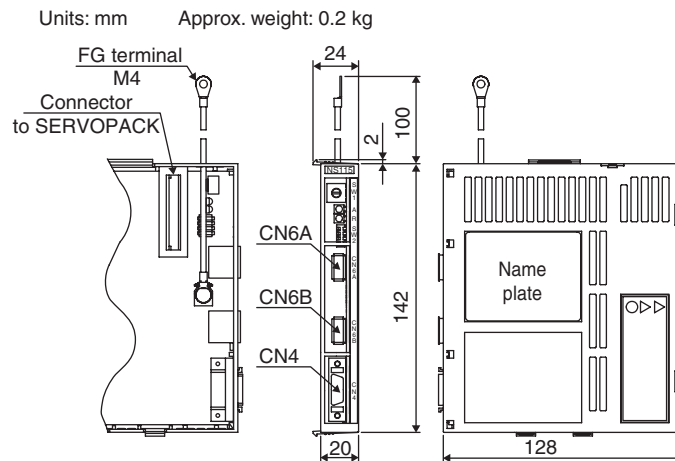
O2310 I/O module



I/O modules PL2900, PL2910

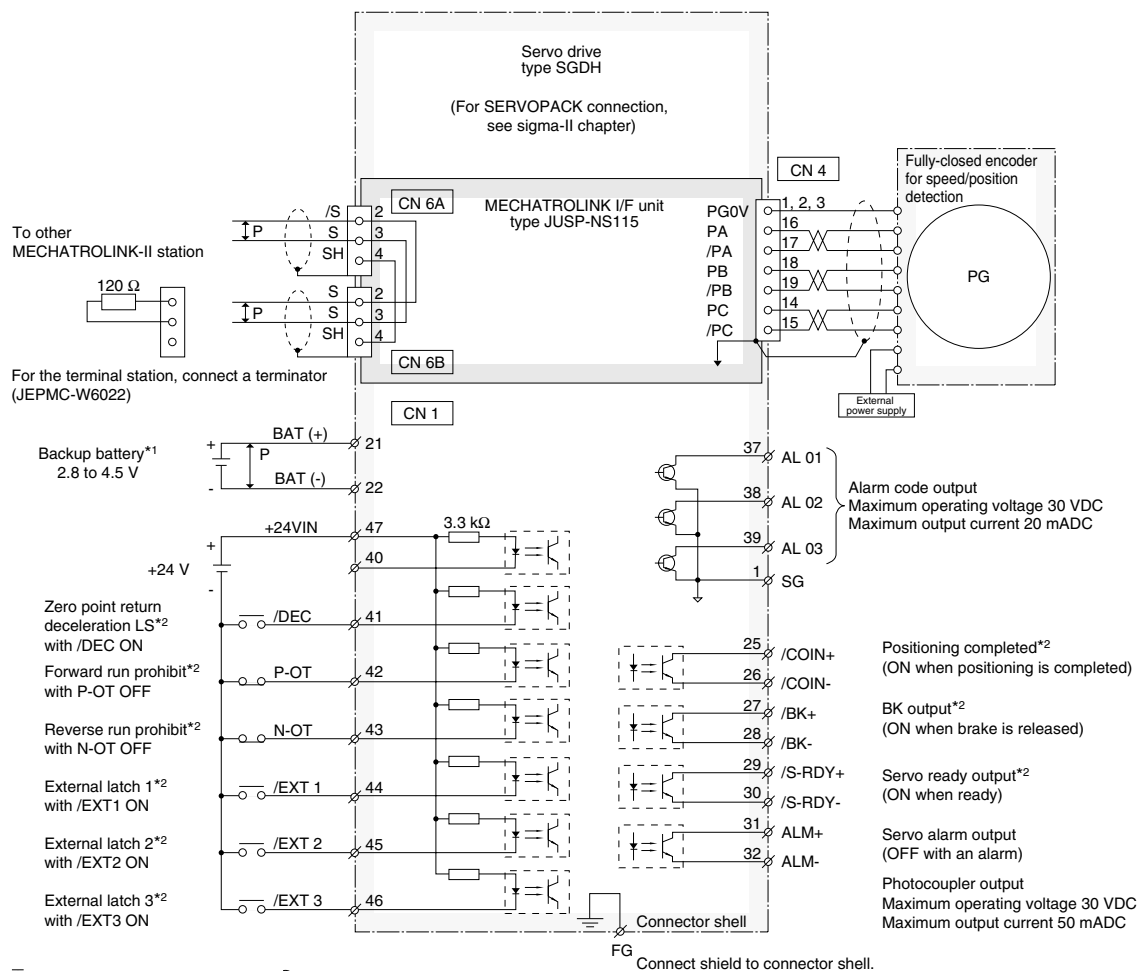


## JUSP-NS115 - MECHATROLINK-II interface unit



## Installation

### MECHATROLINK-II interface connections



$\overline{\text{P}}$  represents twisted-pair wires.  $\bigcirc$  represents shield.

\*1 Connect when using an absolute encoder and when the battery is not connected to CN8.

\*2 Set the signal assignment with the user constants.

## Ordering information

### Motion controller

| Name                                | Model      |
|-------------------------------------|------------|
| MECHATROLINK-II motion control unit | CS1W-MCH71 |

### MECHATROLINK-II - related devices

| Name                            | Remarks                                                                                         | Model          |
|---------------------------------|-------------------------------------------------------------------------------------------------|----------------|
| Distributed I/O modules         | 64 point input and 64 point output                                                              | JEPMC-IO2310   |
|                                 | Reversible counter: 2 channels                                                                  | JEPMC-PL2900   |
|                                 | Pulse output: 2 channels                                                                        | JEPMC-PL2910   |
| MECHATROLINK-II cables          | 0.5 meter                                                                                       | JEPMC-W6003-A5 |
|                                 | 1 meter                                                                                         | JEPMC-W6003-01 |
|                                 | 3 meters                                                                                        | JEPMC-W6003-03 |
|                                 | 5 meters                                                                                        | JEPMC-W6003-05 |
|                                 | 10 meters                                                                                       | JEPMC-W6003-10 |
|                                 | 20 meters                                                                                       | JEPMC-W6003-20 |
|                                 | 30 meters                                                                                       | JEPMC-W6003-30 |
| MECHATROLINK-II terminator      | Terminating resistor                                                                            | JEPMC-W6022    |
| MECHATROLINK-II interface units | For Sigma-II series servo drives. (Firmware version 38 or later)                                | JUSP-NS115     |
|                                 | For Varispeed V7 inverter<br>(for inverter version support contact your OMRON sales office)     | SI-T/V7        |
|                                 | For Varispeed F7, G7 inverter<br>(for inverter version support contact your OMRON sales office) | SI-T           |
| MECHATROLINK-II repeater        | When 17 or more axes are connected to the MECHATROLINK-II the repeater is required              | JEPMC-REP2000  |

### I/O cables

|                      | Remarks                           | Length m | Model          |
|----------------------|-----------------------------------|----------|----------------|
| I/O cable for IO2310 | With connector on the IO2310 side | 0.5      | JEPMC-W5410-05 |
|                      |                                   | 1.0      | JEPMC-W5410-10 |
|                      |                                   | 3.0      | JEPMC-W5410-30 |

### Servo system

**Note:** Refer to servo systems section for detailed information

### Frequency inverters

**Note:** Refer to frequency inverters section for detailed information

### Computer software

| Specifications               | Model  |
|------------------------------|--------|
| CX-One version 1.1 or higher | CX-One |

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

## MP2200 - MECHATROLINK-II

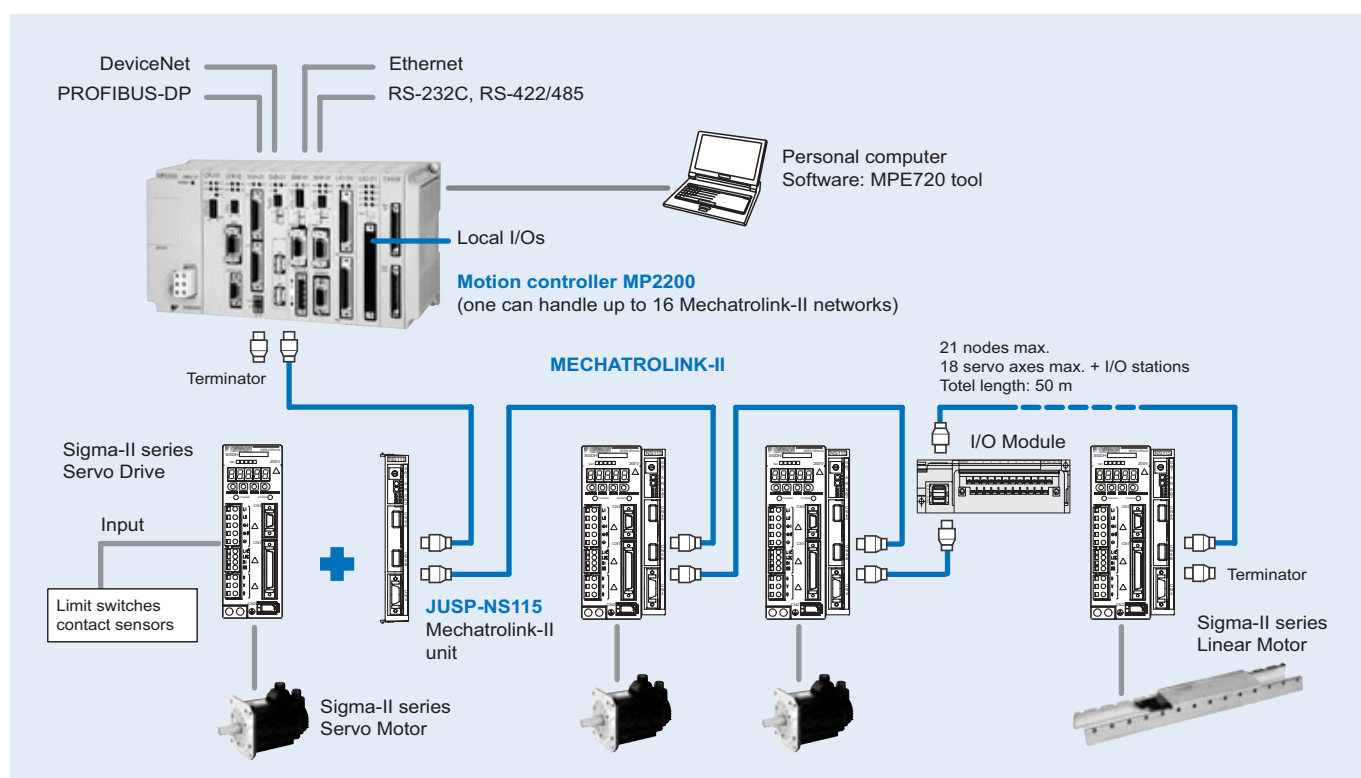
# Motion controller

## Stand-alone solution for advanced motion control

- Up to 256 axes controlled with minimum wiring
- Self configuration of nodes for an easy setup
- DeviceNet, PROFIBUS and ethernet network interfaces provide easy connectivity to any system
- Supports position, speed and torque control
- Electronic CAM profiles and axes synchronization
- The high-speed bus MECHATROLINK-II is specially designed for motion control
- Support for I/Os and pulse inputs locally and over the network
- Access to the complete system from one point.



## System configuration



## Specifications

### General specifications

#### Hardware specifications

| Items                           | Specifications                                                                                                                                                                                                               |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental conditions        | <b>Ambient operating temperature</b> 0 to 55 °C                                                                                                                                                                              |
|                                 | <b>Ambient storage temperature</b> -25 to 85 °C                                                                                                                                                                              |
|                                 | <b>Ambient operating humidity</b> 30% to 95% (with no condensation)                                                                                                                                                          |
|                                 | <b>Ambient storage humidity</b> 5% to 95% (with no condensation)                                                                                                                                                             |
|                                 | <b>Pollution level</b> Pollution level 1 (conforming to JIS B 3501)                                                                                                                                                          |
|                                 | <b>Corrosive gas</b> There must be no combustible or corrosive gas.                                                                                                                                                          |
|                                 | <b>Operating altitude</b> 2,000 m above sea level or lower                                                                                                                                                                   |
| Mechanical operating conditions | <b>Vibration resistance</b> Conforming to JIS B 3502:<br>10 to 57 Hz with single-amplitude of 0.075 mm<br>57 to 150 Hz with fixed acceleration of 1 G<br>10 sweeps each in X, Y, and Z directions (sweep time: 1 octave/min) |
|                                 | <b>Shock resistance</b> Conforming to JIS B 3502:<br>Peak acceleration of 147 m/s <sup>2</sup> (15 G) twice for 11 ms each in the X, Y, and Z directions                                                                     |
| Electrical operating conditions | <b>Noise resistance</b> Conforming to EN 61000-6-2, EN 55011 (Group 1, Class A)                                                                                                                                              |
| Installation requirements       | <b>Ground</b> Ground to 100 Ω max.                                                                                                                                                                                           |
|                                 | <b>Cooling method</b> Natural cooling                                                                                                                                                                                        |

#### Sequential function specifications

| Items                                               | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Control method</b>                               | Sequence: High-speed and low-speed scan methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Programming language</b>                         | Ladder diagram: Relay circuit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                                     | Text-type language: Numeric operations, logic operations, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Scanning</b>                                     | Two scan levels: High-speed scan and low-speed scan<br>High-speed scan time setting: 0.5 to 32 ms (integral multiple of MECHATROLINK communication cycle)<br>Low-speed scan time setting: 2 to 300 ms (integral multiple of MECHATROLINK communication cycle)                                                                                                                                                                                                                                                                                                                                                                       |
| <b>User drawings, functions and motion programs</b> | Startup drawings (DWG.A): 64 drawings max. up to three hierarchical drawing levels<br>Interrupt processing drawings (DWG.I): 64 drawings max. up to three hierarchical drawing levels<br>High-speed scan process drawings (DWG.H): 200 drawings max. up to three hierarchical drawing levels<br>Low-speed scan process drawings (DWG.L): 500 drawings max. up to three hierarchical drawing levels<br>Number of steps: Up to 1,000 steps per drawing<br>User functions: Up to 500 functions<br>Motion programs: Up to 256<br>Revision history of drawings and motion programs<br>Security function for drawings and motion programs |
| <b>Data memory</b>                                  | Common data (M) registers: 64 Kwords<br>System (S) registers: 8 Kwords<br>Drawing local (D) registers: Up to 16 Kwords per drawing<br>Drawing constant (#) registers: Up to 16 Kwords per drawing<br>Input (I) registers: 5 Kwords (including internal input registers)<br>Output (O) registers: 5 Kwords (including internal output registers)<br>Constant (C) registers: 16 Kwords                                                                                                                                                                                                                                                |
| <b>Trace memory</b>                                 | Data trace: 128 Kwords (32 Kwords, 4 groups), 16 points defined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Memory backup</b>                                | Program memory: Flash memory: 8 MBytes (User area: 5.5 MBytes) definition files, ladder programs, motion programs, etc.<br>Data memory: Battery backup: 256 Kbytes, M registers, S registers, alarm history, trace data                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Data types</b>                                   | Bit (relay): ON/OFF<br>Integer: -32768 to +32767<br>Double-length integer: -2147483648 to +2147483647<br>Real number: ± (1.175E-38 to 3.402E+38)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Register designation method</b>                  | Register number: Direct designation of register number<br>Symbolic designation: Up to 8 alphanumeric characters (up to 200 symbols per drawing)<br>With automatic number or symbol assignment                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Motion control function specifications

| Item                                              |                                     | Specifications                                                                                                                                                                                             |                                                           |     |
|---------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----|
| Interface                                         |                                     | MECHATROLINK-I, MECHATROLINK-II                                                                                                                                                                            |                                                           |     |
| Number of controlled axes/module                  |                                     | Up to 16 axes                                                                                                                                                                                              |                                                           |     |
| Control specifications                            | PTP control                         |                                                                                                                                                                                                            | Linear, rotary, and infinite-length                       |     |
|                                                   | Interpolation                       |                                                                                                                                                                                                            | Up to 16 linear axes, 2 circular axes, and 3 helical axes |     |
|                                                   | Speed reference output              |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Torque reference output             |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Phase control                       |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Position control                    | Positioning                                                                                                                                                                                                |                                                           | Yes |
|                                                   |                                     | External positioning                                                                                                                                                                                       |                                                           | Yes |
|                                                   |                                     | Zero point return                                                                                                                                                                                          |                                                           | Yes |
|                                                   |                                     | Interpolation                                                                                                                                                                                              |                                                           | Yes |
|                                                   |                                     | Interpolation with position detection function                                                                                                                                                             |                                                           | Yes |
|                                                   |                                     | JOG operation                                                                                                                                                                                              |                                                           | Yes |
| STEP operation                                    |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Parameter changes during motion command execution |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Reference unit                                    |                                     | mm, inch, deg, or pulse                                                                                                                                                                                    |                                                           |     |
| Reference unit minimum setting                    |                                     | 1, 0.1, 0.01, 0.001, 0.0001, 0.00001                                                                                                                                                                       |                                                           |     |
| Maximum programmable value                        |                                     | -2147483648 to +2147483647 (signed 32-bit value)                                                                                                                                                           |                                                           |     |
| Speed reference unit                              |                                     | Reference unit/s designation: mm/s, inch/s, deg/s, pulse/s<br>Reference unit/min. designation: mm/min, inch/ min, deg/min, pulse/min<br>Percentage designation: Percentage of rated speed                  |                                                           |     |
| Acceleration/deceleration type                    |                                     | Linear, asymmetric, S-curve, exponent                                                                                                                                                                      |                                                           |     |
| Acceleration/deceleration reference unit          |                                     | Reference unit/s <sup>2</sup> designation: mm/s <sup>2</sup> , inch/s <sup>2</sup> , deg/s <sup>2</sup> , pulse/s <sup>2</sup><br>Acceleration/deceleration time constant: Time from 0 to rated speed (ms) |                                                           |     |
| Override function                                 |                                     | Positioning: 0.01% to 327.67% by axis                                                                                                                                                                      |                                                           |     |
| Coordinate system                                 |                                     | Rectangular coordinates                                                                                                                                                                                    |                                                           |     |
| Zero point re-<br>turn                            | DEC1+ phase-C pulse                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | ZERO signal                         |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | DEC1+ ZERO signal                   |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Phase-C pulse                       |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Only phase-C pulse                  |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | POT and phase-C pulse               |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | POT                                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Home limit switch and phase-C pulse |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | HOME                                |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | NOT and phase-C pulse               |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | NOT                                 |                                                                                                                                                                                                            | Yes                                                       |     |
| INPUT and phase-C pulse                           |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| INPUT                                             |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Applicable servo drives                           |                                     | SGDH-□□□E-OY + NS115                                                                                                                                                                                       |                                                           |     |
| Applicable frequency inverters                    |                                     | Varispeed V7, F7, G7 with MECHATROLINK-II interface<br>(for inverter version support contact your OMRON sales office)                                                                                      |                                                           |     |
| Encoders                                          |                                     | Incremental encoder<br>Yaskawa absolute encoder                                                                                                                                                            |                                                           |     |

## MP2200 base units

| Items                     | Specifications                                                                                                                                                                        |                                                                                                                                                                 |  |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                     | JEPMC-BU2200 (MBU-01)                                                                                                                                                                 | JEPMC-BU2210 (MBU-02)                                                                                                                                           |                                                                                       |
| Power supply              | Input power voltage: 85 VAC to 276 VAC<br>Current consumption: 1.5 A or less with I/O rating<br>Inrush current: 10 A or less when completely discharged, 200 VAC input, output rating | Input power voltage: 24 VDC±20%<br>Current consumption: 3.0 A or less with I/O rating<br>Inrush current: 10 A or less when completely discharged, output rating |                                                                                       |
| Motion network            | Not available for the base unit                                                                                                                                                       |                                                                                                                                                                 |                                                                                       |
| I/O signals               | Not available for the base unit                                                                                                                                                       |                                                                                                                                                                 |                                                                                       |
| Slot for optional modules | 9 slots                                                                                                                                                                               |                                                                                                                                                                 |                                                                                       |
| Expansion configuration   | Maximum of 4 base units can be connected using the EXIOIF.                                                                                                                            |                                                                                                                                                                 |                                                                                       |
| Dimensions (mm)           | 130x240x108 (HxWxD)                                                                                                                                                                   |                                                                                                                                                                 |                                                                                       |
| Weight                    | 665 g                                                                                                                                                                                 | 640 g                                                                                                                                                           |                                                                                       |

## CPU module (CPU-01)

| Items                          | Specifications                          | Appearance                                                                            |
|--------------------------------|-----------------------------------------|---------------------------------------------------------------------------------------|
| Model                          | JAPMC-CP2200                            |  |
| Max. number of controlled axes | 256 axes                                |                                                                                       |
| High-speed scan                | 0.5 ms to 32 ms (in units of 0.5 ms)    |                                                                                       |
| Low-speed scan                 | 2.0 ms to 300.0 ms (in units of 0.5 ms) |                                                                                       |
| User memory capacity           | 8 MB                                    |                                                                                       |
| Weight                         | 80 g                                    |                                                                                       |



### Connection module between racks (EXIOIF)

| Items                     | Specifications           | Appearance                                                                          |
|---------------------------|--------------------------|-------------------------------------------------------------------------------------|
| Model                     | JAPMC-EX2200             |  |
| Number of expansion racks | 4 racks max.             |                                                                                     |
| Rack No.                  | Automatically identified |                                                                                     |
| Weight                    | 70 g                     |                                                                                     |

### General-purpose serial communication module (217IF-01)

| Items                            | Specifications                                                                            | Appearance                                                                          |
|----------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                            | JAPMC-CM2310                                                                              |  |
| Port                             | For RS-232C communication                                                                 |                                                                                     |
| Interface                        | One port                                                                                  |                                                                                     |
| Connector                        | D-sub 9 pins (female)                                                                     |                                                                                     |
| Max. transmission distance       | 15 m                                                                                      |                                                                                     |
| Transmission speed               | 76.8 kbps                                                                                 |                                                                                     |
| Access mode                      | Asynchronous (start-stop synchronization)                                                 |                                                                                     |
| Communication protocols          | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            |                                                                                     |
| Media access control method      | 1:1                                                                                       |                                                                                     |
| Transmission format (can be set) | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: even, odd, or none |                                                                                     |
|                                  | For RS-422/485 communication                                                              |                                                                                     |
|                                  | One port (RS-422 or -485)                                                                 |                                                                                     |
|                                  | MDR 14 pins (female)                                                                      |                                                                                     |
|                                  | 300 m                                                                                     |                                                                                     |
|                                  | 76.8 kbps                                                                                 |                                                                                     |
|                                  | Asynchronous (start-stop synchronization)                                                 |                                                                                     |
|                                  | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            |                                                                                     |
|                                  | 1:1 (RS-422), 1:N (RS-485)                                                                |                                                                                     |
|                                  | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: even, odd, or none |                                                                                     |

### Ethernet communication module (218IF-01)

| Items                                | Specifications                                                                            | Appearance                                                                            |
|--------------------------------------|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                                | JAPMC-CM2300                                                                              |  |
| Port                                 | For ethernet communication                                                                |                                                                                       |
| Interface                            | One port (10BaseT)<br>(RJ-45 modular jack)                                                |                                                                                       |
| Max. segment length                  | 100m                                                                                      |                                                                                       |
| Transmission speed                   | 10 Mbps                                                                                   |                                                                                       |
| Access mode                          | IEEE802.3                                                                                 |                                                                                       |
| Flame format                         | Ethernet ver.2 (conforming to DIX)                                                        |                                                                                       |
| Connections                          | TCP/UDP/IP/ARP                                                                            |                                                                                       |
| Max. number of words in transmission | 512 words<br>(1024 bytes)                                                                 |                                                                                       |
| Communication protocols              | Extended MEMOBUS,<br>MEMOBUS, MELSEC-A,<br>non-protocol, or MODBUS/TCP                    |                                                                                       |
| Max. number of connections           | 20 stations                                                                               |                                                                                       |
|                                      | For RS-232C communication                                                                 |                                                                                       |
|                                      | One port                                                                                  |                                                                                       |
|                                      | D-sub 9 pins (female)                                                                     |                                                                                       |
|                                      | 15 m                                                                                      |                                                                                       |
|                                      | 76.8 kbps                                                                                 |                                                                                       |
|                                      | Asynchronous (Start-stop synchronization)                                                 |                                                                                       |
|                                      | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            |                                                                                       |
|                                      | 1:1                                                                                       |                                                                                       |
|                                      | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: Even, odd, or none |                                                                                       |

### DeviceNet communication module (260IF-01)

| Items                                   | Specifications                                                                                                          | Appearance                                                                            |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                                   | JAPMC-CM2320                                                                                                            |  |
| Port                                    | For DeviceNet communication                                                                                             |                                                                                       |
| Number of circuits                      | 1                                                                                                                       |                                                                                       |
| Applicable communication                | Conforms to DeviceNet master or slave<br>- I/O transmission (polled I/O and bisstrobed I/O)<br>- Explicit messaging     |                                                                                       |
| I/O communication                       | Max. number of slaves<br>63 Nodes                                                                                       |                                                                                       |
|                                         | Max. I/O bytes<br>1024 bytes, 256 bytes per node                                                                        |                                                                                       |
| Message Communication (only for master) | Max. number of nodes<br>63 Nodes (Synchronous communications possible: 8 nodes)                                         |                                                                                       |
|                                         | Max. message length<br>256 bytes                                                                                        |                                                                                       |
|                                         | Executed functions<br>MSG-SND function                                                                                  |                                                                                       |
| Switches on the front                   | Two rotary switches: Node address settings<br>DIP switch: Settings for transmission speed and switching master or slave |                                                                                       |
| Indicators                              | 2 LEDs: MS or NS                                                                                                        |                                                                                       |
| Power voltage for communication         | 24 VDC±10%<br>(Using the specially designed cable)                                                                      |                                                                                       |
| Max. current consumption                | Communication power: 45 mA<br>(supplied by transmission connectors)                                                     |                                                                                       |
|                                         | For RS-232C communication                                                                                               |                                                                                       |
|                                         | One Port                                                                                                                |                                                                                       |
|                                         | D-sub 9 pins (female)                                                                                                   |                                                                                       |
|                                         | 15m                                                                                                                     |                                                                                       |
|                                         | 76.8kbps                                                                                                                |                                                                                       |
|                                         | Asynchronous (start-stop synchronization)                                                                               |                                                                                       |
|                                         | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                                                          |                                                                                       |
|                                         | 1:1                                                                                                                     |                                                                                       |
|                                         | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: Even, odd, or none                               |                                                                                       |

## PROFIBUS communication module (261IF-01)

| Items                | Specifications                                                                                 |                                  |                                                                                           | Appearance                                                                          |
|----------------------|------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                | JAPMC-CM2330                                                                                   |                                  |                                                                                           |  |
| Port                 | For PROFIBUS communication                                                                     | Port                             | For RS-232C communication                                                                 |                                                                                     |
| Functions            | DP slave                                                                                       | Interface                        | One port                                                                                  |                                                                                     |
|                      | Cyclic communication (DP standard function)                                                    | Connector                        | D-sub 9 pins (female)                                                                     |                                                                                     |
| Transmission speed   | 12M/6M/4M/3M/1.5M/750k/500k/187.5k/93.75k/19.2k/9.6kbps (automatic detection)                  | Max. transmission distance       | 15 m                                                                                      |                                                                                     |
| Configuration        | By PROFIBUS master                                                                             |                                  |                                                                                           |                                                                                     |
| Slave address        | 1 to 64                                                                                        | Transmission speed               | 76.8 kbps                                                                                 |                                                                                     |
| I/O processing       | Total capacity of IW/OW registers: 64 words<br>Max. I/O allocation (IN and OUT each): 64 words | Access mode                      | Asynchronous (start-stop synchronization)                                                 |                                                                                     |
|                      |                                                                                                | Communication protocols          | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            |                                                                                     |
| Diagnostic functions | Display for status and slave status using the EWS.<br>I/O error display for SW registers       | Media access control method      | 1:1                                                                                       |                                                                                     |
|                      |                                                                                                | Transmission format (can be set) | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: Even, odd, or none |                                                                                     |

## Analogue reference motion control module (SVA-01)

| Items                      | Specifications                                                               | Appearance                                                                          |
|----------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                      | JAPMC-MC2300                                                                 |  |
| Number of axes             | 2 axes (CN1 & CN2) analogue output and encoder input.                        |                                                                                     |
| Digital inputs (per axis)  | 6 inputs, PNP or NPN (including alarm, ready, zero and latch)                |                                                                                     |
| Digital outputs (per axis) | 6 outputs, (including servo_on, alarm_reset, control_mode_select and SEN)    |                                                                                     |
| Encoder input (per axis)   | Differential line-driver (A./A.B./B./Z./Z.). 4 Mpps (before multiplication). |                                                                                     |
| Analog outputs (per axis)  | 2 outputs $\pm 10$ V 16 bits (typically speed and torque references)         |                                                                                     |
| Analog inputs (per axis)   | 2 inputs $\pm 10$ V 16 bits                                                  |                                                                                     |
| External supply            | 24 VDC (in CN3)                                                              |                                                                                     |
| LED's                      | RUN (green) ERR (red)                                                        |                                                                                     |

## MECHATROLINK-II motion control module (SVB-01)

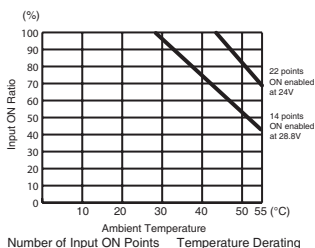
| Items                         | Specifications                                                                                                                                                                                          | Appearance                                                                            |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                         | JAPMC-MC2310                                                                                                                                                                                            |  |
| Communication circuits        | 1 circuit                                                                                                                                                                                               |                                                                                       |
| Communication ports           | 2 ports                                                                                                                                                                                                 |                                                                                       |
| Terminator                    | External resistor (JEPMC-W6022 required)                                                                                                                                                                |                                                                                       |
| Transmission speed            | 10 Mbps                                                                                                                                                                                                 |                                                                                       |
| Communication cycle           | 0.5 ms, 1 ms, 1.5 ms, 2 ms                                                                                                                                                                              |                                                                                       |
| Number of connecting stations | 21 stations (16 axes for servo drives and inverters) / 2ms, 15 stations (15 axes for servo drives) / 1.5 ms, 9 stations (9 axes for servo drives) / 1 ms, 4 stations (4 axes for servo drives) / 0.5 ms |                                                                                       |
| Retry function                | Available with MECHATROLINK-II                                                                                                                                                                          |                                                                                       |
| Slave function                | Available with MECHATROLINK-II                                                                                                                                                                          |                                                                                       |
| Transmission distance         | See "MECHATROLINK-II repeater"                                                                                                                                                                          |                                                                                       |

## I/O modules (LIO-01/-02)

| Items              | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Appearance                                                                                                                                                                     |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Models             | JAPMC-IO2300 (NPN output), JAPMC-IO2301 (PNP output)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <br> |
| Digital I/O        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                |
| Input signals      | 16 points (all connected) and 24 VDC $\pm$ 20%, 5 mA (TYP)<br>Sink mode or source mode input and photocoupler isolation<br>Min. ON voltage/current: 15 V/1.6 mA<br>Max. OFF voltage/current: 5 V/1.0 mA<br>Max. response time: OFF $\rightarrow$ ON 1 ms and ON $\rightarrow$ OFF 1 ms<br>Interruption (DI-00): DI-00 can be used for interruptions. If an interruption is enabled, the interrupt drawing is started when DI-00 is set to ON.<br>Pulse latch (DI-01): DI-01 can be used for pulse latching. If pulse latching is enabled, the pulse counter is latched when DI-01 is set to ON. |                                                                                                                                                                                |
| Output signals     | 16 points (all connected) and 24 VDC $\pm$ 20%, 100 mA max.<br>Open collector: Sink mode output (LIO-01 module)<br>Source mode output (LIO-02 module)<br>Photocoupler isolation and max. OFF current: 0.1 mA<br>Max. response time: OFF $\rightarrow$ ON 1 ms and ON $\rightarrow$ OFF 1 ms<br>Output protection: Fuse (for protection against fires caused by an overcurrent when outputting after a short circuit occurred)<br>If circuit protection is required, provide a fuse for each output circuit.                                                                                     |                                                                                                                                                                                |
| Pulse input        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                |
| Number of channels | 1 (phase A, B, or Z input)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                |
| Input circuit      | Phase A/B: 5 V differential inputs, no insulation, and max. frequency 4 MHz<br>Phase Z: 5 V/12 V photocoupler inputs and max. frequency 500 kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                |
| Input method       | A/B (1, 2, or 4 multipliers), sign (1 or 2 multipliers),<br>UP/DOWN (1 or 2 multipliers)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                |
| Latch input        | Pulse latch with phase Z or DI-01<br>Min. response time: 5 $\mu$ s when input with phase Z; 60 $\mu$ s when input with DI-01                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                |
| Others             | Coincident detection; preset and clear functions for counter values                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                |

## I/O modules (LIO-04)

| Items                 | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Appearance                                                                          |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>          | JAPMC-IO2303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>Input signals</b>  | <p>32 points (8 points common) and 24 VDC<math>\pm</math>20%, 5 mA (TYP)<br/> Sink mode or source mode input and photocoupler isolation<br/> Min. ON voltage/current: 15 V/1.6 mA<br/> Max. OFF voltage/current: 5 V/1.0 mA<br/> Max. response time: OFF<math>\rightarrow</math>ON 0.5 ms and ON<math>\rightarrow</math>OFF 0.5 ms<br/> Interruption (DI-00, DI-01, DI-16, DI-17):<br/> DI-00, DI-01, DI-16, and DI-17 can be used for interruptions. If an interruption is enabled, the interrupt drawing is started when DI-00, DI-01, DI-16, or DI-17 is set to ON.<br/> Note: See right for the derating conditions</p> |                                                                                     |
| <b>Output signals</b> | <p>32 points (8 points common) and 24 VDC<math>\pm</math>20%, 100 mA max.<br/> Open collector: Sink mode output (NPN) and photocoupler isolation<br/> Max. OFF current: 0.1 mA<br/> Max. response time: OFF<math>\rightarrow</math>ON 0.5 ms and ON<math>\rightarrow</math>OFF 1 ms<br/> Output protection: Fuse (for protection against fires caused by an overcurrent when outputting after a short-circuit occurred) If circuit protection is required, provide a fuse for each output circuit.</p>                                                                                                                      |                                                                                     |



## MECHATROLINK-II, 64 point I/O module (IO2310)

| Items                      | Specifications                                                                                                                                                                                                                                   | Appearance                                                                          |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>               | JEPMC-IO2310                                                                                                                                                                                                                                     |  |
| <b>I/O signals</b>         | <p>Input: 64 points, 24 VDC, 5mA, sink/source mode input<br/> Output: 64 points, 24 VDC, 50mA when all points ON, (The Max. rating is 100 mA per point)<br/> sink mode output (NPN)<br/> Signal connection method: Connector (FCN360 series)</p> |                                                                                     |
| <b>Module power supply</b> | <p>24 VDC (20.4 V to 28.8 V)<br/> Rated current: 0.5 A<br/> Inrush current: 1 A</p>                                                                                                                                                              |                                                                                     |
| <b>Weight</b>              | 590 g                                                                                                                                                                                                                                            |                                                                                     |

## MECHATROLINK-II, counter module (PL2900)

| Items                           | Specifications                                                             | Appearance                                                                            |
|---------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                    | JEPMC-PL2900                                                               |  |
| <b>Number of input channels</b> | 2                                                                          |                                                                                       |
| <b>Functions</b>                | Pulse counter, notch output, registration input                            |                                                                                       |
| <b>Pulse input method</b>       | Sign (1/2 multipliers), A/B (1/2/4 multipliers), UP/DOWN (1/2 multipliers) |                                                                                       |
| <b>Max. counter speed</b>       | 1200 kpps (4 multipliers)                                                  |                                                                                       |
| <b>Pulse input voltage</b>      | 3/5/12/24 VDC                                                              |                                                                                       |
| <b>External power supply</b>    | 24 VDC, 120 mA or less                                                     |                                                                                       |
| <b>Weight</b>                   | 300 g                                                                      |                                                                                       |

## MECHATROLINK-II, pulse output module (PL2910)

| Items                            | Specifications                                                                                                                              | Appearance                                                                            |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                     | JEPMC-PL2910                                                                                                                                |  |
| <b>Number of output channels</b> | 2                                                                                                                                           |                                                                                       |
| <b>Functions</b>                 | Pulse positioning, JOG run, zero-point return                                                                                               |                                                                                       |
| <b>Pulse output method</b>       | CW, CCW pulse, sign                                                                                                                         |                                                                                       |
| <b>Max. output speed</b>         | 500 kpps                                                                                                                                    |                                                                                       |
| <b>Pulse output voltage</b>      | 5 VDC                                                                                                                                       |                                                                                       |
| <b>Pulse interface circuit</b>   | Open collector output<br>5 VDC, 10 mA/circuit                                                                                               |                                                                                       |
| <b>External control signal</b>   | Digital input: 8 points/module, 5 VDC x 4 points, 24 VDC x 4 points<br>Digital output: 6 points/module, 5 VDC x 4 points, 24 VDC x 2 points |                                                                                       |
| <b>Weight</b>                    | 300 g                                                                                                                                       |                                                                                       |

## MECHATROLINK-II, analog input module (AN2900)

| Items                           | Specifications                                                 | Appearance                                                                            |
|---------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                    | JEPMC-AN2900                                                   |  |
| <b>Number of input channels</b> | 4                                                              |                                                                                       |
| <b>Input voltage range</b>      | -10 V to +10 V                                                 |                                                                                       |
| <b>Input impedance</b>          | 1 M $\Omega$ min.                                              |                                                                                       |
| <b>Data format</b>              | Binary, -32000 to +32000                                       |                                                                                       |
| <b>Input delay time</b>         | 4ms max.                                                       |                                                                                       |
| <b>Error</b>                    | $\pm$ 0.5% F.S. (at 25 °C), $\pm$ 1.0% F.S. (at 0 °C to 60 °C) |                                                                                       |
| <b>External power supply</b>    | 24 VDC (20.4 VDC to 26.4 VDC), 120 mA max.                     |                                                                                       |
| <b>Weight</b>                   | 300 g                                                          |                                                                                       |

## MECHATROLINK-II, analog output module (AN2910)

| Items                       | Specifications                                         | Appearance                                                                          |
|-----------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                       | JEPMC-AN2910                                           |  |
| Number of output channels   | 2                                                      |                                                                                     |
| Output voltage range        | -10 V to +10 V                                         |                                                                                     |
| Max. allowable load current | ± 5 mA (2 kΩ)                                          |                                                                                     |
| Data format                 | Binary, -32000 to +32000                               |                                                                                     |
| Output delay time           | 1 ms                                                   |                                                                                     |
| Error                       | ± 0.2% F.S. (at 25 °C), ± 0.5% F.S. (at 0 °C to 60 °C) |                                                                                     |
| External power supply       | 24VDC (20.4 VDC to 26.4 VDC), 120mA max.               |                                                                                     |
| Weight                      | 300 g                                                  |                                                                                     |

## MECHATROLINK-II repeater

| Items                   | Specifications                                                                                                                                                                                                                                                                                                                                                                     | Appearance                                                                          |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                   | JEPMC-REP2000                                                                                                                                                                                                                                                                                                                                                                      |  |
| Communication type      | MECHATROLINK-II                                                                                                                                                                                                                                                                                                                                                                    |                                                                                     |
| Cable length            | Between controller and repeater: 50 m., after repeater: 50 m                                                                                                                                                                                                                                                                                                                       |                                                                                     |
| Max. connected stations | Total stations on both sides of repeater: 30<br>(limited to the max. number of connectable stations of the controller (e.g., 21 stations for the MP2300 series))                                                                                                                                                                                                                   |                                                                                     |
| Restrictions            | Between controller and repeater<br>- Total cable length ≤30m: 15 stations max. including I/O and servo, etc.<br>- 30m < total cable length ≤50m: 14 stations max. including I/O and servo, etc.<br>After repeater:<br>- Total cable length ≤30m: 16 stations max. including I/O and servo, etc.<br>- 30m < total cable length ≤50m: 15 stations max. including I/O and servo, etc. |                                                                                     |
| Power supply            | 24VDC, 100mA                                                                                                                                                                                                                                                                                                                                                                       |                                                                                     |
| Weight                  | 340 g                                                                                                                                                                                                                                                                                                                                                                              |                                                                                     |
| Dimensions (mm)         | 30x160x77 (HxWxD)                                                                                                                                                                                                                                                                                                                                                                  |                                                                                     |

## MECHATROLINK-II servo drive interface unit

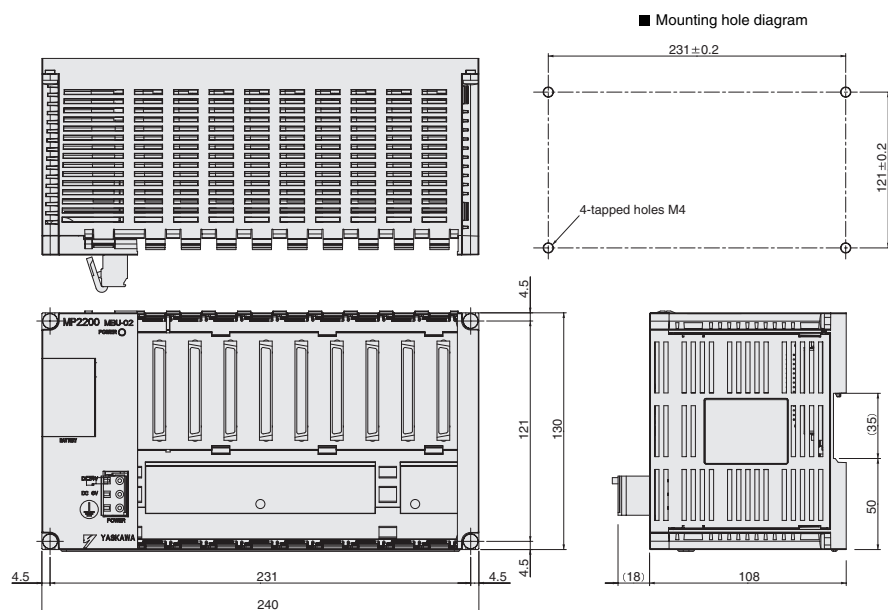
| Item                               |                                              | Details                                                                                                                               |  |
|------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 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 Mbps / 1 ms or more. MECHATROLINK-II communications                                                                                |                                                                                       |
| Command format                     | Operation specification                      | Positioning using MECHATROLINK-I/II communications.                                                                                   |                                                                                       |
|                                    | Reference input                              | MECHATROLINK-I/II communications<br>Commands: position, speed, torque, 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 | Encoder pulse output in the servo drive      | 5 V differential line-driver output (complies with EIA Standard RS-422A)                                                              |                                                                                       |
|                                    | Fully closed encoder pulse signal            | A quad B line-driver                                                                                                                  |                                                                                       |
|                                    | Maximum receivable frequency for servo drive | 1 Mpps                                                                                                                                |                                                                                       |
|                                    | Power supply for fully closed encoder        | To be prepared by customer.                                                                                                           |                                                                                       |
| Input signals in the servo drive   | Signal allocation changes possible           | Forward/reverse run prohibited, zero point return deceleration LS<br>External latch signals 1, 2, 3<br>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                                                                                          |                                                                                       |

## MECHATROLINK-II, frequency inverter interface units

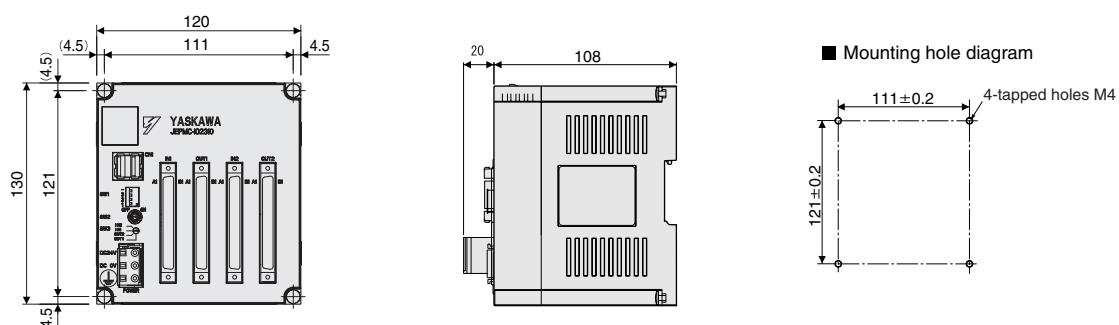
| Item                           | Details                                                                                                                                              |                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Type                           | SI-T/V7                                                                                                                                              | SI-T                                                               |
| Applicable inverter            | CIMR-V7 / 3G3-MV<br>(firmware 5740 or newer)                                                                                                         | CIMR-G7 / CIMR-F7<br>(firmware 656x/for G7 / 4011 or newer for F7) |
|                                | Contact your OMRON sales office for information about firmware compatibility                                                                         |                                                                    |
| Installation method            | Mounted on the inverter                                                                                                                              |                                                                    |
| Power supply                   | Supplied from the inverter                                                                                                                           |                                                                    |
| MECHATROLINK-II communications | 10 MHz, 0.5 ms to 8 ms for MECHATROLINK-II                                                                                                           |                                                                    |
| Operation                      | Read and write registers, read monitors, inverter operation, speed reference, torque reference (G7/F7 only).                                         |                                                                    |
| Inputs and outputs             | The inputs and outputs in the inverter can be read and set by the MLII master                                                                        |                                                                    |
| Connectors                     | ML-II bus connector. DPRAM connector for the inverter                                                                                                |                                                                    |
| Switches                       | Rotary switch for ML-II address (low byte)<br>Dip switch for: ML-II address (high bit). ML-II/ML-I selection. 17 byte/32 byte data length selection. |                                                                    |

## Dimensions

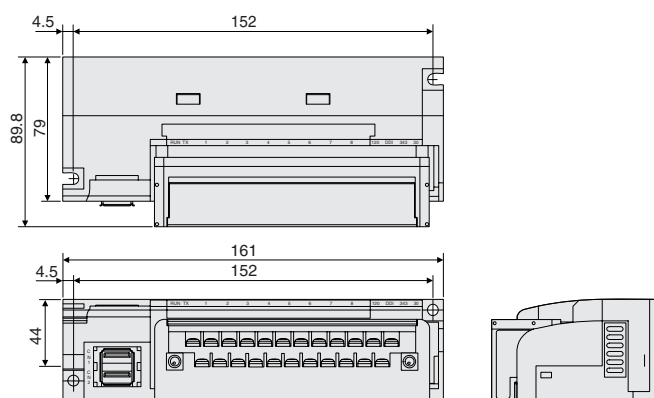
### MP2200 basic unit



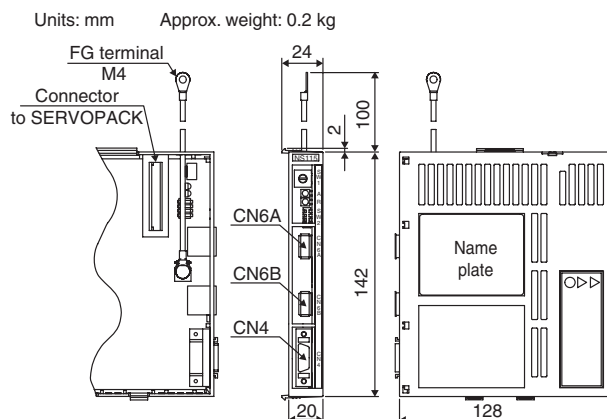
### IO2310 I/O module



### I/O modules PL2900, PL2910, AN2900, AN2910



## MECHATROLINK-II servo drive interface unit



## Ordering information

### MP2200 - motion controller base unit

| Name                                              | Model name | Model        |
|---------------------------------------------------|------------|--------------|
| MP2200 base unit, 100 VAC/200 VAC input base unit | MBU-01     | JEPMC-BU2200 |
| MP2200 base unit, 24 VDC input base unit          | MBU-02     | JEPMC-BU2210 |

### MP2200 - CPU module

| Name           | Model name | Model        |
|----------------|------------|--------------|
| CPU for MP2200 | CPU-01     | JAPMC-CP2200 |

### MP2200 - motion control modules

| Name                                              | Model name | Model        |
|---------------------------------------------------|------------|--------------|
| Analogue reference motion control module (2 axes) | SVA-01     | JAPMC-MC2300 |
| 1 channel for MECHATROLINK-II communication       | SVB-01     | JAPMC-MC2310 |

### MP2200 - communication modules

| Name                                                                        | Model name | Model        |
|-----------------------------------------------------------------------------|------------|--------------|
| General-purpose serial communication module (RS-232C / RS422 communication) | 217IF-01   | JAPMC-CM2310 |
| Ethernet communication module (RS-232C / ethernet communication)            | 218IF-01   | JAPMC-CM2300 |
| DeviceNet communication module (RS-232C / DeviceNet communication)          | 260IF-01   | JAPMC-CM2320 |
| PROFIBUS communication module (RS-232C / PROFIBUS communication)            | 261IF-01   | JAPMC-CM2330 |

### MP2200 - I/O and expansion modules

| Name                                                                                | Model name | Model        |
|-------------------------------------------------------------------------------------|------------|--------------|
| 16-point input, 16-point output (sink mode output / NPN), and 1-point pulse input   | LIO-01     | JAPMC-IO2300 |
| 16-point input, 16-point output (source mode output / PNP), and 1-point pulse input | LIO-02     | JAPMC-IO2301 |
| 32-point input and 32-point output                                                  | LIO-04     | JAPMC-IO2303 |
| Expansion interface for MP2200                                                      | EXIOIF     | JAPMC-EX2200 |

### MECHATROLINK-II - elated devices

| Name                           | Remarks                                                                                          | Model          |
|--------------------------------|--------------------------------------------------------------------------------------------------|----------------|
| Distributed I/O modules        | 64-point input and 64-point output                                                               | JEPMC-IO2310   |
|                                | Reversible counter: 2 channels                                                                   | JEPMC-PL2900   |
|                                | Pulse output: 2 channels                                                                         | JEPMC-PL2910   |
|                                | Analog input: -10 V to +10 V, 4 channels                                                         | JEPMC-AN2900   |
|                                | Analog output: -10 V to +10 V, 2 channels                                                        | JEPMC-AN2910   |
| MECHATROLINK-II cables         | 0.5 meter                                                                                        | JEPMC-W6003-A5 |
|                                | 1 meter                                                                                          | JEPMC-W6003-01 |
|                                | 3 meters                                                                                         | JEPMC-W6003-03 |
|                                | 5 meters                                                                                         | JEPMC-W6003-05 |
|                                | 10 meters                                                                                        | JEPMC-W6003-10 |
|                                | 20 meters                                                                                        | JEPMC-W6003-20 |
|                                | 30 meters                                                                                        | JEPMC-W6003-30 |
| MECHATROLINK-II terminator     | Terminating resistor                                                                             | JEPMC-W6022    |
| MECHATROLINK-II interface unit | For Sigma-II series servo drives (firmware version 38 or later)                                  | JUSP-NS115     |
|                                | For Varispeed V7 inverter (for inverter's version supported contact your OMRON sales office)     | SI-T/V7        |
|                                | For Varispeed F7, G7 inverter (for inverter's version supported contact your OMRON sales office) | SI-T           |
| MECHATROLINK-II repeater       | MECHATROLINK-II repeater                                                                         | JEPMC-REP2000  |

## I/O cables

|                          | Remarks                                | Length m | Model           |
|--------------------------|----------------------------------------|----------|-----------------|
| I/O cable for LIO-01, 02 | With connector on the LIO-01, -02 side | 0.5      | JEPMC-W2061-A5  |
|                          |                                        | 1.0      | JEPMC-W2061-01  |
|                          |                                        | 3.0      | JEPMC-W2061-03  |
| I/O cable for LIO-04     | With connector on the LIO-04 side      | 0.5      | JEPMC-W6060-05  |
|                          |                                        | 1.0      | JEPMC-W6060-10  |
|                          |                                        | 3.0      | JEPMC-W6060-30  |
| I/O cable for IO2310     | With connector on the IO2310 side      | 0.5      | JEPMC-W5410-05  |
|                          |                                        | 1.0      | JEPMC-W5410-10  |
|                          |                                        | 3.0      | JEPMC-W5410-30  |
| EXIOIF cable             | With connector on both sides           | 0.5      | JEPMC-W2091-A5  |
|                          |                                        | 1.0      | JEPMC-W2091-01  |
|                          |                                        | 3.0      | JEPMC-W2091-2A5 |

## Accessories

| Name                  | Model        |
|-----------------------|--------------|
| Battery ER3V 3.6V     | JZSP-BA01    |
| Empty slot cover      | JEPMC-OP2300 |
| Brackets for DIN rail | JEPMC-OP300  |

## Computer software

| Specifications                                                                                                                                                                       | Model       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Programming software support from system design to maintenance. Intuitive ladder programming and editing functions. CAM data generation. Windows-based (Windows 95/98/NT4.0/2000/XP) | CPMC-MPE720 |

## Servo system

**Note:** Refer to servo systems section for detailed information

## Frequency inverters

**Note:** Refer to frequency inverters section for detailed information

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

## MP2300 - MECHATROLINK-II

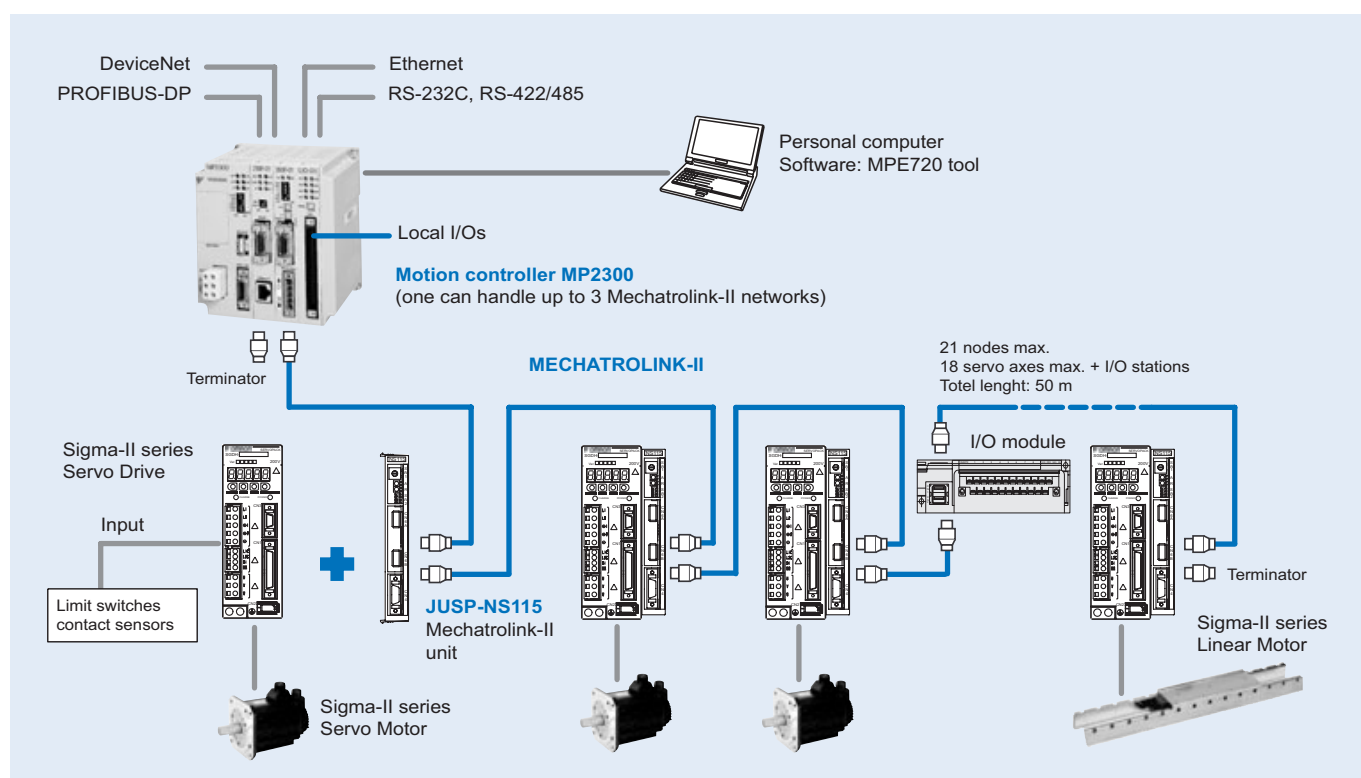
# Motion controller

## Stand-alone solution for advanced motion control

- Up to 48 axes controlled with minimum wiring
- Self configuration of nodes for an easy setup
- DeviceNet, PROFIBUS and ethernet network interfaces provide easy connectivity to any system
- Supports position, speed and torque control
- Electronic CAM profiles and axes synchronization
- The high-speed bus MECHATROLINK-II is specially designed for motion control
- Support for I/Os and pulse inputs locally and over the network
- Access to the complete system from one point.



## System configuration





## Specifications

### General specifications

#### Hardware specifications

| Items                           | Specifications                                                                                                                                                                                                        |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental conditions        | <b>Ambient operating temperature</b> 0 to 55 °C                                                                                                                                                                       |
|                                 | <b>Ambient storage temperature</b> -25 to 85 °C                                                                                                                                                                       |
|                                 | <b>Ambient operating humidity</b> 30% to 95% (with no condensation)                                                                                                                                                   |
|                                 | <b>Ambient storage humidity</b> 5% to 95% (with no condensation)                                                                                                                                                      |
|                                 | <b>Pollution level</b> Pollution level 1 (conforming to JIS B 3501)                                                                                                                                                   |
|                                 | <b>Corrosive gas</b> There must be no combustible or corrosive gas.                                                                                                                                                   |
|                                 | <b>Operating altitude</b> 2,000 m above sea level or lower                                                                                                                                                            |
| Mechanical operating conditions | <b>Vibration resistance</b> Conforming to JIS B 3502:<br>10 to 57 Hz with single-amplitude of 0.075 mm<br>57 to 150 Hz with acceleration of 1G<br>10 sweeps each in X, Y, and Z directions (sweep time: 1 octave/min) |
|                                 | <b>Shock resistance</b> Conforming to JIS B 3502:<br>Peak acceleration of 147 m/s <sup>2</sup> (15 G) twice for 11 ms each in the X, Y, and Z directions                                                              |
| Electrical operating conditions | <b>Noise resistance</b> Conforming to EN 61000-6-2, EN 55011 (Group 1, Class A)                                                                                                                                       |
| Installation requirements       | <b>Ground</b> Ground to 100 Ω max.                                                                                                                                                                                    |
|                                 | <b>Cooling method</b> Natural cooling                                                                                                                                                                                 |

#### Sequential function specifications

| Items                                               | Specifications                                                                                                                      |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Control method</b>                               | Sequence: High-speed and low-speed scan methods                                                                                     |
| <b>Programming language</b>                         | Ladder diagram: Relay circuit                                                                                                       |
|                                                     | Text-type language: Numeric operations, logic operations, etc.                                                                      |
| <b>Scanning</b>                                     | Two scan levels: High-speed scan and low-speed scan                                                                                 |
|                                                     | High-speed scan time setting: 1 to 32 ms (Integral multiple of MECHATROLINK communication cycle)                                    |
|                                                     | Low-speed scan time setting: 2 to 300 ms (Integral multiple of MECHATROLINK communication cycle)                                    |
| <b>User drawings, functions and motion programs</b> | Startup drawings (DWG.A): 64 drawings max. up to three hierarchical drawing levels                                                  |
|                                                     | Interrupt processing drawings (DWG.I): 64 drawings max. up to three hierarchical drawing levels                                     |
|                                                     | High-speed scan process drawings (DWG.H): 200 drawings max. up to three hierarchical drawing levels                                 |
|                                                     | Low-speed scan process drawings (DWG.L): 500 drawings max. up to three hierarchical drawing levels                                  |
|                                                     | Number of steps: Up to 1,000 steps per drawing                                                                                      |
|                                                     | User functions: Up to 500 functions                                                                                                 |
|                                                     | Motion programs: Up to 256                                                                                                          |
| <b>Data memory</b>                                  | Revision history of drawings and motion programs                                                                                    |
|                                                     | Security function for drawings and motion programs                                                                                  |
|                                                     | Common data (M) registers: 64 Kwords                                                                                                |
|                                                     | System (S) registers: 8 Kwords                                                                                                      |
|                                                     | Drawing local (D) registers: Up to 16 Kwords per drawing                                                                            |
|                                                     | Drawing constant (#) registers: Up to 16 Kwords per drawing                                                                         |
|                                                     | Input (I) registers: 5 Kwords (including internal input registers)                                                                  |
| <b>Trace memory</b>                                 | Output (O) registers: 5 Kwords (including internal output registers)                                                                |
|                                                     | Constant (C) registers: 16 Kwords                                                                                                   |
| <b>Trace memory</b>                                 | Data trace: 128 Kwords (32 Kwords, 4 groups), 16 points defined                                                                     |
| <b>Memory backup</b>                                | Program memory: Flash memory: 8 MBytes (user area: 5.5 MBytes) definition files, ladder programs, motion programs, etc.             |
|                                                     | Data memory: Battery backup: 256 Kbytes, M registers, S registers, alarm history, trace data                                        |
| <b>Data types</b>                                   | Bit (relay): ON/OFF                                                                                                                 |
|                                                     | Integer: -32768 to +32767                                                                                                           |
|                                                     | Double-length integer: -2147483648 to +2147483647                                                                                   |
|                                                     | Real number: ± (1.175E-38 to 3.402E+38)                                                                                             |
| <b>Register designation method</b>                  | Register number: Direct designation of register number                                                                              |
|                                                     | Symbolic designation: Up to 8 alphanumeric characters (up to 200 symbols per drawing)<br>With automatic number or symbol assignment |

## Motion control function specifications

| Item                                              |                                     | Specifications                                                                                                                                                                                             |                                                           |     |
|---------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----|
| Interface                                         |                                     | MECHATROLINK-I, MECHATROLINK-II                                                                                                                                                                            |                                                           |     |
| Number of controlled axes/module                  |                                     | Up to 16 axes                                                                                                                                                                                              |                                                           |     |
| Control specifications                            | PTP control                         |                                                                                                                                                                                                            | Linear, rotary, and infinite-length                       |     |
|                                                   | Interpolation                       |                                                                                                                                                                                                            | Up to 16 linear axes, 2 circular axes, and 3 helical axes |     |
|                                                   | Speed reference output              |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Torque reference output             |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Phase control                       |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Position control                    | Positioning                                                                                                                                                                                                |                                                           | Yes |
|                                                   |                                     | External positioning                                                                                                                                                                                       |                                                           | Yes |
|                                                   |                                     | Zero point return                                                                                                                                                                                          |                                                           | Yes |
|                                                   |                                     | Interpolation                                                                                                                                                                                              |                                                           | Yes |
|                                                   |                                     | Interpolation with position detection function                                                                                                                                                             |                                                           | Yes |
|                                                   |                                     | JOG operation                                                                                                                                                                                              |                                                           | Yes |
| STEP operation                                    |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Parameter changes during motion command execution |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Reference unit                                    |                                     | mm, inch, deg, or pulse                                                                                                                                                                                    |                                                           |     |
| Reference unit minimum setting                    |                                     | 1, 0.1, 0.01, 0.001, 0.0001, 0.00001                                                                                                                                                                       |                                                           |     |
| Maximum programmable value                        |                                     | -2147483648 to +2147483647 (signed 32-bit value)                                                                                                                                                           |                                                           |     |
| Speed reference unit                              |                                     | Reference unit/s designation: mm/s, inch/s, deg/s, pulse/s<br>Reference unit/min. designation: mm/min, inch/ min, deg/min, pulse/min<br>Percentage designation: Percentage of rated speed                  |                                                           |     |
| Acceleration/deceleration type                    |                                     | Linear, asymmetric, S-curve, exponent                                                                                                                                                                      |                                                           |     |
| Acceleration/deceleration reference unit          |                                     | Reference unit/s <sup>2</sup> designation: mm/s <sup>2</sup> , inch/s <sup>2</sup> , deg/s <sup>2</sup> , pulse/s <sup>2</sup><br>Acceleration/deceleration time constant: Time from 0 to rated speed (ms) |                                                           |     |
| Override function                                 |                                     | Positioning: 0.01% to 327.67% by axis                                                                                                                                                                      |                                                           |     |
| Coordinate system                                 |                                     | Rectangular coordinates                                                                                                                                                                                    |                                                           |     |
| Zero point return                                 | DEC1+ phase-C pulse                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | ZERO signal                         |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | DEC1+ ZERO signal                   |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Phase-C pulse                       |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Only phase-C pulse                  |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | POT and phase-C pulse               |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | POT                                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Home limit switch and phase-C pulse |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | HOME                                |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | NOT and phase-C pulse               |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | NOT                                 |                                                                                                                                                                                                            | Yes                                                       |     |
| INPUT and phase-C pulse                           |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| INPUT                                             |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Applicable servo drives                           |                                     | SGDH-□□□E-OY + NS115                                                                                                                                                                                       |                                                           |     |
| Applicable frequency inverters                    |                                     | Varispeed V7, F7, G7 with MECHATROLINK-II interface<br>(for inverter version support contact your OMRON sales office)                                                                                      |                                                           |     |
| Encoders                                          |                                     | Incremental encoder<br>Yaskawa absolute encoder                                                                                                                                                            |                                                           |     |

## MP2300 CPU (basic module)

| Items                     | Specifications                                                                                                                                                                                                                                                            | Appearance                                                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                     | JEPMC-MP2300                                                                                                                                                                                                                                                              |  |
| Power supply              | Input power voltage: 24 VDC±20%<br>Current consumption: 1 A<br>Inrush current: 40 A or less                                                                                                                                                                               |                                                                                       |
| Motion network            | One channel for MECHATROLINK-II:<br>Twenty-one stations, including servo drives and I/O equipment, can be connected.<br>(16 axes for servo drives and inverters)<br>Transmission speed: 10Mbps (MECHATROLINK-II)<br>Transmission distance: See "MECHATROLINK-II repeater" |                                                                                       |
| I/O signals               | Digital input: 8 points (one point can be used for interrupts),<br>24 VDC, 4 mA, and source mode or sink mode input<br>Digital output: 4 points, 24 VDC, 100 mA, open collector, and sink mode output (NPN)                                                               |                                                                                       |
| Slot for optional modules | 3 slots                                                                                                                                                                                                                                                                   |                                                                                       |
| Dimensions (mm)           | 130x120x108 (HxWxD)                                                                                                                                                                                                                                                       |                                                                                       |
| Weight                    | 500 g                                                                                                                                                                                                                                                                     |                                                                                       |

### General-purpose serial communication module (217IF-01)

| Items                            | Specifications                                                                            |                                                                                           | Appearance                                                                          |
|----------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                            | JAPMC-CM2310                                                                              |                                                                                           |  |
| Port                             | For RS-232C communication                                                                 | For RS-422/485 communication                                                              |                                                                                     |
| Interface                        | One port                                                                                  | One port (RS-422 or -485)                                                                 |                                                                                     |
| Connector                        | D-sub 9 pins (female)                                                                     | MDR 14 pins (female)                                                                      |                                                                                     |
| Max. transmission distance       | 15 m                                                                                      | 300 m                                                                                     |                                                                                     |
| Transmission speed               | 76.8 kbps                                                                                 | 76.8 kbps                                                                                 |                                                                                     |
| Access mode                      | Asynchronous (start-stop synchronization)                                                 | Asynchronous (start-stop synchronization)                                                 |                                                                                     |
| Communication protocols          | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            |                                                                                     |
| Media access control method      | 1:1                                                                                       | 1:1 (RS-422), 1:N (RS-485)                                                                |                                                                                     |
| Transmission format (can be set) | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: even, odd, or none | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: even, odd, or none |                                                                                     |

### Ethernet communication module (218IF-01)

| Items                                | Specifications                                                         |                                  | Appearance                                                                          |
|--------------------------------------|------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------|
| Model                                | JAPMC-CM2300                                                           |                                  |  |
| Port                                 | For ethernet communication                                             | Port                             |                                                                                     |
| Interface                            | One port (10BaseT)<br>(RJ-45 modular jack)                             | Interface                        |                                                                                     |
| Max. segment length                  | 100 m                                                                  | Connector                        |                                                                                     |
| Transmission speed                   | 10 Mbps                                                                | Max. transmission distance       |                                                                                     |
| Access mode                          | IEEE802.3                                                              | Transmission speed               |                                                                                     |
| Flame format                         | Ethernet ver.2 (conforming to DIX)                                     | Access mode                      |                                                                                     |
| Connections                          | TCP/UDP/IP/ARP                                                         | Communication protocols          |                                                                                     |
| Max. number of words in transmission | 512 words<br>(1024 bytes)                                              | Media access control method      |                                                                                     |
| Communication protocols              | Extended MEMOBUS,<br>MEMOBUS, MELSEC-A,<br>non-protocol, or MODBUS/TCP | Transmission format (can be set) |                                                                                     |
| Max. number of connections           | 20 stations                                                            |                                  |                                                                                     |

### DeviceNet communication module (260IF-01)

| Items                                   | Specifications                                                                                                          |                                  | Appearance                                                                            |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------|
| Model                                   | JAPMC-CM2320                                                                                                            |                                  |  |
| Port                                    | For DeviceNet communication                                                                                             | Port                             |                                                                                       |
| Number of circuits                      | 1                                                                                                                       | Interface                        |                                                                                       |
| Applicable communication                | Conforms to DeviceNet master or slave<br>- I/O transmission<br>(polled I/O and bistrobbed I/O)<br>- Explicit messaging  | Connector                        |                                                                                       |
| I/O communication                       | Max. number of slaves<br>Max. I/O bytes                                                                                 | Max. transmission distance       |                                                                                       |
| Message communication (only for master) | Max. number of nodes<br>Max. message length<br>Executed functions                                                       | Transmission speed               |                                                                                       |
| Switches on the front                   | Two rotary switches: Node address settings<br>DIP switch: Settings for transmission speed and switching master or slave | Access mode                      |                                                                                       |
| Indicators                              | 2 LEDs: MS or NS                                                                                                        | Communication protocols          |                                                                                       |
| Power voltage for communication         | 24 VDC±10%<br>(using the specially designed cable)                                                                      | Media access control method      |                                                                                       |
| Max. current consumption                | Communication power: 45 mA<br>(supplied by transmission connectors)                                                     | Transmission format (can be set) |                                                                                       |

## PROFIBUS communication module (261IF-01)

| Items                | Specifications                                                                                 |                                  |                                                                                           | Appearance                                                                          |
|----------------------|------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                | JAPMC-CM2330                                                                                   |                                  |                                                                                           |  |
| Port                 | For PROFIBUS communication                                                                     | Port                             | For RS-232C communication                                                                 |                                                                                     |
| Functions            | DP slave                                                                                       | Interface                        | One port                                                                                  |                                                                                     |
|                      | Cyclic communication (DP standard function)                                                    | Connector                        | D-sub 9 pins (female)                                                                     |                                                                                     |
| Transmission speed   | 12M/6M/4M/3M/1.5M/750k/500k/187.5k/93.75k/19.2k/9.6kbps (automatic detection)                  | Max. transmission distance       | 15 m                                                                                      |                                                                                     |
| Configuration        | By PROFIBUS master                                                                             |                                  |                                                                                           |                                                                                     |
| Slave address        | 1 to 64                                                                                        | Transmission speed               | 76.8 kbps                                                                                 |                                                                                     |
| I/O processing       | Total capacity of IW/OW registers: 64 words<br>Max. I/O allocation (IN and OUT each): 64 words | Access mode                      | Asynchronous (start-stop synchronization)                                                 |                                                                                     |
|                      |                                                                                                | Communication protocols          | MEMOBUS (master or slave)<br>MELSEC, HostLink, or non-protocol                            |                                                                                     |
| Diagnostic functions | Display for status and slave status using the EWS.<br>I/O error display for SW registers       | Media access control method      | 1:1                                                                                       |                                                                                     |
|                      |                                                                                                | Transmission format (can be set) | Data bit length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Parity bits: even, odd, or none |                                                                                     |

## Analogue reference motion control module (SVA-01)

| Items                      | Specifications                                                               | Appearance                                                                          |
|----------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                      | JAPMC-MC2300                                                                 |  |
| Number of axes             | 2 axes (CN1 & CN2) analogue output and encoder input.                        |                                                                                     |
| Digital inputs (per axis)  | 6 inputs, PNP or NPN (including alarm, ready, zero and latch)                |                                                                                     |
| Digital outputs (per axis) | 6 outputs (including servo_on, alarm_reset, control_mode_select and SEN)     |                                                                                     |
| Encoder input (per axis)   | Differential line-driver (A./A.B./B./Z./Z.). 4 Mpps (before multiplication). |                                                                                     |
| Analog outputs (per axis)  | 2 outputs $\pm 10$ V 16 bits (typically speed and torque references)         |                                                                                     |
| Analog inputs (per axis)   | 2 inputs $\pm 10$ V 16 bits                                                  |                                                                                     |
| External supply            | 24 VDC (in CN3)                                                              |                                                                                     |
| LED's                      | RUN (green) ERR (red)                                                        |                                                                                     |

## MECHATROLINK-II motion control module (SVB-01)

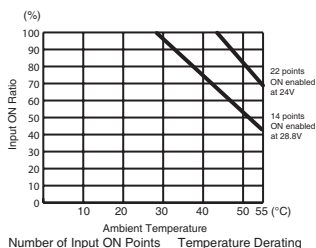
| Items                         | Specifications                                                                                                                                                                                          | Appearance                                                                            |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                         | JAPMC-MC2310                                                                                                                                                                                            |  |
| Communication circuits        | 1 circuit                                                                                                                                                                                               |                                                                                       |
| Communication ports           | 2 ports                                                                                                                                                                                                 |                                                                                       |
| Terminator                    | External resistor (JEPMC-W6022 required)                                                                                                                                                                |                                                                                       |
| Transmission speed            | 10 Mbps                                                                                                                                                                                                 |                                                                                       |
| Communication cycle           | 0.5ms, 1ms, 1.5ms, 2ms                                                                                                                                                                                  |                                                                                       |
| Number of connecting stations | 21 stations (16 axes for servo drives and inverters) / 2 ms, 15 stations (15 axes for servo drives) / 1.5 ms, 9 stations (9 axes for servo drives) / 1ms, 4 stations (4 axes for servo drives) / 0.5 ms |                                                                                       |
| Retry function                | Available with MECHATROLINK-II                                                                                                                                                                          |                                                                                       |
| Slave function                | Available with MECHATROLINK-II                                                                                                                                                                          |                                                                                       |
| Transmission distance         | See "MECHATROLINK-II repeater"                                                                                                                                                                          |                                                                                       |

## I/O modules (LIO-01/-02)

| Items              | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Appearance                                                                            |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Models             | JAPMC-IO2300 (NPN output), JAPMC-IO2301 (PNP output)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| Digital I/O        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                       |
| Input signals      | 16 points (all connected) and 24 VDC $\pm 20\%$ , 5 mA (TYP)<br>Sink mode or source mode input and photocoupler isolation<br>Min. ON voltage/current: 15V/1.6 mA<br>Max. OFF voltage/current: 5V/1.0 mA<br>Max. response time: OFF $\rightarrow$ ON 1 ms and ON $\rightarrow$ OFF 1 ms<br>Interruption (DI-00): DI-00 can be used for interruptions. If an interruption is enabled, the interrupt drawing is started when DI-00 is set to ON.<br>Pulse latch (DI-01): DI-01 can be used for pulse latching. If pulse latching is enabled, the pulse counter is latched when DI-01 is set to ON. |                                                                                       |
| Output signals     | 16 points (all connected) and 24 VDC $\pm 20\%$ , 100 mA max.<br>Open collector: Sink mode output (LIO-01 module)<br>Source mode output (LIO-02 module)<br>Photocoupler isolation and max. OFF current: 0.1 mA<br>Max. response time: OFF $\rightarrow$ ON 1 ms and ON $\rightarrow$ OFF 1 ms<br>Output protection: Fuse (for protection against fires caused by an overcurrent when outputting after a short circuit occurred).<br>If circuit protection is required, provide a fuse for each output circuit.                                                                                  |                                                                                       |
| Pulse input        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                       |
| Number of channels | 1 (Phase A, B, or Z input)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                       |
| Input circuit      | Phase A/B: 5V differential inputs, no insulation, and max. frequency 4 MHz<br>Phase Z: 5 V/12 V photocoupler inputs and max. frequency 500 kHz                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                       |
| Input method       | A/B (1, 2, or 4 multipliers), sign (1 or 2 multipliers), UP/DOWN (1 or 2 multipliers)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                       |
| Latch input        | Pulse latch with phase Z or DI-01<br>Min. response time: 5 $\mu$ s when input with phase Z; 60 $\mu$ s when input with DI-01                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                       |
| Others             | Coincident detection; preset and clear functions for counter values.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                       |

## I/O modules (LIO-04)

| Items                 | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Appearance                                                                          |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>          | JAPMC-IO2303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>Input signals</b>  | <p>32 points (8 points common) and 24 VDC<math>\pm</math>20%, 5 mA (TYP)<br/> Sink mode or source mode input and photocoupler isolation<br/> Min. ON voltage/current: 15 V/1.6 mA<br/> Max. OFF voltage/current: 5 V/1.0 mA<br/> Max. response time: OFF<math>\rightarrow</math>ON 0.5 ms and ON<math>\rightarrow</math>OFF 0.5 ms<br/> Interruption (DI-00, DI-01, DI-16, DI-17):<br/> DI-00, DI-01, DI-16, and DI-17 can be used for interruptions. If an interruption is enabled, the interrupt drawing is started when DI-00, DI-01, DI-16, or DI-17 is set to ON.<br/> Note: See right for the derating conditions</p> |                                                                                     |
| <b>Output signals</b> | <p>32 points (8 points common) and 24 VDC<math>\pm</math>20%, 100 mA max.<br/> Open collector: Sink mode output (NPN) and photocoupler isolation<br/> Max. OFF current: 0.1 mA<br/> Max. response time: OFF<math>\rightarrow</math>ON 0.5 ms and ON<math>\rightarrow</math>OFF 1 ms<br/> Output protection: Fuse (for protection against fires caused by an overcurrent when outputting after a short circuit occurred)<br/> If circuit protection is required, provide a fuse for each output circuit.</p>                                                                                                                 |                                                                                     |



## MECHATROLINK-II, 64 point I/O module (IO2310)

| Items                      | Specifications                                                                                                                                                                                                                                | Appearance                                                                          |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Model</b>               | JEPMC-IO2310                                                                                                                                                                                                                                  |  |
| <b>I/O signals</b>         | <p>Input: 64 points, 24 VDC, 5 mA, sink/source mode input<br/> Output: 64 points, 24 VDC, 50 mA when all points ON, (the max. rating is 100 mA per point) sink mode output (NPN)<br/> Signal connection method: Connector (FCN360 series)</p> |                                                                                     |
| <b>Module power supply</b> | <p>24 VDC (20.4 V to 28.8 V)<br/> Rated current: 0.5 A<br/> Inrush current: 1 A</p>                                                                                                                                                           |                                                                                     |
| <b>Weight</b>              | 590 g                                                                                                                                                                                                                                         |                                                                                     |

## MECHATROLINK-II, counter module (PL2900)

| Items                           | Specifications                                                                                             | Appearance                                                                            |
|---------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                    | JEPMC-PL2900                                                                                               |  |
| <b>Number of input channels</b> | 2                                                                                                          |                                                                                       |
| <b>Functions</b>                | Pulse counter, notch output, registration input                                                            |                                                                                       |
| <b>Pulse input method</b>       | Sign (1/2 multipliers), A/B (1/2/4 multipliers), UP/DOWN (1/2 multipliers)                                 |                                                                                       |
| <b>Max. counter speed</b>       | 1200 kpps (4 multipliers)                                                                                  |                                                                                       |
| <b>Pulse input voltage</b>      | 3/5/12/24 VDC                                                                                              |                                                                                       |
| <b>External power supply</b>    | For input signal: 24 VDC, For dividing load: 24 VDC, For module: 24 VDC (20.4 V to 26.4 V), 120 mA or less |                                                                                       |
| <b>Weight</b>                   | 300 g                                                                                                      |                                                                                       |

## MECHATROLINK-II, pulse output module (PL2910)

| Items                            | Specifications                                                                                                                              | Appearance                                                                            |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                     | JEPMC-PL2910                                                                                                                                |  |
| <b>Number of output channels</b> | 2                                                                                                                                           |                                                                                       |
| <b>Functions</b>                 | Pulse positioning, JOG run, zero-point return                                                                                               |                                                                                       |
| <b>Pulse output method</b>       | CW, CCW pulse, sign                                                                                                                         |                                                                                       |
| <b>Max. output speed</b>         | 500kpps                                                                                                                                     |                                                                                       |
| <b>Pulse output voltage</b>      | 5VDC                                                                                                                                        |                                                                                       |
| <b>Pulse interface circuit</b>   | Open collector output<br>5VDC, 10mA/circuit                                                                                                 |                                                                                       |
| <b>External control signal</b>   | Digital input: 8 points/module, 5 VDC x 4 points, 24 VDC x 4 points<br>Digital output: 6 points/module, 5 VDC x 4 points, 24 VDC x 2 points |                                                                                       |
| <b>Weight</b>                    | 300 g                                                                                                                                       |                                                                                       |

## MECHATROLINK-II, analog input module (AN2900)

| Items                           | Specifications                                                 | Appearance                                                                            |
|---------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Model</b>                    | JEPMC-AN2900                                                   |  |
| <b>Number of input channels</b> | 4                                                              |                                                                                       |
| <b>Input voltage range</b>      | -10 V to +10 V                                                 |                                                                                       |
| <b>Input impedance</b>          | 1 M $\Omega$ min.                                              |                                                                                       |
| <b>Data format</b>              | Binary, -32000 to +32000                                       |                                                                                       |
| <b>Input delay time</b>         | 4 ms max.                                                      |                                                                                       |
| <b>Error</b>                    | $\pm$ 0.5% F.S. (at 25 °C), $\pm$ 1.0% F.S. (at 0 °C to 60 °C) |                                                                                       |
| <b>External power supply</b>    | 24 VDC (20.4 VDC to 26.4 VDC), 120 mA max.                     |                                                                                       |
| <b>Weight</b>                   | 300 g                                                          |                                                                                       |

## MECHATROLINK-II, analog output module (AN2910)

| Items                       | Specifications                                         | Appearance |
|-----------------------------|--------------------------------------------------------|------------|
| Model                       | JEPMC-AN2910                                           |            |
| Number of output channels   | 2                                                      |            |
| Output voltage range        | -10 V to +10 V                                         |            |
| Max. allowable load current | ± 5 mA (2 kΩ)                                          |            |
| Data format                 | Binary, -32000 to +32000                               |            |
| Output delay time           | 1 ms                                                   |            |
| Error                       | ± 0.2% F.S. (at 25 °C), ± 0.5% F.S. (at 0 °C to 60 °C) |            |
| External power supply       | 24 VDC (20.4 VDC to 26.4 VDC), 120 mA max.             |            |
| Weight                      | 300 g                                                  |            |

## MECHATROLINK-II, repeater

| Items                   | Specifications                                                                                                                                                                                                                                                                                                                                                                               | Appearance |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Model                   | JEPMC-REP2000                                                                                                                                                                                                                                                                                                                                                                                |            |
| Communication type      | MECHATROLINK-II                                                                                                                                                                                                                                                                                                                                                                              |            |
| Cable length            | Between controller and repeater: 50 m., after repeater: 50 m                                                                                                                                                                                                                                                                                                                                 |            |
| Max. connected stations | Total stations on both sides of repeater: 30<br>(limited to the max. number of connectable stations of the controller (e.g., 21 stations for the MP2300 series))                                                                                                                                                                                                                             |            |
| Restrictions            | Between controller and repeater<br>- Total cable length ≤ 30 m: 15 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤ 50 m: 14 stations max. including I/O and servo, etc.<br>After repeater:<br>- Total cable length ≤ 30 m: 16 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤ 50 m: 15 stations max. including I/O and servo, etc. |            |
| Power supply            | 24 VDC, 100 mA                                                                                                                                                                                                                                                                                                                                                                               |            |
| Weight                  | 340 g                                                                                                                                                                                                                                                                                                                                                                                        |            |
| Dimensions (mm)         | 30x160x77 (HxWxD)                                                                                                                                                                                                                                                                                                                                                                            |            |

## MECHATROLINK-II, servo drive 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 Mbps / 1 ms or more. MECHATROLINK-II communications                                                                                |
| Command format                     | Operation specification                      | Positioning using MECHATROLINK-I/II communications.                                                                                   |
|                                    | Reference input                              | MECHATROLINK-I/II communications<br>Commands: position, speed, torque, 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 | Encoder pulse output in the servo drive      | 5 V differential line-driver output (complies with EIA Standard RS-422A)                                                              |
|                                    | Fully closed encoder pulse signal            | A quad B line-driver                                                                                                                  |
|                                    | Maximum receivable frequency for servo drive | 1 Mpps                                                                                                                                |
|                                    | Power supply for fully closed encoder        | To be prepared by customer.                                                                                                           |
| Input signals in the servo drive   | Signal allocation changes possible           | Forward/reverse run prohibited, zero point return deceleration LS<br>External latch signals 1, 2, 3<br>Forward/reverse torque control |
|                                    | Internal functions                           | 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                                                                                          |

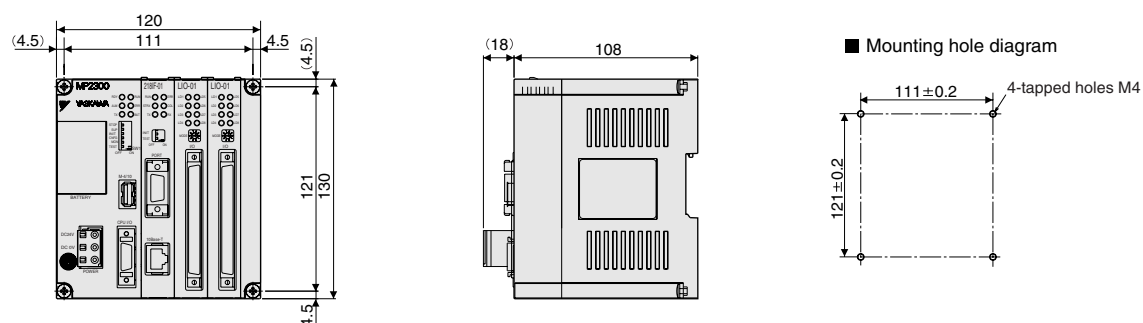


## MECHATROLINK-II, frequency inverter interface units

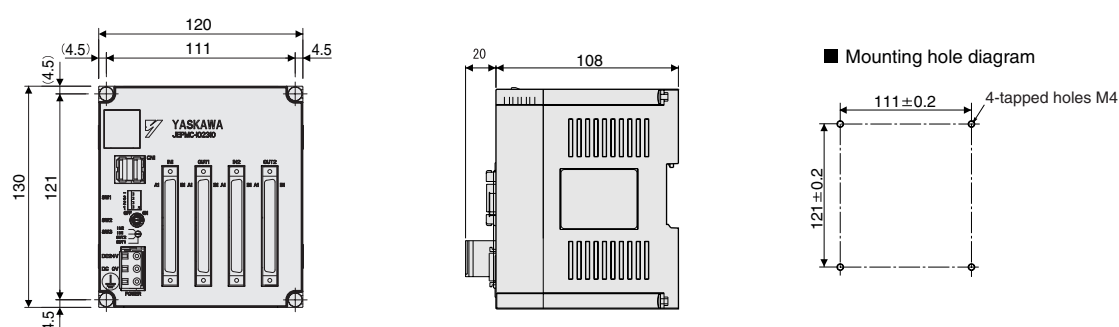
| Item                           | Details                                                                                                      |                                                                    |
|--------------------------------|--------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Type                           | SI-T/V7                                                                                                      | SI-T                                                               |
| Applicable inverter            | CIMR-V7 / 3G3-MV<br>(firmware 5740 or newer)                                                                 | CIMR-G7 / CIMR-F7<br>(firmware 656x/for G7 / 4011 or newer for F7) |
|                                | Contact your OMRON sales office for information about firmware compatibility                                 |                                                                    |
| Installation method            | Mounted on the inverter                                                                                      |                                                                    |
| Power supply                   | Supplied from the inverter                                                                                   |                                                                    |
| MECHATROLINK-II communications | 10 MHz, 0.5 ms to 8 ms for MECHATROLINK-II                                                                   |                                                                    |
| Operation                      | Read and write registers, read monitors, inverter operation, speed reference, torque reference (G7/F7 only). |                                                                    |
| Inputs and outputs             | The inputs and outputs in the inverter can be read and set by the MLII master                                |                                                                    |
| Connectors                     | ML-II bus connector. DPRAM connector for the inverter                                                        |                                                                    |
| Switches                       | Rotary switch for ML-II address (low byte)                                                                   |                                                                    |
|                                | Dip switch for: ML-II address (high bit). ML-II/ML-I selection. 17 byte/32 byte data length selection.       |                                                                    |

## Dimensions

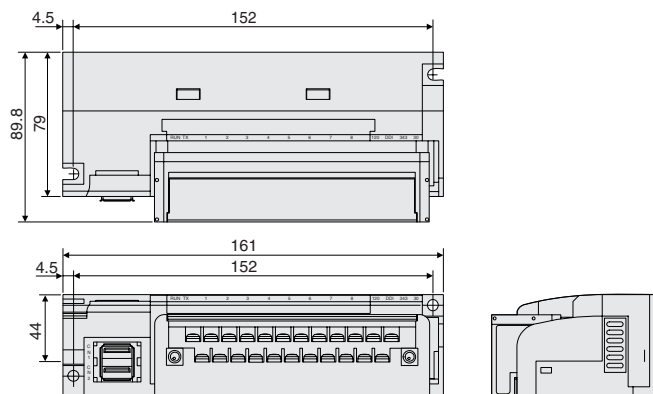
### MP2300 basic module



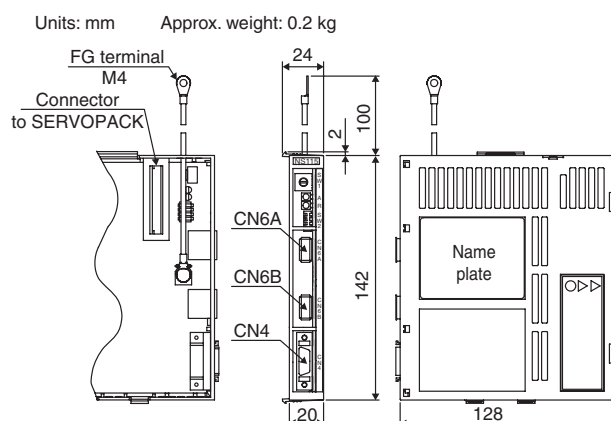
### IO2310 I/O module



### I/O modules PL2900, PL2910, AN2900, AN2910



### MECHATROLINK-II servo drive interface unit



## Ordering information

## MP2300 - motion controller main unit

| Name                                                                          | Model name | Model        |
|-------------------------------------------------------------------------------|------------|--------------|
| MP2300 basic module (CPU module included), 1 channel for MECHATROLINK-II, I/O | MP2300     | JEPMC-MP2300 |

## MP2300 - motion control modules

| Name                                               | Model name | Model        |
|----------------------------------------------------|------------|--------------|
| Analogue reference motion control module (2 axes)  | SVA-01     | JAPMC-MC2300 |
| 1 additional MECHATROLINK-II communication channel | SVB-01     | JAPMC-MC2310 |

## MP2300 - communication modules

| Name                                                                        | Model name | Model        |
|-----------------------------------------------------------------------------|------------|--------------|
| General-purpose serial communication module (RS-232C / RS422 communication) | 217IF-01   | JAPMC-CM2310 |
| Ethernet communication module (RS-232C / ethernet communication)            | 218IF-01   | JAPMC-CM2300 |
| DeviceNet communication module (RS-232C / DeviceNet communication)          | 260IF-01   | JAPMC-CM2320 |
| PROFIBUS communication module (RS-232C / PROFIBUS communication)            | 261IF-01   | JAPMC-CM2330 |

## MP2300 - I/O modules

| Name                                                                                | Model name | Model        |
|-------------------------------------------------------------------------------------|------------|--------------|
| 16-point input, 16-point output (sink mode output / NPN), and 1-point pulse input   | LIO-01     | JAPMC-IO2300 |
| 16-point input, 16-point output (source mode output / PNP), and 1-point pulse input | LIO-02     | JAPMC-IO2301 |
| 32-point input and 32-point output                                                  | LIO-04     | JAPMC-IO2303 |

## MECHATROLINK-II - related devices

| Name                           | Remarks                                                                                         | Model          |
|--------------------------------|-------------------------------------------------------------------------------------------------|----------------|
| Distributed I/O modules        | 64-point input and 64-point output                                                              | JEPMC-IO2310   |
|                                | Reversible counter: 2 channels                                                                  | JEPMC-PL2900   |
|                                | Pulse output: 2 channels                                                                        | JEPMC-PL2910   |
|                                | Analog input: -10 V to +10 V, 4 channels                                                        | JEPMC-AN2900   |
|                                | Analog output: -10 V to +10 V, 2 channels                                                       | JEPMC-AN2910   |
| MECHATROLINK-II cables         | 0.5 meter                                                                                       | JEPMC-W6003-A5 |
|                                | 1 meter                                                                                         | JEPMC-W6003-01 |
|                                | 3 meters                                                                                        | JEPMC-W6003-03 |
|                                | 5 meters                                                                                        | JEPMC-W6003-05 |
|                                | 10 meters                                                                                       | JEPMC-W6003-10 |
|                                | 20 meters                                                                                       | JEPMC-W6003-20 |
|                                | 30 meters                                                                                       | JEPMC-W6003-30 |
| MECHATROLINK-II terminator     | Terminating resistor                                                                            | JEPMC-W6022    |
| MECHATROLINK-II interface unit | For Sigma-II series servo drives. (Firmware version 38 or later)                                | JUSP-NS115     |
|                                | For Varispeed V7 inverter<br>(for inverter version support contact your OMRON sales office)     | SI-T/V7        |
|                                | For Varispeed F7, G7 inverter<br>(for inverter version support contact your OMRON sales office) | SI-T           |
| MECHATROLINK-II repeater       | MECHATROLINK-II repeater                                                                        | JEPMC-REP2000  |

## I/O cables

|                          | Remarks                                | Length m | Model          |
|--------------------------|----------------------------------------|----------|----------------|
| I/O cable for LIO-01, 02 | With connector on the LIO-01, -02 side | 0.5      | JEPMC-W2061-A5 |
|                          |                                        | 1.0      | JEPMC-W2061-01 |
|                          |                                        | 3.0      | JEPMC-W2061-03 |
| I/O cable for LIO-04     | With connector on the LIO-04 side      | 0.5      | JEPMC-W6060-05 |
|                          |                                        | 1.0      | JEPMC-W6060-10 |
|                          |                                        | 3.0      | JEPMC-W6060-30 |
| I/O cable for MP2300     | With connector on the MP2300 side      | 0.5      | JEPMC-W2060-A5 |
|                          |                                        | 1.0      | JEPMC-W2060-01 |
|                          |                                        | 3.0      | JEPMC-W2060-03 |
| I/O cable for IO2310     | With connector on the IO2310 side      | 0.5      | JEPMC-W5410-05 |
|                          |                                        | 1.0      | JEPMC-W5410-10 |
|                          |                                        | 3.0      | JEPMC-W5410-30 |

## Accessories

| Name                  | Model        |
|-----------------------|--------------|
| Battery ER3V 3.6V     | JZSP-BA01    |
| Empty slot cover      | JEPMC-OP2300 |
| Brackets for DIN rail | JEPMC-OP300  |



## Computer software

| Specifications                                                                                                                                                                               | Model       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Programming software to support from system design to maintenance.<br>Intuitive ladder programming and editing functions. CAM data generation<br>Windows-based (Windows 95/98/NT4.0/2000/XP) | CPMC-MPE720 |

## Servo system

**Note:** Refer to servo systems section for detailed information

## Frequency inverters

**Note:** Refer to frequency inverters section for detailed information

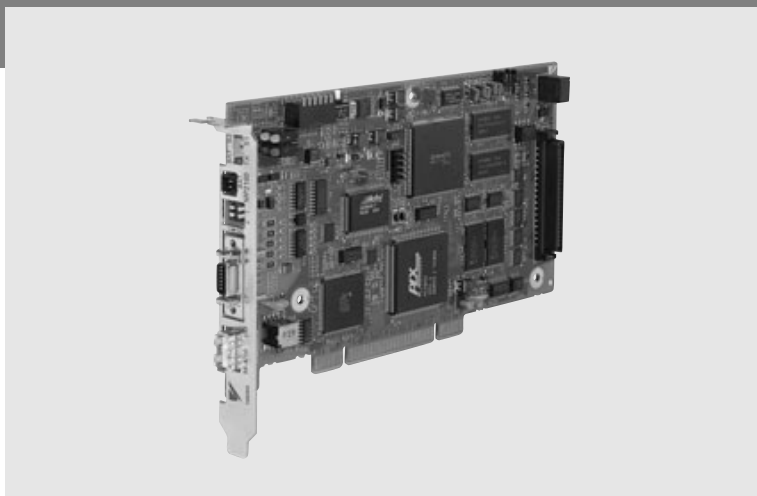
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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.</p> <p>To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.</p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## MP2100 - MECHATROLINK-II

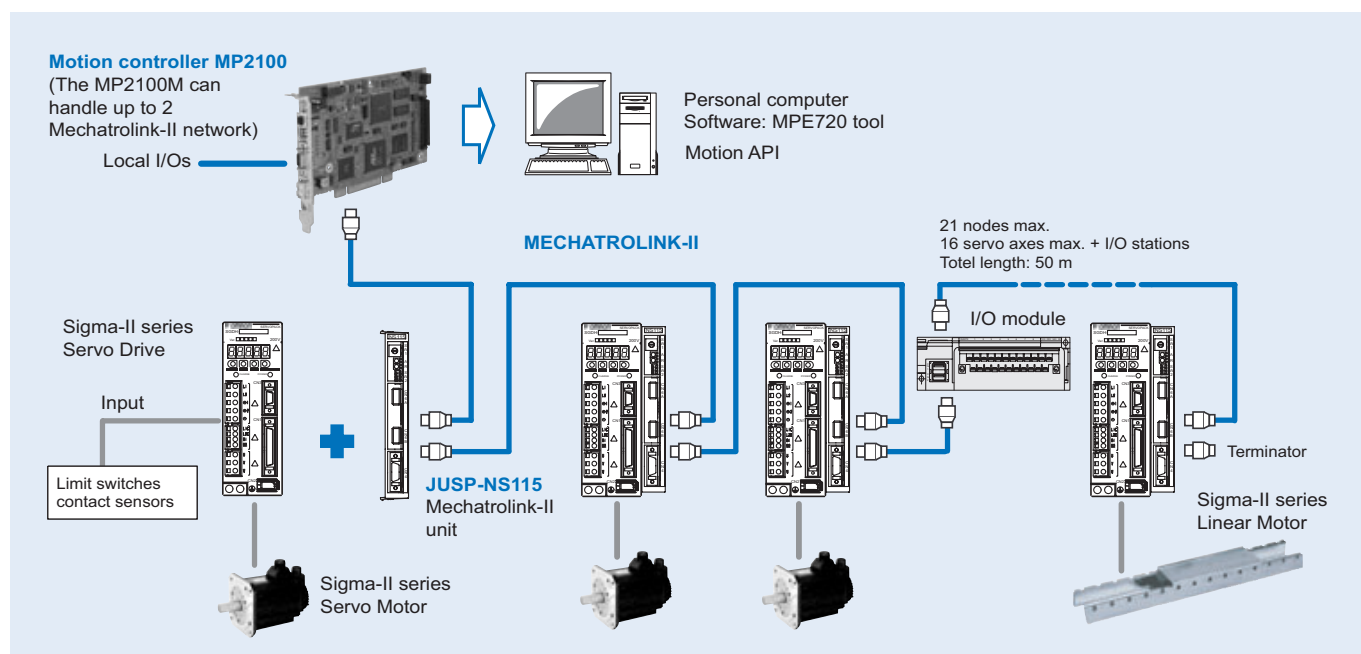
# PC motion controller

## PC based solution for advanced motion control

- Up to 32 axes controlled with minimum wiring
- Motion APIs are available for customised control applications. Motion commands can be input from either the PC application or the MP2100 program
- Self configuration of nodes for an easy setup
- Supports position, speed and torque control
- Electronic CAM profiles and axes synchronization
- The high-speed bus MECHATROLINK-II is specially designed for motion control
- Support for I/Os locally and over the network
- Access to the complete system from one point



## System configuration



## Specifications

### General specifications

#### Hardware specifications

| Items                           | Specifications                |
|---------------------------------|-------------------------------|
| Environmental conditions        | Ambient operating temperature |
|                                 | Ambient storage temperature   |
|                                 | Ambient operating humidity    |
|                                 | Ambient storage humidity      |
|                                 | Pollution level               |
|                                 | Corrosive gas                 |
|                                 | Operating altitude            |
| Mechanical operating conditions | Vibration resistance          |
|                                 | Shock resistance              |
| Electrical operating conditions | Noise resistance              |
| Installation requirements       | Ground                        |
|                                 | Cooling method                |

#### Sequential function specifications

| Items                                        | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Control method                               | Sequence: High-speed and low-speed scan methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Programming language                         | Ladder diagram: Relay circuit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                              | Text-type language: Numeric operations, logic operations, etc.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Scanning                                     | Two scan levels: High-speed scan and low-speed scan<br>High-speed scan time setting: 1 to 32 ms (Integral multiple of MECHATROLINK communication cycle)<br>Low-speed scan time setting: 2 to 300 ms (Integral multiple of MECHATROLINK communication cycle)                                                                                                                                                                                                                                                                                                                                                                         |
| User drawings, functions and motion programs | Startup drawings (DWG.A): 64 drawings max. up to three hierarchical drawing levels<br>Interrupt processing drawings (DWG.I): 64 drawings max. up to three hierarchical drawing levels<br>High-speed scan process drawings (DWG.H): 200 drawings max. up to three hierarchical drawing levels<br>Low-speed scan process drawings (DWG.L): 500 drawings max. up to three hierarchical drawing levels<br>Number of steps: Up to 1,000 steps per drawing<br>User functions: Up to 500 functions<br>Motion programs: Up to 256<br>Revision history of drawings and motion programs<br>Security function for drawings and motion programs |
| Data memory                                  | Common data (M) registers: 64 Kwords<br>System (S) registers: 8 Kwords<br>Drawing local (D) registers: Up to 16 Kwords per drawing<br>Drawing constant (#) registers: Up to 16 Kwords per drawing<br>Input (I) registers: 5 Kwords (including internal input registers)<br>Output (O) registers: 5 Kwords (including internal output registers)<br>Constant (C) registers: 16 Kwords                                                                                                                                                                                                                                                |
| Trace memory                                 | Data trace: 128 Kwords (32 Kwords / 4 groups), 16 points defined                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Memory backup                                | Program memory: Flash memory: 8 MBytes (User area: 5.5 MBytes) definition files, ladder programs, motion programs, etc.<br>Data memory: Battery backup: 256 Kbytes, M registers, S registers, alarm history, trace data                                                                                                                                                                                                                                                                                                                                                                                                             |
| Data types                                   | Bit (relay): ON/OFF<br>Integer: -32768 to +32767<br>Double-length integer: -2147483648 to +2147483647<br>Real number: $\pm (1.175\text{E}-38 \text{ to } 3.402\text{E}+38)$                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Register designation method                  | Register number: Direct designation of register number<br>Symbolic designation: Up to 8 alphanumeric characters (up to 200 symbols per drawing)<br>With automatic number or symbol assignment                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Motion control function specifications.

| Item                                              |                                     | Specifications                                                                                                                                                                                             |                                                           |     |
|---------------------------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----|
| Interface                                         |                                     | MECHATROLINK-I, MECHATROLINK-II                                                                                                                                                                            |                                                           |     |
| Number of controlled axes/module                  |                                     | Up to 16 axes                                                                                                                                                                                              |                                                           |     |
| Control specifications                            | PTP control                         |                                                                                                                                                                                                            | Linear, rotary, and infinite-length                       |     |
|                                                   | Interpolation                       |                                                                                                                                                                                                            | Up to 16 linear axes, 2 circular axes, and 3 helical axes |     |
|                                                   | Speed reference output              |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Torque reference output             |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Phase control                       |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Position control                    | Positioning                                                                                                                                                                                                |                                                           | Yes |
|                                                   |                                     | External positioning                                                                                                                                                                                       |                                                           | Yes |
|                                                   |                                     | Zero point return                                                                                                                                                                                          |                                                           | Yes |
|                                                   |                                     | Interpolation                                                                                                                                                                                              |                                                           | Yes |
|                                                   |                                     | Interpolation with position detection function                                                                                                                                                             |                                                           | Yes |
|                                                   |                                     | JOG operation                                                                                                                                                                                              |                                                           | Yes |
|                                                   |                                     | STEP operation                                                                                                                                                                                             |                                                           | Yes |
| Parameter changes during motion command execution |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Reference unit                                    |                                     | mm, inch, deg, or pulse                                                                                                                                                                                    |                                                           |     |
| Reference unit minimum setting                    |                                     | 1, 0.1, 0.01, 0.001, 0.0001, 0.00001                                                                                                                                                                       |                                                           |     |
| Maximum programmable value                        |                                     | -2147483648 to +2147483647 (signed 32-bit value)                                                                                                                                                           |                                                           |     |
| Speed reference unit                              |                                     | Reference unit/s designation: mm/s, inch/s, deg/s, pulse/s<br>Reference unit/min. designation: mm/min, inch/ min, deg/min, pulse/min<br>Percentage designation: Percentage of rated speed                  |                                                           |     |
| Acceleration/deceleration type                    |                                     | Linear, asymmetric, S-curve, exponent                                                                                                                                                                      |                                                           |     |
| Acceleration/deceleration reference unit          |                                     | Reference unit/s <sup>2</sup> designation: mm/s <sup>2</sup> , inch/s <sup>2</sup> , deg/s <sup>2</sup> , pulse/s <sup>2</sup><br>Acceleration/deceleration time constant: Time from 0 to rated speed (ms) |                                                           |     |
| Override function                                 |                                     | Positioning: 0.01% to 327.67% by axis                                                                                                                                                                      |                                                           |     |
| Coordinate system                                 |                                     | Rectangular coordinates                                                                                                                                                                                    |                                                           |     |
| Zero point return                                 | DEC1+ phase-C pulse                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | ZERO signal                         |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | DEC1+ ZERO signal                   |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Phase-C pulse                       |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Only phase-C pulse                  |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | POT and phase-C pulse               |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | POT                                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | Home limit switch and phase-C pulse |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | HOME                                |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | NOT and phase-C pulse               |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | NOT                                 |                                                                                                                                                                                                            | Yes                                                       |     |
|                                                   | INPUT and phase-C pulse             |                                                                                                                                                                                                            | Yes                                                       |     |
| INPUT                                             |                                     | Yes                                                                                                                                                                                                        |                                                           |     |
| Applicable servo drives                           |                                     | SGDH-□□□E-OY + NS115                                                                                                                                                                                       |                                                           |     |
| Applicable frequency inverters                    |                                     | Varispeed V7, F7, G7 with MECHATROLINK-II Interface<br>(for inverter's version supported contact your OMRON sales office)                                                                                  |                                                           |     |
| Encoders                                          |                                     | Incremental encoder<br>Yaskawa absolute encoder                                                                                                                                                            |                                                           |     |

## MP2100, MP2100M boards

| Items                           |                      | Specifications                                                                                                                                                                                                                                                                                                       | Appearance                                                                            |
|---------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                           |                      | JAPMC-MC2100, JAPMC-MC2140                                                                                                                                                                                                                                                                                           |  |
| Power supply                    |                      | Input supply voltage: 5 VDC±5%                                                                                                                                                                                                                                                                                       |                                                                                       |
| Dimensions                      |                      | 106.68x174.63 mm half the size of a standard PCI                                                                                                                                                                                                                                                                     |                                                                                       |
| Motion network                  |                      | MECHATROLINK-II: One channel with MP2100, two channels with MP2100M<br>Twenty-one stations, including servo drives, inverters and I/O equipment, can be connected. (16 axes for servo drives and inverters)<br>Transmission speed: 10Mbps (MECHATROLINK-II)<br>Transmission distance: See "MECHATROLINK-II repeater" |                                                                                       |
| I/O signals                     |                      | Digital input: 5 points (one point can be used for interrupts), 24 VDC, 4 mA, and source mode or sink mode input<br>Digital output: 4 points, 24 VDC, 100 mA, open collector, and sink mode output                                                                                                                   |                                                                                       |
| Electrical operating conditions | Noise resistance     | Radiation noise (FT noise): 1 kV or more for 1 min.<br>Static noise (contact discharging method): 6 kV or more for 10 times<br>Other noise: Not specified                                                                                                                                                            |                                                                                       |
|                                 |                      |                                                                                                                                                                                                                                                                                                                      |                                                                                       |
| Mechanical operating conditions | Vibration resistance | Not specified                                                                                                                                                                                                                                                                                                        |                                                                                       |
|                                 | Shock resistance     | Not specified                                                                                                                                                                                                                                                                                                        |                                                                                       |
| Installation requirements       | Ground               | Follows the personal computer's requirements                                                                                                                                                                                                                                                                         |                                                                                       |
| Environmental conditions        |                      | Same as the general specifications                                                                                                                                                                                                                                                                                   |                                                                                       |

## Host computer specifications

| Items    | Specifications              |
|----------|-----------------------------|
| Hardware | Model                       |
|          | CPU                         |
|          | Memory capacity             |
|          | Hard disk drive capacity    |
|          | Display resolution          |
|          | Expansion slot <sup>1</sup> |
|          | Interrupts <sup>1</sup>     |
|          | I/O memory <sup>1</sup>     |
| Software | OS                          |
|          | Web browser                 |
|          | Language                    |

1. These specifications are applicable if using one MP2100s board. If using two or more boards in the same host personal computer, expansion slots, interrupts and I/O memory resources needs to be increased per each board.

## MECHATROLINK-II, 64 point I/O module (IO2310)

| Items               | Specifications                                                                                                                                                                                                                     | Appearance                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model               | JEPMC-IO2310                                                                                                                                                                                                                       |  |
| I/O signals         | Input: 64 points, 24 VDC, 5 mA, sink/source mode input<br>Output: 64 points, 24 VDC, 50 mA when all points ON, (The max. rating is 100 mA per point) sink mode output (NPN)<br>Signal connection method: Connector (FCN360 series) |                                                                                     |
| Module power supply | 24 VDC (20.4 V to 28.8 V)<br>Rated current: 0.5 A<br>Inrush current: 1 A                                                                                                                                                           |                                                                                     |
| Weight              | 590 g                                                                                                                                                                                                                              |                                                                                     |

## MECHATROLINK-II, counter module (PL2900)

| Items                    | Specifications                                                                                             | Appearance                                                                            |
|--------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                    | JEPMC-PL2900                                                                                               |  |
| Number of input channels | 2                                                                                                          |                                                                                       |
| Functions                | Pulse counter, notch output, registration input                                                            |                                                                                       |
| Pulse input method       | Sign (1/2 multipliers), A/B (1/2/4 multipliers), UP/DOWN (1/2 multipliers)                                 |                                                                                       |
| Max. counter speed       | 1200 kpps (4 multipliers)                                                                                  |                                                                                       |
| Pulse input voltage      | 3/5/12/24 VDC                                                                                              |                                                                                       |
| External power supply    | For input signal: 24 VDC, for dividing load: 24 VDC, for module: 24 VDC (20.4 V to 26.4 V), 120 mA or less |                                                                                       |
| Weight                   | 300 g                                                                                                      |                                                                                       |

## MECHATROLINK-II, pulse output module (PL2910)

| Items                     | Specifications                                                                                                                              | Appearance                                                                            |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                     | JEPMC-PL2910                                                                                                                                |  |
| Number of output channels | 2                                                                                                                                           |                                                                                       |
| Functions                 | Pulse positioning, JOG run, zero-point return                                                                                               |                                                                                       |
| Pulse output method       | CW, CCW pulse, sign                                                                                                                         |                                                                                       |
| Max. output speed         | 500 kpps                                                                                                                                    |                                                                                       |
| Pulse output voltage      | 5 VDC                                                                                                                                       |                                                                                       |
| Pulse interface circuit   | Open collector output<br>5 VDC, 10 mA/circuit                                                                                               |                                                                                       |
| External control signal   | Digital input: 8 points/module, 5 VDC x 4 points, 24 VDC x 4 points<br>Digital output: 6 points/module, 5 VDC x 4 points, 24 VDC x 2 points |                                                                                       |
| Weight                    | 300 g                                                                                                                                       |                                                                                       |

## MECHATROLINK-II, analog input module (AN2900)

| Items                    | Specifications                                         | Appearance                                                                            |
|--------------------------|--------------------------------------------------------|---------------------------------------------------------------------------------------|
| Model                    | JEPMC-AN2900                                           |  |
| Number of input channels | 4                                                      |                                                                                       |
| Input voltage range      | -10 V to +10 V                                         |                                                                                       |
| Input impedance          | 1 MΩ min.                                              |                                                                                       |
| Data format              | Binary, -32000 to +32000                               |                                                                                       |
| Input delay time         | 4 ms max.                                              |                                                                                       |
| Error                    | ± 0.5% F.S. (at 25 °C), ± 1.0% F.S. (at 0 °C to 60 °C) |                                                                                       |
| External power supply    | 24 VDC (20.4 VDC to 26.4 VDC), 120 mA max.             |                                                                                       |
| Weight                   | 300 g                                                  |                                                                                       |

## MECHATROLINK-II, analog output module (AN2910)

| Items                       | Specifications                                         | Appearance                                                                          |
|-----------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                       | JEPMC-AN2910                                           |  |
| Number of output channels   | 2                                                      |                                                                                     |
| Output voltage range        | -10 V to +10 V                                         |                                                                                     |
| Max. allowable load current | ± 5 mA (2 kΩ)                                          |                                                                                     |
| Data format                 | Binary, -32000 to +32000                               |                                                                                     |
| Output delay time           | 1 ms                                                   |                                                                                     |
| Error                       | ± 0.2% F.S. (at 25 °C), ± 0.5% F.S. (at 0 °C to 60 °C) |                                                                                     |
| External power supply       | 24 VDC (20.4 VDC to 26.4 VDC), 120 mA max.             |                                                                                     |
| Weight                      | 300 g                                                  |                                                                                     |

## MECHATROLINK-II repeater

| Items                   | Specifications                                                                                                                                                                                                                                                                                                                                                                               | Appearance                                                                          |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Model                   | JEPMC-REP2000                                                                                                                                                                                                                                                                                                                                                                                |  |
| Communication type      | MECHATROLINK-II                                                                                                                                                                                                                                                                                                                                                                              |                                                                                     |
| Cable length            | Between controller and repeater: 50 m, after repeater: 50 m                                                                                                                                                                                                                                                                                                                                  |                                                                                     |
| Max. connected stations | Total stations on both sides of repeater: 30<br>(limited to the max. number of connectable stations of the controller (e.g., 21 stations for the MP2300 series))                                                                                                                                                                                                                             |                                                                                     |
| Restrictions            | Between controller and repeater<br>- Total cable length ≤ 30 m: 15 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤ 50 m: 14 stations max. including I/O and servo, etc.<br>After repeater:<br>- Total cable length ≤ 30 m: 16 stations max. including I/O and servo, etc.<br>- 30 m < total cable length ≤ 50 m: 15 stations max. including I/O and servo, etc. |                                                                                     |
| Power supply            | 24 VDC, 100 mA                                                                                                                                                                                                                                                                                                                                                                               |                                                                                     |
| Weight                  | 340 g                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                     |
| Dimensions (mm)         | 30x160x77 (HxWxD)                                                                                                                                                                                                                                                                                                                                                                            |                                                                                     |

## MECHATROLINK-II servo drive 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 Mbps / 1 ms or more. MECHATROLINK-II communications                                                                                |
| Command format                     | Operation specification                      | Positioning using MECHATROLINK-I/II communications.                                                                                   |
|                                    | Reference input                              | MECHATROLINK-I/II communications<br>Commands: position, speed, torque, 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 | Encoder pulse output in the servo drive      | 5 V differential line-driver output (complies with EIA Standard RS-422A)                                                              |
|                                    | Fully closed encoder pulse signal            | A quad B line-driver                                                                                                                  |
|                                    | Maximum receivable frequency for servo drive | 1 Mpps                                                                                                                                |
|                                    | Power supply for fully closed encoder        | To be prepared by customer.                                                                                                           |
| Input signals in the servo drive   | Signal allocation changes possible           | Forward/reverse run prohibited, zero point return deceleration LS<br>External latch signals 1, 2, 3<br>Forward/reverse torque control |
|                                    | Position data latch function                 | Position data latching is possible using phase C, and external signals 1, 2, 3                                                        |
| Internal functions                 | Protection                                   | Parameters damage, parameter setting errors, communications errors, WDT errors, fully closed encoder detecting disconnection          |
|                                    | LED indicators                               | A: Alarm, R: MECHATROLINK-I/II communicating                                                                                          |

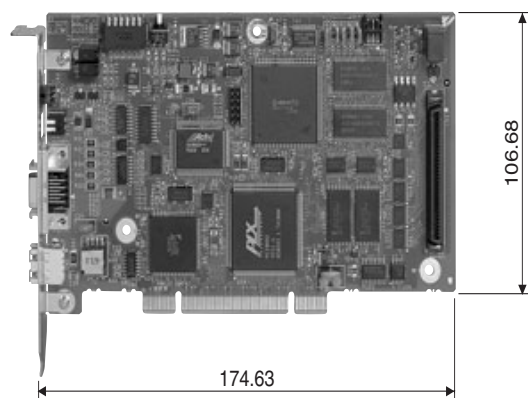


## MECHATROLINK-II, frequency inverter interface units

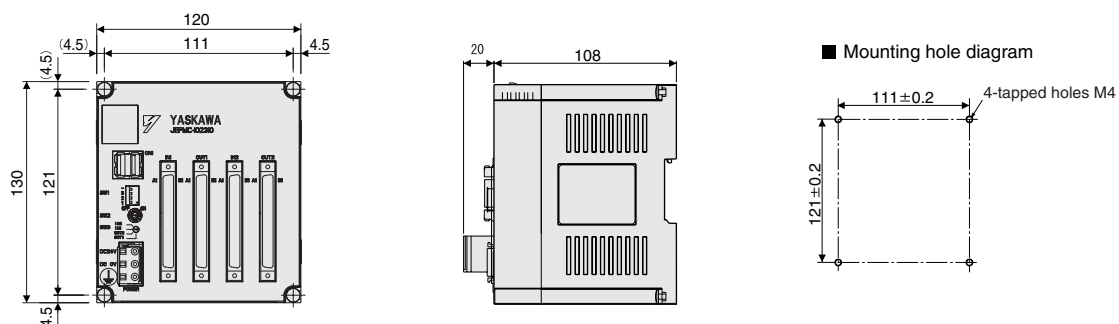
| Item                           | Details                                                                                                                                              |                                                                    |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| Type                           | SI-T/V7                                                                                                                                              | SI-T                                                               |
| Applicable inverter            | CIMR-V7 / 3G3-MV<br>(firmware 5740 or newer)                                                                                                         | CIMR-G7 / CIMR-F7<br>(firmware 656x/for G7 / 4011 or newer for F7) |
|                                | Contact your OMRON sales office for information about firmware compatibility                                                                         |                                                                    |
| Installation method            | Mounted on the inverter                                                                                                                              |                                                                    |
| Power supply                   | Supplied from the inverter                                                                                                                           |                                                                    |
| MECHATROLINK-II communications | 10 MHz, 0.5 ms to 8 ms for MECHATROLINK-II                                                                                                           |                                                                    |
| Operation                      | Read and write registers, read monitors, inverter operation, speed reference, torque reference (G7/F7 only).                                         |                                                                    |
| Inputs and outputs             | The inputs and outputs in the inverter can be read and set by the MLII master                                                                        |                                                                    |
| Connectors                     | ML-II bus connector. DPRAM connector for the inverter                                                                                                |                                                                    |
| Switches                       | Rotary switch for ML-II address (low byte)<br>Dip switch for: ML-II address (high bit). ML-II/ML-I selection. 17 byte/32 byte data length selection. |                                                                    |

## Dimensions

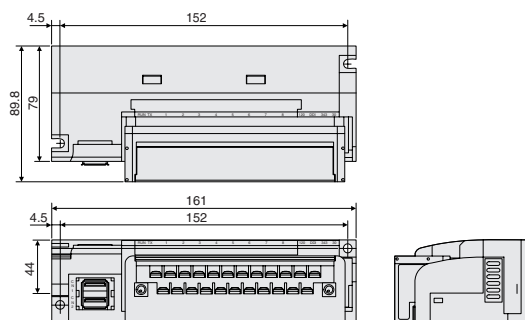
### MP2100, MP2100M boards



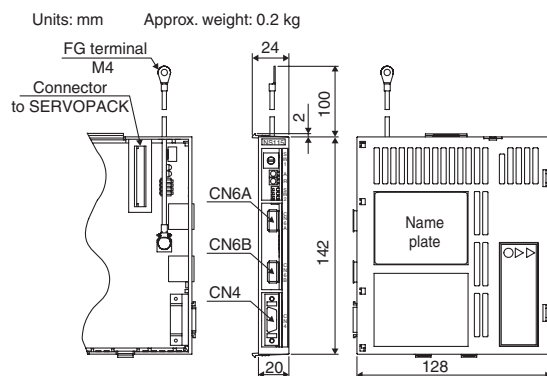
### IO2310 I/O module



### I/O modules PL2900, PL2910, AN2900, AN2910



### MECHATROLINK-II servo drive interface unit



## Ordering information

## MP2100 - motion controller main units

| Name                                                                                          | Model name | Model        |
|-----------------------------------------------------------------------------------------------|------------|--------------|
| MP2100 board, 1 channel for MECHATROLINK-II communication, 5-point input and 4-point output   | MP2100     | JAPMC-MC2100 |
| MP2100M board, 2 channels for MECHATROLINK-II communication, 5-point input and 4-point output | MP2100M    | JAPMC-MC2140 |

## MECHATROLINK-II - related devices

| Name                           | Remarks                                                                                         | Model          |
|--------------------------------|-------------------------------------------------------------------------------------------------|----------------|
| Distributed I/O modules        | 64-point input and 64-point output                                                              | JEPMC-IO2310   |
|                                | Reversible counter: 2 channels                                                                  | JEPMC-PL2900   |
|                                | Pulse output: 2 channels                                                                        | JEPMC-PL2910   |
|                                | Analog input: -10 V to +10 V, 4 channels                                                        | JEPMC-AN2900   |
|                                | Analog output: -10 V to +10 V, 2 channels                                                       | JEPMC-AN2910   |
| MECHATROLINK-II cables         | 0.5 meter                                                                                       | JEPMC-W6003-A5 |
|                                | 1 meter                                                                                         | JEPMC-W6003-01 |
|                                | 3 meters                                                                                        | JEPMC-W6003-03 |
|                                | 5 meters                                                                                        | JEPMC-W6003-05 |
|                                | 10 meters                                                                                       | JEPMC-W6003-10 |
|                                | 20 meters                                                                                       | JEPMC-W6003-20 |
|                                | 30 meters                                                                                       | JEPMC-W6003-30 |
| MECHATROLINK-II terminator     | Terminating resistor                                                                            | JEPMC-W6022    |
| MECHATROLINK-II interface unit | For Sigma-II series servo drives. (Firmware version 38 or later)                                | JUSP-NS115     |
|                                | For Varispeed V7 inverter<br>(for inverter version support contact your OMRON sales office)     | SI-TV7         |
|                                | For Varispeed F7, G7 inverter<br>(for inverter version support contact your OMRON sales office) | SI-T           |
| MECHATROLINK-II repeater       | MECHATROLINK-II repeater                                                                        | JEPMC-REP2000  |

## I/O cables

| Name                 | Remarks                           | Length m | Model          |
|----------------------|-----------------------------------|----------|----------------|
| I/O cable for MP2100 | With connector on the MP2100 side | 0.5      | JEPMC-W2062-A5 |
|                      |                                   | 1.0      | JEPMC-W2062-01 |
|                      |                                   | 3.0      | JEPMC-W2062-03 |
| I/O cable for IO2310 | With connector on the IO2310 side | 0.5      | JEPMC-W5410-05 |
|                      |                                   | 1.0      | JEPMC-W5410-10 |
|                      |                                   | 3.0      | JEPMC-W5410-30 |

## Accessories

| Name                                                     | Model          |
|----------------------------------------------------------|----------------|
| Battery ER3V 3.6V                                        | JZSP-BA01      |
| Extended cable for battery with connectors on both sides | JEPMC-W2090-01 |
| Brackets for DIN rail                                    | JEPMC-OP300    |

## Computer software

| Specifications                                                                                                                                                                               | Model       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Programming software to support from system design to maintenance.<br>Intuitive ladder programming and editing functions. CAM data generation<br>Windows-based (Windows 95/98/NT4.0/2000/XP) | CPMC-MPE720 |
| Motion API. Header file, library, DLL, driver, and manual                                                                                                                                    | CPMC-MPA70  |

## Servo system

**Note:** Refer to servo systems section for detailed information

## Frequency inverters

**Note:** Refer to frequency inverters section for detailed information



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

C200HW-MC402-E

# Motion control unit

## Advanced multi-axes motion control made perfectly intuitive

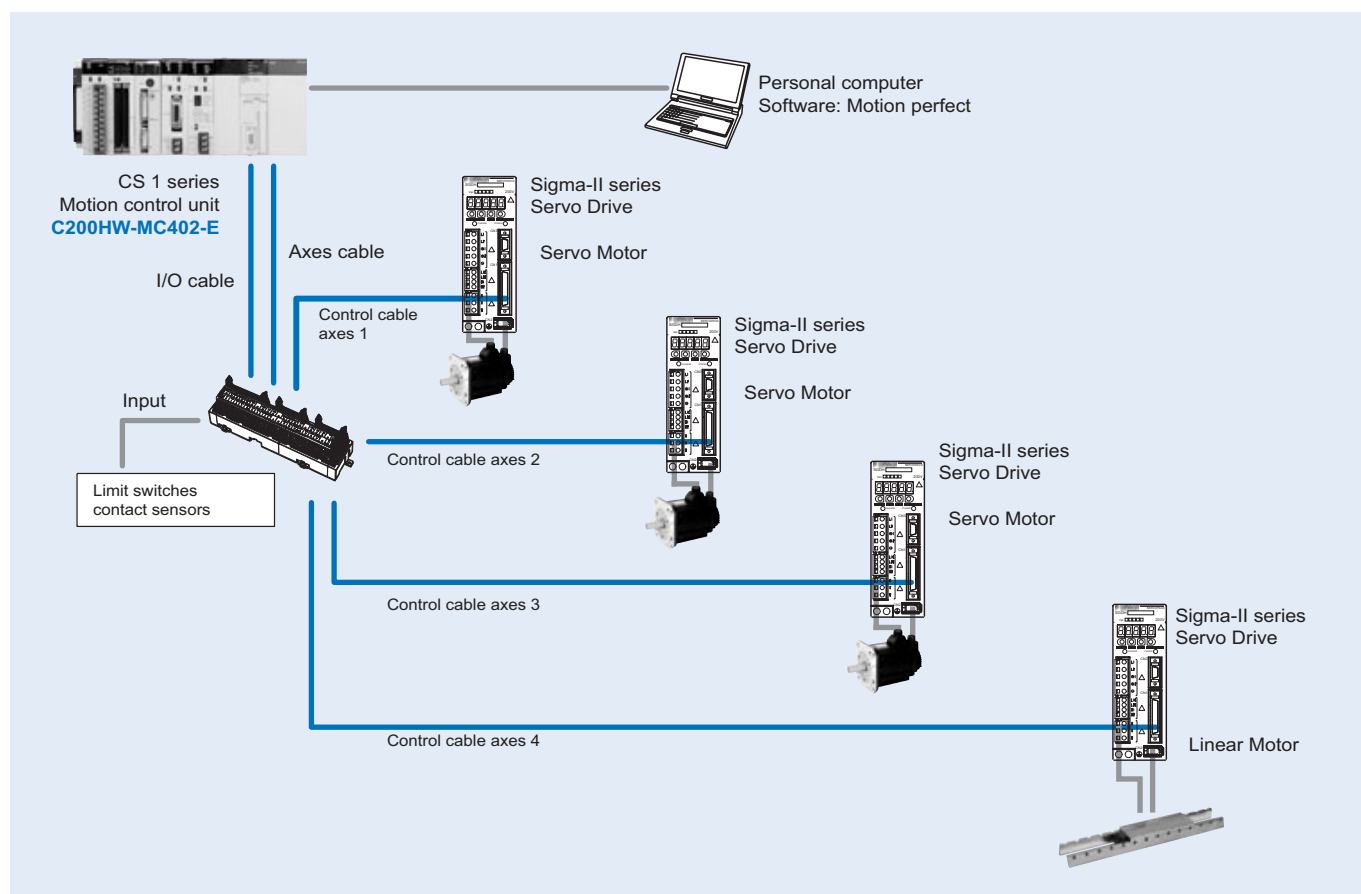
- Advanced motion control of 4 real axes and 4 virtual axes per unit. Up to 16 modules can be installed in one PLC
- Analogue outputs for close loop position and speed control
- Simple to develop and modify using BASIC
- Multi-tasking programming
- Hardware registration input for every axis
- Electronic 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, it is 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, rotating knives, any synchronization and electronic CAM profile to be easily programmed.

## System configuration



## Specifications

|                                  |                                         |                                                                                                                                                                        |
|----------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                     |                                         | <b>C200HW-MC402-E</b>                                                                                                                                                  |
| <b>Classification</b>            |                                         | C200H special I/O unit                                                                                                                                                 |
| <b>Control output signals</b>    |                                         | Analogue                                                                                                                                                               |
| <b>Programming language</b>      |                                         | BASIC type motion control language                                                                                                                                     |
| <b>Basic specifications</b>      | <b>Power supply voltage</b>             | 5 VDC (supplied from backplane).<br>24 VDC (supplied from external power supply)                                                                                       |
|                                  | <b>Approx. mass</b>                     | 500 g                                                                                                                                                                  |
|                                  | <b>External dimensions</b>              | 130x34.5x100.5 mm (HxWxD)                                                                                                                                              |
| <b>Functional specifications</b> | <b>Controlled axes</b>                  | 4 real axes<br>4 virtual axes                                                                                                                                          |
|                                  | <b>Control method</b>                   | Closed loop with incremental encoder and with PID and speed command outputs                                                                                            |
|                                  | <b>Servo loop cycle</b>                 | 1.0 ms                                                                                                                                                                 |
|                                  | <b>Speed control</b>                    | Speed control of up to 4 axes. Up to 1 MHz pulse input frequency after quadrature                                                                                      |
|                                  | <b>Measurement units</b>                | User definable                                                                                                                                                         |
| <b>Motion control</b>            | <b>Linear interpolation</b>             | 4 axes                                                                                                                                                                 |
|                                  | <b>Circular interpolation</b>           | For any 2 axes                                                                                                                                                         |
|                                  | <b>Helical interpolation</b>            | For any 3 axes                                                                                                                                                         |
|                                  | <b>Axes synchronization</b>             | For any 2 axes                                                                                                                                                         |
|                                  | <b>Axes linked CAM profile</b>          | For any 2 axes                                                                                                                                                         |
|                                  | <b>Hardware registration interrupt</b>  | 4 axes                                                                                                                                                                 |
|                                  | <b>Acceleration/deceleration curves</b> | Trapezoidal or S-curve                                                                                                                                                 |
| <b>Task programming capacity</b> | <b>Number of tasks</b>                  | Up to 5 tasks simultaneous plus interface task                                                                                                                         |
|                                  | <b>Number of programs</b>               | 14                                                                                                                                                                     |
|                                  | <b>Data storage capacity</b>            | 251 (VR) + 16000 (table) max.                                                                                                                                          |
| <b>External I/O</b>              | <b>Encoder input</b>                    | Line driver receiver inputs for 4 axes (1 MHz after quadrature)                                                                                                        |
|                                  | <b>Servo drive relationships</b>        | The following signals are provided per axis<br>Inputs: Drive alarm signal<br>Outputs: Drive enable (RUN or SERVO ON)<br>Drive alarm reset<br>SPEED command             |
|                                  | <b>Digital inputs</b>                   | Up to 16 digital inputs can be wired to control MC unit functions. These include limit switches, rapid stop switches and proximity inputs.                             |
|                                  | <b>Digital outputs</b>                  | Total of 8 digital outputs can be wired and used for position dependent switching or other general purposes.                                                           |
|                                  | <b>Registration inputs</b>              | Each axis has a registration input that can be used to record the current position of the encoder feedback signals in hardware for use within the software environment |
| <b>Serial communications</b>     | <b>RS-232C</b>                          | Connection to PC (motion perfect software)                                                                                                                             |

### Motion perfect software

|                            |                                                                                                                     |
|----------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>               | <b>Motion perfect</b>                                                                                               |
| <b>Supported MC units</b>  | C200HW-MC402-E, R88A-MCW151-E, R88A-MCW151-DRT-E                                                                    |
| <b>Applicable computer</b> | Windows 95/98/2000/NT4.0                                                                                            |
| <b>Functions</b>           | Programming and debugging software tool. Test and monitoring functions including a 4-channel software oscilloscope. |

## Ordering information

### Motion controller unit

| Name                              | Model          |
|-----------------------------------|----------------|
| 4 axes advanced motion controller | C200HW-MC402-E |

### Serial cable

| Name              | Model               |
|-------------------|---------------------|
| Programming cable | 2 m R88A-CCM002P4-E |

### Terminal block and cables to motion controller unit

| Description                           | Model               |
|---------------------------------------|---------------------|
| Terminal block for MC402 unit         | - R88A-TC04-E       |
| PLC unit control cable (I/O signals)  | 1 m R88A-CMX001S-E  |
| PLC unit control cable (axes control) | 1 m R88A-CMX001J1-E |

### Sigma-II series servo drive cables

| Description                                                                            | Model                 |
|----------------------------------------------------------------------------------------|-----------------------|
| Servo drive connecting cable, 1 axis.<br>(It is required 1 cable for each servo drive) | 1 m R88A-CMUK001J3-E2 |

### Computer software

| Specifications          | Model           |
|-------------------------|-----------------|
| Motion perfect software | MOTION TOOLS CD |

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

CS1W-MC421/-MC221

# Motion control units

## High-precision, motion controller with multi-tasking G-language programming

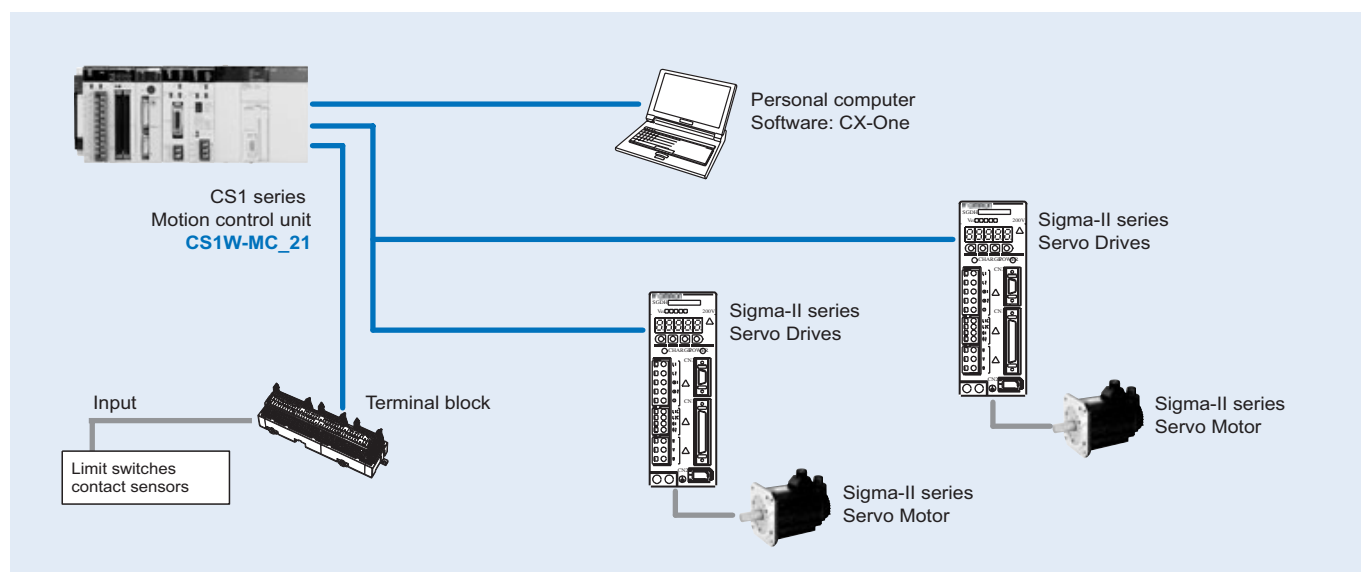
- High-speed control of up to 4 axes with one unit and up to 76 axes with one PLC (19 units x 4 axes) (assumes that power supply unit capacity is not exceeded).
- Winding operations easily controlled at high-speed using traverse positioning control.
- High-speed response to commands from CPU unit (8 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 servo motors.
- 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 motion control via analog outputs for up to 4 axes, and supports the G language for advanced, high-speed, high-precision position control. Multi-tasking allows you to run the axes independently for a wider range of application.

## System configuration



## Specifications

### General

| Model                         |                       | CS1W-MC421-V1                                                                                       | CS1W-MC221-V1                            |
|-------------------------------|-----------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------|
| 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 |

## Ordering information

### Motion control unit

| Name                        | Model         |
|-----------------------------|---------------|
| 2 axes motion control unit. | CS1W-MC221-V1 |
| 4 axes motion control unit. | CS1W-MC421-V1 |

### Sigma-II series servo drive cables

| Description                    | Connect to                                                                          |     | Model         |
|--------------------------------|-------------------------------------------------------------------------------------|-----|---------------|
| Axis control cable<br>(1 axis) | Motion control units<br>CS1W-MC221 (1 cable needed)<br>CS1W-MC421 (2 cables needed) | 1 m | R88A-CPW001M1 |
|                                |                                                                                     | 2 m | R88A-CPW002M1 |
|                                |                                                                                     | 3 m | R88A-CPW003M1 |
|                                |                                                                                     | 5 m | R88A-CPW005M1 |
| Axes control cable<br>(2 axis) | Motion control units<br>CS1W-MC221 (1 cable needed)<br>CS1W-MC421 (2 cables needed) | 1 m | R88A-CPW001M2 |
|                                |                                                                                     | 2 m | R88A-CPW002M2 |
|                                |                                                                                     | 3 m | R88A-CPW003M2 |
|                                |                                                                                     | 5 m | R88A-CPW005M2 |

### I/O terminal block and cables

| Description                            | Connect to motion control unit |     | Model        |
|----------------------------------------|--------------------------------|-----|--------------|
| Terminal block                         | CS1W-MC221                     | -   | XW2B-20J6-6  |
|                                        | CS1W-MC421                     | -   | XW2B-40J6-7  |
| Cable form PLC unit to terminal block. | CS1W-MC221<br>CS1W-MC421       | 1 m | XW2Z-100J-F1 |

### Computer software

| Specifications | Model  |
|----------------|--------|
| CX-One         | CX-One |

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CJ1W-NC□□

# Position control units

## High-speed, High-precision positioning with 1, 2, or 4 axes

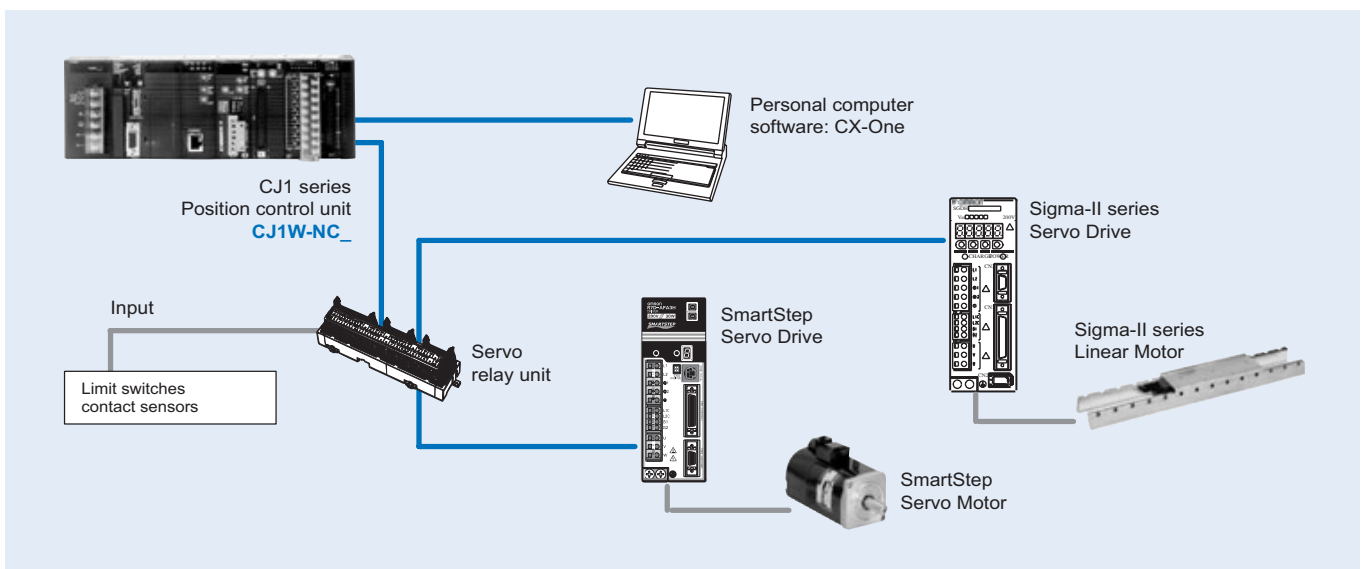
- Positioning can be done by direct ladder commands
- Position and speed control
- Linear interpolation
- Interrupt feeding function
- Positioning of 100 points done from memory
- S-curve acceleration/deceleration, origin search, backlash compensation, and other features are also supported.
- Positioning 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.



## Function

These position control units support positioning control via pulse-train outputs. Positioning is performed using trapezoidal or S-curve acceleration and deceleration. Models are available with 1, 2, or 4 axes control, and can be used in combination with servo drives or stepping motors that accept pulse-train control.

## System configuration



## Specifications

|                                     |                                                                     |                          |                                          |
|-------------------------------------|---------------------------------------------------------------------|--------------------------|------------------------------------------|
| Model                               | CJ1W-NC113<br>CJ1W-NC133                                            | CJ1W-NC213<br>CJ1W-NC233 | CJ1W-NC413<br>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<br>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 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 (WS02-NCTC1-E)                                          |                          |                                          |
| Ambient operating temperature       | 0 to 55 °C                                                          |                          | 0 to 50 °C                               |
| External power supply               | 24 VDC ±10%, 5 VDC ±5% (line driver only)                           |                          | 24 VDC ±5%, 5 VDC ±5% (line driver only) |

## Ordering information

### Position control unit

| Name                                                 | Model      |
|------------------------------------------------------|------------|
| 1 axis position control unit. Open-collector output. | CJ1W-NC113 |
| 2 axes position control unit. Open-collector output. | CJ1W-NC213 |
| 4 axes position control unit. Open-collector output. | CJ1W-NC413 |
| 1 axis position control unit. Line-driver output.    | CJ1W-NC133 |
| 2 axes position control unit. Line-driver output.    | CJ1W-NC233 |
| 4 axes position control unit. Line-driver output.    | CJ1W-NC433 |

### Servo drive cables

**Note:** Refer the selected servo systems section for cable and servo relay units information.

### Computer software

| Specifications | Model  |
|----------------|--------|
| CX-One         | CX-One |

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CS1W-NC□□□, C200HW-NC□□□

# Position control units

## High-speed, high-precision positioning with 1, 2, or 4 axes

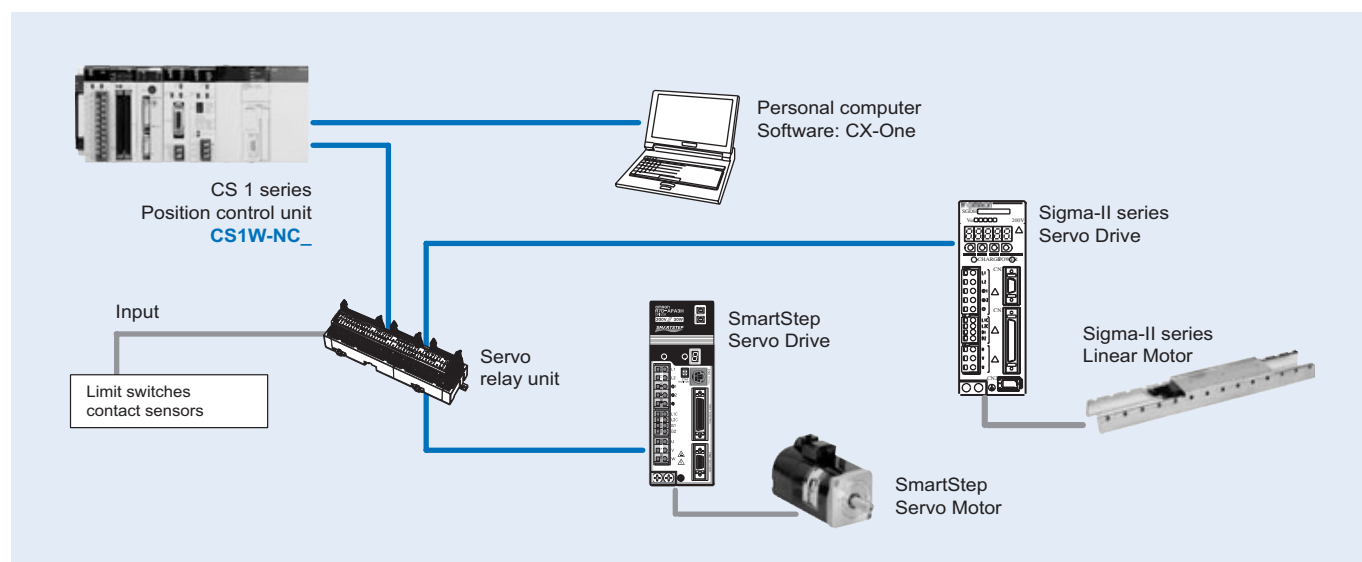
- Positioning can be done by direct ladder commands
- Position and speed control
- Linear interpolation
- Interrupt feeding function
- Positioning of 100 points done from memory
- S-curve acceleration/deceleration, origin search, backlash compensation, and other features are also supported.
- Positioning 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.



## Function

These position control units support positioning control via pulse-train outputs. Positioning is performed using trapezoidal or S-curve acceleration and deceleration. Models are available with 1, 2, or 4 axes control, and can be used in combination with servo drives or stepping motors that accept pulse-train control.

## System configuration





## Specifications

| Model                               | CS1W-NC113<br>CS1W-NC133                                              | CS1W-NC213<br>CS1W-NC233 | CS1W-NC413<br>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<br>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)                                |              |              |

## Ordering information

### Position control unit

| Name                                                 | Model        |
|------------------------------------------------------|--------------|
| 1 axis position control unit. Open-collector output. | CS1W-NC113   |
| 2 axes position control unit. Open-collector output. | CS1W-NC213   |
| 4 axes position control unit. Open-collector output. | CS1W-NC413   |
| 1 axis position control unit. Line-driver output.    | CS1W-NC133   |
| 2 axes position control unit. Line-driver output.    | CS1W-NC233   |
| 4 axes position control unit. Line-driver output.    | CS1W-NC433   |
| 1 axis position control unit. Open-collector output. | C200HW-NC113 |
| 2 axes position control unit. Open-collector output. | C200HW-NC213 |
| 4 axes position control unit. Open-collector output. | C200HW-NC413 |

### Servo drive cables

**Note:** Refer to selected servo systems section for cable and servo relay units information.

### Computer software

| Specifications | Model  |
|----------------|--------|
| CX-One         | CX-One |

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R88A-MCW151-□

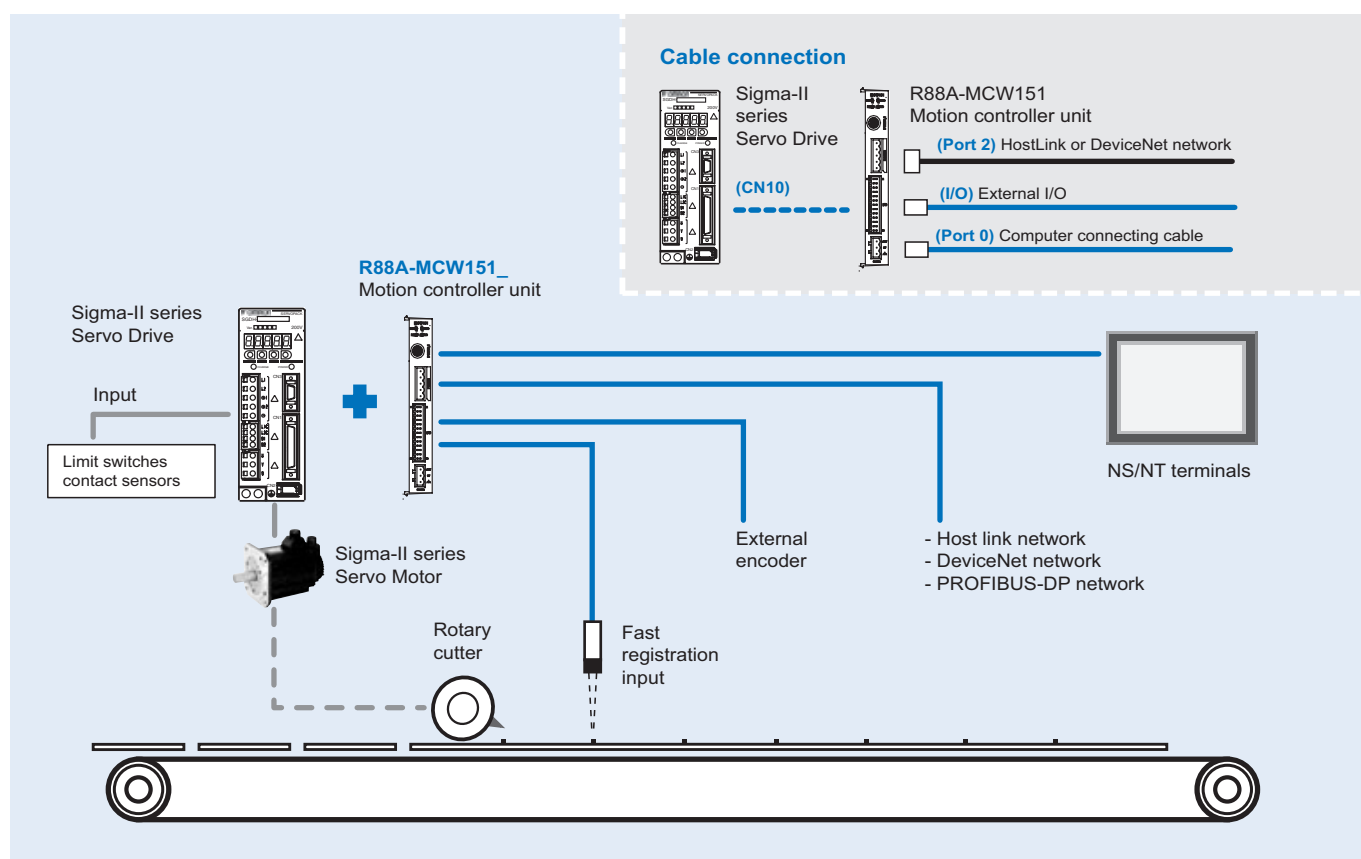
# 1.5 axis motion controller

## Advanced motion made perfectly intuitive

- Connects directly to the Sigma-II series drive
- Controls 1 real axis, 1 virtual axis and a configurable third axis
- Provides an additional encoder input/output to the servo drive
- Simple to develop and modify using BASIC
- Built-in local I/O for easy operation
- Provides two additional hardware registration inputs to the drive
- Electronic CAM profiles and axes synchronization
- Multi-tasking functionality
- Friendly and powerful Windows-based software
- Network connectivity via HostLink or DeviceNet
- Supports HMI connection without the need of a PLC



## System configuration



## Specifications

### General specifications

| Item                      |                                        | Details                                                                                                                                                                                         |
|---------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                      |                                        | R88A-MCW151-E, R88A-MCW151-DRT-E                                                                                                                                                                |
| Applicable servo drive    |                                        | SGDH-□□□□E models (software version 14 or later)                                                                                                                                                |
| Installation method       |                                        | Mounted on the SGDh servo drive side: CN10.                                                                                                                                                     |
| Basic specifications      | Power supply method                    | 24 VDC (supplied from external power supply)                                                                                                                                                    |
|                           |                                        | 5 VDC (supplied from the servo drive control power supply)                                                                                                                                      |
|                           | Power consumption                      | 4.0 W                                                                                                                                                                                           |
|                           | External dimensions                    | 20x142x128 mm (HxWxD)                                                                                                                                                                           |
|                           | Approx. mass                           | 200 g                                                                                                                                                                                           |
|                           | Current consumption                    | 170 mA for 24 VDC                                                                                                                                                                               |
| Environment               | Output power supply                    | 5 VDC, maximum 160 mA (to external encoder)                                                                                                                                                     |
|                           | Operating temperature                  | 0 ... +55 °C                                                                                                                                                                                    |
|                           | Storage temperature                    | -20 ... +75 °C                                                                                                                                                                                  |
|                           | Operating and storage humidity         | 90% RH max. (no condensation)                                                                                                                                                                   |
|                           | Vibration resistance                   | 0.5 G (4.9 m/s <sup>2</sup> )                                                                                                                                                                   |
|                           | Shock resistance                       | 2 G (19.6 m/s <sup>2</sup> )                                                                                                                                                                    |
| Functional specifications | Number of axes                         | - 1 controlled servo drive axis<br>- 1 master axis, encoder output axis or virtual axis<br>- 1 virtual axis                                                                                     |
|                           | Servo loop cycle                       | Selectable to 0.5 ms or 1.0 ms.                                                                                                                                                                 |
|                           | Registration inputs                    | 2x MCW151 unit for encoder input axis<br>1x Sigma-II servo drive axis                                                                                                                           |
|                           | Measurement units                      | User definable                                                                                                                                                                                  |
|                           |                                        |                                                                                                                                                                                                 |
| Programming               | Programming language                   | BASIC                                                                                                                                                                                           |
|                           | Number of tasks                        | Up to 3 tasks running simultaneously plus the command line task                                                                                                                                 |
|                           | Max. number of programs                | 14                                                                                                                                                                                              |
|                           | Available memory for user programs     | 128 KB                                                                                                                                                                                          |
|                           | Data storage capacity                  | 251 (VR) + 8000 (table)                                                                                                                                                                         |
|                           | Saving program data, motion controller | Random access memory (RAM) and flash memory backup.                                                                                                                                             |
|                           | Saving program data, personal computer | Motion perfect software manages a backup on the hard disk of the personal computer.                                                                                                             |
| Motion control            | Speed control                          | Inferred closed loop with PID, output speed and speed feed forward gains<br>Speed reference (open loop)<br>Possible torque limit operation                                                      |
|                           | Torque control                         | Torque reference (open loop)<br>Possible speed limit operation                                                                                                                                  |
|                           | Control switch                         | Speed / torque control switching during operation                                                                                                                                               |
|                           | Positioning operations                 | Linear interpolation<br>Circular interpolation<br>CAM profile movement<br>Electronic gearbox link<br>Linked CAM profile movement<br>Linked move for any two axes<br>Adding axes                 |
|                           | Acceleration/deceleration curves       | Trapezoidal or S-curve                                                                                                                                                                          |
|                           |                                        |                                                                                                                                                                                                 |
| Servo drive access        | Motion control                         | Speed control<br>Torque control<br>Position feedback<br>Driver enable<br>Driver print registration                                                                                              |
|                           | Monitoring                             | Driver alarm and warning status<br>General driver status<br>Driver digital input<br>Driver analogue input<br>Driver limit switches                                                              |
|                           | General control                        | Driver alarm reset<br>Driver reset                                                                                                                                                              |
|                           | Parameter access                       | Read and write Pn parameters<br>Read Un parameters                                                                                                                                              |
|                           |                                        |                                                                                                                                                                                                 |
| External I/O              | Encoder input                          | Line receiver input; maximum response frequency: 1500 kHz pulses (before multiplication)<br>Pulse multiplication: x4                                                                            |
|                           | Encoder output                         | Line receive output; maximum frequency: 500 kHz pulses<br>Internal counts to output pulse ratio: 64:1                                                                                           |
|                           | Digital inputs                         | Total of 8 digital inputs can be wired and used for instance for limit switches, emergency stop and proximity inputs. Two inputs can be used for registration of the encoder input/output axis. |
|                           | Digital outputs                        | Total of 6 digital outputs can be wired and used for position dependent switching or other general purposes.                                                                                    |
|                           | Registration inputs                    | Two registration inputs can be used (simultaneously) to capture the position in hardware.                                                                                                       |
| Serial communications     | RS-232C                                | Port 0: Connection to PC (motion perfect software)                                                                                                                                              |
|                           |                                        | Port 1: Host link master protocol<br>Host link slave protocol<br>General-purpose                                                                                                                |

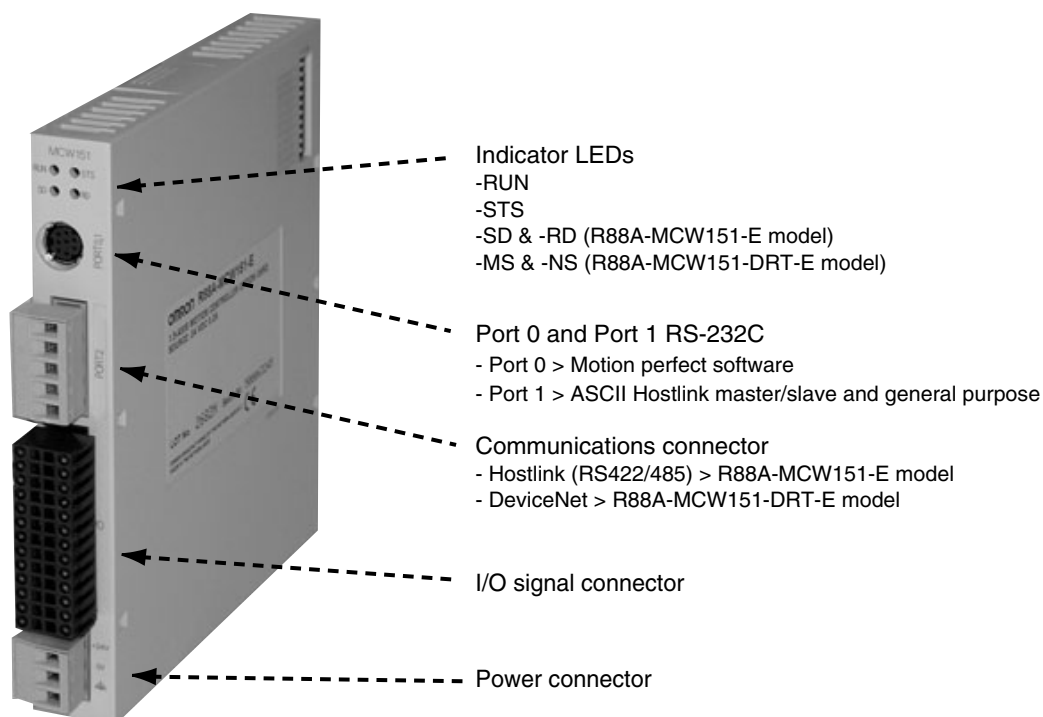
## RS-422A/485 interface specifications (R88A-MCW151-E only)

| Item                       | Details                                                 |                                                                                  |
|----------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------|
| Electrical characteristics | Conform to EIA RS-422A/485                              |                                                                                  |
| Synchronization            | Start-stop synchronization (asynchronous)               |                                                                                  |
| Baud rate                  | 1200 / 2400 / 4800 / 9600 / 19200 / 38400 bps           |                                                                                  |
| Transmission format        | Databit length                                          | 7 or 8 bit                                                                       |
|                            | Stop bit                                                | 1 or 2 bit                                                                       |
|                            | Parity bit                                              | Even/odd/none                                                                    |
| Transmission mode          | Point-to-multipoint (1:N)                               |                                                                                  |
| Transmission protocol      | RS-422A                                                 | Host link master protocol,<br>Host link slave protocol,<br>ASCII general-purpose |
|                            | RS-485                                                  | ASCII general-purpose                                                            |
| Galvanic isolation         | Yes                                                     |                                                                                  |
| Connector type             | Phoenix MSTB 2.5/5-ST-5.08 (included in package).       |                                                                                  |
| Communication buffers      | 254 bytes                                               |                                                                                  |
| Flow control               | None                                                    |                                                                                  |
| Terminator                 | Yes, internal 220 $\Omega$ selectable by DIP-switch SW2 |                                                                                  |
| Cable length               | 500 m max.                                              |                                                                                  |

## DeviceNet specifications (R88A-MCW151-DRT-E only)

| Item                                   | Details                                                                                                                 |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Communications protocol                | DeviceNet                                                                                                               |
| Supported connections (communications) | Remote I/O polling messages<br>Explicit messages<br>Both conform to DeviceNet specifications                            |
| Baud rate                              | 500 kbps, 250 kbps, 125 kbps (switchable)                                                                               |
| Communications media                   | Special 5-wire cables (2 signal lines, 2 power lines, 1 shield line)                                                    |
| Communications distances               |                                                                                                                         |
| 500 kbps                               | Network length: 100 m max. (thin cable: 100 m max.)<br>Drop line length: 6 m max.<br>Total drop line length: 39 m max.  |
| 250 kbps                               | Network length: 250 m max. (thin cable: 100 m max.)<br>Drop line length: 6 m max.<br>Total drop line length: 78 m max.  |
| 125 kbps                               | Network length: 500 m max. (thin cable: 100 m max.)<br>Drop line length: 6 m max.<br>Total drop line length: 156 m max. |

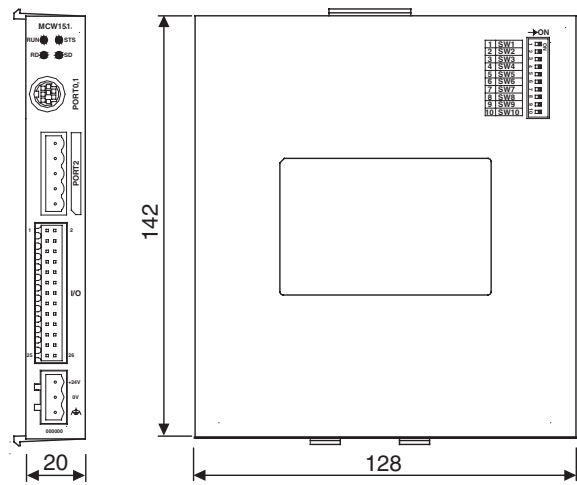
## Nomenclature



Dimensions

R88A-MCW151-(DRT)-E - 1.5 axes motion controller unit

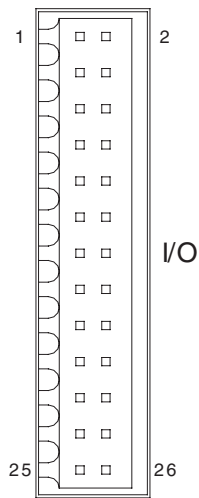
Units: mm      Approx. weight: 0.2 kg



Installation

I/O connector

Connector pin arrangement



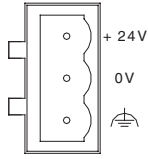
|         |    |    |         |
|---------|----|----|---------|
| A+      | 1  | 2  | A-      |
| B+      | 3  | 4  | B-      |
| Z+      | 5  | 6  | Z-      |
| 0V_ENC  | 7  | 8  | 5V_ENC  |
| I0 / R0 | 9  | 10 | FG      |
| I2      | 11 | 12 | I1 / R1 |
| I4      | 13 | 14 | I3      |
| I6      | 15 | 16 | I5      |
| 0V_IN   | 17 | 18 | I7      |
| O8      | 19 | 20 | O9      |
| O10     | 21 | 22 | O11     |
| O12     | 23 | 24 | O13     |
| 0V_OP   | 25 | 26 | 24V_OP  |

I/O connector pin functions

| Pin | Signal  |                                   |
|-----|---------|-----------------------------------|
|     | Name    | Function                          |
| 1   | A+      | Encoder phase A+ (input / output) |
| 2   | A-      | Encoder phase A- (input / output) |
| 3   | B+      | Encoder phase B+ (input / output) |
| 4   | B-      | Encoder phase B- (input / output) |
| 5   | Z+      | Encoder phase Z+ (input / output) |
| 6   | Z-      | Encoder phase Z- (input / output) |
| 7   | 0V_ENC  | Encoder 0V common                 |
| 8   | 5V_ENC  | Encoder 5 V power supply output   |
| 9   | I0 / R0 | (Registration) Input 0            |
| 10  | FG      | Frame ground                      |
| 11  | I2      | Input 2                           |
| 12  | I1 / R1 | (Registration) Input 1            |
| 13  | I4      | Input 4                           |
| 14  | I3      | Input 3                           |
| 15  | I6      | Input 6                           |
| 16  | I5      | Input 5                           |
| 17  | 0V_IN   | Inputs 0 V common                 |
| 18  | I7      | Input 7                           |
| 19  | O8      | Output 8                          |
| 20  | O9      | Output 9                          |
| 21  | O10     | Output 10                         |
| 22  | O11     | Output 11                         |
| 23  | O12     | Output 12                         |
| 24  | O13     | Output 13                         |
| 25  | 0V_OP   | Outputs 0 V common                |
| 26  | 24V_OP  | Outputs 24 V power supply input   |

# Power connector

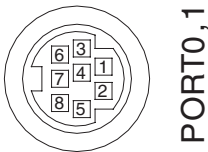
The power connector is used to connect the 24 V power supply to the controller unit



| Pin | Name  | Function          |
|-----|-------|-------------------|
| 1   | +24 V | Power supply 24 V |
| 2   | 0 V   | Power supply 0 V  |
| 3   | FG    | Frame ground      |

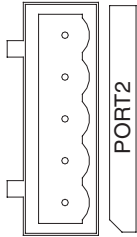
# RS-232C connections (port 0 and port 1)

The controller unit has two serial RS-232C ports for communication with external devices.



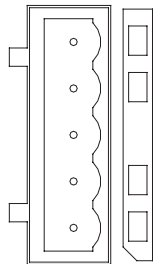
| Pin | Symbol | Name            | Port | Direction |
|-----|--------|-----------------|------|-----------|
| 1   | -      | Not used        | -    |           |
| 2   | RS-1   | Request to send | 1    | Output    |
| 3   | SD-0   | Send data       | 0    | Output    |
| 4   | SG-0   | Signal ground   | 0    | -         |
| 5   | RD-0   | Receive data    | 0    | Input     |
| 6   | SD-1   | Send data       | 1    | Output    |
| 7   | SG-1   | Signal ground   | 1    | -         |
| 8   | RD-1   | Receive data    | 1    | Input     |

# RS-422A/485 connections (R88A-MCW151-E only)



| Pin | Symbol | Name             | Port | Direction |
|-----|--------|------------------|------|-----------|
| 1   | RD-    | Receive data (-) | 2    | Input     |
| 2   | RD+    | Receive data (+) | 2    | Input     |
| 3   | FG     | Frame ground     | 2    | -         |
| 4   | SD-    | Send data (-)    | 2    | Output    |
| 5   | SD+    | Send data (+)    | 2    | Output    |

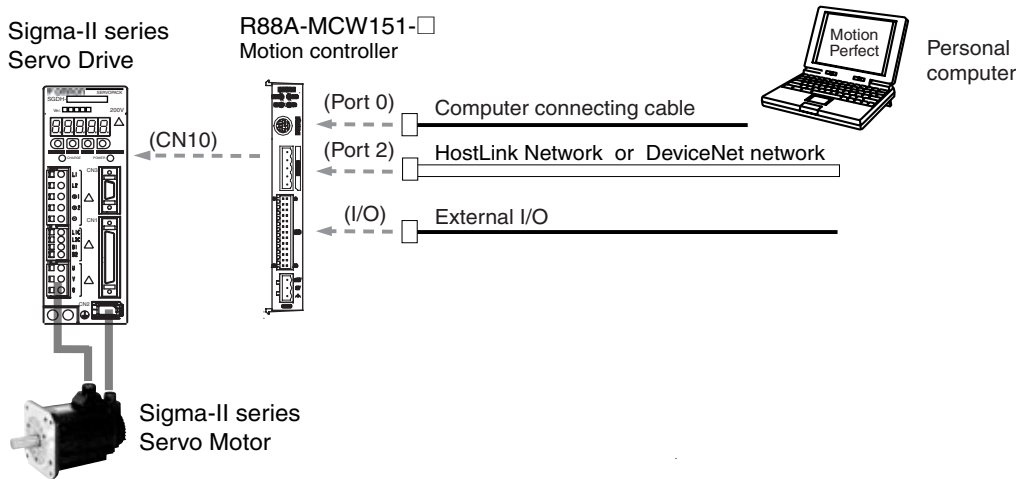
# DeviceNet connections (R88A-MCW151-DRT-E only)



| Pin | Symbol | Signal                       | Color of cable |
|-----|--------|------------------------------|----------------|
| 1   | V+     | Power line, positive voltage | Red            |
| 2   | CAN-H  | Communications line, high    | White          |
| 3   | Shield | Shield                       | -              |
| 4   | CAN-L  | Communications line, low     | Blue           |
| 5   | V-     | Power line, negative voltage | Black          |

Ordering information

System configuration



Motion controller unit

| Name                                                         | Model             |
|--------------------------------------------------------------|-------------------|
| 1.5 axis advanced motion controller with Host Link interface | R88A-MCW151-E     |
| 1.5 axis advanced motion controller with DeviceNet interface | R88A-MCW151-DRT-E |

PROFIBUS connectivity

| Name                                                              | Model      |
|-------------------------------------------------------------------|------------|
| PROFIBUS-DP module interface for R88A-MCW151-E motion controllers | PRT1-SCU11 |

Serial cables (for port 0, 1)

| Name                                                                                                                                                | Model           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Programing cable, 2 m. (Port 0)                                                                                                                     | R88A-CCM002P4-E |
| Splitter cable, 1 m (Port 0 & 1). Combined with R88A-CCM002P4-E cable allows using motion perfect and a general purpose application.(e.g. terminal) | R88A-CCM001P5-E |

Connectors

| Specification                          | Model                         |
|----------------------------------------|-------------------------------|
| I/O connector (Included in package)    | B2L 3.5/26 SN SW (Weidmüller) |
| Power connector (Included in package)  | MSTB 2.5/3-ST-5.08 (Phoenix)  |
| Port 2 connector (Included in package) | MSTB 2.5/5-ST-5.08 (Phoenix)  |

**Note:** For a complete view of DeviceNet network accessories, refer to automation systems catalogue or contact your OMRON representative.

Computer software

| Specifications | Model           |
|----------------|-----------------|
| Motion perfect | MOTION TOOLS CD |
| EDS file       |                 |

Servo system

**Note:** Refer to the servo systems section for more information

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

JUSP-NS300

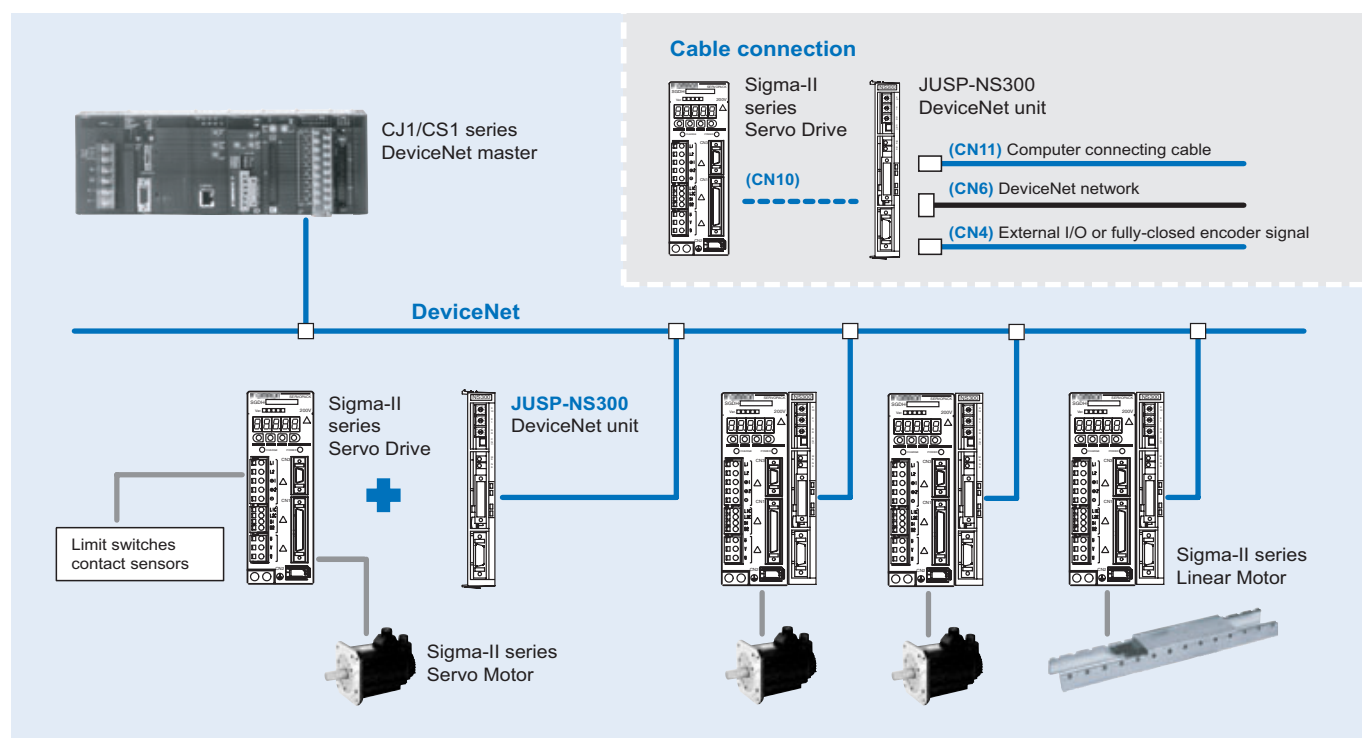
# DeviceNet unit

## DeviceNet connectivity with positioning functionality.

- Connects directly to the Sigma-II series drive
- Simplifies distributed control and information management
- No programming languages are required.
- Various positioning functions including point-to-point mode (with multi-step speed positioning available) and station number mode (indexing function)
- All parameters are set and maintained by a PLC or PC.
- Up to 63 servos can be connected to the DeviceNet network
- Supports polling I/O and explicit messages



## System configuration





## Specifications

### JUSP-NS300 - DeviceNet interface unit

| Item                       |                                               | Details                                                                                                           |
|----------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Type                       |                                               | JUSP-NS300                                                                                                        |
| Applicable servo drive     |                                               | All SGDh-□□□E models                                                                                              |
| 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                             | 1.3 W                                                                                                             |
| DeviceNet communications   | Baud rate setting                             | Select from 125 kbps, 250 kbps, or 500 kbps using a rotary switch.                                                |
|                            | Node address setting                          | Select the address from 0 to 63 using the rotary switches.                                                        |
| Command format             | Operation specifications                      | Positioning using DeviceNet communications.                                                                       |
|                            | Reference input                               | DeviceNet communications<br>Commands: motion commands (position, speed), and parameter read/write                 |
| Position control functions | Acceleration/deceleration method              | Linear first/second-step, asymmetric, exponential, S-curve                                                        |
|                            | Fully-closed control                          | Possible                                                                                                          |
| Input signals              | Fixed allocation to servo drive CN1 connector | Forward/reverse run prohibited, zero point return deceleration LS, zero point signal, external positioning signal |
|                            | NS300 unit                                    | Emergency stop signal                                                                                             |
| Output signals             | Servo drive CN1 connector*                    | Servo alarm, brake interlock, servo ready, positioning completion                                                 |
|                            | NS300 unit                                    | P1, P2 (area signals)                                                                                             |
| Internal functions         | Position data latch function                  | Position data latching is possible using phase C, zero point signals, and external signals.                       |
|                            | Protection                                    | Parameters damage, parameter setting errors, communications errors, etc.                                          |
|                            | LED indicators                                | MS: Module status<br>NS: Network status                                                                           |

**Note:** \*The allocation of the output signals for brake interlock, servo ready, or positioning completion can be changed using parameter settings.

### Transmission specifications

| Item                      | Specifications                          |                     |               |                     |
|---------------------------|-----------------------------------------|---------------------|---------------|---------------------|
| Communication format      | Multi-drop, T-branch (1:N)              |                     |               |                     |
| Transmission speed (kbps) | 500, 250, 125 kbps                      |                     |               |                     |
| Transmission media        | 5-wire cables                           |                     |               |                     |
| Transmission distance     | Speed                                   | Max. network length | Branch length | Total branch length |
|                           | 500 kbps                                | 100 m or less       | 6 m or less   | 39 m or less        |
|                           | 250 kbps                                | 250 m or less       |               | 78 m or less        |
|                           | 125 kbps                                | 500 m or less       |               | 156 m or less       |
| Number of nodes           | Up to 64 units                          |                     |               |                     |
| Error control             | SRS error, node address double checking |                     |               |                     |

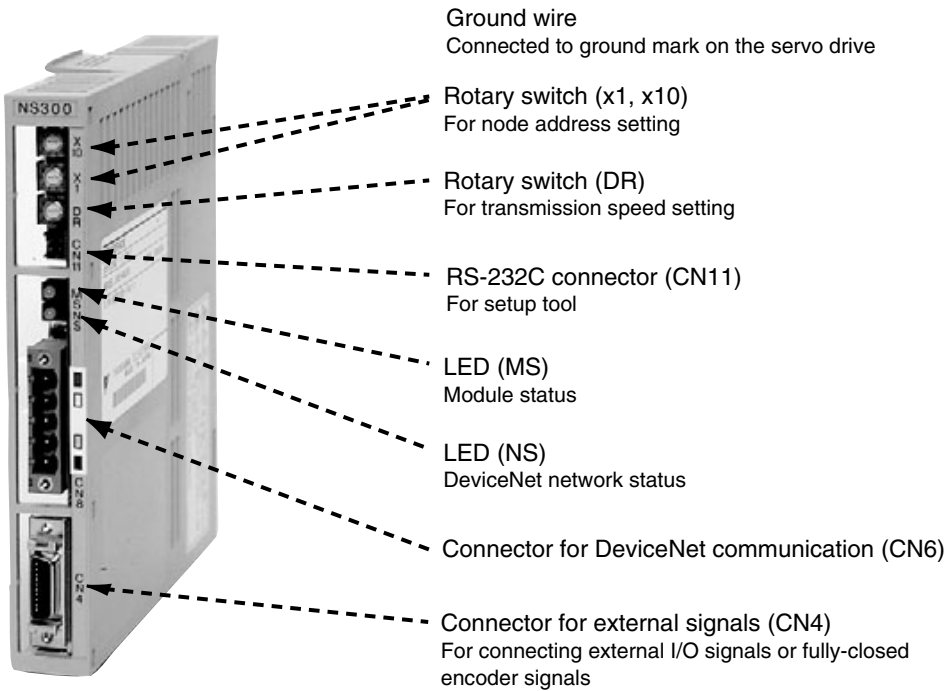
### Cable

| Item                   | Cable                   |                     |
|------------------------|-------------------------|---------------------|
|                        | Thick                   | Thin                |
| Loss of signal         | Little                  | Much                |
| Transmission distance  | Long                    | Short               |
| Advantage/disadvantage | Hard (not easy to bend) | Soft (easy to bend) |

The maximum network lengths differ in accordance with the cable type as shown below.

| Transmission speed (kbps) | Max. network length (m) |            |
|---------------------------|-------------------------|------------|
|                           | Thick cable             | Thin cable |
| 500                       | 100                     | 100        |
| 250                       | 250                     | 100        |
| 125                       | 500                     | 100        |

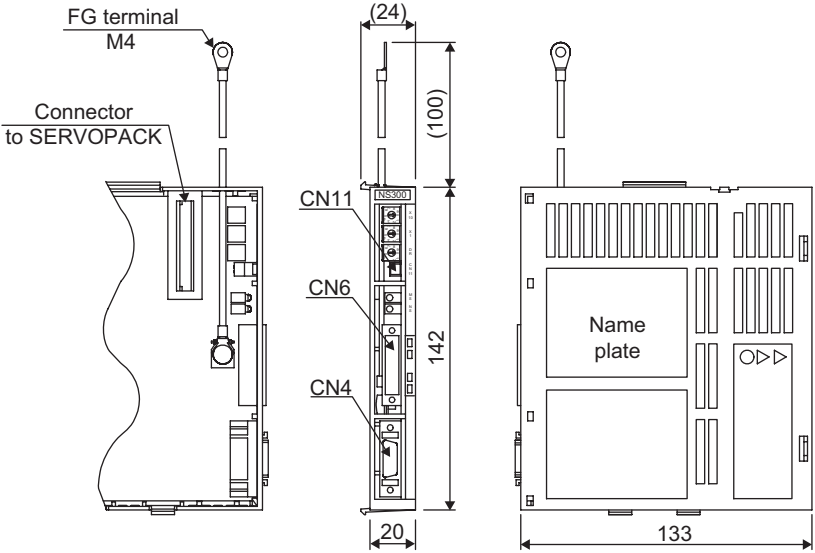
# Nomenclature



# Dimensions

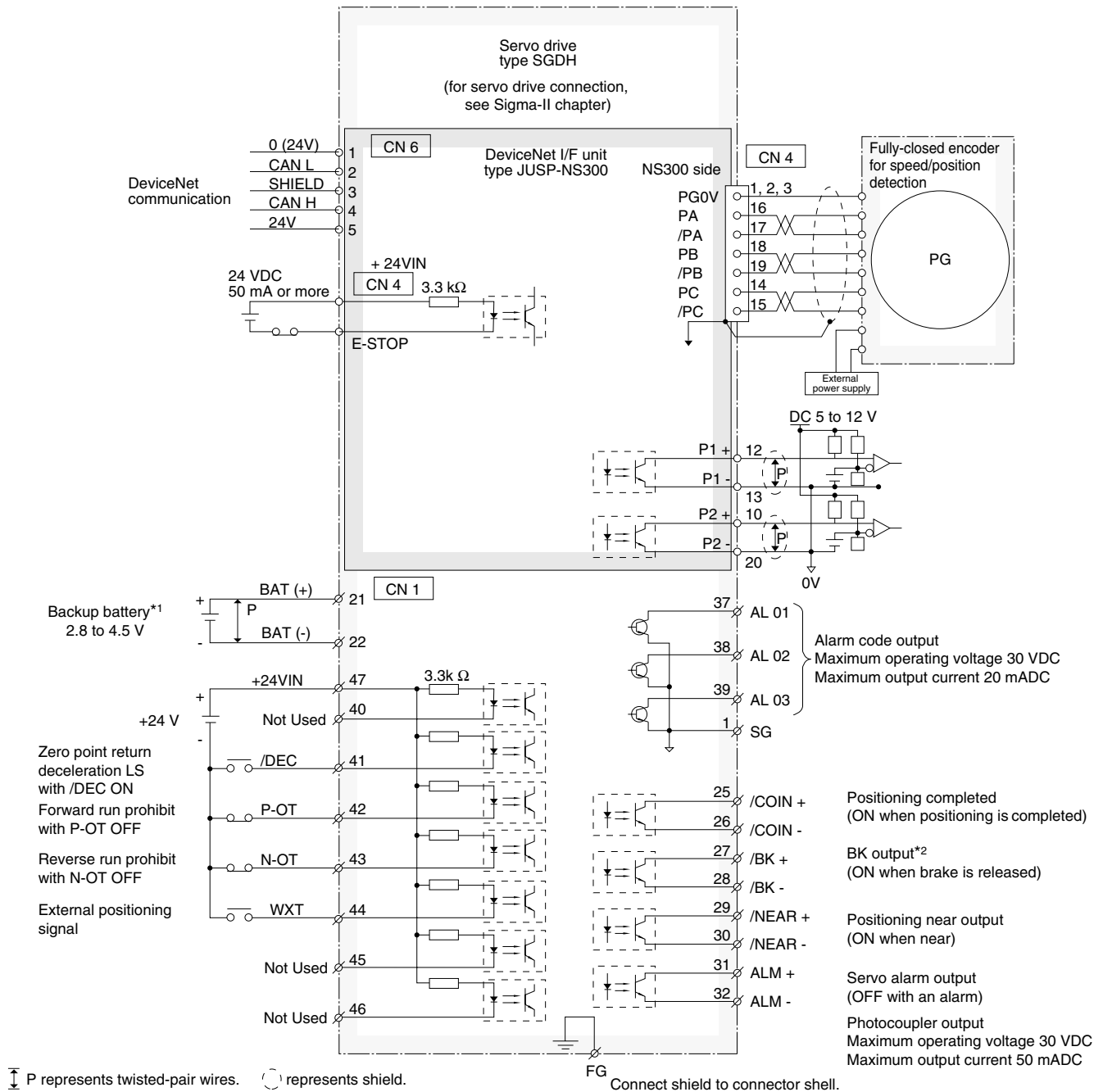
## JUSP-NS300 - DeviceNet interface unit

Units: mm      Approx. weight: 0.2 kg



## Installation

### Standard connections



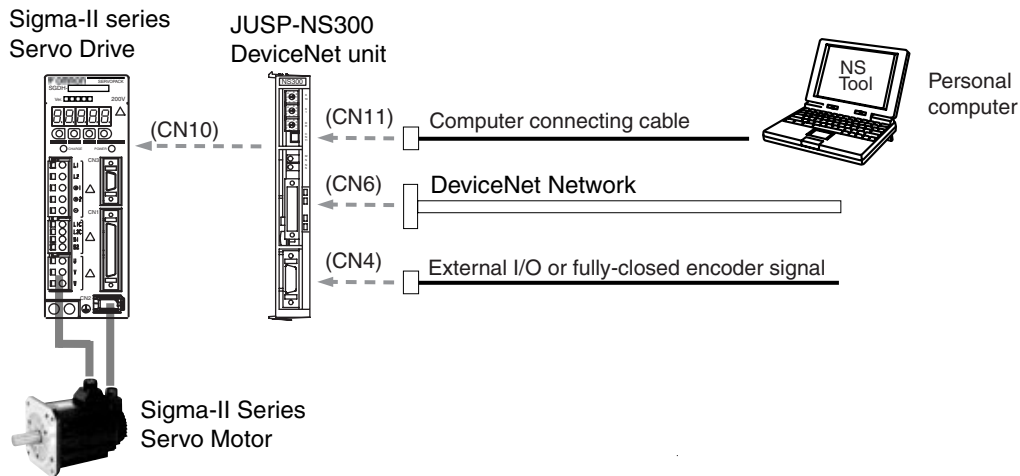
\*1 Connect when using an absolute encoder and when the battery is not connected to CN8.

\*2 Set the signal assignment with the user constants.

**Note:** Connect the ground cable of the field bus I/F unit to the ground connector of the servo drive.

## Ordering information

### System configuration



### DeviceNet interface unit

| Name                                                                   | Model      |
|------------------------------------------------------------------------|------------|
| DeviceNet interface unit with point-to-point positioning functionality | JUSP-NS300 |

### Serial cable (for CN11)

| Name                      | Model            |
|---------------------------|------------------|
| Computer connecting cable | 2m R88A-CCW002P4 |

### Connectors

| Name                                                                                   | Model                    |
|----------------------------------------------------------------------------------------|--------------------------|
| Connector for CN4. For connecting external I/O signals or fully-closed encoder signals | R88A-CNU01R or DE9406973 |
| Connector for CN6. DeviceNet connector with retaining screws                           | XW4B-05C1-H1-D           |
| Connector for CN6. DeviceNet multi-branching Connector with retaining screws           | XW4B-05C4-TF-D           |
| Connector for CN6. DeviceNet multi-branching Connector (without retaining screws)      | XW4B-05C4-T-D            |

**Note:** For a complete view of DeviceNet network accessories, refer to automation systems catalogue or contact your OMRON representative.

### Computer software

| Name     | Model           |
|----------|-----------------|
| NS tool  | MOTION TOOLS CD |
| ESD file |                 |

### Servo system

**Note:** Refer to the servo systems section for more information

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

JUSP-NS500

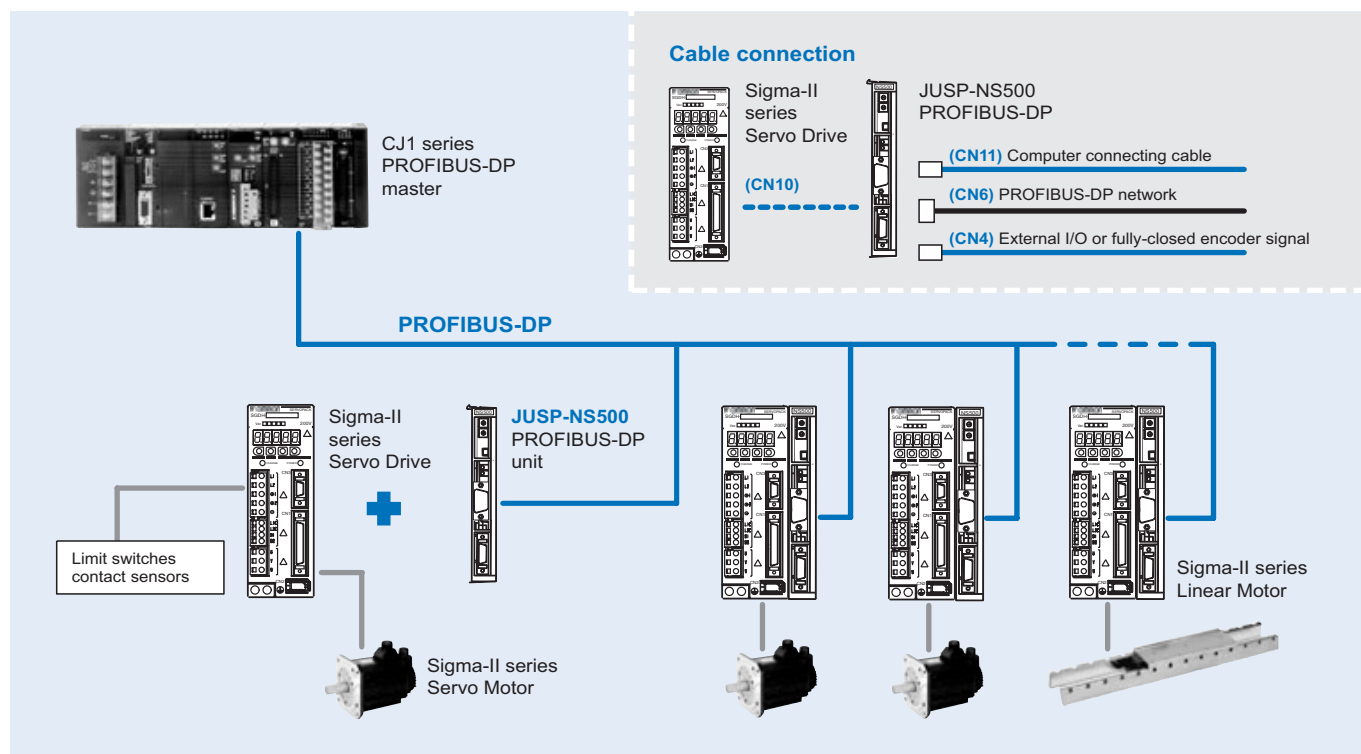
# PROFIBUS-DP unit

## PROFIBUS-DP connectivity with positioning functionality.

- Connects directly to the Sigma-II series drive
- Simplifies distributed control and information management
- No programming languages are required.
- Various positioning functions including point-to-point mode (with multi-step speed positioning available) and station number mode (indexing function)
- All parameters are set and maintained by a PLC or PC.
- Up to 126 servos can be connected to the PROFIBUS-DP network



## System configuration



## Specifications

### JUSP-NS500 - PROFIBUS-DP interface unit

| Item                       |                                             | Details                                                                                                           |
|----------------------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Type                       |                                             | JUSP-NS500                                                                                                        |
| Applicable servo drive     |                                             | All SGDh-□□□E models                                                                                              |
| 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                           | 1.3 W                                                                                                             |
| PROFIBUS-DP communications | Baud rate setting                           | The baud rate is automatically set by the master between 9.6 kbps and 12 Mbps.                                    |
|                            | Station address setting                     | Select the address from 0 to 7D (0 to 125) using the rotary switches.                                             |
| Command format             | Operation specifications                    | Positioning using PROFIBUS-DP communications                                                                      |
|                            | Reference input                             | PROFIBUS-DP communications<br>Commands: motion commands (position, speed), parameter read/write                   |
| Position control functions | Acceleration/deceleration method            | Linear first/second-step, asymmetric, exponential, S-curve                                                        |
|                            | Fully-closed control                        | Possible                                                                                                          |
| Input signals              | Fixed allocation to SERVOPACK CN1 connector | Forward/reverse run prohibited, zero point return deceleration LS, zero point signal, external positioning signal |
|                            | NS500 unit                                  | Emergency stop signal                                                                                             |
| Output signals             | Servo drive CN1 connector*                  | Servo alarm, brake interlock, servo ready, positioning completion                                                 |
|                            | NS500 unit                                  | P1, P2 (area signals)                                                                                             |
| Internal functions         | Position data latch function                | Position data latching is possible using phase C, zero point signals, and external signals.                       |
|                            | Protection                                  | Parameters damage, parameter setting errors, communications errors, etc.                                          |
|                            | LED indicators                              | ERR: Module error<br>COMM: Communications status                                                                  |

**Note:** \*The allocation of the output signals for brake interlock, servo ready, or positioning completion can be changed using parameter settings.

### Transmission specifications

| Item                      | Specifications                                                |      |       |       |     |      |       |
|---------------------------|---------------------------------------------------------------|------|-------|-------|-----|------|-------|
| Communication format      | Conforms to PROFIBUS-DP                                       |      |       |       |     |      |       |
| Transmission speed (kbps) | 9.6                                                           | 19.2 | 93.75 | 187.5 | 500 | 1500 | 12000 |
| Transmission distance (m) | 1200                                                          |      |       | 1000  | 400 | 200  | 100   |
| Transmission media        | STP cable                                                     |      |       |       |     |      |       |
| Number of stations        | 32 stations (can be extended to 126 stations using repeater.) |      |       |       |     |      |       |

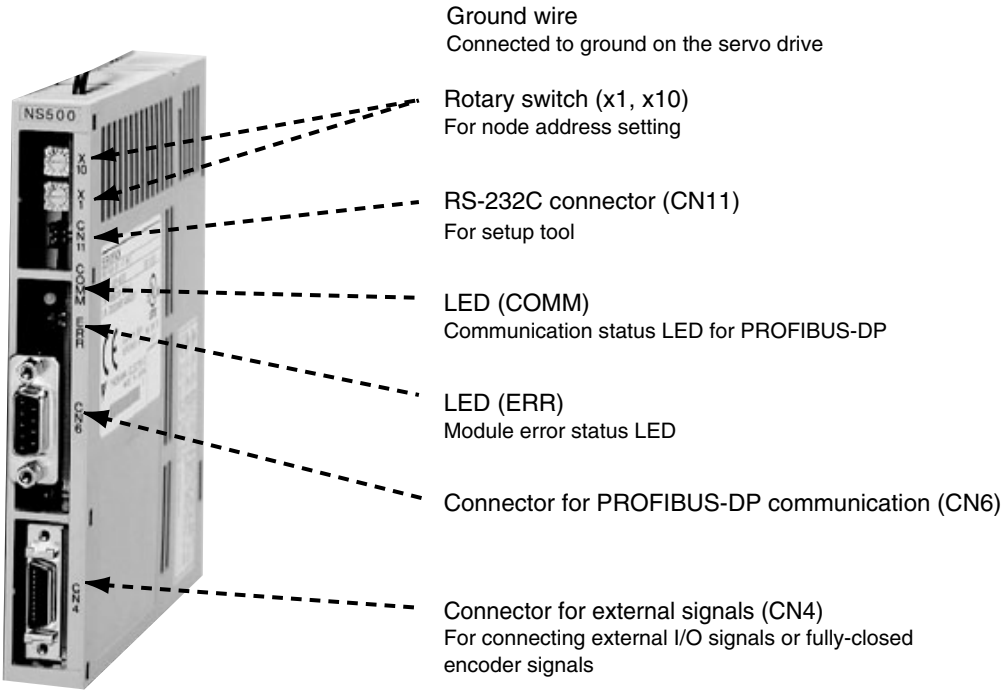
### Cable

| Item                 | Specifications                                 |
|----------------------|------------------------------------------------|
| Cable type impedance | Shielded twisted-pair wire type A 135 to 165 Ω |
| Capacity             | < 30 pF/m                                      |
| Loop resistance      | 110 Ω/km                                       |
| Wire gage            | 0.64 mm                                        |
| Conductor area       | > 0.34 mm <sup>2</sup>                         |

### Connector

9-pin D-sub connectors are used.

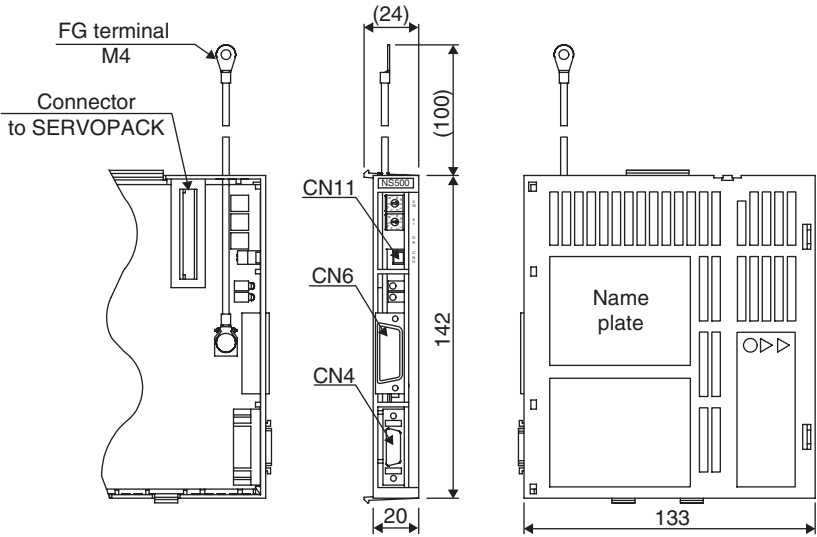
# Nomenclature



# Dimensions

## JUSP-NS500 - PROFIBUS-DP interface unit

Units: mm      Approx. weight: 0.2 kg





**Wiring Diagram for PROFIBUS-DP I/F Unit Type JUSP-NS500**

**Power Supply:**

- 24 VDC 50mA or more:** Connected to **PN 4** (+24VIN) and **PN 5** (E-STOP).
- Backup battery\*1 (2.8 to 4.5 V):** Connected to **PN 21** (BAT +) and **PN 22** (BAT -).
- +24 V:** Connected to **PN 47** (+24VIN) and **PN 40** (Not Used).

**Communication:**

- PROFIBUS-DP communication:** Connected to **PN 3** (PXD/TXD-P), **PN 8** (PXD/TXD-N), **PN 6** (VP), and **PN 5** (DGND).

**Control Signals:**

- Zero point return deceleration LS with /DEC ON:** Connected to **PN 41** (/DEC).
- Forward run prohibit with P-OT OFF:** Connected to **PN 42** (P-OT).
- Reverse run prohibit with N-OT OFF:** Connected to **PN 43** (N-OT).
- External positioning signal:** Connected to **PN 44** (WXT).
- Not Used:** **PN 45** and **PN 46**.

**Alarm and Positioning Signals:**

- Alarm code output:** **PN 37** (AL 01), **PN 38** (AL 02), **PN 39** (AL 03), and **PN 1** (SG).
- Positioning completed (ON when positioning is completed):** **PN 25** (/COIN +) and **PN 26** (/COIN -).
- BK output\*2 (ON when brake is released):** **PN 27** (/BK +) and **PN 28** (/BK -).
- Positioning near output (ON when near):** **PN 29** (/NEAR +) and **PN 30** (/NEAR -).
- Servo alarm output (OFF with an alarm):** **PN 31** (ALM +) and **PN 32** (ALM -).

**Other Connections:**

- PG0V, PA, /PA, PB, /PB, PC, /PC:** Connected to **PN 1, 2, 3** and **PN 16, 17, 18, 19, 14, 15**.
- DC 5 to 12 V:** Connected to **PN 12** (P1 +), **PN 13** (P1 -), **PN 10** (P2 +), and **PN 20** (P2 -).
- 0V:** Connected to **PN 13** and **PN 20**.
- Connect shield to connector shell:** **FG**.

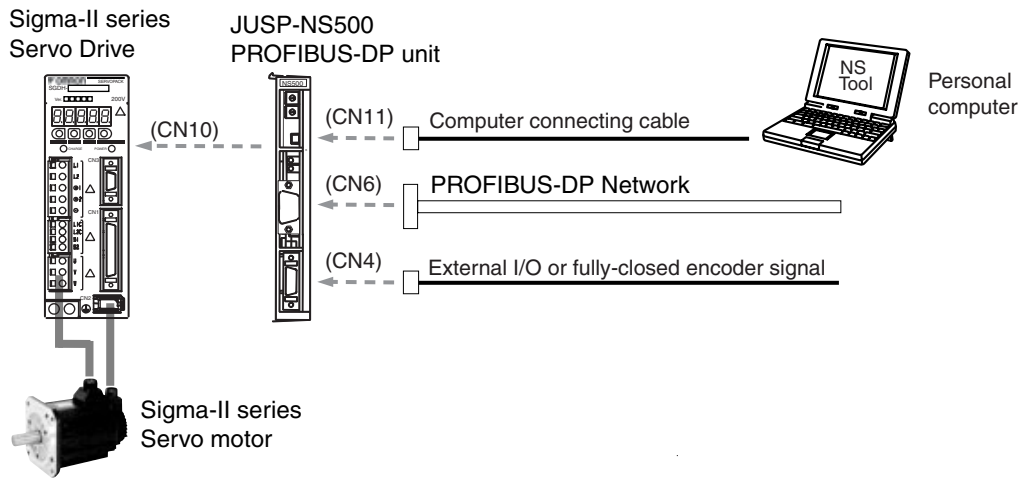
**Notes:**

- \*1 Connect when using an absolute encoder and when the battery is not connected to CN8.
- \*2 Set the signal assignment with the user constants.

**Note:** Connect the ground cable of the field bus I/F unit to the ground connector of the servo drive.

Ordering information

System configuration



PROFIBUS-DP interface unit

| Name                                                                     | Model      |
|--------------------------------------------------------------------------|------------|
| PROFIBUS_DP interface unit with point-to-point positioning functionality | JUSP-NS500 |

Serial cable (for CN11)

| Name                      | Model             |
|---------------------------|-------------------|
| Computer connecting cable | 2 m R88A-CCW002P4 |

Connectors

| Name                                                                                   | Model                    |
|----------------------------------------------------------------------------------------|--------------------------|
| Connector for CN4. For connecting external I/O signals or fully-closed encoder signals | R88A-CNU01R or DE9406973 |

Computer software

| Name     | Model           |
|----------|-----------------|
| NS tool  | MOTION TOOLS CD |
| GSD file |                 |

Servo system

**Note:** Refer to the servo systems section for more information

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

JUSP-NS600

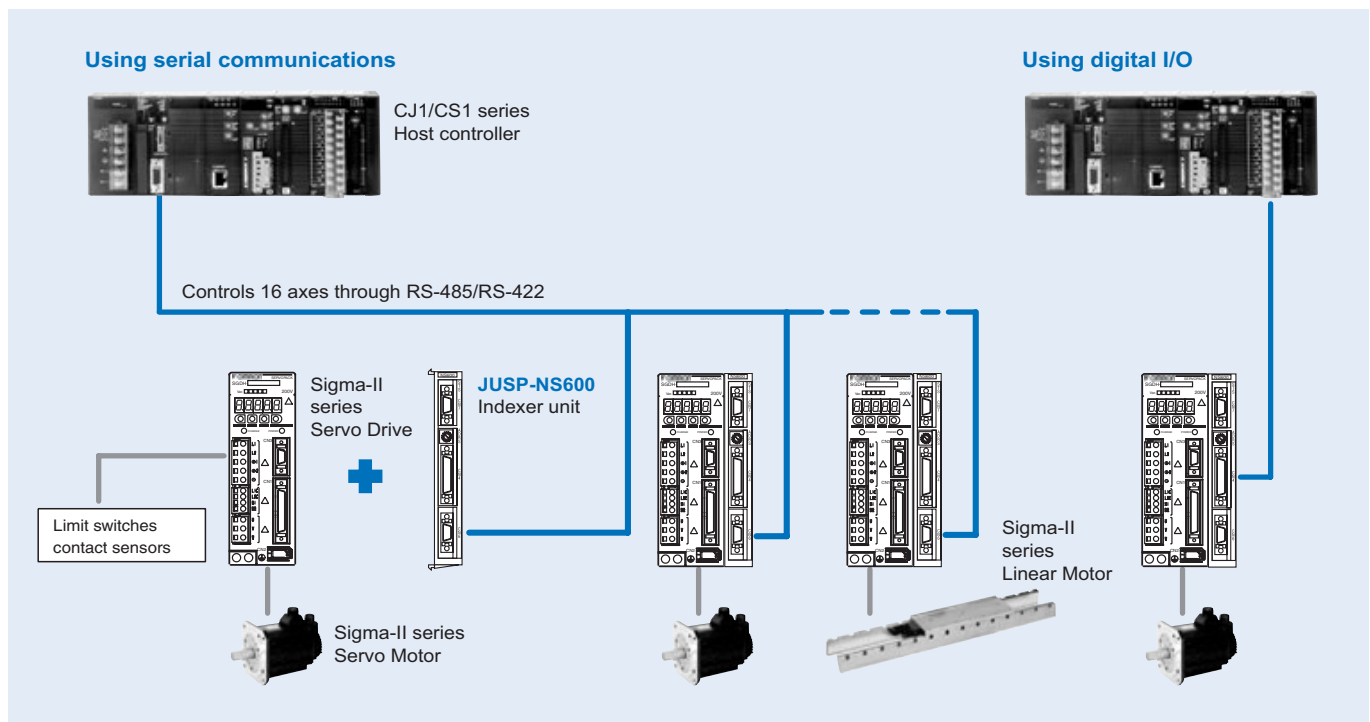
# Indexer unit

## Smart and simple positioning solution.

- No programming languages are required. Connects directly to the Sigma-II series drive
- Allows serial network control and discrete I/O control
- Servo axis set-up, actuation and monitoring
- 128 indexing programmed moves
- Refined methods and functions for smart control like program tables or position and speed tables
- Up to 16 servos can be connected via serial network
- With SigmaWin+ the system can be easily configured



## System configuration

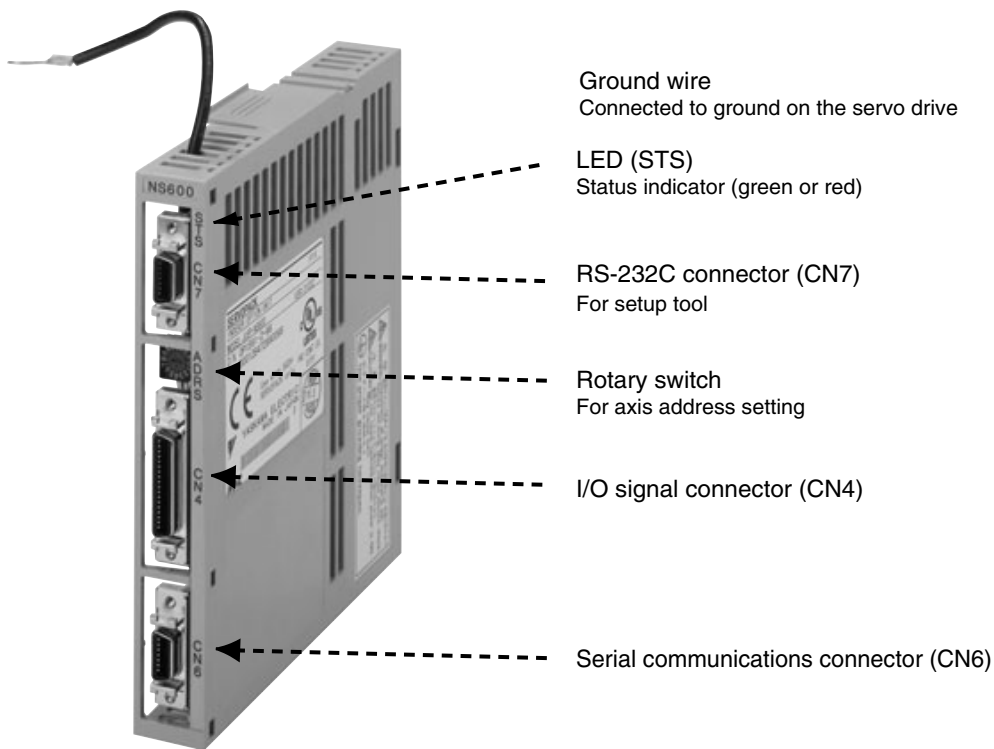


## Specifications

### JUSP-NS600 - indexer unit

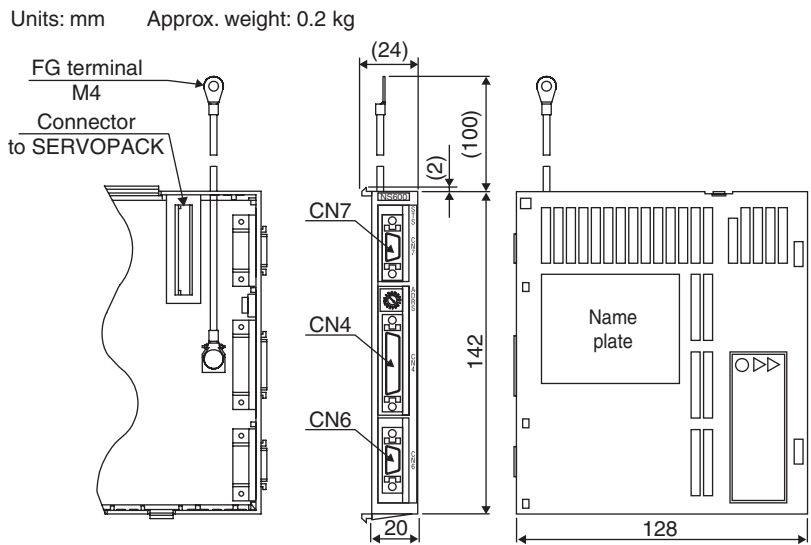
| Item                   |                       |                | Details                                                                                                                                                                                                                                                                                                          |
|------------------------|-----------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                   |                       |                | JUSP-NS600                                                                                                                                                                                                                                                                                                       |
| Applicable servo drive |                       |                | All SGDH-□□□□E SERVOPACKs                                                                                                                                                                                                                                                                                        |
| 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     |                | 2.6 W                                                                                                                                                                                                                                                                                                            |
| Control specifications | Program table         |                | Program table positioning by designating the starting step by the contact input (maximum 128 steps)                                                                                                                                                                                                              |
|                        | Serial communications |                | Serial commands in ASCII codes<br>Communications specifications: RS422 / RS485 (maximum 50 m (164.0 ft))<br>RS232C (maximum 3 m (9.84 ft))<br>Connection: Multi-drop method (maximum 16 axes)<br>Baud rate: 9600, 19200, 38400bps                                                                                |
|                        | Command table         |                | Positioning by designating the command table by the contact input (maximum 128 points)                                                                                                                                                                                                                           |
|                        | Zero-point return     |                | 3 types                                                                                                                                                                                                                                                                                                          |
| Other functions        |                       |                | External positioning, JOG speed table operation (maximum 16 speeds)                                                                                                                                                                                                                                              |
| I/O signals            | Input                 | Servo drive    | S-ON (Servo ON)<br>P-OT (forward run prohibited), N-OT (reverse run prohibited)<br>DEC (zero-point return deceleration LS)<br>RTRG (external positioning signal)                                                                                                                                                 |
|                        |                       | INDEXER module | MODE0/1 (mode signal)<br>START/HOME (start signal / zero-point return execution)<br>PGMRES/JOGP (program reset / motor forward rotation)<br>SEL0/JOGN (program starting step designation / motor reverse rotation)<br>SEL1 to SEL4 / JOG0 to JOG3 (program starting table selection / JOG speed table selection) |
|                        | Output                | Servo drive    | ALM (servo alarm)<br>WARN (warning)<br>BK (brake interlock)<br>S-RDY (servo ready)<br>ALO1, ALO2, ALO3 (alarm codes)                                                                                                                                                                                             |
|                        |                       | INDEXER module | INPOSITION (positioning completed)<br>POUT0 to POUT4 (programmable outputs)                                                                                                                                                                                                                                      |

Nomenclature



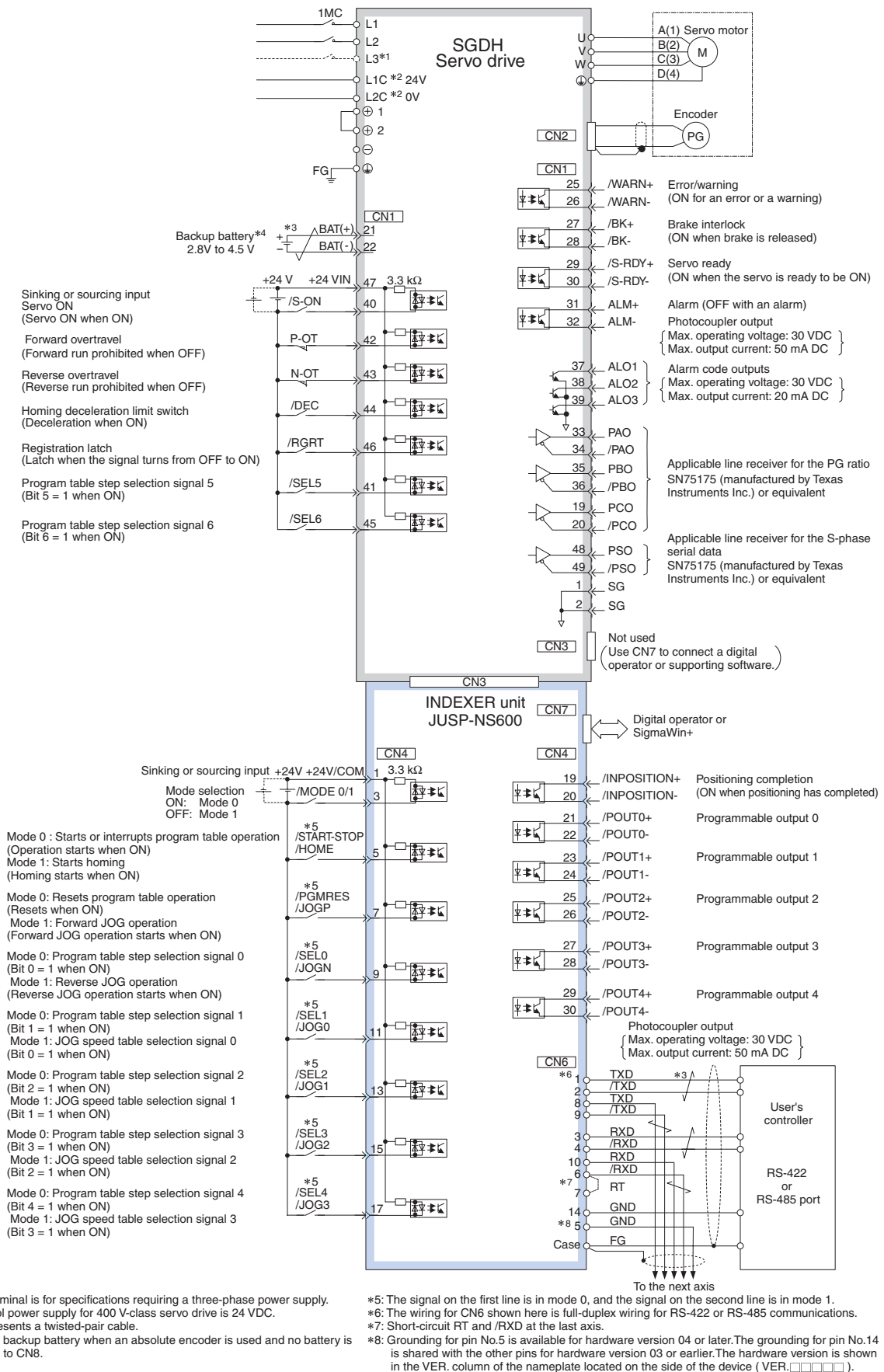
Dimensions

JUSP-NS600 - indexer unit



# Installation

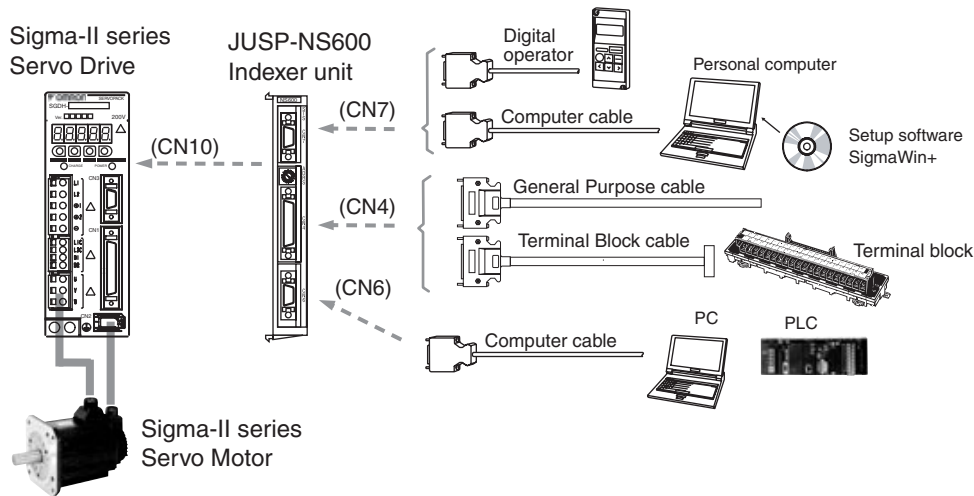
## Standard connections



**Note:** Connect the ground cable of indexer unit to the ground connector of the servo drive.

## Ordering information

### System configuration



### Indexer option unit

| Name                                               | Model      |
|----------------------------------------------------|------------|
| Indexer unit. Versatile point-to-point positioning | JUSP-NS600 |

### Serial options (for CN7)

| Name                          | Model                           |
|-------------------------------|---------------------------------|
| Computer connecting cable     | 2 m R88A-CCW002P2 or JZSP-CMS02 |
| Parameter unit with 1 m cable | 2 m JUSP-OP02A-2 or R88A-PR02W  |

### Control cables (for CN4)

| Name                                      | Model            |
|-------------------------------------------|------------------|
| Relay terminal block                      | XW2B-40F5-P      |
| Relay terminal block cables               | 1 m R88A-CTU001N |
|                                           | 2 m R88A-CTU002N |
| General purpose I/O cable (with open end) | 1 m FND-CCX001S  |
|                                           | 2 m FND-CCX002S  |

### Serial cables (for CN6)

| Name                      | Model                           |
|---------------------------|---------------------------------|
| Computer connecting cable | 2 m R88A-CCW002P2 or JZSP-CMS02 |

### Connectors

| Specification             | Model       |
|---------------------------|-------------|
| Connector for CN4         | R88A-CNU01C |
| Connector for CN6 and CN7 | R7A-CNA01R  |

### Computer software

| Specifications | Model           |
|----------------|-----------------|
| SigmaWin+      | MOTION TOOLS CD |

### Servo system

**Note:** Refer to the servo systems section for more information.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.