

**OMRON**



## **Industrial Automation Guide 2006**

Industrial products & systems  
...for the best machines.

**realizing**



## Industrial Automation Guide 2006

**[www.omron-industrial.com](http://www.omron-industrial.com)**

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# Industrial Automation Guide 2006



## 50 years of innovation in industrial business

Welcome to Omron's world of advanced industrial automation.

The INDUSTRIAL AUTOMATION GUIDE is your essential tool to select best in class devices for your automation system. It highlights our core competences in sensing, control, visualisation, motion and panel components.

Of course Omron offers a much larger range of products that you can find in the attached CD-ROM. For more information on services and company competence please visit our web site at [www.omron-industrial.com](http://www.omron-industrial.com).

## Content

### Sensing

- 8 Photoelectric sensors
- 33 Rotary encoders
- 38 Inductive sensors
- 64 Fibre optic amplifiers
- 82 Displacement / measurement sensors
- 96 Vision sensors & systems

### Safety

- 108 Safety networks and units
- 118 Safety sensors
- 130 Safety components

### Switching components

- 148 Electromechanical relays
- 158 Solid state relays
- 166 Low voltage switch gears
- 180 Monitoring products
- 196 Limit switches
- 212 Pushbutton switches

### Control components

- 220 Temperature controllers
- 234 Power supplies
- 244 Timers
- 254 Counters
- 264 Programmable relays
- 268 Digital panel indicators

### Automation Systems

- 278 Programmable logical controllers (PLC)
- 302 Remote I/O
- 308 Human machine interface (HMI)

### Motion & Drives

- 314 Motion controllers
- 326 Servo systems
- 366 Inverters

### 401 Index

# Omron – a global corporation

...right on your doorstep



## Omron Corporation

Omron Industrial Automation is a leading manufacturer of technologically advanced industrial automation products and worldwide supplier of application expertise. It is part of the global Omron Corporation, which has been anticipating and filling social needs since 1933. With pioneering technology Omron has developed into a \$5 billion global manufacturing company in sensing and control.

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

## Omron Industrial Automation Europe

In Europe we have maintained a leading position in machine and industrial automation for over 30 years. Our infrastructure is designed to think globally while acting locally. From sales, application knowledge and support to R&D and customised production, we can support your needs wherever you are located, and through every step of your manufacturing process.

You'll find Omron's expertise in control systems, motion & drives, sensing, safety and control components.

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

## Application support

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



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



### ◀ European manufacturing

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



### ◀ Online support

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



### ◀ European Repair Centre

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



# Smart Platform

One software – One connection – One minute



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

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

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

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

- One software
- One connection
- One minute



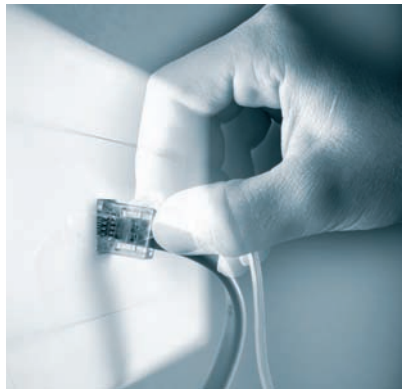
Easy programming and configuration with Omron's CX-One software.

For a demonstration and to order your 30 days' trial version for free please visit [www.smartplatform.info](http://www.smartplatform.info)



## One software

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



## One connection

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



## One minute

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

**... just create**

### Why Smart Platform?

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

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



# Product selection table

## Sensing

Page 8

Photoelectric sensors  
Rotary encoders  
Inductive sensors  
Fibre optic amplifiers  
Displacement / measurement sensors  
Vision sensors & systems



## Safety

Page 108

Safety networks and units  
Safety sensors  
Safety components



## Switching Components

Page 148

Electromechanical relays  
Solid state relays  
Low voltage switch gears  
Monitoring products  
Limit switches  
Pushbutton switches







## Control Components

Temperature controllers  
Power supplies  
Timers  
Counters  
Programmable relays  
Digital panel indicators

**Page 220**



## Automation Systems

Programmable logical controllers (PLC)  
Remote I/O  
Human machine **interface (HMI)**

**Page 278**



## Motion & Drives

Motion controllers  
Servo systems  
Inverters

**Page 314**

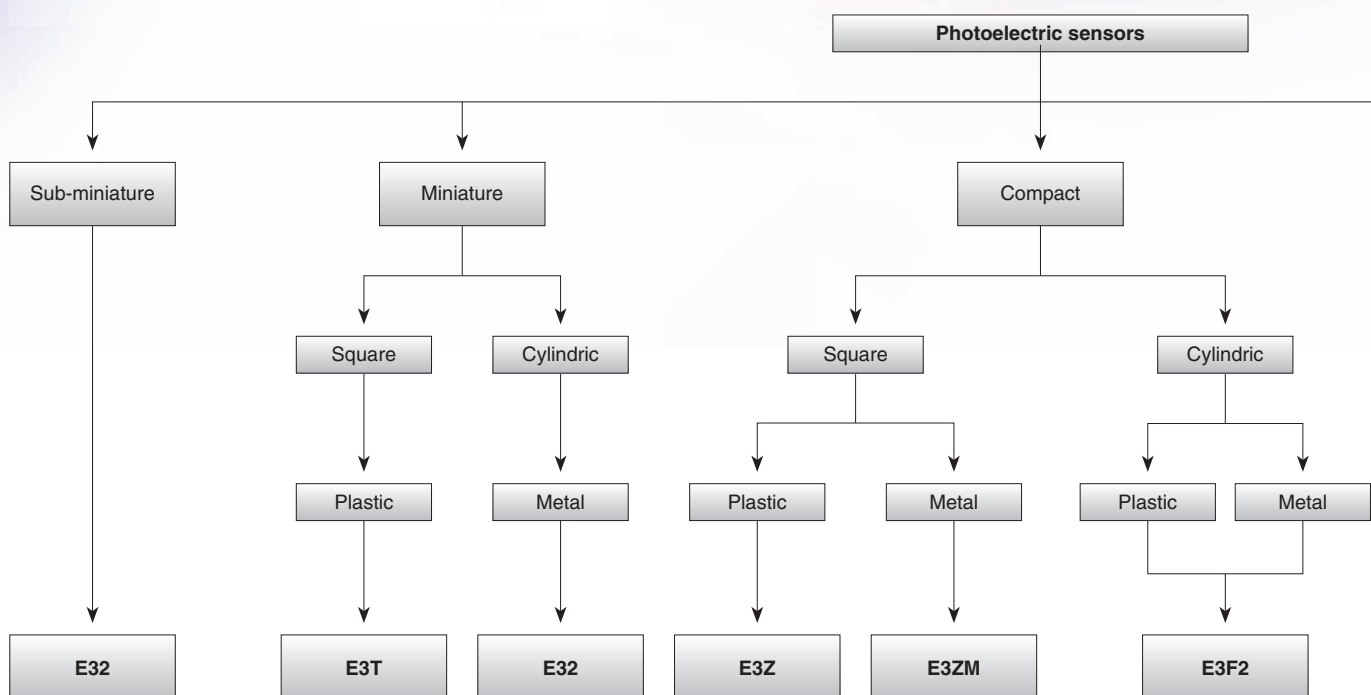
# Photoelectric sensors

## Reliability and accuracy confirmed by millions... every day

Omron invests heavily in intensive research and in new production technologies for photoelectric sensors. These continuous improvement processes ensure that the most popular photoelectric sensor family worldwide (E3Z) is also one of the most reliable with a return quota of less than 20 PPM.

### Modular platform – choose the performance you need

- Highest flexibility for your machine design
- The sensing performance for your application
- The housing design for your machine concept
- The housing material for your operation environment





## Tested reliability for demanding conditions

Omron's sensor design standards exceed legal requirements by far and are based on the application know how of our world wide customers to ensure reliable operation wherever your machines go.



- Highest water resistance



- Highest electromagnetic protection (e.g. from dialing mobile phones)



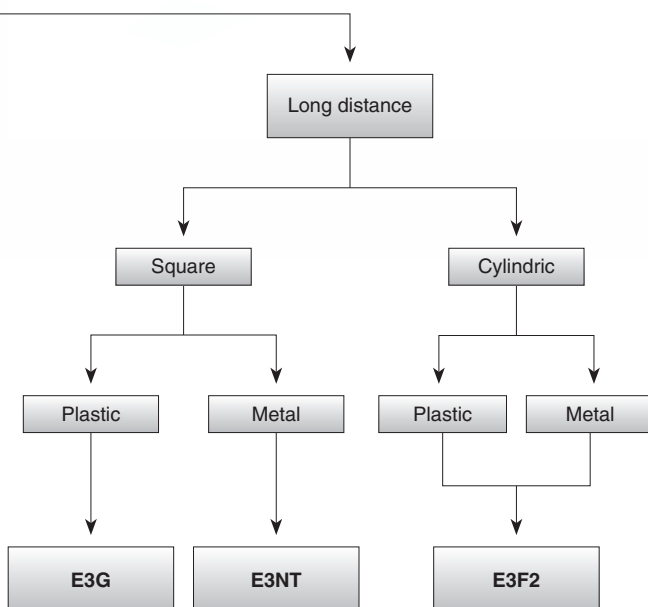
- Pulse synchronisation for reliable ambient light immunity



- Detergent and chemical resistant tested stainless steel and PTFE housings






## Table of contents




<b>Selection table</b>		10
<b>Miniature compact</b>	E3T	12
	E3Z	13
	E3S-C	15
	E3S-CL	16
	E3F2 standard	17
<b>Long distance</b>	E3G	18
	E3NT	19
	E3F2 long distance	20
<b>Bottle detection</b>	E3Z-B	21
	E3S-CR62/67	22
<b>Laser LED</b>	E3Z-Laser	23
<b>Preventive maintance</b>	E3Z-□G, E3Z-□J	24
<b>AC power supply</b>	E3F2-□Z	25
	E3G-M	26
	E3JK	27
<b>Mark sensor</b>	E3M-V	28
	E3S-G	29
<b>PCB detection</b>	E3S-LS3	30
<b>Precision positioning</b>	E3C-LDA	31
<b>Cylindrical 90° optics</b>	E3F2-□41	32










# Selection table






Format		Square				
						
Model		E3T	E3Z	E3ZM	E3S-C	E3G
Type		Miniature		Compact		Long distance
Material		PBT	PBT	SUS	Zinc, diecast	PBT
Max. sensing distance	Through-beam	1 m	30 m	15 m	30 m	
	Retroreflective	200 mm				
	Retroreflective polarizing		4 m	4 m	3 m	10 m
	Diffuse reflective (energetic)	30 mm	1 m	1 m	2 m	2 m
	Diffuse reflective (background suppression)		200 mm	150 mm	500 mm	1.2 m
LED	Infrared		■	■	■	■
	Red	■	■	■	■	■
Operation	Light-ON	■	■	■	■	■
	Dark-ON	■	■	■	■	■
	Selectable		■	■	■	■
Voltage	10 - 24 VDC	■	■	■		
	10 - 30 VDC				■	■
	24 - 240 VAC					■
IP	IP67	■	■	■	■	■
	IP69k		■	■		
Connection	PVC cable	■	■	■	■	■
	M8 connector	□	■	■		
	M12 connector	□	□	□	■	■
Page		12	13	Please contact your OMRON representative	15	18





Format		Square	Cylindrical	
				
Model		E3NT	E32-□C200	E3F2
Type		Long distance	Miniature	Compact
Material		Al die cast	Polyethylene	ABS, brass, SUS
Max. sensing distance	Through-beam		3 m	7 m
	Retroreflective			2 m
	Retroreflective polarizing	16 m		2 m
	Diffuse reflective (energetic)		150 mm	300 mm
	Diffuse reflective (background suppression)	3 m		100 mm
LED	Infrared	■		■
	Red	■	■	■
Operation	Light-ON	■	■	■
	Dark-ON	■	■	■
	Selectable	■		■
Voltage	10 - 24 VDC		■	
	10 - 30 VDC	■		■
	24 - 240 VAC			■
IP	IP67	■	■	■
	IP69k	■		■
Connection	PVC cable		■	■
	M8 connector		■	□
	M12 connector	■		■
Page		19	Please contact your OMRON representative	17

# Photoelectric sensors

## Special models

Application	Building installations	Doors and building installations		Filling and bottle conveying	
					
Model	E3F2-□Z	E3JK	E3G-M	E3S-CR62/67	E3Z-B
Type	Cylindrical AC voltage sensor	Compact AC&DC voltage sensor	Long distance AC&DC voltage sensor	Transparent bottle sensor	PET bottle sensor
Key features	24-240 VAC power supply voltage	12-240 VDC or 24-240 VAC power supply voltage		Special optical design for reliable detection of glass bottles compensating 'double-detection-effect'	Inner view optical system for PET bottle detection
BGS					
D	■	■	■		
R	■	■	■	■	■
T	■	■			
Page	25	27	26	22	21

Application	Mark detection on laminated objects	Mark detection on transparent objects	Precision positioning and counting	PCB detection	Object detection and sensor condition monitoring
					
Model	E3M-V	E3S-G	E3Z Laser	E3S-LS3	E3Z-□G, E3Z-□J
Type	Mark sensor	Mark sensor in forked housing	LASER sensor	Wide beam models	Preventive maintenance
Key features	Coaxial optical system for reliable mark detection	Forked shaped housing for simple installation	Visible LASER light	Wide beam for detection of structured objects (e.g. with holes)	'machine stop' or 'defect' alarm active sensor checking detection of dirt on lens
BGS			■		
D	■			■	
R			■		■
T		■	■		■
Page	28	29	23	30	24

Application	Conveying applications			High precision positioning
				
Model	E3Z-□H	F3C-AA	E3F2-□41	E3C-LDA
Type	Tampering protection	Conveyor sensor	Cylindrical sensors with 90° optics	High precision LASER sensor
Key features	Without adjuster to prevent misalignment	special housing shape fitting between conveyor segments	radial (90°) optics for simple installation and adjustment	up to 10 μm accuracy
BGS		■		
D	■		■	■
R	■		■	■
T	■			
Page	Please contact your OMRON representative		32	31

■ Standard

□ Available

□ No / not available



## Miniature size sensors in plastic housing

Small sized square photoelectric sensors with high performance pin-point LED for demanding mounting conditions.

- Ultra small size with high power pinpoint LED where space is crucial
- 3.5 mm thin flat shape or 7 mm wide side view shape
- IP67



## Ordering information

Sensor type	Shape	Connection method	Sensing distance	Output form	NPN output <sup>*1</sup>	PNP output
Through-beam	Side-view	Pre-wired	1 m (Red light)	Light ON	E3T-ST11	E3T-ST13 <sup>*2</sup>
				Dark ON	E3T-ST12	E3T-ST14 <sup>*2</sup>
	Flat		500 mm (Red light)	Light ON	E3T-FT11	E3T-FT13 <sup>*2</sup>
				Dark ON	E3T-FT12	E3T-FT14 <sup>*</sup>
Retroreflective	Side-view		200 mm (10 mm) <sup>*3</sup> (Red light)	Light ON	E3T-SR11	E3T-SR13 <sup>*2</sup>
				Dark ON	E3T-SR12	E3T-SR14 <sup>*2</sup>
Diffuse reflective	Flat		5 to 30 mm (Red light)	Light ON	E3T-FD11	E3T-FD13 <sup>*2</sup>
				Dark ON	E3T-FD12	E3T-FD14 <sup>*2</sup>
Limited reflective	Side-view		5 to 30 mm (Red light)	Light ON	E3T-SL21	E3T-SL23 <sup>*2</sup>
				Dark ON	E3T-SL22	E3T-SL24 <sup>*2</sup>

<sup>\*1</sup> The robot cable type is available. Its type ends with "R". (Example: E3T-ST11R)

<sup>\*2</sup> preferred stock item

<sup>\*3</sup> Values in parentheses indicate the minimum required distance between the sensor and the reflector.

## Specifications

Item	Through-beam				Retroreflective		Limited reflective		Diffuse reflective	
	Side-view		Flat		Side-view				Flat	
	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP	NPN	PNP
Light-ON	-ST11	-ST13	-FT11	-FT13	-SR11	-SR13	-SL21	-SL23	-FD11	-FD13
Dark-ON	-ST12	-ST14	-FT12	-FT14	-SR12	-SR14	-SL22	-SL24	-FD12	-FD14
Sensing distance	1 m (Sensitivity adjustment Unit is available)		500 mm		200 mm (10 mm) with the E39-R4		5 to 30 mm (50x50 mm white paper)		5 to 30 mm (50x50 mm white paper)	
Directional angle	Emitter: 3° to 10° Receiver: 3 to 70°		Emitter: 3° to 13° Receiver: 3 to 70°		Emitter: 2° to 5°		---			
Light source (wave length)	Red LED ("Pin-point" LED) (λ=650 nm)									
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.									24 VDC ±10%
Control output	Open collector, load current: 50 mA max. at 24 VDC, residual voltage: 1 V max., operation mode: Light ON or Dark ON (separate models)									
Protective circuits	Protection from reversed power supply connection and output short-circuit				Protection from reversed power supply connection, output short-circuit, and mutual interference					
Response time	1 ms max. each for operation and release									
Ambient temperature	Operating: -25 °C to 55 °C Storage: -40 °C to 70 °C (with no icing or condensation)									
Vibration resistance	Destruction: 10 to 2,000 Hz, 1.5 mm double amplitude or 300 m/s <sup>2</sup> (approx. 30 G) for 0.5 hrs each in X, Y, and Z directions									
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> (approx. 100 G) 3 times each in X, Y, and Z directions									
Degree of protection	IEC60529: IP67									
Connection method	Prewired (standard length: 2 m)									
Materials	Case: PBT Lens and cover: Polycarbonate									





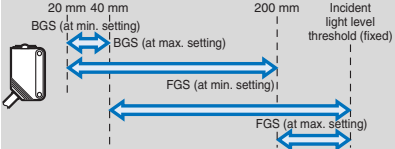
## General purpose sensors in compact plastic housing

Compact housing size and high-power LED for excellent performance-size ratio and best value-performance ratio for standard applications.

- Compact housing size and high power LED for excellent performance-size ratio
- IP67 and IP69k for highest protection in wet environment
- Intensive shielding for highest noise immunity (EMC)
- Tough PBT housing for high mechanical resistance

CE

### Ordering information

Sensor type	Connection method	Sensing distance	NPN output	PNP output
Through-beam	Pre-wired models (2 m) <sup>*1</sup>	30 m (Infrared light)	E3Z-T62	E3Z-T82
			E3Z-T62-60	E3Z-T82-60
	Connector type		E3Z-T67	E3Z-T87
			E3Z-T67-60	E3Z-T87-60
	Pre-wired models (2 m) <sup>*1</sup>	10 m (Red light)	E3Z-T61A	E3Z-T81A
			E3Z-T66A	E3Z-T86A
Connector type				
	Retroreflective model (with M.S.R. function)	Pre-wired (2 m) <sup>*1</sup>	4 m (100 mm) <sup>*2</sup> (Red light)	E3Z-R61
Connector type				E3Z-R66
Diffuse-reflective	Pre-wired models (2 m) <sup>*1, *3</sup>	1 m (Infrared light)	E3Z-D62	E3Z-D82
			Connector type	E3Z-D67
Distance-settable	Pre-wired models (2 m) <sup>*1</sup>	 (Red light)	E3Z-LS61	E3Z-LS81
	Connector type		E3Z-LS66	E3Z-LS86

<sup>\*1</sup> Models provided with a 0.5-m cable are available. When ordering, specify the cable length by adding the code "0.5M" to the model number (e.g., E3Z-T61 0.5M).

<sup>\*2</sup> The sensing distance specified is possible when the E39-R1S used. Figure in parentheses indicate the minimum required distance between the sensor and reflector.

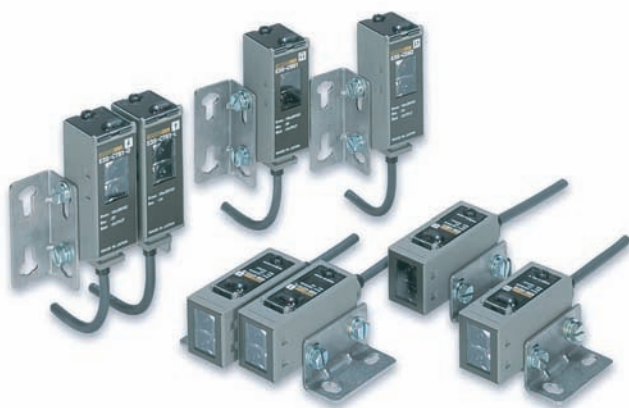
<sup>\*3</sup> The connector joint type is available M12. Its model ends with -M1. (Example: E3Z-T61-M1J)

### Specifications

Output		Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective	Distance-settable
Item	NPN	E3Z-T62/T67	E3Z-T61A/T66A	E3Z-R61/R66	E3Z-D62/D67	E3Z-LS61/66
	PNP	E3Z-T82/T87	E3Z-T81A/T86A	E3Z-R81/R86	E3Z-D82/D87	E3Z-LS81/86
Sensing distance		30 m	10 m	4 m (100 mm) <sup>*1</sup> (When using the E39-R1S)	1 m (White paper 300x300 mm)	BGS: White or black paper (100x100 mm): 20 mm to set distance FGS: White paper (100x100 mm): Set distance to 200 mm min. Black paper (100x100 mm): Set distance to 160 mm min.
Directional angle		Both emitter and receiver: 3° to 15°		2° to 10°	---	
Light source (wave length)		Infrared LED (870 nm)	Red LED (700 nm)	Red LED (680 nm)	Infrared LED (860 nm)	Red LED (680 nm)
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) : 10% max.				
Control output		Load power supply voltage 26.4 VDC max., load current 100 mA max. (residual voltage 2 V max.) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable				

Output		Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective	Distance-settable
Item	NPN	E3Z-T62/T67	E3Z-T61A/T66A	E3Z-R61/R66	E3Z-D62/D67	E3Z-LS61/66
	PNP	E3Z-T82/T87	E3Z-T81A/T86A	E3Z-R81/R86	E3Z-D82/D87	E3Z-LS81/86
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse protection	Protection from load short-circuit and reversed power supply connection	Reverse polarity protection, output short-circuit protection, mutual interference prevention, output reverse protection	Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation or reset: 2 ms max.	Operation or reset: 1 ms max.			
Ambient temperature		Operating: -25 °C to 55 °C, Storage: -40 °C to 70 °C (with no icing or condensation)				
Vibration resistance		10 to 55 Hz, 1.5 mm or 300 m/s <sup>2</sup> double amplitude for 2 hours each in X, Y, and Z directions				
Shock resistance		Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions				
Degree of protection		IEC 60529 IP67, IP69k after DIN 40050 part 9				
Connection method		Pre-wired (standard length: 2 m / 500 mm) / M8 connector				
Material	Case	PBT (polybutylene terephthalate)				
	Lens	Denatured polyacrylate resin	Methacrylate resin			Denatured polyallylate

\*1 Values in parentheses indicate the minimum required distance between the sensor and reflector.



## Oil-resistant, compact photoelectric sensor in metal housing

High oil resistance built into a compact housing shape.

- High functional reserve for highest reliability in dirty environments




CE

### Ordering information

Sensor type	Shape	Connection method	Sensing distance	Model
Through-beam	Horizontal model	Pre-wired	30 m (Infrared light)	E3S-CT11
		M12 connector		E3S-CT16
	Vertical model	Pre-wired		E3S-CT61
		M12 connector		E3S-CT66
Retroreflective Models	Horizontal model	Pre-wired	3 m (Red light)	E3S-CR11
		M12 connector		E3S-CR16
	Vertical model	Pre-wired		E3S-CR61
		M12 connector		E3S-CR66
Diffuse-reflective	Horizontal model	Pre-wired	2 m (Infrared light)	E3S-CD12
		M12 connector		E3S-CD17
	Vertical model	Pre-wired	2 m (Infrared light)	E3S-CD62
		M12 connector		E3S-CD67

**Note:** All pre-wired models are also available as M12-junction connector type- M1J.

### Specifications

Item	Through-beam		Retroreflective model (with M.S.R. function)	Diffuse-reflective
	Horizontal E3S-CT11 (-M1J)		Horizontal E3S-CR11 (-M1J)	Horizontal E3S-CD12 (-M1J)
	Vertical E3S-CT61 (-M1J)		Vertical E3S-CR61 (-M1J)	Vertical E3S-CD62 (-M1J)
Sensing distance	30 m		3 m (When using the E39-R1)	2 m (White paper 300x300 mm)
Light source (wave length)	Infrared LED (880 nm)		Red LED (700 nm)	Infrared LED (880 nm)
Supply voltage	10 to 30 VDC [ripple (p-p) 10% included]			
Protective circuits	Reverse polarity protection, output short-circuit protection		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time	Operation or reset: 1 ms max.			Operation/reset: 2 ms max. each
Ambient temperature	Operating: -25 °C to 55 °C, Storage: -40 °C to 70 °C (with no icing or condensation)			
Vibration resistance	10 to 2,000 Hz double amplitude 1.5 mm or 300 m/s <sup>2</sup> for 0.5 h in each of X, Y, Z directions			
Shock resistance	1000 m/s <sup>2</sup> (approx.- 100 G) 3 times each in X, Y, and Z directions			
Protective structure	IEC Standard IP67, NEMA 6P (limited to indoors use) <sup>*1</sup>			
Connection method	<div><div></div><div>Pre-wired (standard length: 2 m)</div><div></div><div>Junction connector (standard length: 300 mm)</div><div></div><div>M12 Connector</div></div>			
Materials	Case	Zinc diecast		
	Operation panel cover	Polyethyl sulfon		
	Lens	Acrylics		
Size in mm	20Hx57Wx23D			

<sup>\*1</sup> NEMA (National Electrical Manufacturers Association) standards



## Distance setting photoelectric sensor in metal housing

- High water, oil and detergent resistance
- Minimal black / white error for highest reliability detecting different colored objects (E3S-CL1)

CE

### Ordering information

■ Red light   ■ Green light

Sensing/Setting range	Model
	E3S-CL1
	E3S-CL2

### Specifications

Item	E3S-CL1	E3S-CL2
<b>Sensing distance</b>	5 to 200 mm (White paper 200x200 mm) (Setting distance 200 mm)	5 to 500 mm (White paper 200x200 mm) (Setting distance 500 mm)
<b>Light source (wave length)</b>	Red LED (700 nm)	Infrared LED (860 nm)
<b>Power supply voltage</b>	10 to 30 VDC [ripple (p-p) 10% included]	
<b>Protective circuits</b>	Reverse polarity protection, output short-circuit protection, mutual interference prevention	
<b>Response time</b>	Operation or reset: 1 ms max.	Operation or reset: 2 ms max.
<b>Ambient temperature</b>	Operating/Storage: -25 °C to 55 °C (with no icing or condensation)	
<b>Vibration resistance</b>	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions	
<b>Shock resistance</b>	Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions	
<b>Degree of protection</b>	IEC standard IP67, NEMA 6P (limited to indoor use) <sup>*1</sup>	
<b>Connection method</b>	Pre-wired models (standard length: 2 m)	
<b>Reflectivity characteristics (black / white error) <sup>*2</sup></b>	2% max.	10% max.
<b>Materials</b>		
<b>Case</b>	Zinc diecast	
<b>Operation panel cover</b>	Polyethyl sulfon	
<b>Lens</b>	Acrylics	
<b>Size in mm</b>	15.4Hx40Wx42D	

<sup>\*1</sup> NEMA (National Electrical Manufacturers Association) standards

<sup>\*2</sup> Sensing distance difference between standard white paper (reflectivity 90%) and standard black paper (reflectivity 5%)





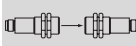
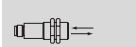
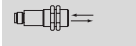
## Standard cylindrical M18 photoelectric sensor

The cylindrical M18 size family offers a large standard portfolio in plastic, brass or stainless steel housings for through-beam, retro-reflective, diffuse-reflective and background-suppression models. For excellent price-performance for your standard applications.

- Plastic, brass or stainless steel housings
- IP67, IP69k for highest water resistance
- Special beam and LED models available

CE



### Ordering information

Sensor type	Appearance	Connection method	Sensing distance	Housing	NPN output	PNP output
Through-beam	Multi purpose	 Pre-wired	7 m (Infrared LED)	Plastic	E3F2-7C4	E3F2-7B4
				Brass	E3F2-7C4-M	E3F2-7B4-M
				Stainless steel	E3F2-7C4-S	E3F2-7B4-S
				Plastic	E3F2-7C4-P1	E3F2-7B4-P1
				Brass	E3F2-7C4-M1-M	E3F2-7B4-M1-M
				Stainless steel	E3F2-7C4-M1-S	E3F2-7B4-M1-S
Retro-reflective <sup>*1</sup>	Non-polarizing (without MSR function)	Pre-wired	0.1 - 2 m <sup>*2</sup> (Infrared LED)	Plastic	E3F2-R2C4-E	E3F2-R2B4-E
		M12 connector		Plastic	E3F2-R2C4-P1-E	E3F2-R2B4-P1-E
		Pre-wired		Brass	E3F2-R2C4-M-E	E3F2-R2B4-M-E
	Polarizing (with MSR function)	Pre-wired	0.1 - 2 m (Red LED)	Stainless steel	E3F2-R2C4-S-E	E3F2-R2B4-S-E
		M12 connector		Brass	E3F2-R2C4-M1-M-E	E3F2-R2B4-M1-M-E
		M12 connector		Stainless steel	E3F2-R2C4-M1-S-E	E3F2-R2B4-M1-S-E
Diffuse reflective	Adjustable sensitivity	 Pre-wired	0.3 m	Plastic	E3F2-DS30C4	E3F2-DS30B4
				Brass	E3F2-DS30C4-M	E3F2-DS30B4-M
				Stainless steel	E3F2-DS30C4-S	E3F2-DS30B4-S
				Plastic	E3F2-DS30C4-P1	E3F2-DS30B4-P1
				Brass	E3F2-DS30C4-M1-M	E3F2-DS30B4-M1-M
				Stainless steel	E3F2-DS30C4-M1-S	E3F2-DS30B4-M1-S
Background suppression	Fixed sensing distance	 Pre-wired	10 cm	Plastic	E3F2-LS10C4	E3F2-LS10B4
				Brass	E3F2-LS10C4-M	E3F2-LS10B4-M
				Stainless steel	E3F2-L210C4-S	E3F2-L210B4-S
				Plastic	E3F2-LS10C4-P1	E3F2-LS10B4-P1
				Brass	E3F2-LS10C4-M1-M	E3F2-LS10B4-M1-M
				Stainless steel	E3F2-LS10C4-M1-S	E3F2-LS10B4-M1-S

<sup>\*1</sup> Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available

<sup>\*2</sup> With reflector E39-R1S

### Specifications

Item	E3F2-7□	E3F2-R2□4-□	E3F2-R2R□	E3F2-DS30□	E3F2-LS10□4-□
Sensing distance type	Through-beam	Retroreflective		Diffuse reflective	
	multi purpose	Non-polarizing	Polarizing	Adjustable sensing distance	Background suppression
Light source (wave length)	Infrared LED (880 nm / 850 nm)		Red LED (660 nm)	Infrared LED (880 nm)	Red LED (660 nm)
Power supply voltage	10 to 30 V DC				
Protective circuits	Output short-circuit and power supply reverse polarity				
Response time	≤ 2.5 ms				
Ambient temperature	Operating: -25 to 55 °C / Storage: -30 to 70 °C (with no icing or condensation)				
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)				
Shock resistance	Destruction: 500 m/s <sup>2</sup> each direction (X, Y, Z)				
Degree of protection	IP67 <sup>*1</sup> ; NEMA 1, 2, 4; IP69k after DIN 40050 part 9				
Connection method	 2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18 / 0.12) <sup>*2</sup> ) or				
	 M12-connector				
Material	Plastic (case: ABS; lens: PMMA)				
	Nickel brass	—	Nickel brass	Nickel brass	Nickel brass
	Stainless steel <sup>*3</sup>	—	Stainless steel <sup>*3</sup>	Stainless steel <sup>*3</sup>	Stainless steel <sup>*3</sup>

<sup>\*1</sup> The enclosure rating IP67 of OMRON internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions")

<sup>\*2</sup> For other cable materials (e.g. PUR) please contact your OMRON sales representative.

<sup>\*3</sup> Material-specification for stainless steel housing case: 1.4305 (W.-No.), 303 (AISI), 2346 (SS). For other stainless steel materials please contact your OMRON sales representative.



## Long distance sensors in plastic housing

Long distance retro-reflective and diffuse reflective sensors in plastic housing.

- Diffuse reflective model with
- M12 rotary connector or pre-wired models





CE

### Ordering information

Sensor type	Shape	Size in mm (HxWxD)	Connection method	Sensing distance	NPN/PNP selector
Retroreflective models (with M.S.R. function)		45x17.8x21	Pre-wired	10 m (500 mm) * <sup>1</sup> (Red light)	E3G-R13-G
		43x67.8x21	Connector type		E3G-R17-G
Distance setting		45x67.8x21	Pre-wired	0.2 to 2 m White paper 300 x 300 mm (Infrared light)	E3G-L73
		43x67.8x21	Connector type		E3G-L77

\*<sup>1</sup> Values in parentheses indicate the minimum required distance between the sensor and reflector.

### Specifications

Item		Retroreflective models (M.S.R. function)		Distance-setting	
		E3G-R13-G	E3G-R17-G	E3G-L73	E3G-L77
Sensing distance		10 m (500 mm) <sup>*1</sup> (When using the E39-R2)		0.2 to 2 m (White paper 300x300 mm) (setting distance 0.5 to 1.2 m)	
Light source (wave length)		Red LED (700 nm)		Infrared LED (860 nm)	
Power supply voltage		10 to 30 VDC (Ripple (p-p) 10% included)		10 to 30 VDC (Ripple (p-p) 10% included)	
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation / reset: 1 ms each		Operation/reset: 5 ms each	
Ambient temperature		Operating: -25 °C to 55 °C, Storage: -30 °C to 70 °C (with no icing or condensation)			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		500 m/s <sup>2</sup> 3 times in each of X, Y and Z directions			
Degree of protection		IEC 60529 IP67 (with Protective Cover attached)			
Connection method		 Pre-wired (standard length: 2 m)	 M12 connector	 Pre-wired (standard length: 2 m)	 M12 connector
Materials	Case	PBT (polybutylene terephthalate)			
	Lens	Acrylics (PMMA)			
	Mounting brackets	Stainless steel (SUS304)			

\*<sup>1</sup> Values in parentheses indicate the minimum required distance between the sensor and reflector.



## Harsh environment long-distance photoelectric sensor

Harsh environment long-distance retro-reflective and diffuse-reflective photoelectric sensors in rugged aluminium die cast housing.


- 4 Diffuse reflective E3NT-L application optimized models (long distance, window heating, analog output, fast response)
- Retro-reflective E3NT-R models with sensing distance of up to 16 m
- Two programmable outputs for 'window teaching'
- Double triangulation for stable detection of shiny objects
- IP67 and IP69k for highest resistance in wet environments

CE

### Ordering information

Sensing method	Type	Connector appearance	Connection method	Sensing / Setting distance	Model
Distance setting (BGS / FGS)	Long distance	horizontal	M12 connector (5-pole)	0.2 m .. 3.0 m (90% remission)	E3NT-L17-20
		vertical		0.2 m .. 2.7 m (6% remission)	E3NT-L37-20
	Fast response	horizontal		0.2 m .. 2.0 m	E3NT-L17
		vertical			E3NT-L37
	Window heating	horizontal			E3NT-LH17
		vertical			E3NT-LH37
	Analog and digital output	horizontal			E3NT-L27
		vertical			E3NT-L47
Retro reflective (with MSR-polarisation)	Long distance	horizontal		0.2 m .. 16.0 m (with E39-R8)	E3NT-R17
		vertical			E3NT-R37

### Specifications

Item	E3NT-L17 E3NT-L37	E3NT-L27 E3NT-L47	E3NT-LH17 E3NT-LH37	E3NT-L17-20 E3NT-L37-20	E3NT-R		
Sensing distance	2 m			3 m	16 m		
Light source (wave length)	Infrared LED 850-880 nm				Red LED 660 nm		
Power supply voltage	12 to 24 VDC (10 to 30 VDC)			12 to 24 VDC (11 to 30 VDC)	12 to 24 VDC (10 to 30 VDC)		
Protective circuits	Reversed power supply, overload, short-circuit (pulsed)						
Response time	≤ 2.5 ms	≤ 5 ms	≤ 2.5 ms	≤ 20 ms	≤ 2.0 ms		
Ambient temperature	- 25 °C ... + 55 °C	- 10 °C ... + 55 °C (analog output)	- 40 °C ... + 55 °C	- 25 °C ... + 55 °C			
Vibration resistance (to IEC 68-2-6)	± 1.5 mm, 1 h , 10 - 70 Hz						
Shock resistance (to IEC 68-2-27)	300 m/s²						
Degree of protection	IP67 (after IEC 60529), IP69k (after DIN 40050 part 9)						
Connection method	 M12 connector, 5-pole (piercing)						
Materials	Housing	Powder-coated aluminum, 231 GD AISi12 (Cu)					
	Front pane	Glas					
Size in mm	65.1Hx88.7Wx27D						





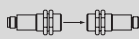


## Long distance cylindrical M18 photoelectric sensors

The long distance types within the E3F2 family provide enhanced sensing distances and functional reserve for enhanced reliability in dirty environments.

- High-power LED for enhanced sensing distance

CE



### Ordering information

Sensor type		Appearance	Connection method	Sensing distance	Housing	NPN output	PNP output
Through-beam	Precision positioning Test input		Pre-wired	10 m	Plastic	E3F2-10C4	E3F2-10B4
			M12 connector		Brass	E3F2-10C4-M	E3F2-10B4-M
					Plastic	E3F2-10C4-P1	E3F2-10B4-P1
					Brass	E3F2-10C4-M1-M	E3F2-10B4-M1-M
Retro-reflective <sup>*1</sup>	Polarizing (Adjustable sensitivity)		Pre-wired	0.1 - 4 m <sup>*2</sup>	Brass	E3F2-R4RC4-M-E	E3F2-R4RB4-M-E
			M12 connector		Brass	E3F2-R4RC4-M1-M-E	E3F2-R4RB4-M1-M-E
Diffuse reflective	Adjustable sensitivity		Pre-wired	1 m	Plastic	E3F2-D1C4	E3F2-D1B4
			M12 connector		Brass	E3F2-D1C4-M	E3F2-D1B4-M
					Plastic	E3F2-D1C4-P1	E3F2-D1B4-P1
					Brass	E3F2-D1C4-M1-M	E3F2-D1B4-M1-M

<sup>\*1</sup> Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available

<sup>\*2</sup> with reflector E39-R1S

### Specifications

Item	E3F2-10□	E3F2-R4□	E3F2-DS1□
Type	Through-beam multi purpose	Retroreflective Polarizing	Diffuse reflective Adjustable sensing distance
Light source (wave length)	Infrared LED (880 nm)	Red LED (660 nm)	Infrared LED (880 nm)
Power supply voltage	10 to 30 V DC		
Protective circuits	Output short-circuit and power supply reverse polarity		
Ambient temperature	Operating: -25 to 55 °C / Storage: -30 to 70 °C (with no icing or condensation)		
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)		
Shock resistance	Destruction: 500 m/s <sup>2</sup> each direction (X, Y, Z)		
Degree of protection	IP67 <sup>*1</sup> ; NEMA 1, 2, 4; IP69k after DIN 40050 part 9		
Connection method	 2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18 / 0.12) <sup>*2</sup> ) or  M12-connector		
Material	Plastic (case: ABS; lens: PMMA) Nickel brass	Nickel brass	Nickel brass

<sup>\*1</sup> The enclosure rating IP67 of OMRON internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions")

<sup>\*2</sup> For other cable materials (e.g. PUR) please contact your OMRON sales representative.



## PET bottle detection photoelectric sensor

The E3Z-B features the inner view optical system for reliable PET bottle detection.

- Uses OMRON's unique optical system
- Detects a wide range of bottles from 500 ml bottles to 2 l bottles, and from single bottles to sets of stocked bottles
- IP67 / IP69k tested for highest water resistance

CE

### Ordering information





Sensor type	Shape	Connection method	Sensing distance	Model	
				NPN output	PNP output
Retroreflective model (without M.S.R. function)		*1 Pre-wired*2	500 mm (80 mm)*3	E3Z-B61	E3Z-B81
		Connector type	(Red light)	E3Z-B66	E3Z-B86
		Pre-wired models	2 m (500 mm)*3	E3Z-B62	E3Z-B82
		Connector type	(Red light)	E3Z-B67	E3Z-B87

\*1 The reflector is sold separately.

\*2 The cable of 0.5 m length is also available. Specify the cable length at the end of the model name. (Example: E3Z-B61 0.5M)

\*3 The specified sensing distance is possible when the E39-R1S is used. Figures in parentheses indicate the minimum required distance between the sensor and the reflector.

### Specifications

Sensor type		Retroreflective model (without M.S.R. function)			
Model	NPN output	E3Z-B61	E3Z-B66	E3Z-B62	E3Z-B67
Item	PNP output	E3Z-B81	E3Z-B86	E3Z-B82	E3Z-B87
Sensing distance		500 mm (80 mm) <sup>*1</sup> (When using the E39-R1S)		2 m (100 mm) <sup>*1</sup> (When using the E39-R1S)	
Directional angle					
Light source (wave length)		Red LED (680 nm)			
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) : 10% max.			
Control output		Load power supply voltage 26.4 VDC max., load current 100 mA max. (residual voltage 1 V max.) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON switch selectable			
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention			
Response time		Operation or reset: 1 ms max.			
Ambient temperature		Operating: -25 °C to 55 °C, Storage: -40 °C to 70 °C (with no icing or condensation)			
Vibration resistance		10 to 55 Hz, 1.5 mm or 300 m/s <sup>2</sup> double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions			
Degree of protection		IEC 60529 IP67, IP69k (DIN40050)			
Connection method		 Pre-wired type (Standard cable length 2 m / 500 mm)	 M8 connector	 Pre-wired type (Standard cable length 2 m / 500 mm)	 M8 connector
Indicator lamp		Operation indicator (orange)			
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Methacrylate resin			

\*1 Figures in parentheses indicate the minimum required distances between the sensors and reflectors.



## Transparent bottle sensor

The special optical design of the E3S-CR62/67 ensures reliable detection of glass bottles compensating the often noticed 'double-detection-effect' when using other sensors.

- Special optical system for reliable bottle detection preventing 'lens effect'
- Thin beam for reliable bottle counting



## Ordering information

Sensor type	Shape	Connection method	Sensing distance		Model
			Reflector E39-R6	Reflector E39-R1	
Retroreflective models		Pre-wired type	250 mm (Red light)	1 m (250 mm) (Red light) <sup>*1</sup>	E3S-CR62-C
		Connector type			E3S-CR67-C

<sup>\*1</sup> Values in parentheses indicate the minimum required distance between the sensor and reflector.

## Specifications

Item	E3S-CR62-C	E3S-CR67-C
<b>Sensing distance</b>	250 mm (When using the E39-R6), 1 m (250 mm) <sup>*1</sup> (When using the E39-R1)	
<b>Light source (wave length)</b>	Red LED (660 nm)	
<b>Power supply voltage</b>	10 to 30 VDC, ripple (p-p) : 10 % max.	
<b>Protective circuits</b>	Load short protection, reverse connection protection, mutual interference protection function	
<b>Response time</b>	Operation or reset: 1 ms max.	
<b>Ambient temperature</b>	Operating: -25 °C to 55 °C, Storage: -40 °C to 70 °C (with no icing or condensation)	
<b>Vibration resistance</b>	Destruction: 10 to 2,000 Hz, 1.5 mm double amplitude or 300 m/s <sup>2</sup> (approx. 30 G) for 0.5 hrs each in x, y, and Z directions	
<b>Shock resistance</b>	1000 m/s <sup>2</sup> (approx. 100 G) 3 times each in X, Y, and Z directions	
<b>Degree of protection</b>	IEC Standard IP67; NEMA 6P (restricted to indoor use)	
<b>Connection method</b>	Pre-wired models (standard length: 2 m)	Connector type
<b>Materials</b>	<b>Case</b>	Zinc diecast
	<b>Lens</b>	Acrylics
	<b>Display operation panel</b>	Polyethyl sulfon
<b>Size in mm</b>	20Hx57Wx23D	

<sup>\*1</sup> Values in parentheses indicate the minimum required distance between the sensor and reflector.





## LASER sensor in compact size housing

The E3Z LASER sensor in compact plastic housing features visible LASER light for precision positioning and detection applications.

- Visible LASER light for precision positioning and small object detection
- High power LED for high functional reserve

### Ordering information

Sensing method	Connection method	Response time	Sensing distance	Model	
				NPN output	PNP output
Through-beam	Pre-wired (2 m)	1 ms	60 m	E3Z-LT61	E3Z-LT81
	Standard M8 connector			E3Z-LT66	E3Z-LT86
Retroreflective with M.S.R. function	Pre-wired (2 m)		15 m (300 mm), (Using E39-R1) 7 m (200 mm), (Using E39-R12) 7 m (200 mm), (Using E39-R6)	E3Z-LR61	E3Z-LR81
	Standard M8 connector			E3Z-LR66	E3Z-LR86
Distance-settable (BGS-Models)	Pre-wired (2 m)	0.5 ms	20 to 40 mm (Min. distance) 20 to 300 mm (Max. distance)	E3Z-LL61	E3Z-LL81
	Standard M8 connector			E3Z-LL66	E3Z-LL86
	Pre-wired (2 m)		25 to 40 mm (Min. distance) 25 to 300 mm (Max. distance)	E3Z-LL63	E3Z-LL83
	Standard M8 connector			E3Z-LL68	E3Z-LL88

### Specifications

Sensing method		Through-beam	Retro-reflective with M.S.R. function	Diffuse-reflective	
Response		Standard response			High-speed response
Model	NPN output	E3Z-LT61/-LT66	E3Z-LR61/-LR66	E3Z-LL61/-LL66	E3Z-LL63/-LL68
Item	PNP output	E3Z-LT81/-LT86	E3Z-LR81/-LR86	E3Z-LL81/-LL86	E3Z-LL83/-LL88
Sensing distance		60 m	0.3 to 15 m (when using E39-R1S) 0.2 to 7 m (when using E39-R12) 0.2 to 7 m (when using E39-R6)	White paper (100x100 mm) 20 to 300 mm Black paper (100x100 mm) 20 to 160 mm	White paper (100x100 mm) 25 to 300 mm Black paper (100x100 mm) 25 to 100 mm
Light source (wavelength)		Red LED (655 nm), JIS Class 1, IEC Class 1, FDA Class II			
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p): 10% max.			
Ambient temperature range		Operating: -10 °C to 55 °C, Storage: -25 °C to 70 °C (with no icing or condensation)			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 500 m/s <sup>2</sup> 3 times each in X, Y, and Z directions			
Degree of protection		IP67 (IEC 60529)			
Connection method		Pre-wired cable (standard length: 2 m): Standard M8 connector:	E3Z-□□1/-□□3 E3Z-□□1/-□□3		
Material	Case	PBT (polybutylene terephthalate)			
	Lens	Modified polyacrylate resin	Methacrylic resin	Modified polyacrylate resin	



## Compact size photoelectric sensors for condition monitoring and preventive maintenance

The E3Z 'Preventive maintenance' family features active or passive sensor function checking capabilities detecting misalignments, dirt covers, defective sensors, jammed products, etc.

- E3Z-□-J0: 'Machine stop' or 'Sensor defect' alarm output if beam interruption is too long
- E3Z-□-G0: Active sensor functionality check by test input forcing state change at receiver
- E3Z-□-G2: Detection of dirt cover by power reduction

CE

### Ordering information

Sensor type	Sensing distance	Output specifications	Preventive maintenance function			
			anti-tampering	self diagnosis	emission stop	light intensity switching
Through-beam	15 m	NPN	E3Z-T61H	E3Z-T61-J0SHW	E3Z-T61-G0SHW	E3Z-T61-G2SHW
		PNP	E3Z-T81H	E3Z-T81-J0SHW	E3Z-T81-G0SHW	E3Z-T81-G2SHW
Retroreflective	4 m	NPN	E3Z-R61H	E3Z-R61-J0SHW	E3Z-R61-G0SHW	E3Z-R61-G2SHW
		PNP	E3Z-R81H	E3Z-R81-J0SHW	E3Z-R81-G0SHW	E3Z-R81-G2SHW
Diffuse-reflective	1 m	NPN	E3Z-D62H	E3Z-D62-J0SHW	E3Z-D62-G0SHW	E3Z-D62-G2SHW
		PNP	E3Z-D82H	E3Z-D82-J0SHW	E3Z-D82-G0SHW	E3Z-D82-G2SHW

### Specifications

	E3Z-T□	E3Z-R□	E3Z-D□
Sensing distance	15 m	4 m	1 m
Light source	Infrared LED (870 nm)	Red LED (660 nm)	Infrared LED (860 nm)
Power supply voltage	12 to 24 VDC ±10%		
Ambient temperature	Operating: -25 °C to 55 °C, Storage: -40 °C to 70 °C (with no icing or condensation)		
Vibration resistance	10 to 55 Hz, 1.5 mm or 300 m/s <sup>2</sup> double amplitude for 2 hours each in X, Y, and Z directions		
Degree of protection	IP67, IP69k		
Material	PBT		



## AC voltage sensor in cylindrical M18 housing

The E3F2 family of cylindrical M18 sized photoelectric sensors features models for direct AC voltage switching.

- 24 to 240 VAC power supply
- UL and CSA approved

CE

### Ordering information

Sensing method		Appearance	Connection method	Sensing distance	Model	
					Light-ON	Dark-ON
Through-beam			pre-wired	3 m	E3F2-3Z1	E3F2-3Z2
Retro-reflective	Non-polarizing (without MSR function)		pre-wired	0.1 - 2 m (with reflector E39-R1)	E3F2-R2Z1-E	E3F2-R2Z2-E
Diffuse reflective	Fixed sensing distance wide-beam characteristics		pre-wired	0.1 m	E3F2-DS10Z1-N	E3F2-DS10Z2-N

Note: Standard cable length is 2 m. Models provided with a 5 m long cable are available. When ordering, specify the cable length by adding the length of the cable (e.g. E3F2-R2Z1 2M or E3F2-R2Z1 5M). For other cable length please contact your OMRON sales representative.

### Specifications

Item	E3F2-3Z1 E3F2-3Z2	E3F2-R2Z1 E3F2-R2Z2	E3F2-DS10Z1 E3F2-DS10Z2
Type	Through-beam	Non-polarizing Retroreflective	Diffuse reflective (wide-beam characteristic)
Power supply voltage	24 to 240 VAC $\pm 10\%$ , 50 / 60 Hz		
Rated sensing distance <sup>*1</sup>	3 m	0.1 - 2 m (with reflector E39-R1)	0.1 m (5 x 5 cm white mat paper)
Ambient temperature	Operating: -25 to 55 °C / Storage: -30 to 70 °C (with no icing or condensation)		
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)		
Shock resistance	500 m/sqr (approx. 50 g) for each direction (X, Y, Z)		
Enclosure rating	IP67 <sup>*2</sup> ; NEMA 1, 2, 4; IP69k after DIN 40050 part 9		
Light source	Infrared LED (880 nm)		
Connection method	2 m, 5 m pre-wired cable (PVC dia. 4 mm (14 / 0.15) <sup>*3</sup> )		
Housing materials	Plastic (case: ABS; lens: PMMA)		

<sup>\*1</sup> For stable sensing distance in detail, please refer to 'Engineering data'

<sup>\*2</sup> The enclosure rating IP67 of OMRON internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions")

<sup>\*3</sup> For other cable materials (e.g. PUR) please contact your OMRON sales representative.





## Long distance all voltage photoelectric sensor in plastic housing

The E3G-M series offers the long sensing distance of the E3G family for all voltage (AC and DC) installations.

- 12 to 240 VDC and 24 to 240 VAC power supply
- Terminal block connection



### Ordering information

Sensor type	Shape	Connection method	Sensing distance	Timer function	Relay contact output
Retroreflective models (with M.S.R. function)		Terminal block	10 m (500 mm) <sup>*1</sup> (Red light)	---	E3G-MR19-G
Distance setting			0.2 to 2 m White paper 300x300 mm (Infrared light)	ON or OFF delay 0 to 5 s (adjustable)	E3G-MR19T-G
				---	E3G-ML79-G
				ON or OFF delay 0 to 5 s (adjustable)	E3G-ML79T-G

<sup>\*1</sup> Values in parentheses indicate the minimum required distance between the sensor and reflector.

### Specifications

Sensor type		Retroreflective models (M.S.R. function)		Distance-setting	
Item	Model	E3G-MR19-G	E3G-MR19T-G	E3G-ML79-G	E3G-ML79T-G
Sensing distance		10 m (500 mm) <sup>*1</sup> (When using the E39-R2)		0.2 to 2 m (White paper 300 x 300 mm)	
Light source (wave length)		Red LED (700 nm)		Infrared LED (860 nm)	
Power supply voltage		12 to 240 VDC $\pm 10\%$ ripple (p-p) : 10% max. 24 to 240 VAC $\pm 10\%$ 50/60 Hz		12 to 240 VDC $\pm 10\%$ ripple (p-p) : 10% max. 24 to 240 VAC $\pm 10\%$ 50/60 Hz	
Control output		Relay output: switch-over contact 250 VAC 3A ( $\cos\phi=1$ ) max. 30 VDC 3A max. L-ON/D-ON switch selectable		Relay output: switch-over contact 250 VAC 3A ( $\cos\phi=1$ ) max. 30 VDC 3A max. L-ON/D-ON switch selectable	
Response time		Operation/reset: 30 ms each		Operation/reset: 30 ms each	
Timer function		---	ON delay/OFF delay 0 to 5 s (Adjuster variable system)	---	ON delay/OFF delay 0 to 5 s (Adjuster variable system)
Ambient temperature		Operating: -25 °C to 55 °C, Storage: -30 °C to 70 °C (with no icing or condensation)			
Vibration resistance		Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		500 m/s <sup>2</sup> 3 times in each of X, Y and Z directions			
Protective structure		IEC 60529 IP67 (with protective cover attached)			

<sup>\*1</sup> Values in parentheses indicate the minimum required distance between the sensor and reflector.






## AC&DC voltage sensor in compact size housing

The compact sized E3JK family provides 12-240 VDC and 24-240 VAC power supply voltage and is ideally suited to AC installations. The wide voltage range also reduces the product variety needed for different voltage requirements.

- Built-in amplifier accepts wide supply voltage range
- Compact, space-saving construction 50Hx50Wx17.4D mm
- Relay outputs with long life expectancy and high switching capacity (3 A, 250 VAC)

CE


### Ordering information

Sensor type	Shape	Connection method	Sensing distance	Output form	Output	Model		
						NPN	PNP	
Through-beam		Pre-wired	5 m (Infrared light)	Light ON	Relay output		E3JK-5M1	
				Dark ON			E3JK-5M2	
				Light ON/ Dark ON (selectable)	DC transistor output	E3JK-5S3		
Retroreflective model (with M.S.R. function)			2.5 m (3 m) <sup>*1</sup> (Red light)	Light ON	Relay output		E3JK-R2M1	
				Dark ON			E3JK-R2M2	
				Light ON/Dark ON (selectable)	DC transistor output	E3JK-R2S3	E3JK-R2R3	
Retroreflective model (without M.S.R. function)				4 m (5 m) <sup>*1</sup> (Red light)	Light ON	Relay output		E3JK-R4M1
					Dark ON			E3JK-R4M2
					Light ON/Dark ON (selectable)	DC transistor output	E3JK-R4S3	
Diffuse-reflective			300 mm (Infrared light)	Light ON	Relay output		E3JK-DS30M1	
				Dark ON			E3JK-DS30M2	
				Light ON/Dark ON (selectable)	DC transistor output	E3JK-DS30S3		

<sup>\*1</sup> The value within the parentheses indicates the sensing distance applied when the E39-R2 reflector is used.

**Note:** The UL-listed model ends with 'US'. (Example: E3JK-5M1-US). Note that the DC transistor type of the E3JK is UL-unlisted.

### Specifications

Item	Through-beam		Retroflective model (with M.S.R. function)		Retroflective model (without M.S.R. function)		Diffuse-reflective	
	E3JK-5M□	E3JK-5S3	E3JK-R2M□	E3JK-R2□3	E3JK-R4M□	E3JK-R4S3	E3JK-DS30M□	E3JK-DS30S3
Sensing distance	5 m		2.5 m (When using the E39-R1)		4 m (When using the E39-R1)		300 mm (White paper 100x100 mm)	
Light source (wave length)	Infrared LED (950 nm)		Red LED (660 nm)				Infrared LED (950 nm)	
Power supply voltage	12 to 240 VDC ±10% ripple (p-p) : 10% max. 24 to 240 VAC ±10% 50/60 Hz							
Response time	≤ 30 ms	≤ 10 ms	≤ 30 ms	≤ 5 ms	≤ 30 ms	≤ 5 ms	≤ 30 ms	≤ 5 ms
Ambient temperature	Operating: -25 °C to 55 °C, Storage: -30 °C to 70 °C (with no icing or condensation)							
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance	Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions							
Degree of protection	IEC60529 IP64							
Connection method	 Pre-wired models (standard length: 2 m)							
Material	Case	ABS						
Size in mm	50Hx50Wx22D							



## Photoelectric sensor for mark detection

The coaxial optical system of the E3M-V provides reliable mark detection on laminated objects

- Detects laminated or light-dispersing objects in stable operation without being influenced by mirror reflection
- Automatically sets to the optimum threshold level by auto-teaching
- Green LED











### Ordering information

Connection method	Setting distance	Spot diameter	Model	
			NPN output	PNP output
Connector type <sup>*1</sup>	10±3 mm	1x4 mm	E3M-VG11	E3M-VG16
		4x1 mm	E3M-VG21	E3M-VG26
Pre-wired		1x4 mm	E3M-VG12	E3M-VG17
		4x1 mm	E3M-VG22	E3M-VG27

<sup>\*1</sup> Possible to switch between vertical or horizontal connection using the M12 rotary connector

### Specifications

Item	E3M-VG11	E3M-VG12	E3M-VG21	E3M-VG22	E3M-VG16	E3M-VG17	E3M-VG26	E3M-VG27
Sensing distance	10±3 mm							
Spot size (HxW)	4x1 mm		1x4 mm		4x1 mm		1x4 mm	
Light source (wavelength)	Green LED (525 nm)							
Power supply voltage	10 to 30 VDC, ripple (p-p) 10% max.							
Control output	Load power supply voltage:30 VDC max. Load current: 100 mA max. (Residual voltage: 1.2 V max.) NPN open collector output type				Load power supply voltage:30 VDC max. Load current: 100 ma max. (Residual voltage: 2 V max.) PNP open collector output type			
Response time	ON: 50 μs max. OFF: 70 μs max.							
Ambient illumination (on receiver lens)	Incandescent lamp:3,000 lx max. Sunlight: 10,000 lx max.							
Ambient temperature	Operating: -20 °C to 55 °C / Storage: -30 °C to 70 °C (with no icing)							
Vibration resistance* <sup>1</sup>	Destruction: 10 to 55 Hz, 1-mm double amplitude or 150 m/s2 for 2 hrs each in X, Y, and Z directions							
Shock resistance* <sup>2</sup>	Destruction: 500 m/s <sup>2</sup> , 3 times each in X, Y, and Z directions							
Degree of protection	IEC60529 IP67 (with protective cover)							
Connection method	Connector 	Pre-wired 	Connector 	Pre-wired 	Connector 	Pre-wired 	Connector 	Pre-wired 
Material	Case: Polybutylene terephthalate Lens: Acrylic (PMMA)							

<sup>\*1</sup> The sensor withstands 0.75 mm double amplitude or 100 m/s<sup>2</sup> if the mounting bracket is attached to the sensor

<sup>\*2</sup> The sensor withstands 300 m/s<sup>2</sup> if the mounting bracket is attached to the sensor.



## Groove-type photoelectric sensor for mark detection

The pre-aligned emitter and receiver of this 1 cm groove-type simplifies the installation and reduces the possibility for misalignment for detecting marks on transparent film.

- Green or red LED
- IP65
- Fork opening: 10x35 mm

CE

### Ordering information

Type	LED	Groove width	Model	
			NPN output	PNP output
Adjustable sensitivity	green	1 cm	E3S-GS1E4	E3S-GS1B4
10-cycle trimmer	red		E3S-GS1RE4	E3S-GS1RB4
	green		E3S-GS1GE4	E3S-GS1GB4

### Specifications

Item			E3S-GS1E4/ E3S-GS1B4	E3S-GS1RE4A/ E3S-GS1RB4A	E3S-GS1GE4A/ E3S-GS1GB4A
Power supply voltage			12 to 24 VDC, ripple (p-p): 10% max.		
Current consumption			40 mA max.		
Sensing distance			1 cm		
Standard objects			Transparent (2x3 mm)		
Control output	DC solid-state	Load	Models with suffix -E4: 80 mA max. Models with suffix -B4: 100 mA max.		
		Voltage output	2 V max.		
Response time (ON, OFF)			1 ms max.		
Sensitivity			Adjustable	10-cycle trimmer	
Operation mode			Wire-selectable (refer to 'output circuit.')		
Indicators			Light indicator (red), stability indicator (green)		
Enclosure rating	IEC 144	IP65		IP65	
	NEMA	1, 2, 12		1, 2, 12	
Housing material			Plastic		
Light source			Green LED	Red LED	Green LED
Ambient temperature			Operating: -25 to 55 °C		





## Photoelectric sensor for structured object detection

The special wide beam optics of the E3S-LS3 ensures reliable detection of structured objects (with holes or different heights) and is therefore ideally suited to detect printed circuit boards (PCBs), for example.


- Wide beam for reliable detection of structured and irregular shaped objects



### Ordering information

Sensor type	Connection method	Detection distance	Timer function	Model	Output	
Limited reflective	Pre-wired (2 m)	20 to 35 mm (Red light)	No	E3S-LS3N	NPN Light ON	
		10 to 60 mm (Red light)		E3S-LS3NW		
	Pre-wired (2 m)	20 to 35 mm (Red light)	No	E3S-LS3P	PNP Light ON	
			Yes	E3S-LS3PT		
	Pre-wired M8 3-pin connector (0.3 m)		No	E3S-LS3P-M5J		
			Yes	E3S-LS3PT-M5J		
	Pre-wired M8 4-pin connector (0.3 m)		No	E3S-LS3P-M3J		
			Yes	E3S-LS3PT-M3J		
	Pre-wired (2 m)	10 to 60 mm (Red light)	No	E3S-LS3PW		
			Yes	E3S-LS3PWT		
	Pre-wired M8 3-pin connector (0.3 m)		No	E3S-LS3PW-M5J		
			Yes	E3S-LS3PWT-M5J		
	Pre-wired M8 4-pin connector (0.3 m)		No	E3S-LS3PW-M3J		
			Yes	E3S-LS3PWT-M3J		

### Specifications

Item	E3S-LS3□	E3S-LS3PT	E3S-LS3□W	E3S-LS3PWT
Sensing	White paper *	20 to 35 mm	10 to 60 mm	
	Black paper *	20 to 30 mm	15 to 50 mm	
Light source (wave length)	Red LED (660 nm)			
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) 10% max.			
Response time	1 ms max. for operation and reset respectively			
Timer function	Available with E3S-LS3P(W)T models only. Time range: 0.1 to 1.0 s (adjustable)			
Ambient temperature	Operating: -10 to 55 °C (with no icing or condensation)			
	Storage: -25 to 70 °C (with no icing or condensation)			
Vibration resistance	10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions			
Shock resistance	500 m/s <sup>2</sup> , 3 times each in X, Y and Z directions			
Degree of protection	IEC60529 IP40			
Connection method	 Pre-wired (standard length: 2 m) / Pre-wired M8 connector (standard length: 0.3 m)			
Material	Case	ABS		
	Lens	Acrylic		



## High precision LASER sensor

The separate amplifier high-precision photoelectric sensors feature a large variety of different LASER sensing heads for highest precision positioning and application detection.

- Up to 10 µm accuracy
- Easy installation due to adjustable focus point and optical axis
- Wide range sensor head portfolio with different laser beam shapes
- Stable detection of transparent objects such as plastic or glass materials
- Controller functions with easy wiring concept and power tuning function



## Ordering information

### Sensor heads

Sensing method	Focus	Model number	Remarks
Diffuse reflective	Spot	E3C-LD11	Mounting a beam unit (sold separately) allows the use of line and area beams.
	Line	E3C-LD21	This model number is for the set consisting of the E39-P11 mounted to the E3C-LD11.
	Area	E3C-LD31	This model number is for the set consisting of the E39-P21 mounted to the E3C-LD11.
Coaxial retroreflective	Spot (variable)	E3C-LR11 <sup>*1</sup>	Mounting a beam unit (sold separately) allows the use of line and area beams.
	Spot (2.0-mm fixed dia.)	E3C-LR12 <sup>*1</sup>	---

<sup>\*1</sup> Select a reflector (sold separately) according to the application.

### Amplifier units

Item		Functions	pre-wired		with connector	
			NPN output	PNP output	NPN output	PNP output
Advanced models	Twin-output models	Area output, self-diagnosis, differential operation	E3C-LDA11	E3C-LDA41	E3C-LDA6	E3C-LDA8
	External-input models	Remote setting, counter, differential operation	E3C-LDA21	E3C-LDA51	E3C-LDA7	E3C-LDA9

## Specifications

### Sensor heads

Item	Diffuse reflective			Coaxial retroreflective			
	E3C-LD11	E3C-LD21	E3C-LD31	E3C-LR11	E3C-LR11 + E39-P31	E3C-LR11 + E39-P41	E3C-LR12
Light source (emission wavelength)	Red semiconductor laser diode (650 nm), 2.5 mW max. (JIS standard: Class 2, FDA standard: Class II)						1 mW max. (JIS standard Class 1)
Sensing distance	High-resolution mode: 30 to 1,000 mm Standard mode: 30 to 700 mm Super-high-speed mode: 30 to 250 mm			7 m 5 m 2 m	1,700 mm, 1,300 mm 700 mm	900 mm 700 mm 400 mm	7 m 5 m 2 m
Beam size	0.8 mm max. (at distances up to 300 mm)	33 mm (at 150 mm)	33x15 mm (at 150 mm)	0.8 mm max. (at distances up to 1,000 mm)	28 mm (at 150 mm)	28x16 mm (at 150 mm)	2.0 mm dia. (at distances up to 1,000 mm)
Functions	Variable focal point mechanism (beam size adjustment) , optical axis adjustment mechanism (axis adjustment)						
Indicators	LDON indicator: Green; Operation indicator: Orange						





## Radial cylindrical M18 photoelectric sensor

Radial (angled) optics for easy mounting, installation and adjustment

- Diffuse reflective and retro-reflective models
- IP67 and IP69k

CE

### Ordering information

Sensor type		Appearance	Connection method	Sensing distance	Housing	NPN output	PNP output
Retro-reflective <sup>*1</sup>	Polarizing (Adjustable sensitivity)		Pre-wired	0.1 - 2 m <sup>*2</sup>	Plastic	E3F2-R2RC41-E	E3F2-R2RB41-E
			M12 connector		Brass	E3F2-R2RC41-E	E3F2-R2B41-E
					Plastic	E3F2-R2RC41-1-E	E3F2-R2RB41-1-E
					Brass	E3F2-R2RC41-M1-M-E	E3F2-R2RB41-M1-M-E
Diffuse reflective	Adjustable sensitivity		Pre-wired	0.3 m	Plastic	E3F2-DS30C41	E3F2-DS30B41
			M12 connector		Brass	E3F2-DS30C41-M	E3F2-DS30B41-M
					Plastic	E3F2-DS30C41-P1	E3F2-DS30B41-P1
					Brass	E3F2-DS30C41-M1-M	E3F2-DS30B41-M1-M

<sup>\*1</sup> Retroreflective models incl. reflectors E39-R1 or E39-R1S are also available.





<sup>\*2</sup> With reflector E39-R1S.


### Specifications

Item	E3F2-R2R□41-□	E3F2-DS30□41-□
Sensing distance type	Retroreflective	Diffuse reflective
	Polarizing, adjustable sensing distance	Adjustable sensing distance
Light source (wave length)	Red LED (660 nm)	Infrared LED (880 nm)
Power supply voltage	10 to 30 V DC	
Protective circuits	Output short-circuit and power supply reverse polarity	
Response time	≤ 2.5 ms	
Ambient temperature	Operating: -25 °C to 55 °C / Storage: -30 °C to 70 °C (with no icing or condensation)	
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hrs each direction (X, Y, Z)	
Shock resistance	Destruction: 500 m/s <sup>2</sup> each direction (X, Y, Z)	
Enclosure ratings	IP67 <sup>*1</sup> ; NEMA 1, 2, 4; IP69k after DIN 40050 part 9	
Connection method	2 m, 5 m pre-wired cable (PVC, dia. 4 mm (18 / 0.12) <sup>*2</sup> ) or M12-connector	
Material	Nickel brass	Nickel brass
	Stainless steel	Stainless steel

<sup>\*1</sup> The enclosure rating IP67 of OMRON internal standards correspond to stricter test requirements than the standard IEC 60529 (refer to chapter "Precautions").

<sup>\*2</sup> For other cable materials (e.g. PUR) please contact your OMRON sales representative.

Output		Incremental				
						
Model		E6A2-C	E6B2-C	E6C2-C	E6C3-C	E6F-C
Type		Miniature	Compact	Water resistant		Rugged housing
Resolution range	Min	10			100	
	Max	500	2,000		3,600	1,000
Output	NPN	■	■	■	■	■
	PNP		■	■		
Size		25 mm	40 mm	50 mm	50 mm	60 mm
Max force	radial	10	30	50	80	120
	axial	5	20	30	50	50
IP rating	IP50	■	■			
	IP64			■		
	IP65				■	■
Max. rotation frequency		5,000	6,000		5,000	
Page		34		35		

Output		Incremental	Absolute		
					
Model		E6H-C	E6C-N	E6C3-A	E6F-A
Type		Hollow shaft	Multiturn	Water resistant	Rugged housing
Resolution Range	Min	300	500	6	256
	Max	3,600	500	1,024	
Output	NPN	■	■	■	■
	PNP			■	■
Size		40 mm (hollow)	50 mm (full and hollow)	50 mm	60 mm
Max force	radial	29.4	30	80	120
	axial	4.9	20	50	50
IP rating	IP50	■	■		
	IP64				
	IP65			■	■
Max. rotation frequency		10,000	1,500	5,000	5,000
Page		36		37	

■ Standard

□ No / not available



## Miniature size rotary encoder

The E6A family of rotary encoders features a small sized dia 25 mm housing.

- Small sized dia 25 mm housing



CE

### Ordering information

Size in mm	Output phase	Power supply voltage	Output form	Resolution (pulse/rotation)	Model
Ø 20	A	5 to 12 VDC	NPN voltage output	10, 60, 100, 200, 300, 360, 500	E6A2-CS3E
			NPN open collector	10, 60, 100, 200, 300, 360, 500	E6A2-CS3C
		12 to 24VDC		10, 60, 100, 200, 300, 360, 500	E6A2-CS5C
	A, B	5 to 12 VDC	NPN voltage output	100, 200, 360, 500	E6A2-CW3E
			NPN open collector	100, 200, 360, 500	E6A2-CW3C
		12 to 24VDC		100, 200, 360, 500	E6A2-CW5C
	A, B, Z	5 to 12 VDC	NPN voltage output	100, 200, 360, 500	E6A2-CWZ3E
			NPN open collector	100, 200, 360, 500	E6A2-CWZ3C
		12 to 24VDC		100, 200, 360, 500	E6A2-CWZ5C

# E6B2-C

## Compact size rotary encoder

The E6B family of incremental rotary encoders features a housing size dia 40 mm.

- Line driver output models available



CE

### Ordering information

Size in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Model
Ø 40	5 to 24 VDC	NPN open collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500 1,800, 2,000	E6B2-CWZ6C
	12 to 24VDC	PNP open collector output	100, 200, 360, 500, 600, 1,000, 2,000	E6B2-CWZ5B
	5 to 12 VDC	NPN voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,200, 1,500 1,800, 2,000	E6B2-CWZ3E
	5 VDC	Line driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600, 1,000, 1,024, 1,200, 1,500 1,800, 2,000	E6B2-CWZ1X

Improved water resistant rotary encoder



The E6C family of dia 50 mm incremental rotary encoders features an improved water resistance compared to standard models.

- IP64f or IP65f drip-proof, oil-proof construction

CE

Ordering information

	Size in mm	Power supply voltage	Output form	Resolution (pulse/rotation)	Model
Standard models	Ø 50	5 to 24 VDC	NPN open collector output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ6C
				720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	
		12 to 24VDC	PNP open collector output	100, 200, 360, 500, 600	E6C2-CWZ5B
		5 to 12 VDC	NPN voltage output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ3E
				720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	
		5 VDC	Line driver output	10, 20, 30, 40, 50, 60, 100, 200, 300, 360, 400, 500, 600	E6C2-CWZ1X
				720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000	
8 dia. tough model		12 to 24VDC	Complimentary output	100, 200	E6C3-CWZ5GH
		5 to 12 VDC	NPN voltage output	300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	E6C3-CWZ3EH
				300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	
		5 to 12 VDC	Line driver output	100, 200	E6C3-CWZ3XH
				300, 360, 500, 600, 720, 800, 1,000, 1,024, 1,200, 1,500, 1,800, 2,000, 2,048, 2,500, 3,600	

E6F-C

Rugged housing rotary encoder



The E6F family of dia 60 mm rotary encoders features a rugged housing.

- Strong shaft for max 120 N in radial direction and max 50 N in thrust direction
- Water- and oil-proof structure (IP65f)

CE

Ordering information

Size in mm	Supply voltage	Output form	Resolution (pulse/rotation)	Model
Ø 60	12 to 24VDC	Complimentary output	100, 200, 360, 500, 600	E6F-CWZ5G
			1000	

Hollow shaft rotary encoder



- The E6H family of incremental encoders features a dia 40 mm hollow shaft.
- Wide operating voltage range from 5 to 24 VDC.
  - Line drive output available (100 m max.)



Ordering information

Size in mm	Supply voltage	Output form	Resolution (pulse/rotation)	Model
Ø 40	5 to 24 VDC	Open collector output	300, 360, 500, 600, 720, 800, 1,000, 1,024	E6H-CWZ6C
			1,200, 1,500, 1,800, 2,000, 2,048	
			2,500, 3,600	
	5 to 12 VDC	Voltage output	300, 360, 500, 600, 720, 800, 1,000, 1,024	E6H-CWZ3E
			1,200, 1,500, 1,800, 2,000, 2,048	
			2,500, 3,600	
	5 to 12 VDC	Line drive output	300, 360, 500, 600, 720, 800, 1,000, 1,024	E6H-CWZ3X
			1,200, 1,500, 1,800, 2,000, 2,048	
			2,500, 3,600	

Multiturn rotary encoder



- The E6C-N rotary encoder provides a multiturn function for applications with rotations over 360°.
- Multiturn function



Ordering information

Size	Name	Model
Ø 50	Shaft model with cable	E6C-NN5C
	Hollow-shaft model with cable	E6C-NN5CA
	Shaft model with connector	E6C-NN5C-C
	Hollow-shaft model with connector	E6C-NN5CA-C



## Improved water resistant rotary encoder

The E6C family of dia 50 mm incremental rotary encoders features an improved water resistance compared to standard models.

- IP65f drip-proof, oil-proof construction

CE

### Ordering information

Size in mm	Supply voltage	Output form	Output code	Resolution (pulse/rotation)	Connection method	Model
Ø 50	12 to 24VDC	NPN open collector output	Gray code	256	Connector type	E6C3-AG5C-C
				256, 360, 720, 1,024	Pre-wired type	E6C3-AG5C
			Binary	32, 40		E6C3-AN5C
		PNP open collector output	BCD	6, 8, 12		E6C3-AB5C
			Gray code	256, 360, 720, 1,024		E6C3-AG5B
			Binary	32, 40		E6C3-AN5B
	5 VDC 12 VDC	NPN voltage output	BCD	6, 8, 12		E6C3-AB5B
			Binary	256		E6C3-AN1E
						E6C3-AN2E

## E6F-A

## Rugged housing rotary encoder



The E6F family of dia 60 mm rotary encoders features a rugged housing.

- Stronger shaft and higher durability (120 N in radial direction and 50 N in thrust direction) than previous E6F encoders
- Drip-proof construction meets IP64f standards
- High-resolution models (1,024 pulses max. per revolution)
- Faster response for high-speed control applications (grey code: 20 kHz).

### Ordering information

Size in mm	Supply voltage	Output form	Output code	Resolution (pulses/revolution)	Connection method	Model
Ø 60	12 to 24 VDC	NPN open collector	BCD	360	Pre-wired	E6F-AB5C
					Connector type	E6F-AB5C-C
		PNP open collector	Gray code	256, 360, 720, 1,024	Pre-wired	E6F-AB5B
					Pre-wired	E6F-AG5B



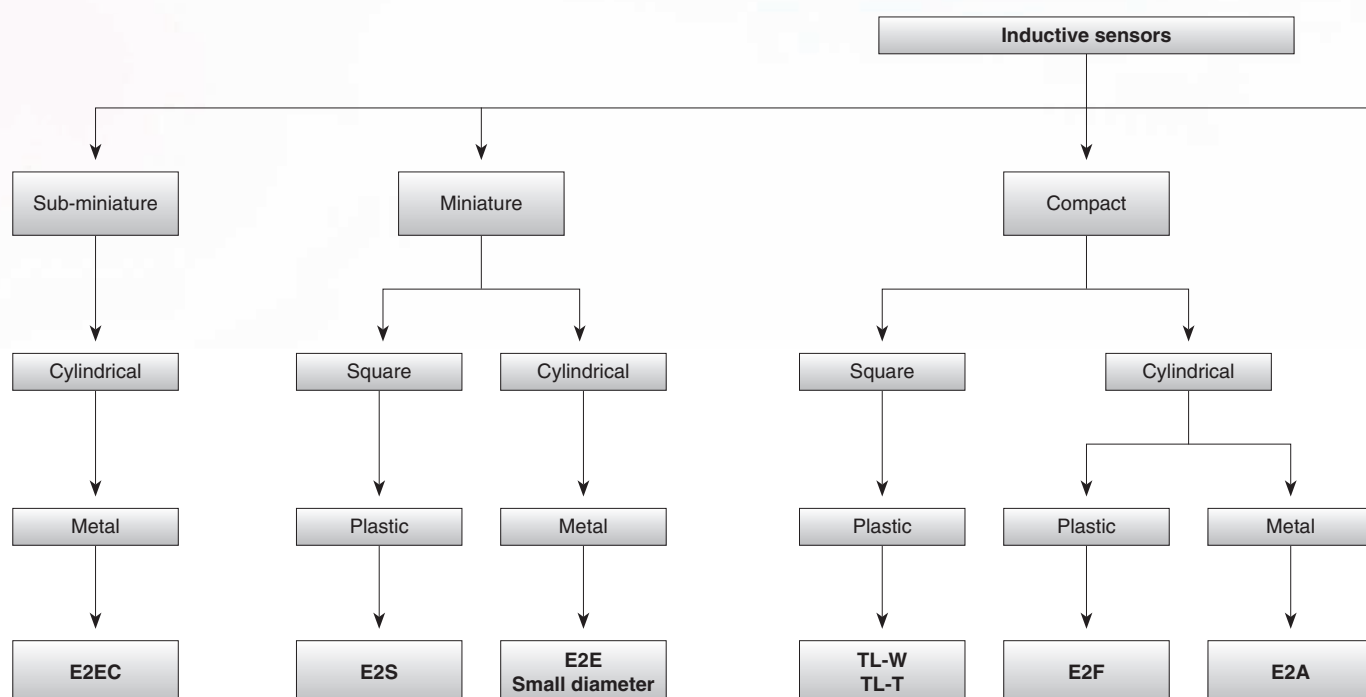
# Inductive sensors

## Reliability and accuracy confirmed by millions... every day

Omron invests heavily in intensive research and new production technologies for inductive sensors. These continuous improvement processes ensure that the most popular cylindrical inductive sensors E2A, E2E and E2F each feature one of the lowest return rates.

### Modular platform – choose the performance you need

- Highest flexibility for your machine design
- The sensing performance for your application
- The housing design for your machine concept
- The housing material for your operation environment





## Tested reliability for demanding conditions

Omron's sensor design standards exceed legal requirements by far and are based on the application know how of our world wide customers to ensure reliable operation wherever your machines go.



- Highest water resistance



- Highest electromagnetic protection (e.g. from dialing mobile phones)



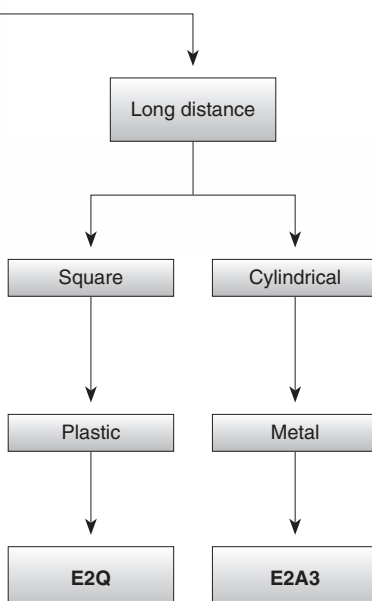
- Low frequency modulation for metal chip immunity








- Detergent and chemical resistant tested stainless steel and PTFE housings

## Table of contents






<b>Selection table</b>		40
<b>Subminiature</b>	E2EC	42
<b>Miniature</b>	E2E	43
<b>Compact - metal</b>	E2A	44
<b>Compact - plastic</b>	E2F	46
<b>Long distance</b>	E2A3	47
<b>Miniature - square</b>	E2S	48
<b>Compact - square</b>	TL-W	49
	TL-T	50
<b>Long distance - square</b>	E2Q2	51
	E2Q4	52
<b>Mobile usage</b>	E2AU	53
<b>Explosive environments</b>	E2AX	54
<b>Anti-microbial</b>	E2F-D	56
<b>High frequency</b>	E2EL	57
<b>Spatter resistant</b>	E2EQ	58
<b>AC power supply</b>	E2E-□Y / E2F-□Y	59
<b>Metal chip immune</b>	E2EZ	60
<b>Chemical resistant</b>	E2FQ	61
<b>Oil resistant</b>	E2E	62
<b>Precision positioning</b>	E2C-EDA	63







# Selection table







Format		Cylindrical				
						
Model		E2EC	E2E small diameter	E2A	E2F	E2A3
Type		Subminiature	Miniature	Compact		Long distance
Material		Brass	Brass	Brass, SUS	Polyarylate	Brass
Max. sensing distance	dia 3	0.8 mm				
	dia 4		0.8 mm			
	M5		1 mm			
	dia 5.4	1.5 mm	1 mm			
	M8			4 mm	1.5 mm	3 mm
	M12	4 mm		8 mm	2 mm	6 mm
	M18			16 mm	5 mm	11 mm
	M30			30 mm	10 mm	20 mm
	19x6x6					
	22x8x6					
	26x40x12					
	31x18x10					
	53x40x23					
	67x40x40					
Mount.	Shielded	■	■	■	■	■
	Non-shielded			■		
Oper. mode	NO	■	■	■	■	■
	NC	■	■	■	■	■
	NO + NC			■		
Wiring	DC 2-wire	■		■		
	DC 3-wire	■	■	■	■	■
	DC 4-wire			■		
	AC 2-wire			□	■	
Voltage	10-30 VDC	■	■	■	■	■
	10-60 VDC					
	12-240 VAC			□	■	
IP rating	IP67	■	■	■	■	■
	IP69k			■		■
Page		42	43	44	46	47

## Special models

Type	AC power supply	Vehicle usage certified	ATEX 3D certified	Oil resistant	Increased frequency
					
Model	E2Y-Y	E2AU	E2AX	E2E	E2EL
Application	<ul style="list-style-type: none"> <li>building installations</li> </ul>	<ul style="list-style-type: none"> <li>utility vehicles</li> <li>mobile construction equipment</li> <li>RCVs (refuse collecting vehicles)</li> <li>mobile agricultural equipment</li> </ul>	<ul style="list-style-type: none"> <li>powder handling and packaging</li> <li>wood cutting/ wood chip handling</li> </ul>	<ul style="list-style-type: none"> <li>automotive manufacturing lines</li> </ul>	<ul style="list-style-type: none"> <li>counting</li> <li>rotation speed control</li> </ul>
Key features	<ul style="list-style-type: none"> <li>24-240 VAC direct switching</li> </ul>	<ul style="list-style-type: none"> <li>e1 mark</li> <li>high EMC immunity (additional test up to 100V/m)</li> </ul>	<ul style="list-style-type: none"> <li>ATEX certification Group II category 3D (94/9/EG Appendix VIII)</li> <li>typically for explosive areas zone 22 with non-leading dust</li> </ul>	<ul style="list-style-type: none"> <li>tested oil resistance on commonly used lubricants</li> </ul>	<ul style="list-style-type: none"> <li>up to 5 kHz response (switching) frequency</li> </ul>
3 mm					
5.4 mm					
6.5 mm					■
M8	■			■	■
M12	■	■	■	■	
M18	■	■	■	■	
M30	■	■	■	■	
Page	59	53	54	62	57

Format		Square			
					
Model		E2S	TL-W	TL-T	E2Q2 / E2Q4
Type		Miniature	Compact	Compact	Long distance
Material		Polyarylate	ABS	PBT	PBT
Max. sensing distance	dia 3				
	dia 4				
	M5				
	dia 5.4				
	M8				
	M12				
	M18				
	M30				
	19x6x6	1.6 mm			
	22x8x6	2.5 mm	1.5 mm		
	26x40x12			4 mm	
	31x18x10		5 mm		
	53x40x23		20 mm		
	67x40x40				40 mm
Mount.	Shielded		■	■	■
	Non-shielded	■	■	■	■
Oper. mode	NO	■	■	■	■
	NC	■	■	■	■
	NO + NC			■	■
Wiring	DC 2-wire	■	■		
	DC 3-wire	■	■	■	■
	DC 4-wire			■	■
	AC 2-wire				
Voltage	10-30 VDC	■	■	■	
	10-60 VDC				■
	12-240 VAC				
IP rating	IP67	■	■	■	■
	IP69k				
Page		48	49	50	51 / 52

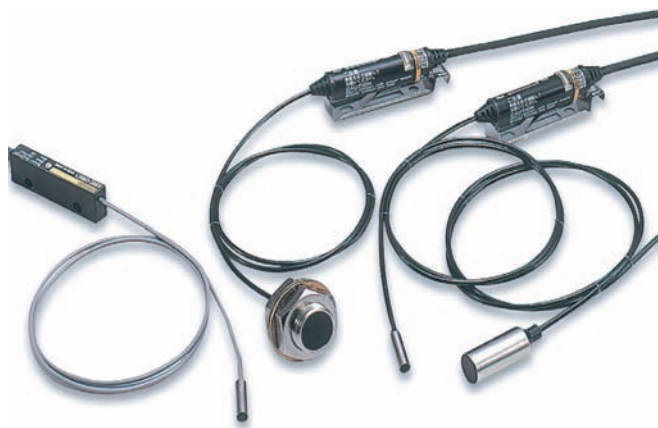
## Special models

Spatter resistant	Metal chip immune	Anti-microbial housing	Chemical resistant	High precision positioning	SMART inductive sensor
					
<b>E2EQ</b>	<b>E2EZ</b>	<b>E2F-D</b>	<b>E2FQ</b>	<b>E2C-EDA</b>	<b>ZX-E</b>
<ul style="list-style-type: none"> <li>welding applications</li> </ul>	<ul style="list-style-type: none"> <li>metal cutting in machine tool industry</li> </ul>	<ul style="list-style-type: none"> <li>meat and dairy products processing</li> <li>pharmaceutical packaging</li> </ul>	<ul style="list-style-type: none"> <li>applications with aggressive chemicals (etching, cleaning, water treatment)</li> </ul>	<ul style="list-style-type: none"> <li>precision positioning</li> </ul>	<ul style="list-style-type: none"> <li>high precision distance measurement</li> </ul>
<ul style="list-style-type: none"> <li>PTFE coating preventing the attachment of spatters</li> </ul>	<ul style="list-style-type: none"> <li>immune to aluminium and cast iron chips on sensing surface</li> </ul>	<ul style="list-style-type: none"> <li>anti-microbial housing material inhibiting and reducing bacteria and microbe growth</li> </ul>	<ul style="list-style-type: none"> <li>PTFE housing</li> </ul>	<ul style="list-style-type: none"> <li>repeat accuracy 1 µm</li> </ul>	<ul style="list-style-type: none"> <li>1 µm measurement resolution</li> </ul>
				■	■
				■	■
■	■	■	■		
■	■	■	■	■	■
■	■		■		
58	60	56	61	63	90

■ Standard

□ No / not available





Sub-miniature sensor for demanding mounting conditions

The E2EC family features the smallest sensor heads for reliable sensing in areas where mounting space is crucial. The miniature sizes of the sensing heads are achieved by separating the sensing part from the amplifier. In contrast to standard separate amplifier models the E2EC family simplifies the installation as the amplifier is built into the cable.

- 3 mm diameter sensing head for the most demanding mounting conditions
- 18 mm long ultra short M12 size housing



Ordering information

DC 2-wire				
Size	Shape	Sensing distance	Operating status	
			NO	NC
3-mm dia. <sup>*1</sup>	Shielded	0.8 mm	E2EC-CR8D1	E2EC-CR8D2
5.4-mm dia. <sup>*1</sup>		1.5 mm	E2EC-C1R5D1	E2EC-C1R5D2
8-mm dia. <sup>*1</sup>		3 mm	E2EC-C3D1	E2EC-C3D2
M12 <sup>*1</sup>		4 mm	E2EC-X4D1	E2EC-X4D2

<sup>\*1</sup> A different frequency type is available. (E2EC-□□5; e.g.E2EC-CR8D15)

Specifications

Item		E2EC-CR8D□	E2EC-C1R5D□	E2EC-C3D□	E2EC-X4D□
Sensing distance		0.8 mm ±15%	1.5 mm ±10%	3 mm ±10%	4 mm ±10%
Response frequency		1.5 kHz		1 kHz	
Power supply voltage (Operating voltage)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.			
Protective circuit		Surge absorber, short-circuit protection			
Ambient temperature		Operating / Storage: -25 °C to 70 °C (with no icing or condensation)			
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance		Destruction: 1,000 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions			
Degree of protection		IEC60529 IP67			
Material	Case	Brass			
	Sensing surface	ABS			

**Note:** The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.





## Miniature inductive proximity sensor

The E2E small diameter line with housing sizes dia 4 mm, M5 or dia 5.4 mm is part of the E2E family and is the ideal solution for tight mounting spaces.

- Miniature housing sizes dia 4 mm, M5 or dia 5.4 mm
- IP67

CE

### Ordering information

Size	Shape	Sensing distance	Connection	Housing material	Output	Operation mode NO	Operation mode NC
dia 4 mm	Shielded	0.8 mm	Pre-wired	brass	PNP	E2E-CR8C1	E2E-CR8C2
					NPN	E2E-CR8C1	E2E-CR8C2
			M8 connector		PNP	E2E-CR8C1-M5	E2E-CR8C2-M5
					NPN	E2E-CR8C1-M5	E2E-CR8C2-M5
M5		1 mm	Pre-wired		PNP	E2E-X1B1	E2E-X1B2
					NPN	E2E-X1C1	E2E-X1C2
			M8 connector		PNP	E2E-X1B1-M5	E2E-X1B2-M5
					NPN	E2E-X1C1-M5	E2E-X1C2-M5
dia 5.4 mm			Pre-wired		PNP	E2E-C1B1	E2E-C1B2
					NPN	E2E-C1C1	E2E-C1C2

### Specifications

Item	4 dia.		M5		5.4 dia.	
	E2E-CR8C□/B□		E2E-X1C□/B□		E2E-C1C□/B□	
Sensing distance	0.8 mm ±15%		1 mm ±15%			
Response frequency <sup>*1</sup>	3 kHz					
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.					
Protective circuit	Power supply reverse polarity protection, surge suppressor					
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)					
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions					
Shock resistance	500 m/s <sup>2</sup> 10 times each in X, Y, and Z directions					
Degree of protection	IEC 60529 IP67					
Material	Case	Stainless steel (SUS303)		Brass-nickel plated		
	Sensing surface	Heat-resistant ABS				

<sup>\*1</sup> The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.

## Cylindrical inductive sensor in brass and stainless steel housing



The modular E2A family of inductive sensors is designed and tested for extra long life with maximum quality consistency in manufacturing. The modular design provides the basis for an unmatched portfolio flexibility.

- Standard (single) or extended (double) sensing distance
- IP67 and IP69k for highest protection in wet environments
- Continuously high quality level through specialized manufacturing process
- DC 3-wire (NO, NC), DC 4-wire (NO+NC) and DC 2-wire models
- Wide portfolio range through modular concept

### Ordering information

(Exemplary for pre-wired. For connector versions, different cable materials and lengths or special connectors, please refer to complete datasheet.)

Size	Shape	Sensing distance	Thread length (overall length)	Output configuration	Operation mode NO	Operation mode NC	Operation mode NO + NC
M8	Shielded	2.0 mm	27 (40) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-S08KS02-WP-B1 2M	E2A-S08KS02-WP-B2 2M	
	Non-shielded	4.0 mm	27 (40) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-S08KN04-WP-B1 2M	E2A-S08KN04-WP-B2 2M	
M12	Shielded	4.0 mm	34 (50) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-M12KS04-WP-B1 2M	E2A-M12KS04-WP-B2 2M	E2A-M12KS04-WP-B3 2M
	Non-shielded	8.0 mm	34 (50) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-M12KN08-WP-B1 2M	E2A-M12KN08-WP-B2 2M	E2A-M12KN08-WP-B3 2M
M18	Shielded	8.0 mm	39 (59) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-M18KS08-WP-B1 2M	E2A-M18KS08-WP-B2 2M	E2A-M18KS08-WP-B3 2M
	Non-shielded	16.0 mm	39 (59) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-M18KN16-WP-B1 2M	E2A-M18KN16-WP-B2 2M	E2A-M18KN16-WP-B3 2M
M30	Shielded	15.0 mm	44 (64) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-M30KS15-WP-B1 2M	E2A-M30KS15-WP-B2 2M	E2A-M30KS15-WP-B3 2M
	Non-shielded	20.0 mm	44 (64) <sup>*1</sup>	PNP <sup>*2</sup>	E2A-M30KN20-WP-B1 2M	E2A-M30KN20-WP-B2 2M	E2A-M30KN20-WP-B3 2M

<sup>\*1</sup> Longer housing models are available.

<sup>\*2</sup> NPN models are also available.

### Model number legend

(please contact your OMRON representative for all available combinations)

E2A-□-□-□-□-□-□-□-□-□-□-□-□  
1 2 3 4 5 6 7 8 9 10 11 12

**Example:** E2A-M12LS04-M1-B1 Standard, M12, long barrel, shielded, Sn=4 mm, M12 connector, PNP-NO  
E2A-S08KN04-WP-B1 5M Standard, M8 stainless steel, short barrel, non-shielded, Sn=4 mm, pre-wired PVC cable, PNP-NO, cable length=5 m

#### 1. Basic name

E2A

#### 2. Sensing technology

Blank: Standard double distance  
3: Extended (triple) distance  
U: for mobile machines (vehicles)  
X: for explosive environments

#### 3. Housing shape and material

M: Cylindrical, metric threaded, brass  
S: Cylindrical, metric threaded, stainless steel

#### 4. Housing size

08: 8 mm  
12: 12 mm  
18: 18 mm  
30: 30 mm

#### 5. Barrel length

K: Standard length  
L: Long body

#### 6. Shield

S: Shielded  
N: Non-shielded

#### 7. Sensing distance

Numeral: Sensing distance: e.g. 02=2 mm, 16=16 mm

#### 8. Kind of connection

WP: pre-wired, PVC, dia 4mm (standard)  
WS: pre-wired, PVC, dia 6mm  
WR: pre-wired, PVC, robotic cable, dia 4mm  
WA: pre-wired, PUR/PVC (PUR jacket), dia 4mm  
WB: pre-wired, PUR/PVC (PUR jacket), dia 6mm

M1: M12 connector (4 pin) <sup>1</sup>  
M3: M8 connector (4 pin)  
M5: M8 connector (3 pin)

M1J pre-wired with M12 cable end connector (4 pin)  
M3J pre-wired with M8 cable end connector (4 pin)  
M5J pre-wired with M8 cable end connector (3 pin)

#### 9. Power source and output

B: DC, 3-wire, PNP open collector  
C: DC, 3-wire, NPN open collector  
D: DC, 2-wire  
E: DC, 3-wire, NPN voltage output  
F: DC, 3-wire, PNP voltage output

#### 10. Operation mode

1: Normally open (NO)  
2: Normally closed (NC)  
3: Antivalent (NO+NC)

#### 11. Specials (e.g., cable material, oscillating frequency)

#### 12. Cable length

Blank: Connector type  
Numeral: Cable length

1. In case of DC 2-wire models the M12 connector identifier is 'M1G'

## Specifications

Type	M8	M12	M18	M30
Item	E2A-S08	E2A-M12	E2A-M18	E2A-M30
Sensing distance	2 mm ±10%	4 mm ±10%	8 mm±10%	15 mm±10%
Response frequency	1,500 Hz	1,000 Hz	500 Hz	250 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protective circuit	Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection	Output reverse polarity protection, Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection		
Ambient temperature	Operating: -40 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)			
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y and Z directions			
Shock resistance	500 m/s <sup>2</sup> , 10 times each in X, Y and Z directions	1,000 m/s <sup>2</sup> , 10 times each in X, Y and Z directions		
Standard and listings (Degree of protection)	IP67 after IEC 60529 IP69k after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555			
Material	Case	Stainless steel	Brass-nickel plated or stainless steel	
	Sensing surface	PBT		



## Cylindrical inductive sensor in compact plastic housing

The general purpose E2F family features a full body plastic housing for high water and light chemical resistance.

- High quality full body plastic housing for high waterproof requirements
- Light chemical resistance

CE

### Ordering information

Size	Shape	Sensing distance	Output specifications	Operating status	
				NO	NC
M8	Shielded	1.5 mm	NPN	E2F-X1R5E1	E2F-X1R5E2
M12		2 mm	NPN	E2F-X2E1 <sup>*1</sup>	E2F-X2E2 <sup>*1</sup>
M18		5 mm	NPN	E2F-X5E1 <sup>*1</sup>	E2F-X5E2 <sup>*1</sup>
M30		10 mm	NPN	E2F-X10E1 <sup>*1</sup>	E2F-X10E2 <sup>*1</sup>

<sup>\*1</sup> A different frequency type is available. (E2F-X□□5; e.g. E2F-X5E15)

### Specifications

Item	E2F-X1R5E□	E2F-X2E□	E2F-X5E□	E2F-X10E□
Sensing distance	1.5 mm ±10%	2 mm ±10%	5 mm ±10%	10 mm ±10%
Response frequency <sup>*1</sup>	2 kHz	1.5 kHz	600 Hz	400 Hz
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Protective circuits	Reverse connection protection, load short-circuit protection, surge absorber			
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)			
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions			
Degree of protection	IEC IP67			
Material	Case	Polyarylate		
	Sensing surface			

<sup>\*1</sup> The response frequencies are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.



## Long (triple) distance inductive sensor

The E2A3 family features an optimised sensing performance to achieve triple sensing distance for flush mounting requirements. The E2A3 is based on the modular concept of the E2A family.

- Triple distance for demanding sensing requirements and enhanced sensor protection
- IP67 and IP69k

CE

### Ordering information

Diameter	Thread length	Type	Sensing distance	Connection	Output	Operation mode: NO	Operation mode: NC
M8	27 (40) mm	Shielded	3.0mm	Pre-wired	PNP	E2A3-S08KS03-WP-B1 2M	E2A3-S08KS03-WP-B2 2M
					NPN	E2A3-S08KS03-WP-C1 2M	E2A3-S08KS03-WP-C2 2M
	27 (44) mm			M12 Connector	PNP	E2A3-S08KS03-M1-B1	E2A3-S08KS03-M1-B2
					NPN	E2A3-S08KS03-M1-C1	E2A3-S08KS03-M1-C2
	27 (40) mm			M8 Connector (3-pin)	PNP	E2A3-S08KS03-M5-B1	E2A3-S08KS03-M5-B2
					NPN	E2A3-S08KS03-M5-C1	E2A3-S08KS03-M5-C2
M12	34 (50) mm	Shielded	6.0 mm	Pre-wired	PNP	E2A3-M12KS06-WP-B1 2M	E2A3-M12KS06-WP-B2 2M
					NPN	E2A3-M12KS06-WP-C1 2M	E2A3-M12KS06-WP-C2 2M
	34 (49) mm			M12 Connector	PNP	E2A3-M12KS06-M1-B1	E2A3-M12KS06-M1-B2
					NPN	E2A3-M12KS06-M1-C1	E2A3-M12KS06-M1-C2
M18	39 (60) mm	Shielded	11.0 mm	Pre-wired	PNP	E2A3-M18KS11-WP-B1 2M	E2A3-M18KS11-WP-B2 2M
					NPN	E2A3-M18KS11-WP-C1 2M	E2A3-M18KS11-WP-C2 2M
	39 (54) mm			M12 Connector	PNP	E2A3-M18KS11-M1-B1	E2A3-M18KS11-M1-B2
					NPN	E2A3-M18KS11-M1-C1	E2A3-M18KS11-M1-C2
M30	44 (65) mm	Shielded	20.0 mm	Pre-wired	PNP	E2A3-M30KS20-WP-B1 2M	E2A3-M30KS20-WP-B2 2M
					NPN	E2A3-M30KS20-WP-C1 2M	E2A3-M30KS20-WP-C2 2M
	44 (59) mm			M12 Connector	PNP	E2A3-M30KS20-M1-B1	E2A3-M30KS20-M1-B2
					NPN	E2A3-M30KS20-M1-C1	E2A3-M30KS20-M1-C2

### Specifications

Item	M8	M12	M18	M30
	E2A3-S08KS03-□□-B□ E2A3-S08KS03-□□-C□	E2A3-M12KS06-□□-B□ E2A3-M12KS06-□□-C□	E2A3-M18KS11-□□-B□ E2A3-M18KS11-□□-C□	E2A3-M30KS20-□□-B□ E2A3-M30KS20-□□-C□
Sensing distance	3 mm ±10%	6 mm ±10%	11 mm ±10%	20 mm ±10%
Response frequency <sup>*1</sup>	700 Hz	350 Hz	250 Hz	80 Hz
Power supply voltage (operating voltage)	12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)			
Protection circuit	Power source circuit reverse polarity protection, Surge suppressor, Short-circuit protection			
Ambient temperature	Operating: -25 °C to 70 °C, Storage: -25 °C to 70 °C			
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions			
Shock resistance	500 m/s <sup>2</sup> , 10 times each in X, Y, and Z directions			
Standards and listings	IP67 after IEC 60529 IP69K after DIN 40050 EMC after EN60947-5-2 UL (CSA) E196555 <sup>*2</sup>			
Material	Case	Stainless steel <sup>*3</sup>	Brass-nickel plated	
	Sensing surface	PBT		

<sup>\*1</sup> The response frequency is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object length between sensing objects, and a set distance of half the sensing distance.

<sup>\*2</sup> UL (CSA) [E196555]: Use class 2 circuit only.

<sup>\*3</sup> Material specifications for stainless steel housing case: 1.4305 (W.-No.), SUS303 (AISI), 2346 (SS).



## Miniature square inductive sensor

The E2S family features miniature block style plastic housings for demanding mounting conditions.

- Miniature housing with long sensing ranges
- Front and side facing sensing surfaces
- Simple mounting with one screw
- IP67



CE

### Ordering information

#### DC 2-wire models

Sensing surface	Shape	Size in mm (HxWxD)	Sensing distance	Operating status	
				NO	NC
Front face	Unshielded	19x6x6	1.6 mm	E2S-W11	E2S-W12
End face				E2S-Q11	E2S-Q12
Front face		23x8x8	2.5 mm	E2S-W21	E2S-W22
End face				E2S-Q21	E2S-Q22

#### DC 3-wire models

Sensing surface	Shape	Size in mm (HxWxD)	Sensing distance	Output specifications	Operating status	
					NO	NC
Front face	Unshielded	19x6x6	1.6 mm	NPN	E2S-W13	E2S-W14
End face					E2S-Q13	E2S-Q14
Front face		27x8x8	2.5 mm		E2S-W23	E2S-W24
End face					E2S-Q23	E2S-Q24
Front face		19x6x6	1.6 mm	PNP	E2S-W15	E2S-W16
End face					E2S-Q15	E2S-Q16
Front face		23x8x8	2.5 mm		E2S-W25	E2S-W26
End face					E2S-Q25	E2S-Q26

### Specifications

#### DC 2-wire models

Item	E2S-W11 E2S-W12	E2S-Q11 E2S-Q12	E2S-W21 E2S-W22	E2S-Q21 E2S-Q22
Sensing surface	Front face	End face	Front face	End face
Sensing distance	1.6 mm ±10%		2.5 mm ±15%	
Response frequency	1 kHz min.			
Rated supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.			
Operating status (with sensing object approaching)	□□1 models: NO □□2 models: NC			

#### DC 3-wire models

Item	E2S-W13 E2S-W14	E2S-Q13 E2S-Q14	E2S-W23 E2S-W24	E2S-Q23 E2S-Q24	E2S-W15 E2S-W16	E2S-Q15 E2S-Q16	E2S-W25 E2S-W26	E2S-Q25 E2S-Q26
Sensing surface	Front face	End face	Front face	End face	Front face	End face	Front face	End face
Sensing distance	1.6 mm ±10%		2.5 mm ±15%		1.6 mm ±10%		2.5 mm ±15%	
Response frequency	1 kHz min.							
Rated supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Protective circuit	Reverse polarity connection and surge absorber							
Ambient temperature	Operating: -25 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)							
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance	Destruction: 500 m/s2 for 3 times each in X, Y, and Z directions							
Degree of protection	IEC60529 IP67							
Material	Case	Polyarylate						



## Compact square (flat shape) inductive sensor

The TL-W family offers a wide range of block style inductive sensors featuring different housing sizes for all standard applications.

- Front and side facing surface
- IP67
- DC 2-wire and DC 3-wire models

CE

### Ordering information

#### DC 2-wire models

Shape	Sensing distance	Output and operating status	
		NO	NC
Non-Shielded	5 mm	TL-W5MD1 <sup>*1</sup>	TL-W5MD2 <sup>*1</sup>

<sup>\*1</sup> Models with different response frequency are available. These model numbers take the form TL-W5MD□5 (e.g., TL-W5MD15)

#### DC 3-wire models

Shape	Size in mm (HxWxD)	Sensing distance	Output specifications	Output and operating status			
				PNP-NO	PNP-NC	NPN-NO	NPN-NC
Non-Shielded	25x8x5	1.5 mm	DC 3-wire	TL-W1R5MB1	---	TL-W1R5MC1 <sup>*1</sup>	---
	22x8x6	3 mm		TL-W3MB1	TL-W3MB2	TL-W3MC1 <sup>*1</sup>	TL-W3MC2
	31x18x10	5 mm		TL-W5MB1	TL-W5MB2	TL-W5MC1 <sup>*1</sup>	TL-W5MC2
	53x40x23	20 mm		---	---	TL-W20ME1 <sup>*1</sup>	TL-W20ME2 <sup>*1</sup>
Shielded	31x18x10	5 mm	DC 3-wire	TL-W5F1	TL-W5F2	TL-W5E1	TL-W5E2

<sup>\*1</sup> Models with different response frequency are available. These model numbers take the form TL-W5MD□5 (e.g., TL-W5MD15)

### Specifications

Item	TL-W5MD□	TL-W1R5M□1	TL-W3M□□	TL-W5M□□	TL-W5E□/F□	TL-W20ME□
Sensing distance	5 mm ±10%	1.5 mm ±10%	3 mm ±10%	5 mm ±10%		20 mm ±10%
Response frequency	0.5 kHz	1 kHz min.	600 Hz min.	500 Hz min.	300 Hz min.	40 Hz min.
Power supply voltage (operating voltage)	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.				10 to 30 VDC with a ripple (p-p) of 20% max.	12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)					
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions					
Shock resistance	Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions					Destruction: 500 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions
Degree of protection	IEC60529 IP67					
Material	Case	Heat-resistant ABS resin			Diecast aluminum	Heat-resistant ABS resin
	Sensing surface	Heat-resistant ABS resin				



## Compact square (thin shape) inductive sensor

The TL-T features a 12 mm thin housing for space saving direct wall mounting.

- 12 mm thin housing
- Direct side wall mounting for bracket-less installation



### Ordering information

#### DC 3-wire models

Mounting	Sensing distance	Connection	Output configuration	Operation status mode NO	Operation status mode NC
Shielded	2.0 mm	Pre-wired	NPN	TL-T2E1-E	TL-T2E2-E
			PNP	TL-T2F1-E	TL-T2F2-E
		M8 connector (3-pin)	NPN	TL-T2E1-M5-E	TL-T2E2-M5-E
			PNP	TL-T2F1-M5-E	TL-T2F2-M5-E
Non-shielded	4.0 mm	Pre-wired	NPN	TL-T4ME1-E	TL-T4ME2-E
			PNP	TL-T4MF1-E	TL-T4MF2-E
		M8 connector (3-pin)	NPN	TL-T4ME1-M5-E	TL-T4ME2-M5-E
			PNP	TL-T4MF1-M5-E	TL-T4MF2-M5-E

#### DC 4-wire models (NO + NC)

Mounting	Sensing distance	Connection	Output configuration	Operation status mode antivalent (NO + NC)
Shielded	2.0 mm	Pre-wired	NPN	TL-T2E3-E
			PNP	TL-T2F3-E
Non-shielded	4.0 mm	Pre-wired	NPN	TL-T4ME3-E
			PNP	TL-T4MF3-E

### Specifications

Item		Shielded TL-T2	Non-shielded TL-T4
Sensing distance		2 mm $\pm 10\%$	4 mm $\pm 10\%$
Response frequency <sup>*1</sup>		3000 Hz	1500 Hz
Power supply voltage (operating voltage)		24 VDC. Ripple (p-p): 10% max. (10 to 35 VDC)	
Protective circuit		Output reverse polarity protection, power source circuit reverse polarity protection, surge suppressor, short-circuit protection	
Ambient temperature		Operating/Storage: -25 °C to 70 °C	
Vibration resistance		0 to 55 Hz with 30 min. dwell time at resonance frequency or 55 Hz each in X, Y, and Z directions 55 to 2000 Hz, 150 m/s <sup>2</sup> , double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance		300 m/s <sup>2</sup> 6 times each in X, Y, and Z directions	
Degree of protection		in accordance with IEC 60529: Pre-wired models: IP67 M8 Connector models: IP65	
Material	Case	PBT	
	Cable	PVC	
Size in mm		26Hx40Wx12D	

<sup>\*1</sup> The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.



## Long distance square inductive sensor

The E2Q family of long distance sensors features two housing styles. The compact sized E2Q4 with M12 connector and the E2Q2 with the same housing dimensions as standard type electromechanical limit switches and terminal connection for simple wiring connections.

- Sensing distance of up to 40 mm
- Active face direction changeable
- 10 to 60 VDC supply voltage
- Optionally weld-field-immune or AC voltage models



### Ordering information

Shape	Sensing distance	Connection	Active face	Output		
					NO	NO + NC
Shielded	20 mm	Terminals	Changeable	NPN	E2Q2-N20E1-H	E2Q2-N20E3-□
				PNP	E2Q2-N20F1-H	E2Q2-N20F3-□
Non-shielded	30 mm			NPN		E2Q2-N30ME3-□
				PNP		E2Q2-N30MF3-□
Non-shielded	40 mm			NPN		E2Q2-N40ME3-□
				PNP		E2Q2-N40MF3-□

### Specifications

Item		Shielded	Non-shielded	
		E2Q2-N20□□-□	E2Q2-N30□□-□	E2Q2-N40□□-□
Sensing distance		20 mm ±10%	30 mm ±10%	40 mm ±10%
Response frequency		150 Hz	100 Hz	30 Hz
Power supply voltage (operating voltage)		10 to 60 VDC		
Protective circuit		Reverse polarity, output short circuit		
Ambient temperature		Operating: -25 °C to 70 °C		
Vibration resistance		10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6		
Shock resistance		Approx. 30 G for 11 ms according to IEC 60068-2-27		
Degree of protection		IEC 60529    IP 67		
Material	Case terminal base	PBT		
		Al		
	Sensing face	PBT (...-H type)		
PBT				
Size in mm		118Hx40Wx40D		



## Long distance square inductive proximity sensor

- Compact size for long distance requirements
- M12 Plug-in connection
- Active face positioning: Y-axis 15°, X-axis 90° increments



### Ordering information

Shape	Sensing distance	Connection	Active face	Operating status		
					NO	NO + NC
Shielded	20 mm	Plug-in connector	Changable	NPN	E2Q4-N20E1-M1	E2Q4-N20E3-M1
				PNP	E2Q4-N20F1-M1	E2Q4-N20F3-M1
Non-shielded	30 mm			NPN	E2Q4-N30ME1-M1	E2Q4-N30ME3-M1
				PNP	E2Q4-N30MF1-M1	E2Q4-N30MF3-M1
Non-shielded	40 mm			NPN		E2Q4-N40ME3-M1
				PNP		E2Q4-N40MF3-M1

### Specifications

Item	Shielded	Non-shielded	
	E2Q4-N20□□-M1	E2Q4-N30M□□-M1	E2Q4-N40M□3-M1
Sensing distance $S_n$	20 mm ± 10%	30 mm ± 10%	40 mm ± 10%
Switching frequency	150 Hz		
Power supply voltage (operating voltage)	10 to 30 VDC		
Protective circuit	Reverse polarity, output short circuit		
Ambient temperature	Operating: -25 °C to 70 °C		
Vibration resistance	10 to 55 Hz, 1 mm amplitude according IEC 60068-2-6		
Shock resistance	Approx. 30 G for 11 ms according to IEC 60068-2-27		
Degree of protection	IEC 60529 IP 67		
Material	Case	PBT	
	Sensing face	PBT	
Size in mm	67Hx40Wx40D		





## Cylindrical inductive sensor for mobile usage

Designed and tested to keep your machines moving.

- IP69k tested and certified for highest water resistance
- e1 type approval (according to automotive directive 95/54/EC)
- EMC noise tested up to 100 V/m (ISO 11452-2)
- Cable breakage protection

CE

### Ordering information

Size	Length	Type	Sensing distance	Connection	Output configuration	Operation mode NO
M12	34 (50)	Shielded	4.0 mm	Pre-wired	PNP	E2AU-M12KS04-WP-B1 2M
	56 (72)				PNP	E2AU-M12LS04-WP-B1 2M
	34 (48)			M12 connector	PNP	E2AU-M12KS04-M1-B1
	56 (70)				PNP	E2AU-M12LS04-M1-B1
M18	39 (59)	Shielded	8.0 mm	Pre-wired	PNP	E2AU-M18KS08-WP-B1 2M
	61 (81)				PNP	E2AU-M18LS08-WP-B1 2M
	39 (53)			M12 connector	PNP	E2AU-M18KS08-M1-B1
	61 (75)				PNP	E2AU-M18LS08-M1-B1
M30	44 (64)	Shielded	15.0 mm	Pre-wired	PNP	E2AU-M30KS15-WP-B1 2M
	66 (86)				PNP	E2AU-M30LS15-WP-B1 2M
	44 (58)			M12 connector	PNP	E2AU-M30KS15-M1-B1
	66 (80)				PNP	E2AU-M30LS15-M1-B1

### Specifications

Item	M12 E2AU-M12□S04-□□-B1	M18 E2AU-M18□S08-□□-B1	M30 E2AU-M30□S15-□□-B1
<b>Sensing distance</b>	4 mm ±10%	8 mm ±10%	15 mm ±10%
<b>Response frequency</b> <sup>*1</sup>	1,000 Hz	500 Hz	250 Hz
<b>Power supply voltage (operating voltage)</b>	12 to 24 VDC. Ripple (p-p): 10% max.(10 to 32 VDC)		
<b>Protective circuit</b>	Output reverse polarity protection, power source circuit reverse polarity protection, surge suppressor, short-circuit protection		
<b>Ambient temperature</b>	Operating: -40 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)		
<b>Vibration resistance</b>	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions		
<b>Shock resistance</b>	1,000 m/s <sup>2</sup> , 10 times each in X, Y and Z directions		
<b>Degree of protection</b>	IP67 after IEC 60529 IP69k after DIN 40050		
<b>Standard and listings</b>	EMC after EN60947-5-2 UL (CSA) E196555 <sup>*2</sup> EMC after 95/94/EC EMC after ISO11452-2		
<b>Material</b>	<b>Case</b>	Brass-nickel plated	
	<b>Sensing surface</b>	PBT	

<sup>\*1</sup> The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

<sup>\*2</sup> UL (CSA) [E196555]: Use class 2 circuit only.



## Cylindrical inductive sensor for explosive environments

The high-reliability and robustness of the E2A family is now also available for explosive environments. The protective structure of the E2A family (based on EN50014 and EN50281-1-1/2) allows the ATEX certification group II category 3D (94/9/EC appendix VIII) typically for explosive areas zone 22 with non-leading dust.

- Protective connector cover to avoid disconnection under power
- Certified ATEX group II category 3D (94/9/EC appendix VIII)
- Rugged housing construction based on EN50014 and EN50281-1-1/2



### Ordering information

#### DC 3-wire models (NO + NC: DC 4-wire) <sup>\*1</sup>

Size	Sensing distance	Connection	Body material	Thread length (overall length)	Output configuration	Operation mode NO	Operation mode NC	Operation mode NO + NC
M12	Shielded	M12 connector	Brass <sup>*2</sup>	34 (48)	PNP	E2AX-M12KS04-M1-B1	E2AX-M12KS04-M1-B2	E2AX-M12KS04-M1-B3
					NPN	E2AX-M12KS04-M1-C1	E2AX-M12KS04-M1-C2	E2AX-M12KS04-M1-C3
				56 (70)	PNP	E2AX-M12LS04-M1-B1	E2AX-M12LS04-M1-B2	E2AX-M12LS04-M1-B3
					NPN	E2AX-M12LS04-M1-C1	E2AX-M12LS04-M1-C2	E2AX-M12LS04-M1-C3
	Non-shielded	M12 connector	Brass <sup>*2</sup>	34 (48)	PNP	E2AX-M12KN08-M1-B1	E2AX-M12KN08-M1-B2	E2AX-M12KN08-M1-B3
					NPN	E2AX-M12KN08-M1-C1	E2AX-M12KN08-M1-C2	E2AX-M12KN08-M1-C3
				56 (70)	PNP	E2AX-M12LN08-M1-B1	E2AX-M12LN08-M1-B2	E2AX-M12LN08-M1-B3
					NPN	E2AX-M12LN08-M1-C1	E2AX-M12LN08-M1-C2	E2AX-M12LN08-M1-C3
M18	Shielded	M12 connector	Brass <sup>*2</sup>	39 (53)	PNP	E2AX-M18KS08-M1-B1	E2AX-M18KS08-M1-B2	E2AX-M18KS08-M1-B3
					NPN	E2AX-M18KS08-M1-C1	E2AX-M18KS08-M1-C2	E2AX-M18KS08-M1-C3
				61 (75)	PNP	E2AX-M18LS08-M1-B1	E2AX-M18LS08-M1-B2	E2AX-M18LS08-M1-B3
					NPN	E2AX-M18LS08-M1-C1	E2AX-M18LS08-M1-C2	E2AX-M18LS08-M1-C3
	Non-shielded	M12 connector	Brass <sup>*2</sup>	39 (53)	PNP	E2AX-M18KN16-M1-B1	E2AX-M18KN16-M1-B2	E2AX-M18KN16-M1-B3
					NPN	E2AX-M18KN16-M1-C1	E2AX-M18KN16-M1-C2	E2AX-M18KN16-M1-C3
				61 (75)	PNP	E2AX-M18LN16-M1-B1	E2AX-M18LN16-M1-B2	E2AX-M18LN16-M1-B3
					NPN	E2AX-M18LN16-M1-C1	E2AX-M18LN16-M1-C2	E2AX-M18LN16-M1-C3
M30	Shielded	M12 connector	Brass <sup>*2</sup>	44 (58)	PNP	E2AX-M30KS15-M1-B1	E2AX-M30KS15-M1-B2	E2AX-M30KS15-M1-B3
					NPN	E2AX-M30KS15-M1-C1	E2AX-M30KS15-M1-C2	E2AX-M30KS15-M1-C3
				66 (80)	PNP	E2AX-M30LS15-M1-B1	E2AX-M30LS15-M1-B2	E2AX-M30LS15-M1-B3
					NPN	E2AX-M30LS15-M1-C1	E2AX-M30LS15-M1-C2	E2AX-M30LS15-M1-C3
	Non-shielded	M12 connector	Brass <sup>*2</sup>	44 (58) <sup>*3</sup>	PNP	E2AX-M30KN20-M1-B1	E2AX-M30KN20-M1-B2	E2AX-M30KN20-M1-B3
					NPN	E2AX-M30KN20-M1-C1	E2AX-M30KN20-M1-C2	E2AX-M30KN20-M1-C3
				66 (80)	PNP	E2AX-M30LN30-M1-B1	E2AX-M30LN30-M1-B2	E2AX-M30LN30-M1-B3
					NPN	E2AX-M30LN30-M1-C1	E2AX-M30LN30-M1-C2	E2AX-M30LN30-M1-C3

<sup>\*1</sup> Please contact your OMRON representative for DC 2-wire models.

<sup>\*2</sup> Stainless steel models are also available. Please contact your OMRON representative.

<sup>\*3</sup> M30 non-shielded models with double sensing distance and short barrels cannot be mounted due to the necessary separation distance from the surrounding metal. Standard sensing models are thus available.

## Specifications

Size		M12		M18		M30	
Type		Shielded	Non-shielded	Shielded	Non-shielded	Shielded	Non-shielded
Item		E2AX-M12	E2AX-M12	E2AX-M18	E2AX-M18	E2AX-M30	E2AX-M30
		□S04-□□-B□	□N08-□□-B□	□S08-M1-B□	□N16-M1-B□	□S15-M1-B□	KN20-M1-B□
		E2AX-M12	E2AX-M12	E2AX-M18	E2AX-M18	E2AX-M30	E2AX-M30
		□S04-□□-C□	□N08-□□-C□	□S08-M1-C□	□N16-M1-C□	□S15-M1-C□	KN20-M1-C□
		E2AX-S12	E2AX-S12	E2AX-S18	E2AX-S18	E2AX-S30	E2AX-S30
		□S04-□□-B□	□N08-□□-B□	□S08-M1-B□	□N16-M1-B□	□S15-M1-B□	KN20-M1-B□
		E2AX-S12	E2AX-S12	E2AX-S18	E2AX-S18	E2AX-S30	E2AX-S30
		□S04-□□-C□	□N08-□□-C□	□S08-M1-C□	□N16-M1-C□	□S15-M1-C□	KN20-M1-C□
Sensing distance		4 mm ±10%	8 mm ±10%	8 mm ±10%	16 mm ±10%	15 mm ±10%	20 mm ±10%
Response frequency <sup>*1</sup>		1,000 Hz	800 Hz	500 Hz	400 Hz	250 Hz	100 Hz
Power supply voltage (operating voltage range)		12 to 24 VDC. Ripple (p-p): 10% max. (10 to 32 VDC)					
Protection circuit		Output reverse polarity protection, power source circuit reverse polarity protection, surge suppressor, short-circuit protection					
Ambient air temperature		Operating: -40 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)					
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y and Z directions					
Shock resistance		1,000 m/s <sup>2</sup> , 10 times each in X, Y and Z directions					
Standard and listings		IP65 EMC after EN60947-5-2 UL (CSA) E196555 <sup>*2</sup> ATEX after EN50014 EN50281-1-1/2					
Material	Case	Brass-nickel plated or stainless steel					
	Sensing surface	PBT					
	Clamping nut	Brass-nickel plated for brass models stainless steel for steel models					

<sup>\*1</sup> The response frequency is an average value. Measurement conditions are as follows: standard target, a distance of twice the standard target distance between targets, and a setting distance of half the sensing distance.

<sup>\*2</sup> UL (CSA) [E196555]: Use class 2 circuit only



## Anti-microbial inductive sensor in cylindrical plastic housing

The E2F-D features a FDA approved anti-microbial housing reducing the risk of food contamination.

- Anti-microbial housing material reducing bacteria growth
- IP67 and IP69k for highest water resistance
- Tested detergent resistance



### Ordering information

Size	Shape	Sensing distance	Output specifications	Operating status	
				NO	NC
M12	non-shielded	4 mm	NPN	E2F-DX4E1	E2F-DX4E2
			PNP	E2F-DX4F1	E2F-DX4F2
M18		8 mm	NPN	E2F-DX8E1	E2F-DX8E2
			PNP	E2F-DX8F1	E2F-DX8F2

### Specifications

Item	E2F-DX4□	E2F-DX8□
Sensing distance	4 mm ±10%	8 mm ±10%
Response frequency	1 kHz	500 Hz
Power supply voltage	10 to 35 VDC	
Ambient temperature	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)	
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions	
Degree of protection	IP67, IP69k	
Material	PBT with anti-microbial SAN additive based on silver ions	



## Increased switching frequency inductive sensor

The E2EL family features an increased response frequency for high-speed applications such as counting applications.

- Max 5 kHz, switching frequency
- M8 or dia 6.5 mm housing
- Brass or stainless steel housing

CE

### Ordering information

Exemplary for pre-wired types. Please refer to complete datasheet for connector versions.

#### Brass housing

Size	Length	Shape	Sensing distance	Operating status			
				NPN / NO	NPN / NC	PNP / NO	PNP / NC
Ø 6,5	30 mm	Shielded	1,5 mm	E2EL-C1R5E1 2M	E2EL-C1R5E2 2M	E2EL-C1R5F1 2M	E2EL-C1R5F2 2M
	32 mm	Non-shielded	2,0 mm	E2EL-C2ME1 2M	E2EL-C2ME2 2M	E2EL-C2MF1 2M	E2EL-C2MF2 2M
	45 mm	Shielded	1,5 mm	E2EL-C1R5E1-L 2M	E2EL-C1R5E2-L 2M	E2EL-C1R5F1-L 2M	E2EL-C1R5F2-L 2M
	47 mm	Non-shielded	2,0 mm	E2EL-C2ME1-L 2M	E2EL-C2ME2-L 2M	E2EL-C2MF1-L 2M	E2EL-C2MF2-L 2M
M8	30 mm	Shielded	1,5 mm	E2EL-X1R5E1 2M	E2EL-X1R5E2 2M	E2EL-X1R5F1 2M	E2EL-X1R5F2 2M
	32 mm	Non-shielded	2,0 mm	E2EL-X2ME1 2M	E2EL-X2ME2 2M	E2EL-X2MF1 2M	E2EL-X2MF2 2M
	45 mm	Shielded	1,5 mm	E2EL-X1R5E1-L 2M	E2EL-X1R5E2-L 2M	E2EL-X1R5F1-L 2M	E2EL-X1R5F2-L 2M
	47 mm	Non-shielded	2,0 mm	E2EL-X2ME1-L 2M	E2EL-X2ME2-L 2M	E2EL-X2MF1-L 2M	E2EL-X2MF2-L 2M

#### Stainless steel housing

Size	Length	Mounting	Sensing distance	Operating status			
				NPN / NO	NPN / NC	PNP / NO	PNP / NC
Ø 6,5	30 mm	Shielded	2,0 mm	E2EL-C2E1-DS 2M	E2EL-C2E2-DS 2M	E2EL-C2F1-DS 2M	E2EL-C2F2-DS 2M
	45 mm	Shielded	2,0 mm	E2EL-C2E1-DSL 2M	E2EL-C2E2-DSL 2M	E2EL-C2F1-DSL 2M	E2EL-C2F2-DSL 2M
M8	30 mm	Shielded	2,0 mm	E2EL-X2E1-DS 2M	E2EL-X2E2-DS 2M	E2EL-X2F1-DS 2M	E2EL-X2F2-DS 2M
	45 mm	Shielded	2,0 mm	E2EL-X2E1-DSL 2M	E2EL-X2E2-DSL 2M	E2EL-X2F1-DSL 2M	E2EL-X2F2-DSL 2M

### Specifications

Type		Ø 6,5		M8	
Response frequency		5,0 kHz			
Power supply voltage (operating voltage)		24 VDC			
Protective circuit		Reverse polarity, output short-circuit			
Operating voltage		10 to 35 VDC			
Mounting		Shielded	Non-shielded	Shielded	Non-shielded
Operating distance		1,5 mm	2,0 mm	1,5 mm	2,0 mm
Ambient temperature		Operating: -25 °C to 70 °C			
Vibration resistance		Destruction: 10 to 70 Hz, 1,5 mm double amplitude for 1 hour each in X, Y and Z directions			
Shock resistance		Destruction: 300 m/s² (approx. 30 G) for 6 times each in X, Y and Z directions			
Enclosure rating		IP 67 (EN 60947-1)			
Material	Case	Brass, stainless steel 1.4305/AIS/303			
	Sensing face	PBT			





Spatter resistant inductive sensors

The E2EQ family features a PTFE coated brass housing preventing the attachment of sputters in welding applications.

- PTFE coated brass housing
- DC 2-wire models



Ordering information

Size	Shape	Sensing distance	Output specifications	Operating status	Model
M12	Shielded	4 mm	DC 2-wire	NO	E2EQ-X4X1
M18		8 mm			E2EQ-X8X1
M30		15 mm			E2EQ-X15X1

Specifications

Item		E2EQ-X4X1 E2EQ-X4X1-M1J	E2EQ-X8X1 E2EQ-X8X1-M1J	E2EQ-X15X1 E2EQ-X15X1-M1J
Sensing distance		4 mm ±10%	8 mm ±10%	15 mm ±10%
Response frequency <sup>*1</sup>		1 kHz	0.5 kHz	0.25 kHz
Power supply voltage (operating voltage)		12 - 24 VDC (10 to 30 VDC), ripple (p-p) 10% max.		
Protective circuits		Surge absorber, load short-circuit protection		
Ambient temperature		Operating: -25 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)		
Shock resistance		Destruction: 1,000 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions		
Degree of protection		IP67 (IEC 60529)		
Material	Case	Teflon resin coating (brass base)		
	Sensing surface	PTFE resin		

<sup>\*1</sup> The response frequencies for DC switching are average values.



## Inductive sensor line for AC power supply



The E2E-□Y and E2F-□Y models offer the same functionality and protection as the standard E2E (brass housing) and E2F (plastic housing) families but can be connected to an AC power supply.

- 24-240 VAC direct switching
- IP67
- Brass or plastic housing

CE

## Ordering information

### AC 2-wire / Pre-wired models

Size		Sensing distance	Operation mode	Metal housing		Plastic housing
				Pre-wired	Connector	Pre-wired
Shielded 	M8	1.5 mm	NO	E2E-X1R5Y1		E2F-X1R5Y1
			NC	E2E-X1R5Y2		E2F-X1R5Y2
	M12	2 mm	NO	E2E-X2Y1	E2E-X2Y1-M1	E2F-X2Y1
			NC	E2E-X2Y2	E2E-X2Y2-M1	E2F-X2Y2
	M18	5 mm	NO	E2E-X5Y1	E2E-X5Y1-M1	E2F-X5Y1
			NC	E2E-X5Y2	E2E-X5Y2-M1	E2F-X5Y2
	M30	10 mm	NO	E2E-X10Y1	E2E-X10Y1-M1	E2F-X10Y1
			NC	E2E-X10Y2	E2E-X10Y2-M1	E2F-X10Y2
Unshielded 	M8	2 mm	NO	E2E-X2MY1		
			NC	E2E-X2MY2		
	M12	5 mm	NO	E2E-X5MY1	E2E-X5MY1-M1	
			NC	E2E-X5MY2	E2E-X5MY2-M1	
	M18	10 mm	NO	E2E-X10MY1	E2E-X10MY1-M1	
			NC	E2E-X10MY2	E2E-X10MY2-M1	
	M30	18 mm	NO	E2E-X18MY1	E2E-X18MY1-M1	
			NC	E2E-X18MY2	E2E-X18MY2-M1	

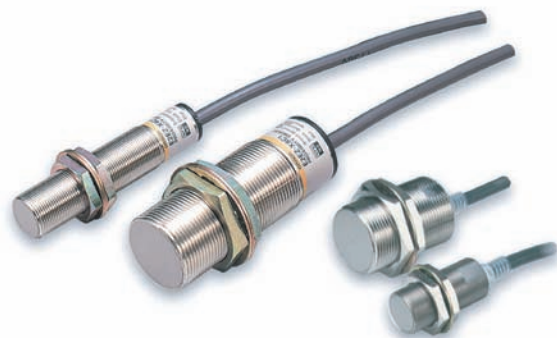
## Specifications (exemplary)

### Metal housing (E2E)

Size		M8		M12		M18		M30	
Type		Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded
Item		E2E-X1R5Y□	E2E-X2MY□	E2E-X2Y□	E2E-X5MY□	E2E-X5Y□	E2E-X10MY□	E2E-X10Y□	E2E-X18MY□
Sensing distance		1.5 mm ±10%	2 mm ±10%	2 mm ±10%	5 mm ±10%	5 mm ±10%	10 mm ±10%	10 mm ±10%	18 mm ±10%
Response speed		25 Hz							
Power supply voltage (operating voltage range) *1		24 to 240 VAC, 50/60 Hz (20 to 264 VAC)							
Operation mode (with sensing object approaching)		Y1 Models: NO Y2 Models: NC For details, refer to <i>Timing charts</i> .							
Ambient temperature *1 *2		Operating/Storage: -25 °C to 70 °C (with no icing or condensation)		Operating/Storage: -40 °C to 85 °C (with no icing or condensation)					
Vibration resistance		10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		500 m/s <sup>2</sup> 10 times each in X, Y, and Z directions		1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67 (Pre-wired models: JEM standard IP67g (waterproof, oil-proof))							
Connection method		Pre-wired models (standard length 2 m), connector models							
Material	Case	Stainless steel (SUS303)		Brass-nickel plated					
	Sensing surface	PBT (polybutylene terephthalate)							
	Clamping nuts	Brass-nickel plated							
	Toothed washer	Iron-zinc plated							

\*1 When supplying 24 VAC to any of the above models, make sure that the operating ambient temperature range is over -25 °C.

\*2 When using an M18- or M30-sized E2E within an ambient temperature of 70 °C to 85 °C, make sure that the E2E has a control output of 5 to 200 mA max.



## Aluminium and cast iron chip immune inductive sensor

The E2EZ family features a specialized sensing method providing reliable metal object detection even when covered with small chips of Aluminium or cast iron (e.g. in metal cutting applications).

- Aluminium and Cast Iron chip immune
- DC 2-wire or DC 3-wire



### Ordering information

Size	Shape	Sensing distance	Output specifications	Operating status	
				NO	NC
M12	Shielded	2 mm	DC 2-wire	E2EZ-X2D1-N	E2EZ-X2D2-N
M18		4 mm	DC 3-wire NPN	E2EZ-X4C1	---
			DC 2-wire	E2EZ-X4D1-N	E2EZ-X4D2-N
M30		6 mm	DC 3-wire NPN	E2EZ-X8C1	---
			DC 2-wire	E2EZ-X8D1-N	E2EZ-X8D2-N

### Specifications

Item	E2EZ-X4C1	E2EZ-X8C1	E2EZ-X2	E2EZ-X4D□-N E2EZ-X4D□-M1J E2EZ-X4D□-M1GJ	E2EZ-X8D□-N E2EZ-X8D□-M1J E2EZ-X8D□-M1GJ
Sensing distance	4 mm ±10%	8 mm ±10%	2 mm ±10%	4 mm ±10%	8 mm ±10%
Response frequency <sup>*1</sup>	12 Hz	8 Hz	200 Hz	100 Hz	30 Hz
Power supply voltage (operating voltage)	C models: 12 to 24 VDC, ripple (p-p) : 10% max., (10 to 30 VDC)		12 to 24 VDC (10 to 30 VDC) ripple (p-p): 10% max.		
Protective circuits	C models: Reverse connection protection, load short-circuit protection, surge absorber		Surge absorber, short-circuit protection		
Ambient temperature	Operating / Storage: 0 °C to 50 °C (with no icing or condensation)				
Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions				
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions				
Degree of protection	IEC60529 IP67				
Material	Case	Brass Sensing face: Heat-resistant ABS resin			
	Screw	Brass Mounting nut: Steel			

<sup>\*1</sup> The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.

## Chemical resistant inductive sensor

The E2FQ features a full-body PTFE housing for chemical resistance (e.g. cleaning agents used in the food industry or semiconductor industry).

- Full body PTFE housing for chemical resistance
- DC 2-wire



CE

### Ordering information

Size	Shape	Sensing distance	DC 3-wire models		DC 2-wire models
			PNP (NO)	NPN (NO)	NO
M12	Shielded	2 mm	E2FQ-X2F1	E2FQ-X2E1	E2FQ-X2D1
M18		5 mm	E2FQ-X5F1	E2FQ-X5E1	E2FQ-X5D1
M30		10 mm	E2FQ-X10F1	E2FQ-X10E1	E2FQ-X10D1

### Specifications

Item	E2FQ-X2□	E2FQ-X5□	E2FQ-X10□
<b>Sensing distance</b>	2 mm ±10%	5 mm ±10%	10 mm ±10%
<b>Response frequency<sup>*1</sup></b>	E1, F1 models: 1.5 kHz D1 models: 800 Hz	E1, F1 models: 600 Hz, D1 models: 500 Hz	E1, F1 models: 400 Hz, D1 models: 300 Hz
<b>Power supply voltage (Operating voltage)</b>	E1, F1 models: 12 to 24 VDC, ripple (p-p) : 10% max., (10 to 30 VDC) D1 models: 12 to 24 VDC, ripple (p-p) : 20% max., (10 to 36 VDC)		
<b>Protective circuit</b>	E1, F1 models: Protection for reverse polarity, load short circuit, surge voltage		
<b>Ambient temperature</b>	Operating/Storage: -25 °C to 70 °C (with no icing or condensation)		
<b>Vibration resistance</b>	Destruction: 10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
<b>Shock resistance</b>	Destruction: 500 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions Destruction: 1,000 m/s <sup>2</sup> for 10 times each in X, Y, and Z directions		
<b>Degree of protection</b>	IEC60529 IP67		
<b>Material</b>	PTFE		

<sup>\*1</sup> The response frequencies for DC switching are average values measured on condition that the distance between each sensing object is twice as large as the size of the sensing object and the sensing distance set is half of the maximum sensing distance.



## Oil resistant inductive sensor family

The standard E2E family offers tested oil resistance on commonly used oils in the automotive industry for reliable long-life operation in automotive assembly lines.

- DC 3-wire and DC 2-wire models
- M8, M12, M18 and M30 standard sizes
- IP67g (water and oil resistance)



## Ordering information

Size		Sensing distance	Self-diagnostic output function	Model	
				NO	NC
M12	Shielded	3 mm	Yes	E2E-X3D1S <sup>*1</sup>	---
M18		7 mm		E2E-X7D1S <sup>*1</sup>	---
M30		10 mm		E2E-X10D1S <sup>*1</sup>	---
M12		8 mm		E2E-X8MD1S <sup>*1</sup>	---
M18		14 mm		E2E-X14MD1S <sup>*1</sup>	---
M30		20 mm		E2E-X20MD1S <sup>*1</sup>	---
M8	Shielded	2 mm	No	E2E-X2D1-N <sup>*2 *3</sup>	E2E-X2D2-N <sup>*3</sup>
M12		3 mm		E2E-X3D1-N <sup>*1 *2 *3</sup>	E2E-X3D2-N <sup>*3</sup>
M18		7 mm		E2E-X7D1-N <sup>*1 *2 *3</sup>	E2E-X7D2-N <sup>*3</sup>
M30		10 mm		E2E-X10D1-N <sup>*1 *2 *3</sup>	E2E-X10D2-N
M8	Unshielded	4 mm		E2E-X4MD1 <sup>*2 *3</sup>	E2E-X4MD2
M12		8 mm		E2E-X8MD1 <sup>*1 *2 *3</sup>	E2E-X8MD2
M18		14 mm		E2E-X14MD1 <sup>*1 *2 *3</sup>	E2E-X14MD2
M30		20 mm		E2E-X20MD1 <sup>*1 *2 *3</sup>	E2E-X20MD2

<sup>\*1</sup> In addition to the above models, E2E-X□□15 models (e.g., E2E-X3D15-N), which are different in frequency from the above models, are available.

<sup>\*2</sup> E2E models with a robotics cable are available as well. The model number of a model with a robotics cable has the suffix '-R' (e.g., E2E-X3D1-R).

<sup>\*3</sup> Cables with a length of 5 m are also available. Specify the cable length at the end of the model number (e.g., E2E-X3D1-N 5M).

## Specifications

Item		M8		M12		M18		M30	
		E2E-X2D□	E2E-X4MD□	E2E-X3D□	E2E-X8MD□	E2E-X7D□	E2E-X14MD□	E2E-X10D□	E2E-X20MD□
Sensing distance		2 mm ±10%	4 mm ±10%	3 mm ±10%	8 mm ±10%	7 mm ±10%	14 mm ±10%	10 mm ±10%	20 mm ±10%
Response frequency *1		1.5 kHz	1.0 kHz	1.0 kHz	0.8 kHz	0.5 kHz	0.4 kHz	0.4 kHz	0.1 kHz
Power supply voltage (operating voltage)		12 to 24 VDC (10 to 30 VDC), ripple (p-p): 10% max.							
Protective circuit		Surge suppressor, output load short-circuit protection (for control and diagnostic output)							
Ambient temperature		Operating: -25 °C to 70 °C, Storage: -40 °C to 85 °C (with no icing or condensation)							
Vibration resistance		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions							
Shock resistance		500 m/s <sup>2</sup> 10 times each in X, Y, and Z directions		1,000 m/s <sup>2</sup> 10 times each in X, Y, and Z directions					
Degree of protection		IEC 60529 IP67 (Pre-wired models, pre-wired connector models: JEM standard IP67g (waterproof and oil-proof))							
Material	Case	Stainless steel (SUS303)		Brass-nickel plated					
	Sensing surface	PBT (polybutylene terephthalate)							

<sup>\*1</sup> The response speed is an average value. Measurement conditions are as follows: standard sensing object, a distance of twice the standard sensing object, and a set distance of half the sensing distance.





## High precision positioning inductive proximity sensor

The separate amplifier inductive sensor family E2C-EDA offers high precision distance positioning and detection. The teach-in function allows simple installation, and with the window function (2 outputs) production tolerance checks can easily be set up and modified.

- 1 µm repeat accuracy
- Precision distance teaching
- Window function (2 outputs) for production tolerance checks

CE

## Ordering information

### Sensor heads

Type	Appearance	Size in mm (HxWxD)	Sensing distance	Repeat accuracy	Model
Shielded	Cylindrical	3 dia.×18	0.6 mm	1 µm	E2C-EDR6-F
		5.4 dia.×18	1 mm	1 µm	E2C-ED01-□
		8 dia.×22	2 mm	2 µm	E2C-ED02-□
	Screw	M10×22	2 mm	2 µm	E2C-EM02-□
	Flat	30×14×4.8	5 mm	2 µm	E2C-EV05-□
Unshielded	Screw	M18×46.3	7 mm	5 µm	E2C-EM07M-□
Heat-resistant	Screw	M12×22	2 mm	2 µm	E2C-EM02H

### Amplifier units with cables

Item	Functions	NPN output	PNP output
Twin-output models	Area output, open circuit detection, differential operation	E2C-EDA11	E2C-EDA41
External-input models	Remote setting, differential operation	E2C-EDA21	E2C-EDA51

### Amplifier units with connectors

Item	Functions	NPN output	PNP output
Twin-output models	Area output, open circuit detection, differential operation	E2C-EDA6	E2C-EDA8
External-input models	Remote setting, differential operation	E2C-EDA7	E2C-EDA9

## Specifications

### Sensor heads

Item	E2C-EDR6-F	E2C-ED01(-□)	E2C-ED02(-□)	E2C-EM02(-□)	E2C-EM07(-□)	E2C-EV05(-□)	E2C-EM02H
	3 dia.×18 mm	5.4 dia.×18 mm	8 dia.×22 mm	M10×22 mm	M18×46.3 mm	30×14×4.8 mm	M12×22 mm
Sensing distance	0.6 mm	1 mm	2 mm		7 mm	5 mm	2 mm
Ambient temperature <sup>*1</sup>							
operating	-10 °C to 60 °C (with no icing or condensation)						-10 °C to 200 °C <sup>*2</sup>
storage	-10 °C to 60 °C (with no icing or condensation)						-20 °C to 70 °C (with no icing or condensation)
Vibration resistance	Destruction: 10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions						
Shock resistance	Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions						
Degree of protection	IEC60529 IP67						IEC60529 IP60 <sup>*3</sup>
Material							
Sensor Head	Case	Brass	Stainless steel	Brass		Zinc	Brass
Sensing surface		Heat-resistant ABS					PEEK

<sup>\*1</sup> A sudden temperature rise even within the rated temperature range may degrade characteristics.

<sup>\*2</sup> For the Sensor Head only without the preamplifier ( -10 to 60 °C). With no icing or condensation.

<sup>\*3</sup> Do not operate in areas exposed to water vapor because the enclosure is not waterproof.

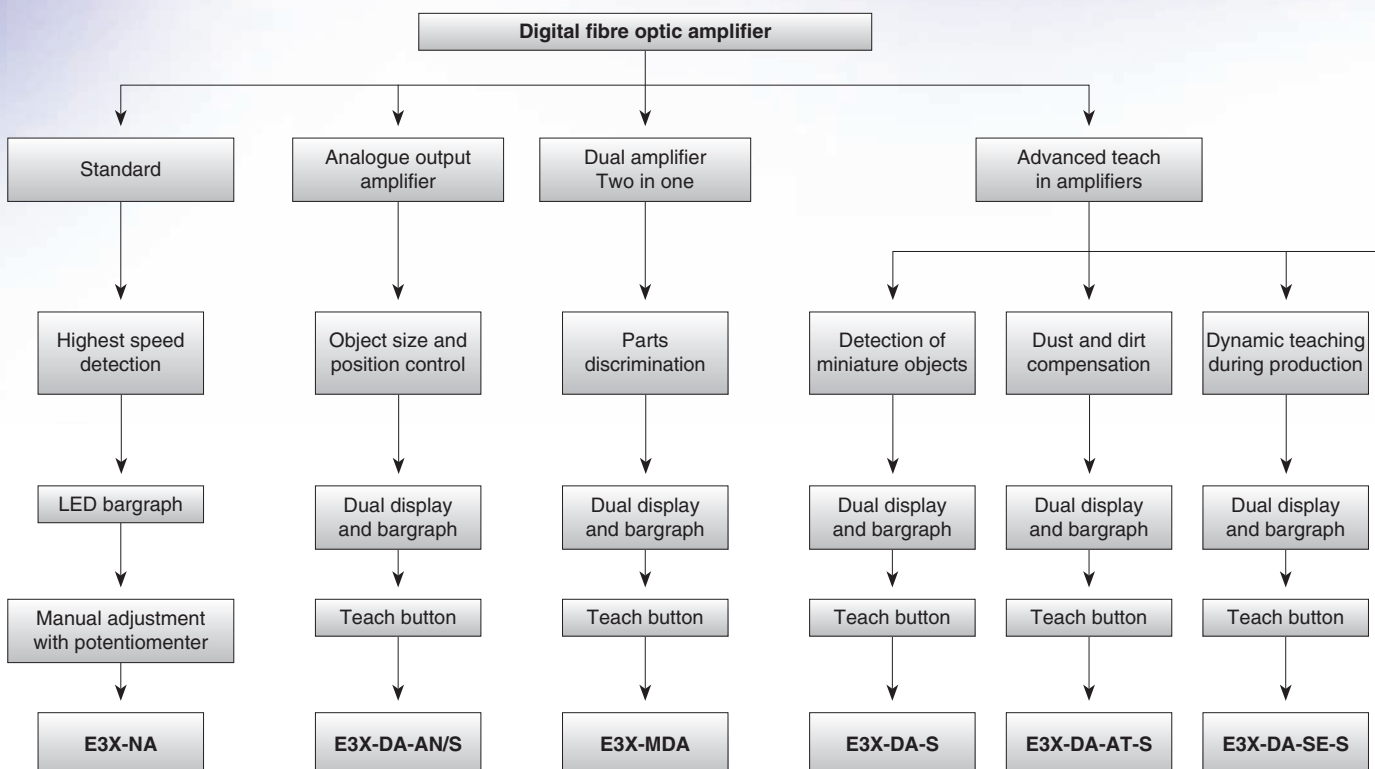
# Fibre optic amplifiers

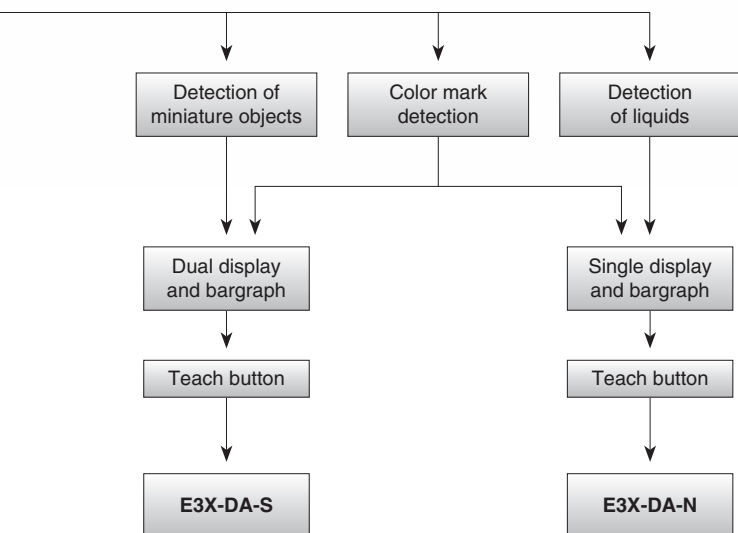
## E3X-DA-S – the new best-in-class fibre optic amplifiers

### The best solution package for powerful digital amplifiers and fibre sensors

The E3X-DA-S fibre amplifier platform is representing the best combination in terms of functionality and cost efficiency. Unique features like powertuning or Active Threshold Control guarantee best sensing performance and highest reliability. Easy one button teaching allows sensor setup within seconds. In case of tiny installation conditions, the E3X-MDA double channel amplifier is not only helping you to save space, but also costs – buy 1 get 2!

- Powertuning for best sensing performance
- Wiring cost saving
- Long-term operating stability by APC, 4 Element LED or Active Threshold Control
- User-friendly operation and easy set up
- Longer sensing distances
- Comprehensive fibre optic portfolio
- European manufacturing know-how and production












## Table of contents

<b>Selection table</b>		66
<b>Fiber optic amplifiers</b>	E3X-DA-N	71
	E3X-NA	73
	E3X-DA-S	75
	E3X-MDA	77
	E3X-DA-SE-S	79
	E3X-DA-AT-S	80
	E3X-DA-AN-S	81

# Selection table

Category		Basic line - cost effective	Industrial line - manual adjustor	High end - one for all	High end - 2 in 1
					
Model		E3X-DA-N	E3X-NA	E3X-DA-S	E3X-MDA
Sensing adjustment	Teach button	■		■	■
	Manual adjustment		■		
Special features	Power tuning			■	■
	Auto power control APC	■		■	■
	Active threshold ATC				
Network connectivity	Communication				
	Module E3X-DRT21	■			
	Communication				
	Module E3X-DRT21-S			■	■
	Communication with mobile console	E3X-MC11 / -SV2		E3X-MC11 / -SV2	E3X-MC11 / -SV2
Display	Digital single (S) / dual (D) display	S		D	D
	LED bargraph	□	■	□	□
Light sources types	Red LED	■	■	■	■
	Green LED	■	■	■	
	Blue LED	■		■	
	Infrared	■			
Power consumption	Voltage range	12 VDC - 24 VDC	12 VDC - 24 VDC	12 VDC - 24 VDC	12 VDC - 24 VDC
	(at 24 VDC, without load)	<40 mA	<35 mA	<45 mA	<45 mA
Control output / input	PNP	■	■	■	■
	NPN	■	■	■	■
	Twin output	■		■	■ / 2 Chn.
	Alarm / error output				
	Analogue output				
	Monitor output 1 V - 5 V	■			
Mode selection	Remote input			■	
	Dark on / Light on	■	■ / switch	■	■
Connection	Response time (min.)	250 µs	20 µs	48 µs	130 µs
	Cable type (prewired)	■	■	■	■
	Connector type	■	■	■	■
Enclosure rating		IP50 / IP66	IP50 / IP60	IP50	IP50
Ambient temperature		-25 °C - 55 °C	-25 °C - 55 °C	-25 °C - 55 °C	-25 °C - 55 °C
Housing material	Case	PBT	PBT	PBT	PBT
	Cover	PC / PES	PC / PES	PC	PC
ROHS conformity		□ (in prep.)	□ (in prep.)	□ (in prep.)	□ (in prep.)
Page		71	73	75	77



Category		High end - teach and go	High end - active threshold	High end - analogue output
				
Model		E3X-DA-SE-S	E3X-DA-AT-S	E3X-DA-AN-S
Sensing adjustment	Teach button	■	■	■
	Manual adjustment			
Special features	Power tuning	■	■	■
	Auto power control APC	■	■	■
	Active threshold ATC		■	
Network connectivity	Communication			
	Module E3X-DRT21			
	Communication			
	Module E3X-DRT21-S	□	□	□
Communication with mobile console		E3X-MC11 / -SV2	E3X-MC11 / -SV2	
Display	Digital single (S) / dual (D) display	D	D	D
	LED bargraph	□	□	□
Light sources types	Red LED	■	■	■
	Green LED			
	Blue LED			
	Infrared			
Power consumption	Voltage range	12 VDC - 24 VDC	12 VDC - 24 VDC	12 VDC - 24 VDC
	(at 24 VDC, without load)	<40 mA	<45 mA	<45 mA
Control output / input	PNP	■	■	■ Control output
	NPN	■	■	■ Control output
	Twin output			■
	Alarm / error output		■ Error output	
	Analogue output		■	■ Analogue Output
	Monitor output 1 V - 5 V			
Mode selection	Remote input			
	Dark on / Light on	■	■	
Connection	Response time (min.)	1 ms	80 µs	80 µs
	Cable type (prewired)	■	■	■
	Connector type	■	■	
Enclosure rating		IP50	IP50	IP50
Ambient temperature		-25 °C - 55 °C	-25 °C - 55 °C	-25 °C - 55 °C
Housing material	Case	PBT	PBT	PBT
	Cover	PC	PC	PC
	ROHS conformity	□ (in prep.)	□ (in prep.)	□ (in prep.)
Page		79	80	81

■ Standard

□ Available

□ No / not available



# Selection table

General purpose						
Category	Standard					
Type name	Long distance					
	E32-DC200 E32-TC200	E32-D16	E32-D11L E32-T11L	E32-D22L E32-T22L	E32-D12R E32-T12R	E32-ED11R E32-ET11R
Ambient operating temperature	-40 °C - 70 °C					
IP rating	IP67	IP40	IP67			
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PE	Plastic / PVC				
Min. bending radius / mm	25	4	25	10	1	1
Freecut (Y/N)	Y					
Max. sensing distance [mm] diffuse- / through beam type	500/1,000	1,000	650/1,700	210/540	300/700	300/700
D = Diffuse type T = Through beam type R = Retro reflective	D/T	D	D/T	D/T	D/T	D/T

	General purpose					
Category	Flexible / R-type					
Type name	E32-T1□R	E32-D1□R	E32-T2□R	E32-ET□R	E32-ED□R	E32-D2□R
Ambient operating temperature	-40 °C - 70 °C					
IP rating	IP67					
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PVC		Plastic / PE			
Min. bending radius / mm	1					
Freecut (Y/N)	Y					
Max. sensing distance [mm] diffuse- / through beam type	4,000 (+ E39-F1)	300	160	3,000 Area sensor (High res. mode)	100	50
D = Diffuse type T = Through beam type R = Retro reflective	T	D	T		D	

Special function fibers						
Category	Wafer mapping	Small spot		Ultracompact ultrafine sleeve	Coaxial small spot	
Type name	E32-A03 E32-A04	E32-D32 + E39-F3A	E32-EC41 + E39F3B	E32-EC31+ E39-EF51	E32-T223R	E32-EC31 + EF51 E32-EC31 + E39F3C E32-EC41 + E39F3B
Ambient operating temperature	-40 °C - 70 °C					
IP rating	IP50					
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PE				Plastic / PVC PO <sup>3</sup>	Plastic / PE
Min. bending radius / mm	1/10	25			1	25
Freecut (Y/N)	Y		N	Y		
Max. sensing distance [mm] diffuse- / through beam type	1,150/460	6 - 15	spot dia.: 0,2 mm at 17 mm sensing distance	spot dia.: 0,5 mm at 17 mm sensing distance	160	
D = Diffuse type T = Through beam type R = Retro reflective	T	D			D/T	D

Special function fibers						
Category	Narrow vision field (fine beam)	Area sensing				
Type name	E32-T22S E32-T24S	E32-ED36-1/-2	E32-D36P1	E32-T16	E32-T16W[R]	E32-ET16WR-1, E32-ET16WR-2
Ambient operating temperature	-40 °C - 70 °C	-15 °C - 70 °C	-40 °C - 70 °C		-25 °C - 55 °C	
IP rating	IP67	IP67 / IP65	IP50	IP67	IP50	IP54
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PVC	Plastic / PE			Plastic / PVC	Plastic / PE
Min. bending radius / mm	10	25	4	25	10 [1]	1
Freecut (Y/N)	Y					
Max. sensing distance [mm] diffuse- / through beam type	2,500/1,750	10 Sensing area: 10 mm	250	3,700	1,700	2,400 / 2,200
D = Diffuse type T = Through beam type R = Retro reflective	T	D		T		

	Special function fibers					
Category	Retro reflective		Limited refelective			
Type name	E32-R21	E32-R16	E32-L25L	E32-L24L	E32-L24S	E32-L16
Ambient operating temperature	-40 °C - 70 °C	-25 °C - 55 °C	-40 °C - 105 °C *1		-	-
IP rating	IP67	IP66	IP50	IP50	IP40	
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PE					
Min. bending radius / mm	10	25	10			25
Freecut (Y/N)	Y					
Max. sensing distance [mm] diffuse- / through beam type	250	1,500	9	6	4	15
D = Diffuse type T = Through beam type R = Retro reflective	R		D			

Category	Special function fibers					
	Limited reflective	Liquid level det.				
Type name	E32-L86	E32-A01	E32-ED36-1 / -2	E32-A02	E32-D82F	E32-L25T
Ambient operating temperature	-40 °C - 200 °C *2	-40 °C - 70 °C	-15 °C - 70 °C	-40 °C - 70 °C	-40 °C - 200 °C *1	-40 °C - 70 °C
IP rating	IP40	IP50	IP67	IP50	IP68	IP50
Ambient humidity	38% - 85%					
Fiber material / coating	Glass / SUS	Plastic / FR *4	Plastic / PE	Plastic / FR *4	Plastic / PTFE cover	Plastic / PE
Min. bending radius / mm	25	4	25	4	40	10
Freecut (Y/N)	N	Y				
Max. sensing distance [mm] diffuse- / through beam type	10	-	-	-	-	-
D = Diffuse type T = Through beam type R = Retro reflective	D					

	Special shape					
Category	Side view					
Type name	E32-T14LR	E32-D14LR	E32-ETS14R	E32-D25YR	E32-D14L	E32-D15Y
Ambient operating temperature	-40 °C - 70 °C					
IP rating	IP67					
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PE					
Min. bending radius / mm	1				25	
Freecut (Y/N)	Y					
Max. sensing distance [mm] diffuse- / through beam type	700	80	360	14	200	170
D = Diffuse type T = Through beam type R = Retro reflective	T	D	T	D		

	Special shape				Special environment	
Category	Square heads				Heat resistant	
Type name	E32-ETS20R	E32-T15XR	E32-D25XR	E32-ETS10R	E32-T5□	E32-D5□
Ambient operating temperature	-40 °C - 70 °C				-40 °C - 150 °C *1	
IP rating	IP67					
Ambient humidity	38% - 85%					
Fiber material / coating	Plastic / PE				Plastic / FR	
Min. bending radius / mm	1				353	
Freecut (Y/N)	Y					
Max. sensing distance [mm] diffuse- / through beam type	250	700	50	720	1,000	400
D = Diffuse type T = Through beam type R = Retro reflective	T		D	T		D

\*1. For continuous operation between -40 °C to 130 °C.

\*2. Max. temperature resistivity depends on location - refer to dimension diagrams for details

\*3. PO= = Polyolefine

\*4. FR = Fluororesin

**Note:** - Achievable sensing distances are according to E3X-DA-S Fiber Optic Amplifiers and can vary if using other types.

	Special environment					
Category	Heat resistant					
Type name	E32-T8□R-S	E32-D8□R-S	E32-T84S-S	E32-T6□-S	E32-D6□-S	E32-D73-S
Ambient operating temperature	-40 °C - 200 °C *1			-60 °C - 350 °C *1		-40 °C - 400 °C *2
IP rating	IP67					
Ambient humidity	38% - 85%					
Fiber material / coating	Glass / FR		Glass / SUS spiral			
Min. bending radius / mm	10		25			
Freecut (Y/N)	N					
Max. sensing distance [mm] diffuse- / through beam type	360	150	1,750	4,000	150	100
D = Diffuse type T = Through beam type R = Retro reflective	T	D	T		D	

	Special environment					
Category	Fluorine coating / U-type		Vacuum resistant		Robotic break resistant / B-type	
Type name	E32-D11U	E32-T11U	E32-T51V	E32-T84SV	E32-D11 E32-T11	E32-D21 E32-T21
Ambient operating temperature	-40 °C - 70 °C		-25 °C - 120 °C	-25 °C - 200 °C	-40 °C - 70 °C	
IP rating	IP67	IP67			IP67	
Ambient humidity	38% - 85%					
Fiber material / coating	Glass / FR *4			Glass / SUS spiral	Plastic / PVC	
Min. bending radius / mm	4	4	30	25	4	4
Freecut (Y/N)	Y	Y	N		Y	
Max. sensing distance [mm] diffuse- / through beam type	300	900	260	630	300/900	50/240
D = Diffuse type T = Through beam type R = Retro reflective	D	T			D/T	

\*1. For continuous operation between -40 °C to 130 °C.

\*2. Max. temperature resistivity depends on location - refer to dimension diagrams for details

\*3. PO= = Polyolefine

\*4. FR = Fluororesin

**Note:** - Achievable sensing distances are according to E3X-DA-S Fiber Optic Amplifiers and can vary if using other types.



## Digital fibre amplifier with remote teaching for a reasonable price

E3X-DA-N is your best choice for basic entry into our digital fibre amplifier line-up. APC function, network connectivity via DeviceNet or CompoBus/S and remote control over mobile console (group teaching) are convincing arguments for purchasing this cost effective amplifier.

- Simple teaching for one or multiple amplifiers using the same settings
- Digital displays show light incident levels, percentage and analog levels
- Optical communication between amps. for copy / paste + storage of settings
- Group mounting of up to 16 sensors avoiding mutual interferences
- Versatile models in the line-up for specific applications



## Ordering information

### Prewired

Item	Control output	Size in mm (HxWxD)	Model	
			NPN output	PNP output
Standard models	ON/OFF output	31,5x64,3x10	E3X-DA11-N	E3X-DA41-N
Monitor-output models	•ON/OFF output •Monitor output		E3X-DA21-N	E3X-DA51-N
Mark-detecting models (Blue LED)	ON/OFF output		E3X-DAB11-N	E3X-DAB41-N
Mark-detecting models (Green LED)			E3X-DAG11-N	E3X-DAG41-N
Infrared models			E3X-DAH11-N	E3X-DAH41-N
Differential output type			E3X-DA11D	---
Water-resistant models		33x81.5x12	E3X-DA11V	E3X-DA41V
Twin-output models		31.5x64.3x10	E3X-DA11TW	E3X-DA41TW

### Connector type

Item	Applicable connector (order separately)		Control output	Model	
				NPN output	PNP output
Standard models	Master	E3X-CN11	ON / OFF output	E3X-DA6	E3X-DA8
	Slave	E3X-CN12			
Monitor-output models	Master	E3X-CN21	•ON / OFF output •Monitor-output	E3X-DA7	E3X-DA9
	Slave	E3X-CN22			
Mark-detecting models (Blue LED)	Master	E3X-CN11	ON / OFF output	E3X-DAB6	E3X-DAB8
	Slave	E3X-CN12			
Mark-detecting models (Green LED)	Master	E3X-CN11		E3X-DAG6	E3X-DAG8
	Slave	E3X-CN12			
Infrared models	Master	E3X-CN11		E3X-DAH6	E3X-DAH8
	Slave	E3X-CN12			
Differential output type	Master	E3X-CN11		E3X-DA6D	---
	Slave	E3X-CN12			
Water-resistant models (M8 Connector)	XS3F-M421-40□-A			E3X-DA14V	E3X-DA44V
	XS3F-M422-40□-A				
Twin-output models	Master	E3X-CN21		E3X-DA6TW	E3X-DA8TW
	Slave	E3X-CN22			

### Amplifier units connectors (order separately)

**Note:** Stickers for connectors are included as accessories.

Item	Cable length	No. of conductors	Model
Master connector	2 m	3	E3X-CN11
		4	E3X-CN21
Slave connector		1	E3X-CN12
		2	E3X-CN22

### Mobile console (order separately)

Model	Remarks
(Set form) E3X-MC11	Mobile console with head, cable, and AC adapter provided as accessories. Power supply provided by chargeable battery
E3X-MC11-C1	Mobile console
E3X-MC11-H1	Head
E39-Z12-1	Cable (1.5 m)

## Specifications

### Prewired

Type			Standard models	Monitor-output models	Mark-detecting models		Infrared models	Water-resistant models	Twin-output models
	Model	NPN output	E3X-DA11-N	E3X-DA21-N	E3X-DAB11-N	E3X-DAG11-N	E3X-DAH11-N	E3X-DA11V	E3X-DA11TW
Item		PNP output	E3X-DA41-N	E3X-DA51-N	E3X-DAB41-N	E3X-DAG41-N	E3X-DAH41-N	E3X-DA41V	E3X-DA41TW
Light source (wave length)			Red LED (660 nm)		Blue LED (470 nm)	Green LED (525 nm)	Infrared LED (870 nm)	Red LED (660 nm)	
Power supply voltage			12 to 24 VDC ±10%, ripple (p-p) : 10% max.						
Power consumption			Normal operation < 40 mA / < 30 mA ECO mode						

Type			Standard models	Monitor-output models	Mark-detecting models		Infrared models	Water-resistant models	Twin-output models	
	Model	NPN output	E3X-DA11-N	E3X-DA21-N	E3X-DAB11-N	E3X-DAG11-N	E3X-DAH11-N	E3X-DA11V	E3X-DA11TW	
Item		PNP output	E3X-DA41-N	E3X-DA51-N	E3X-DAB41-N	E3X-DAG41-N	E3X-DAH41-N	E3X-DA41V	E3X-DA41TW	
Control output	ON / OFF output		Load current 50 mA (residual voltage NPN/PNP: 1 V max. each) Open collector output type (depends on the NPN/PNP output format) Light-ON/Dark-ON, switch selectable							
	Monitor output		---	1 to 5 VDC, load 10 k min.	---					
Protective circuits			Reverse polarity protection, output short-circuit protection, mutual interference prevention (possible for up to 10 amplifiers)							
Response time	Super-high-speed mode		0.25 ms for operation and reset respectively							0.5 ms <sup>*1</sup>
	Standard mode		Operation / reset: 1 ms each							2 ms <sup>*1</sup>
	Super-long-distance mode		4 ms for operation and reset respectively							7 ms <sup>*1</sup>
Sensitivity setting			Teaching or manual method							
Functions	Timer functions		OFF delay 0 to 200 ms (1 to 20: 1 ms increments, 20 to 200 ms: 5 ms increments), when the mobile control is used, select either OFF delay, ON delay or one shot.							
	Automatic power control (APC)		Fiber-optic current digital control		---			Fiber-optic current digital control		
	Zero reset		Yes (negative indication possible)							
	Initial reset		Yes (setting conditions initialized)							
	Monitor focus		---	Setting of upper / lower limit values	---					
Indicator lamp			Operation indicator (orange), 7-segment digital incident level display (red), 7-segment digital incident level percent display (red), incident level & threshold value double-bar display (green, red), 7-segment digital threshold value display (red)							
Ambient temperature			Operating: Groups of 1 to 3 amplifiers: -25 to +55°C, groups of 4 to 11 amplifiers: -25 to +50°C, Groups of 12 to 16 amplifiers: -25 to +45°C Storage: -30 to +70°C (with no icing and condensation)							
Ambient humidity			Operating / Storage: 35% to 85% RH (with no condensation)							
Degree of protection			IEC 60529 IP50 (with Protective Cover attached)					IEC 60529 IP66 <sup>*2</sup> IEC 60529 IP <sup>*2</sup>		
Connection method			Prewired models (standard length: 2 m)							
Accessories			Instruction manual							

<sup>\*1</sup> Operation and reset respectively

<sup>\*2</sup> With protective cover attached

## Digital fiber amplifier

- Differential output digital fiber amplifier (E3X-DA11D/E3X-DA6D)

### Through-beam model

		Sensing distance (mm) (Values in parentheses: When using the E39-F1 lens unit)						Standard object (mm) <sup>*1</sup>
Sensitivity switching		HIGH			LOW			Minimum sensing object <sup>*2</sup>
11 steps can be set		1	2	3-11	1	2	3-11	(Opaque object) default
Fiber type	Response time	270 or 570 $\mu$ s	0.5 or 1 ms	1 to 200 ms or 2 to 400 ms	270 or 570 $\mu$ s	0.5 or 1 ms	1 to 200 ms or 2 to 400 ms	
E32-ET11R		240 (1680)	280 (1960)	370 (2590)	140(980)	180(1260)	240 (1680)	1 mm dia. (0.01 mm dia.)
E32-ET21R		50	60	80	30	40	50	
E32-T16WR		580	690	910	350	450	580	(0.3 mm dia.) <sup>*3</sup>
E32-T16PR		380	450	600	230	290	380	(0.2 mm dia.)

<sup>\*1</sup> Standard object (mm) / Sensing object is operating Minimum sensing object (resp. time is set to 3-11)

<sup>\*2</sup> Value applied when the response time is set to 3-11.

<sup>\*3</sup> Digital value is 1000.

Refer to the E3X-DA-N for the note of the fiber unit.

### Reflective model

		Sensing distance (mm) / white paper						Standard object (mm) <sup>*1</sup>
Sensitivity switching		HIGH			LOW			Minimum sensing object <sup>*2</sup>
11 steps can be set		1	2	3-11	1	2	3-11	(Opaque object) default
Fiber type	Response time	270 or 570 $\mu$ s	0.5 or 1 ms	1 to 200 ms or 2 to 400 ms	270 or 570 $\mu$ s	0.5 or 1 ms	1 to 200 ms or 2 to 400 ms	
E32-ED11R		80	90	120	45	60	80	150x150 (0.01 mm dia.)
E32-ED21R		13	15	20	7	10	13	25x25 (0.01 mm dia.)

<sup>\*1</sup> The sensing object is operating.

<sup>\*2</sup> Value applied when the response time is set to 3-11. The value can be detected if the temperature varies within the operating ambient temperature.

**Note:** Refer to E3X-DA-N for the note of the fiber unit.





## Cost effective fibre optic amplifier with bar graph display

E3X-NA belongs to the most cost-effective fibre optical amplifiers with manual adjustment and LED bar graph display. Group alignment of max. 16 sensors with mutual interference suppression and useful functional models prove high performance for a very reasonable price.

- Easy adjustment with potentiometer
- Short response time of only 20 µs
- Very cost-effective basic-line amplifier
- Mutual interference suppression
- Water-resistant models and green or red light types are available



## Ordering information

### Pre-wired

Item	Control output	Model	
		NPN output	PNP output
Standard models	ON / OFF output	E3X-NA11	E3X-NA41
High-speed detection models		E3X-NA11F	E3X-NA41F
Mark-detecting models		E3X-NAG11	E3X-NAG41
Water-resistant models		E3X-NA11V	E3X-NA41V

### Connector type

Item	Applicable connector (order separately)		Control output	Model	
				NPN output	PNP output
Standard models	Master	E3X-CN11	ON/OFF output	E3X-NA6	E3X-NA8
	Slave	E3X-CN12			
Water-resistant models (M8 connector)	XS3F-M421-40□-A XS3F-M422-40□-A			E3X-NA14V	E3X-NA44V

## Specifications

			Pre-wired				Connector type	
Type			Standard models	High-speed detection models	Mark-detecting models	Water-resistant models	Standard models	Water-resistant models (M8 connector)
	Model	NPN output	E3X-NA11	E3X-NA11F	E3X-NAG11	E3X-NA11V	E3X-NA6	E3X-NA14V
Item		PNP output	E3X-NA41	E3X-NA41F	E3X-NAG41	E3X-NA41V	E3X-NA8	E3X-NA44V
Light source (wave length)			Red LED (680 nm)		Green LED (520 nm)	Red LED (680 nm)		
Power supply voltage			12 to 24 VDC ±10%, ripple (p-p): 10% max.					
Current consumption			35 mA max.	35 mA max. (at power supply voltage 24 VDC)	35 mA max.			
Control output			Load current 50 mA (residual voltage 1 V max. each) Open collector output type (depends on the NPN / PNP output format) Light-ON / Dark-ON switch selectable					
Response time			Operation or reset: 200 μs max.*1	Operating: 20 μs max. Reset: 30 μs max.	200 μs max. for operation and reset respectively*1			
Sensitivity adjustment			8-turn endless adjuster (with indicator)					
Protective circuits			Reverse polarity protection, output short-circuit protection, mutual interference prevention (optically synchronized)	Reverse polarity protection, output short-circuit protection	Reverse polarity protection, output short-circuit protection, mutual interference prevention (optically synchronized)			
Timer function			OFF-delay timer: 40 ms (fixed)					
Ambient illuminance			Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max.					
Ambient temperature			Operating: Groups of 1 to 3 amplifiers: -25 to +55°C, Groups of 4 to 11 amplifiers: -25 to +50°C, Groups of 12 to 16 amplifiers: -25 to +45°C Storage: -30 to +70°C (with no icing and condensation)					
Ambient humidity			Operating / Storage: 35% to 85% RH (with no condensation)					
Insulation resistance			20 M Ω min. at 500 VDC					
Dielectric strength			1,000 VAC at 50/60 Hz for 1 minute					
Vibration resistance			10 to 55 Hz with a 1.5 mm double amplitude for 2 hrs each in X, Y and Z directions					
Shock resistance			Destruction: 500 m/s <sup>2</sup> for 3 times each in X, Y, and Z directions					
Protective structure			IEC 60529 IP50 (with protective cover attached)			IEC 60529 IP66 (with protective cover attached)	IEC 60529 IP50 (with protective cover attached)	IEC 60529 IP66 (with protective cover attached)

			Pre-wired				Connector type	
Type			Standard models	High-speed detection models	Mark-detecting models	Water-resistant models	Standard models	Water-resistant models (M8 connector)
	Model	NPN output	E3X-NA11	E3X-NA11F	E3X-NAG11	E3X-NA11V	E3X-NA6	E3X-NA14V
Item		PNP output	E3X-NA41	E3X-NA41F	E3X-NAG41	E3X-NA41V	E3X-NA8	E3X-NA44V
Connection method			Pre-wired models (standard length: 2 m)				Connector type	M8 connector
Weight (Packed state)			Approx. 100 g			Approx. 110 g	Approx. 55 g	65 g
Material		Case	PBT (polybutylene terephthalate)					
		Cover	Polycarbonate			Polyethersulfone (PES)	Polycarbonate	Polyethersulfone (PES)
Accessories			Instruction manual					
Size in mm			64,3Hx31,5Wx10D			81,5Hx33Wx12D	64,3Hx31,5Wx10D	81,5Hx33Wx12D

\*1 If 8 or more Units are installed side-by-side, the response time will be 350 s max.

#### Amplifier unit connectors

Item	Model	E3X-CN11	E3X-CN12
Rated current		2.5 A	
Rated voltage		50 V	
Contact resistance		20 mΩ max. (20 mVDC max., 100 mA max.) [By connection with amplifier unit and connection with adjacent connector (except conductor resistance of cable)]	
No. of insertions		50 times (By connection with amplifier unit and connection with adjacent connector)	
Material	Housing	PBT (polybutylene terephthalate)	
	Contacts	Phosphor bronze / gold-plated nickel	
Weight (packed state)		Approx. 55 g	Approx. 25 g



## High accuracy double display digital fibre amplifier

Superior digital fibre optic amplifier allowing easy user setting with power tuning. Two large displays are in favour of excellent visibility even from a distance. A convincing range of advanced and useful functions help you solve almost every sensing task.

- User-friendly power-tuning function allows easy sensor settings
- High resolution for long sensing distances and accurate settings
- Short response time of only 50  $\mu$ s for fast sensing processes
- 4 element LED and auto power control for high and long-term stability
- Mutual interference suppression for simultaneous sensor operations



### Ordering information

#### Amplifier units with cables

Item	Functions	Model	
		NPN output	PNP output
Standard models	---	E3X-DA11-S	E3X-DA41-S
Mark-detecting models	Green LED	E3X-DAG11-S	E3X-DAG41-S
	Blue LED	E3X-DAB11-S	E3X-DAB41-S
	Infrared LED	E3X-DAH11-S	E3X-DAH41-S
Advanced models	Twin-output models	E3X-DA11TW-S	E3X-DA41TW-S
	External-input models	E3X-DA11RM-S	E3X-DA41RM-S

#### Amplifier units with connectors

Item	Functions	Model	
		NPN output	PNP output
Standard models	---	E3X-DA6-S	E3X-DA8-S
Mark-detecting models	Green LED	E3X-DAG6-S	E3X-DAG8-S
	Blue LED	E3X-DAB6-S	E3X-DAB8-S
Advanced models	Twin-output models	E3X-DA6TW-S	E3X-DA8TW-S
	External-input models	E3X-DA6RM-S	E3X-DA8RM-S

#### Amplifier unit connectors (order separately)

Item	Cable length	No. of conductors	Model
Master connector	2 m	3	E3X-CN11
		4	E3X-CN21
Slave connector		1	E3X-CN12
		2	E3X-CN22

#### Combining amplifier units and connectors

Amplifier units and connectors are sold separately. Refer to the following tables when placing an order.

Amplifier unit			+	Applicable connector (order separately)	
Model	NPN output	PNP output		Master connector	Slave connector
Standard models	E3X-DA6-S	E3X-DA8-S		E3X-CN11 (3-wire)	E3X-CN12 (1-wire)
Mark-detecting models	E3X-DAG6-S	E3X-DAG8-S			
	E3X-DAB6-S	E3X-DAB8-S		E3X-CN21 (4-wire)	E3X-CN22 (2-wire)
Advanced models	E3X-DA6TW-S	E3X-DA8TW-S			
	E3X-DA6RM-S	E3X-DA8RM-S			

#### When using 5 amplifier units

Amplifier units (5 Units) + 1 Master connector + 4 Slave connectors

## Specifications

## Amplifier units with cables

		Type	Standard models	Mark-detecting models			Advanced, twin-output models	Advanced, external-input models
Model		NPN output	E3X-DA11-S	E3X-DAG11-S	E3X-DAB11-S	E3X-DAH11-S	E3X-DA11TW-S	E3X-DA11RM-S
Item		PNP output	E3X-DA41-S	E3X-DAG41-S	E3X-DAB41-S	E3X-DAH41-S	E3X-DA41TW-S	E3X-DA41RM-S
Light source (wavelength)			Red LED (650 nm)	Green LED (525 nm)	Blue LED (470 nm)	Infrared LED	Red LED (650 nm)	
Supply voltage			12 to 24 VDC ±10%, ripple (p-p) 10% max.					
Power consumption			960 mW max. (current consumption: 40 mA max. at power supply voltage of 24 VDC)				1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)	
Control output			Load power supply voltage: 26.4 VDC; NPN / PNP open collector; load current: 50 mA max.; residual voltage: 1 V max.					
Circuit protection			Reverse polarity for power supply connection, output short-circuit					
Response time	Super-high-speed mode	NPN	48 μs for operation and 50 μs for reset				80 μs for operation and reset	48 μs for operation and 50 μs for reset <sup>*1</sup>
		PNP	53 μs for operation and 55 μs for reset				respectively	53 μs for operation and 55 μs for reset <sup>*1</sup>
	Standard mode		1 ms for operation and reset respectively					
	High-resolution mode		4 ms for operation and reset respectively					
Sensitivity setting			Teaching or manual method					
Functions	Power tuning		Light emission power and reception gain, digital control method					
	Differential detection		---				Switchable between single edge and double edge detection mode Single edge: Can be set to 250 μs, 500 μs, 1 ms, 10 ms, or 100 ms. Double edge: Can be set to 500 μs, 1 ms, 2 ms, 20 ms, or 200 ms.	
	Timer function		Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)					
	Automatic power control (APC)		High-speed control method for emission current					
	Zero-reset		Display can be reset to zero when required (negative values can be displayed).					
	Initial reset		Settings can be returned to defaults as required.					
	Mutual interference prevention		Possible for up to 10 Units <sup>*2, *3</sup>					
	Counter		---					
	I/O settings		---				Output setting (Select from channel 2 output, area output, or self-diagnosis.)	External input setting (Select from teaching, power tuning, zero reset, light OFF, or counter reset.)
Display			Operation indicator (orange), Power tuning indicator (orange)				Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)	Operation indicator (orange), Power Tuning indicator (orange)
Digital display			Select from the following: Incident level + threshold, incident level percentage + threshold, incident light peak level + no incident light bottom level, minimum incident light peak level + maximum no incident light bottom level, long bar display, incident level + peak hold, incident level + channel					
Size in mm			70Hx32Wx10D					

<sup>\*1</sup> When counter is enabled: 80  $\mu$ s for operation and reset respectively.

<sup>\*2</sup> Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the mobile console will not function.

<sup>\*3</sup> Mutual interference prevention can be used for only up to 6 units if power tuning is enabled.



## 2- in -1 digital double-head advanced photoelectric amplifier

E3X-MDA is the innovative consequence incorporating 2 digital fibre amplifiers in one slim-line housing. Many sensing applications require a signal to detect the presence of the object and another to check some part of that object which has been realized by this fibre optic amplifier.

- Two digital amplifiers in one slim-line housing
- Short response time of 130  $\mu$ s
- Power tune function for easy and accurate setting
- Parallel display of light intensity and switch point value
- Twin output models - on / off or area (between two values)

CE

### Ordering information

#### Amplifier units with cables

Item	Functions	Model	
		NPN output	PNP output
2-channel models	AND / OR output	E3X-MDA11	E3X-MDA41

#### Amplifier units with connectors

Item	Functions	Model	
		NPN output	PNP output
2-channel models	AND / OR output	E3X-MDA6	E3X-MDA8

#### Amplifier unit connectors (order separately)

Item	Cable length	No. of conductors	Model
Master connector	2 m	3	E3X-CN11
		4	E3X-CN21
Slave connector		1	E3X-CN12
		2	E3X-CN22

#### Combining amplifier units and connectors

Amplifier units and connectors are sold separately. Refer to the following tables when placing an order.

Amplifier unit			Applicable connector (order separately)	
Model	NPN output	PNP output	Master connector	Slave connector
2-channel models	E3X-MDA6	E3X-MDA8	E3X-CN21 (4-wire)	E3X-CN22 (2-wire)

#### When using 5 amplifier units

Amplifier units (5 units) + 1 Master connector + 4 Slave connectors

### Specifications

		Type	2-channel models	
Model		NPN output	E3X-MDA11	E3X-MDA6
Item		PNP output	E3X-MDA41	E3X-MDA8
Light source (wavelength)			Red LED (650 nm)	
Supply voltage			12 to 24 VDC $\pm 10\%$ , ripple (p-p) 10% max.	
Power consumption			1,080 mW max. (current consumption: 45 mA max. at power supply voltage of 24 VDC)	
Control output			Load power supply voltage: 26.4 VDC; open collector; load current: 50 mA max.; residual voltage: 1 V max.	
Circuit protection			Reverse polarity for power supply connection, output short-circuit	
Response time	Super-high-speed mode	NPN	130 $\mu$ s <sup>1</sup> for operation and reset respectively	
		PNP		
	Standard mode		1 ms for operation and reset respectively	
		High-resolution mode	4 ms for operation and reset respectively	
Sensitivity setting			Teaching or manual method	
Functions	Power tuning		Light emission power and reception gain, digital control method	
	Timer function		Select from OFF-delay, ON-delay, or one-shot timer. 1 ms to 5 s (1 to 20 ms set in 1-ms increments, 20 to 200 ms set in 10-ms increments, 200 ms to 1 s set in 100-ms increments, and 1 to 5 s set in 1 s-increments)	
	Automatic power control (APC)		High-speed control method for emission current	
	Zero-reset		Display can be reset to zero when required (negative values can be displayed).	
	Initial reset		Settings can be returned to defaults as required.	
	Mutual interference prevention		Possible for up to 9 Units (18 channels) <sup>2, *3</sup>	
	I/O settings		Output setting (select from channel 2 output, AND, OR, leading edge sync, falling edge sync, or differential output)	



	Type	2-channel models	
Model	NPN output	E3X-MDA11	E3X-MDA6
Item	PNP output	E3X-MDA41	E3X-MDA8
Display		Operation indicator for channel 1 (orange), Operation indicator for channel 2 (orange)	
Digital display		Select from the following: Incident level for channel 1 + incident level for channel 2, Incident level + threshold, incident level percentage + threshold, incident light peak level + no incident light bottom level, minimum incident light peak level + maximum no incident light bottom level, long bar display, incident level + peak hold, incident level + channel	
Display orientation		Switching between normal/reversed display is possible.	
Ambient illumination (receiver side)		Incandescent lamp: 10,000 lux max. Sunlight: 20,000 lux max.	
Insulation resistance		20 MΩ min. (at 500 VDC)	
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute	
Vibration resistance (destruction)		10 to 55 Hz with a 1.5-mm double amplitude for 2 hrs each in X, Y and Z directions	
Shock resistance (destruction)		500 m/s <sup>2</sup> , for 3 times each in X, Y and Z directions	
Enclosure rating		IEC 60529 IP50 (with Protective Cover attached)	
Connection method		Prewired cable	Standard connector
Weight (packed state)		Approx. 100 g	Approx. 55 g
Materials	Case	Polybutylene terephthalate (PBT)	
	Cover	Polycarbonate (PC)	
Accessories		Instruction sheet	
Size in mm		70Hx32Wx10D	

\*1 When differential output is selected for the output setting, the second channel output is 200 μs for operation and reset respectively.

\*2 Communications are disabled if the detection mode is selected during super-high-speed mode, and the communications functions for mutual interference prevention and the mobile console will not function.

\*3 Mutual interference prevention can be used for up to 5 units (10 channels) if power tuning is enabled.



## Digital fibre optic amplifier with easy teach & go functionality

E3X-DA-SE-S is the right answer for a simple one key setting of an advanced fibre optical amplifier incorporating almost all the same beneficial features as its big brother 'E3X-DA-S'.

- Easy operation with one key teaching or manually
- Digital double display for incident level and threshold
- High-resolution 12 bit A/D converter (4000 resolution)
- Mutual interference protection for alignment of 10 fibre amplifiers
- Low power consumption - 10 amplifiers only need 0.4 A current supply

CE

### Ordering information

Type	Model	
	NPN output	PNP output
Pre-wired models	E3X-DA11SE-S	E3X-DA41SE-S
Connector models	E3X-DA6SE-S	E3X-DA8SE-S

### Specifications

Type	Model	Digital fiber sensor	
	NPN output	E3X-DA11SE-S	E3X-DA6SE-S
Item	PNP output	E3X-DA41SE-S	E3X-DA8SE-S
Light source (wave length)		Red LED (650 nm)	
Power supply voltage		12 to 24 VDC $\pm 10\%$ , ripple (p-p): 10% max.	
Power consumption		960 mW max. (Power supply: 24 V, current consumption: 40 mA max.)	
Control output		Load power supply: 26.4 VDC max., open-collector output, Load current: 50 mA max. (residual voltage: 1 V max.)	
Protective circuits		Power supply reverse polarity protection, output short-circuit protection	
Response time		Operate or reset: 1 ms	
Sensitivity setting		Teaching or manual adjustment	
Functions	Auto power control	High-speed control method for emission current	
	Mutual interference prevention	Optical communications sync, possible for up to 10 Units	
Indicators		Operation indicator (orange)	
Digital displays		Twin digital displays (incident level + threshold)	
Size in mm		70Hx32Wx10D	

**Note:** Basic performance is the same as the E3X-DA-S Series. Refer to the E3X-DA-S Datasheet (E336) for details.



## Digital fibre amplifier with active threshold for dust and dirt compensation

The active threshold E3X-DA-AT-S digital fibre amplifier ignores a certain level of dirt or pollution and makes readjustments of thresholds unnecessary. Combined with APC function you can always be assured of stable sensing characteristics.

- Active threshold control for high stability
- High resolution 12 bit A/D converter (res. = 4.000)
- APC compensation for LED derating
- Short response time of only 80 µs (super-high-speed mode)
- Alarm output for maintenance warning



### Ordering information

#### Digital fiber sensor

Type	Functions	Model	
		NPN output	PNP output
Pre-wired models	ATC	E3X-DA11AT-S	E3X-DA41AT-S
Connector models	ATC error output Alarm output	E3X-DA6AT-S	E3X-DA8AT-S

#### Seperate digital amplifier laser sensors

Type	Functions
Pre-wired models	ATC
Connector models	ATC error output Alarm output

### Specifications

Type	Model	Digital fiber sensor	
	NPN output	E3X-DA11AT-S	E3X-DA6AT-S
Item	PNP output	E3X-DA41AT-S	E3X-DA8AT-S
Response time	Super-high-speed mode	Operate or Reset: 80 µs	
	High-speed mode	Operate or reset: 250 µs	
	Standard mode	Operate or reset: 1 ms	
	High-resolution mode	Operate or reset: 4 ms	
Functions	ATC	Active threshold control (used for output 1)	
	I/O settings	The signal that is output can be selected (used for output 2): ATC error output	
	Startup operation	The operation when power is turned ON can be selected: No operation, PT, or PT + ATC	
Size in mm		70Hx 32Wx 10D	

**Note:** Basic performance is the same as the advanced twin-output sensors. Refer to E3C-LDA datasheet (E338) and E3X-DA-S datasheet (E336) for details. Only differences from the advanced twin-output sensors have been given above.



## Fibre optic amplifier with analog output and short response time

E3X-DA-AN-S is the perfect solution provider in terms of position-detection of objects. A high speed output with only 80 µs response time, low temperature drift and high repeat accuracy are in favour of an excellent sensing characteristic.

- Analog output with high stability and accuracy
- Power tuning for easy setting
- Dual digital display for level and threshold indication
- High-speed mode with 80 µs response time
- APC for compensation of LED derating

CE

### Ordering information

#### Digital fiber amplifier

Type	Functions	Model	
		NPN output	PNP output
Pre-wired models	Analog output	E3X-DA11AN-S	E3X-DA41AN-S

#### Photoelectric sensor with separate digital amplifier (laser-type)

Type	Functions	Model	
		NPN output	PNP output
Pre-wired models	Analog output	E3C-LDA11AN	E3C-LDA41AN

### Specifications

Type	Model	Digital fiber amplifier
	NPN output	E3X-DA11AN-S
Item	PNP output	E3X-DA41AN-S
Analog output	Control output	Voltage output 1 to 5 VDC (with connected load of 10 kΩ min.)
	Repeat accuracy	Super-high-speed mode: 1.5% F.S. High-speed mode: 1.5% F.S. Standard mode: 1% F.S. High-resolution mode: 0.75% F.S.
	Temperature characteristics	0.3% F.S./°C
Response time	Super-high-speed mode	Operate or reset: 80 µs
	High-speed mode	Operate or reset: 250 µs
	Standard mode	Operate or reset: 1 ms
	High-resolution mode	Operate or reset: 4 ms
Size in mm		70Hx32Wx10D

**Note:**

- The power tuning function cannot be used in super-high-speed mode.
- Other performance items and functions are the same as those of general-purpose models.  
For details, refer to the data sheet for the E3X-DA-S (Cat. No. E336) and the E3L-LDA (Cat. No. E338).

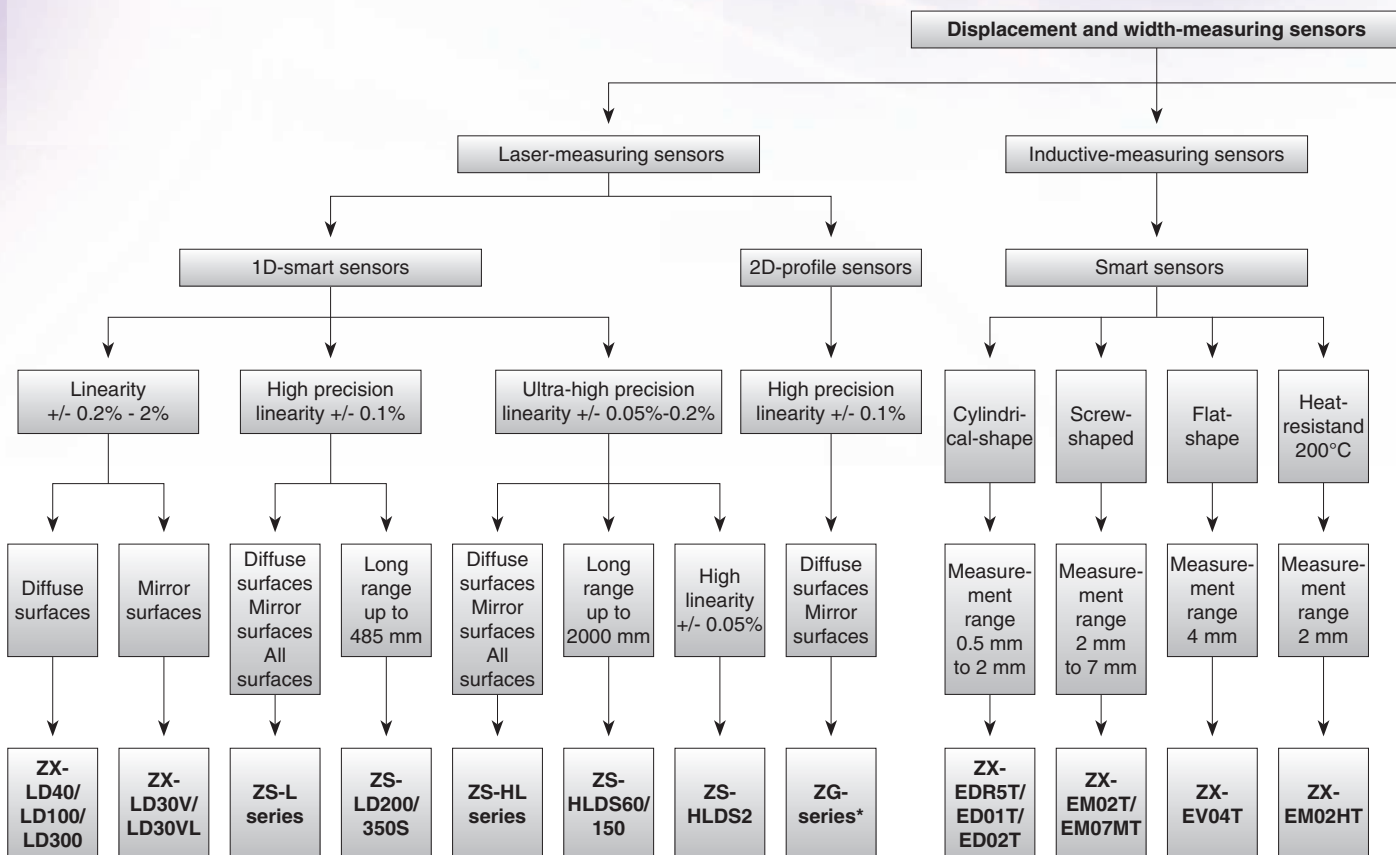
# Displacement / measurement sensors

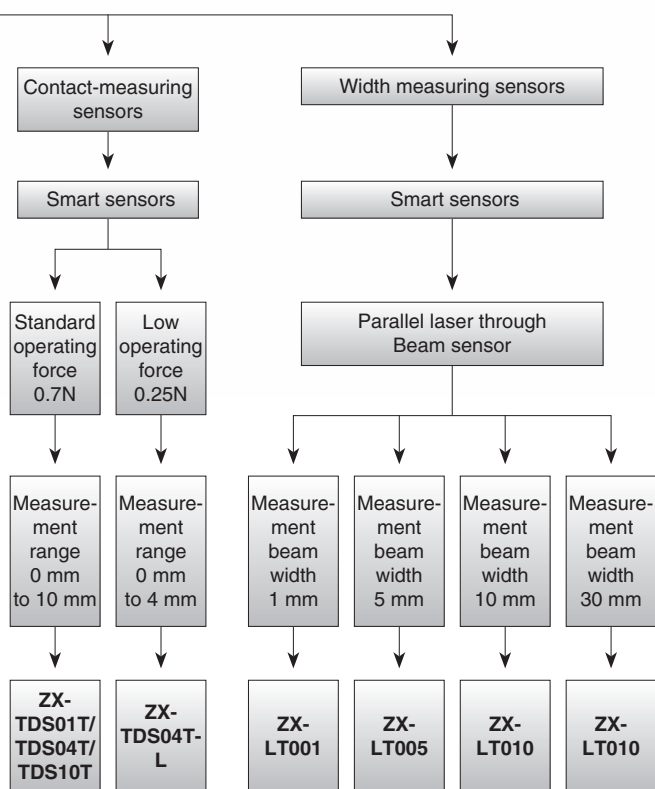
## ZS-L laser displacement sensor

### More flexibility through scalability

The ZS-L laser displacement sensors is a smart, modular and scalable family that offers a platform approach to solve the most challenging tasks in measurements. Aided by Omron C-MOS technology, the ZS-L measures at sub-micron accuracy in a fraction of a millisecond virtually any texture. The ZS-L series comes with a sensor controller, a data storage unit and a multi-controller that coordinates up to 9 units. Hence enabling accurate measurements of material thickness, evenness and warpage.

- Accurate and fast – 0.4  $\mu\text{m}$  at less than 110  $\mu\text{s}$  sampling time
- One sensor fits all – stable measurement of virtually any material structure such as glass, foil or rubber
- Powerful – can measure accurately thickness, warpage and evenness thanks to its multi-unit controller
- Smart – data storage unit for traceability and data logging
- Easy to use – built-in user interface and powerful yet friendly PC configuration tool








## Table of contents




<b>Selection table</b>		84
<b>Laser measuring sensors</b>	ZX-LD	86
	ZS-L	88
<b>Inductive measuring sensors</b>	ZX-E	90
<b>Contact measuring sensor</b>	ZX-T	92
<b>Width measuring sensors</b>	ZX-LT	95



# Selection table

		1D smart laser measuring sensors		
				
Selection criteria	Model	ZX-LD	ZS-L	ZS-HL
	Measurement range Z Min.	±2 mm	±1 mm	±0.5 mm
	Max.	±200 mm	±135 mm	±500 mm
	Measurement range X Min.			
	Max.			
	Center distance Min.	30 mm	6.3 mm	10 mm
	Max.	300 mm	350 mm	1,500 mm
	<sup>*1</sup> Resolution Z	0.25 µm	0.25 µm	0.1 µm
	<sup>*1</sup> Resolution X			
	<sup>*1</sup> Linearity (± % of full scale)	0.2%	0.1 %	0.05%
	Response time	150 µs	110 µs	110 µs
	Spot beam	■	■	■
	Line beam	■	■	■
	IP-rating head	IP50	IP67	IP64 - IP67
	IP-rating controller	IP40	IP40	IP40
	Ambient oper. temperature	0 - 50 °C	0 - 50 °C	0 - 50 °C
	Number of connectable sensors	5	9	
Features	Thickness measurement	■	■	■
	Excentricity	■	■	■
	Step	■	■	■
	Height	■	■	■
	Distance	■	■	■
	Evenness	■	■	■
	Warpage		■	■
	Edge			
	Position			
	Width			
	Peak	■	■	■
	Peak to peak	■	■	■
	Bottom	■	■	■
	Self-trigger	■	■	■
	Multi-point-calculation		■	■
	Mutual interference prevention	■	■	■
	Signal scaling	■	■	■
	PC-software	■	■	■
	Plug & play technology	■	■	■
	Diffuse reflection	■	■	■
Application	Optical method (reflection)	Diffuse / Regular		
	Mirror	■	■	■
	Glass		■	■
	Metal		■	■
	Plastic	■	■	■
	Black rubber		■	■
	Liquid		■	■
Supply voltage	12 - 24 VDC	■		
	21.6 - 26.4 VDC		■	■
Control I/O	4 - 20 mA	■	■	■
	1 - 5 VDC	■		
	±5 VDC			
	±4 VDC	■		
	±10 VDC		■	■
	Judgement output High/Pass/Low	■	■	■
Commu- nication	Trigger	■	■	■
	RS-232C	■	■	■
	USB2.0		■	■
	Page	86	88	Please contact your OMRON representative

# Displacement / measurement sensors

		Inductive measuring sensors	Contact measuring sensors	Width measuring sensors
				
Selection criteria	Model	ZX-E	ZX-T	ZX-LT
	Measurement range Z Min.	0.5 mm	1 mm	1 mm
	Max.	7 mm	10 mm	30 mm
	Measurement range X Min.			
	Max.			
	Center distance Min.			
	Max.			
	<sup>*1</sup> Resolution Z	1 µm	0.1 µm	4 µm
	<sup>*1</sup> Resolution X			
	<sup>*1</sup> Linearity (± % of full scale)	0.5%	0.3%	1%
	Response time	150 µs	1 ms	150 µs
	Spot beam			
	Line beam			
	IP-rating head	IP67	IP67	IP40
	IP-rating controller	IP40	IP40	IP40
	Ambient oper. temperature	0 - 50 °C	0 - 50 °C	0 - 50 °C
	Number of connectable sensors	5	7	5
Features	Thickness measurement	■	■	■
	Excentricity	■	■	■
	Step	■	■	■
	Height	■	■	■
	Distance	■	■	
	Evenness	■	■	
	Warping	■	■	
	Edge			■
	Position			■
	Width			■
	Peak	■	■	■
	Peak to peak	■	■	■
	Bottom	■	■	■
	Self-trigger	■	■	■
	Multi-point-calculation	■	■	■
	Mutual interference prevention	■		■
	Signal scaling	■	■	■
	PC-software	■	■	■
	Plug & play technology	■	■	■
Application	Diffuse reflection			
	Optical method (reflection)			
	Mirror		■	■
	Glass		■	■
	Metal	■	■	■
	Plastic		■	■
	Black rubber		■	■
Supply voltage	Liquid			
	12 - 24 VDC	■	■	■
Control I/O	21.6 - 26.4 VDC			
	4 - 20 mA	■	■	■
	1 - 5 VDC	■	■	■
	±5 VDC	■	■	■
	±4 VDC	■	■	■
	±10 VDC			
Communication	Judgement output High/Pass/Low	■	■	■
	Trigger	■	■	■
	RS-232C	■	■	■
	USB2.0	■		
	Page	90	92	95

■ Standard

□ No / not available



## Smart, fast and accurate laser measurement sensor

Smart ZX-L offers plug & measure technology for applications where high resolution and fast response time is required. A wide range of interchangeable sensor heads provides greater flexibility in solving most demanding applications.

- Small and light sensor heads for easy integration
- High speed response time of 150  $\mu$ s
- Easy sensor head replacement
- Scalability through a modular platform concept
- Multipoint measurement with up to 5 sensors



## Ordering information

### Sensor head (reflection type)

Optical method	Beam shape	Sensing distance	Resolution <sup>*1</sup>	Size in mm (HxWxD)	Model
Diffuse-reflective	Spot beam	40 $\pm$ 10 mm	2 $\mu$ m	39x33x17	ZX-LD40
		100 $\pm$ 40 mm	16 $\mu$ m		ZX-LD100
		300 $\pm$ 200 mm	300 $\mu$ m		ZX-LD300
	Line beam	40 $\pm$ 10 mm	2 $\mu$ m		ZX-LD40L
		100 $\pm$ 40 mm	16 $\mu$ m		ZX-LD100L
		300 $\pm$ 200 mm	300 $\mu$ m		ZX-LD300L
Regular reflection type	Spot beam	30 $\pm$ 2 mm	0.25 $\mu$ m	45x55x25	ZX-LD30V
	Line beam				ZX-LD30VL

<sup>\*1</sup> At average count of 4,096 times

### Amplifier units

Power supply	Output specifications	Model
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

**Note:** Compatible with sensor head connection.

## Specifications

### Sensor head (reflection type)

Item Model	ZX-LD40	ZX-LD100	ZX-LD300	ZX-LD30V	ZX-LD40L	ZX-LD100L	ZX-LD300L	ZX-LD30VL
Optical method	Diffuse reflection			Regular reflection	Diffuse reflection			Regular reflection
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 2)							
Measurement center distance	40 mm	100 mm	300 mm	30 mm	40 mm	100 mm	300 mm	30 mm
Measurement range	±10 mm	±40 mm	±200 mm	±2 mm	±10 mm	±40 mm	±200 mm	±2 mm
Beam shape	Spot				Line			
Beam diameter <sup>*1</sup>	50 mm dia.	100 mm dia.	300 mm dia.	75 mm dia.	75 m x 2mm	150 μm x 2 mm	450 μm x 2 mm	100 μm x 1.8 mm
Resolution <sup>*2</sup>	2 μm	16 μm	300 μm	0.25 μm	2 μm	16 μm	300 m	0.25 μm
Linearity <sup>*3</sup>	±0.2% F.S. (entire range)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)	±0.2% F.S. (32 to 49 mm)	±0.2% F.S. (80 to 121 mm)	±2% F.S. (200 to 401 mm)	±0.2% F.S. (entire range)
Protective structure	IEC 60529 IP50			IEC Standard IP40	IEC 60529 IP50			IEC Standard IP40

<sup>\*1</sup> Beam diameter: This is the value of the measurement center distance (actual value), and is defined at 1/e<sup>2</sup> (13.5%) of the central light intensity. If there is stray light outside, the defined area and the area around the object has a higher reflectance than the object.

<sup>\*2</sup> Resolution: Indicates the amount of fluctuation ( $\pm$ 3  $\mu$ m) in the linear output when connected to the ZX-LDA. (The measured value when the average count of the ZX-LDA is set to 4,096 and our standard object (white ceramic) is used for the central distance.) This indicates the repeatability precision when the work is in a static state, and does indicate the distance precision. The resolution performance may not be satisfactory in a strong electromagnetic field.

<sup>\*3</sup> Linearity: This indicates the error with respect to the ideal straight line of the displacement output when measuring our standard object.

**Note:** When an object has a high reflectance, detection errors are possible outside the measurement range.

## Amplifier units

Item Model	ZX-LDA11-N	ZX-LDA41-N
Measurement period	150 s	
Possible average count settings <sup>*1</sup>	1/2/4/8/16/32/64/128/256/512/1,024/2,048/4,096 times	
Temperature drift	When reflective head is connected: 0.01% F.S./°C, when transmissive head is connected: 0.1% F.S./°C	
Linear output <sup>*2</sup>	4 to 20 mA/F.S., maximum load resistance of 300 Ω ±4 V (±5 V, 1 to 5 V <sup>*3</sup> ), output impedance of 100 Ω	
Decision output (HIGH/PASS/LOW: 3 outputs) <sup>*1</sup>	NPN open collector output, 30 VDC 50 mA max., residual voltage 1.2 V or less	PNP open collector output, 30 V DC 50 mA max., residual voltage 2 V or less
Laser OFF input / zero reset input / timing input / reset	When ON: supply voltage 1.5 V or less, when OFF: open circuit (maximum leakage current 0.1 mA or less)	When ON: supply voltage 1.5 V or less, when OFF: open circuit (maximum leakage current 0.1 mA or less)
Functions	Measurement value display, setting value and incident level and resolution display, scaling, display reverse, display off mode, ECO mode, change number of display digits, sample hold, peak hold, bottom hold, peak to peak hold, self peak hold, self-bottom hold, intensity mode, zero reset, initial reset, on-delay timer, off-delay timer, one-shot timer, differential, sensitivity selection, keeping clamp change, threshold value settings, positioning teaching, two-point teaching, automatic teaching, hiss width variable, timing input, reset input, monitor focus, (A-B) operation, (A+B) operation <sup>*4</sup> , mutual interference <sup>*4</sup> ; laser degradation detection zero reset memory, function lock	
Indicator lamp	Operation indicator lamp: high (orange), pass (green), low (yellow), 7-segment digital main display (red), 7-segment digital sub-display (yellow), laser ON (green), zero reset (green), enable display (green)	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p) : 10% max.	
Current consumption	200 mA or less (when sensor is connected)	

<sup>\*1</sup> The response speed of linear output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

The response speed of decision output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

<sup>\*2</sup> Current/voltage can be switched using the switch on the bottom of the amplifier unit.

<sup>\*3</sup> Can be set with the monitor focus function.

<sup>\*4</sup> Computing unit is required.



## The scalable high precision laser measurement sensor

Smart ZS-L sensor offers superb dynamic sensing range for all surfaces from black rubber to glass and mirror surfaces by simply scaling it to your needs.

- High dynamic sensing range for all surfaces
- High resolution of 0.25  $\mu\text{m}$
- Modular and scalable platform concept for up to 9 sensors
- Easy to use, install and maintain for all user levels
- Fast response time of 110  $\mu\text{s}$



## Features

### The scalable platform for more flexibility

- Connect and expand up to 9 controllers
- Connect multi-calculation controller for advanced calculations like evenness or flatness
- Connect data storage module for process-data logging
- Connect PC software for easy system set up and signal monitoring
- Sensor head with 2D-CMOS technology with high dynamic sensing range for measuring black rubber, plastic, shiny, glass and mirror surfaces
- Advanced application settings
- Easy reconfiguration and teaching

### Measurement tools:

- Height measurement
- Step measurement
- Thickness measurement
- Flatness measurement
- Average measurement
- Excentricity
- Warpage / Evenness

## Ordering information

### Sensor heads

Optical system	Sensing distance	Beam diameter	Resolution <sup>*1</sup>	Size in mm (HxWxD)	Model
Diffuse reflection	50 $\pm$ 5 mm	900 x 60 $\mu\text{m}$	0.8 $\mu\text{m}$	65mmx65mmx35mm	ZS-LD50
	80 $\pm$ 15 mm	900 x 60 $\mu\text{m}$	2 $\mu\text{m}$		ZS-LD80
	130 $\pm$ 15 mm	600 x 70 $\mu\text{m}$	3 $\mu\text{m}$		ZS-LD130
	200 $\pm$ 50 mm	900 x 100 $\mu\text{m}$	5 $\mu\text{m}$		ZS-LD200
	350 $\pm$ 135 mm	dia. 240 $\mu\text{m}$	20 $\mu\text{m}$		ZS-LD350S
Regular reflection	20 $\pm$ 1 mm	900 x 25 $\mu\text{m}$	0.25 $\mu\text{m}$		ZS-LD20T
	40 $\pm$ 2.5 mm	2,000 x 35 $\mu\text{m}$	0.4 $\mu\text{m}$		ZS-LD40T

<sup>\*1</sup> This is the peak-to-peak displacement conversion value in the displacement output at the measuring center distance in high-precision mode when the number of samples to average is set to 128 and the measuring mode is set to the high-resolution mode. The standard workpiece is white aluminum ceramics in diffuse reflection mode and glass in the regular reflection mode.

### Sensor controllers

Supply voltage	Control outputs	Model
24 VDC	NPN outputs	ZS-LDC11
	PNP outputs	ZS-LDC41

### Data storage units

Supply voltage	Control outputs	Model
24 VDC	NPN outputs	ZS-DSU11
	PNP outputs	ZS-DSU41

### Multi controllers

Supply voltage	Control outputs	Model
24 VDC	NPN outputs	ZS-MDC11
	PNP outputs	ZS-MDC41

## Specifications

### Sensor heads

Item	Model	ZS-LD20T		ZS-LD40T		ZS-LD50		ZS-LD80		ZS-LD130		ZS-LD200		ZS-LD350S
Applicable controllers	ZS-LDC Series													
Optical system	Regular reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Diffuse reflection	Regular reflection	Diffuse reflection	Regular reflection	Regular reflection	Regular reflection	Diffuse reflection	Diffuse reflection	Regular reflection	Diffuse reflection
Measuring center distance	20 mm	6.3 mm	40 mm	30 mm	50 mm	47 mm	80 mm	78 mm	130 mm	130 mm	200 mm	200 mm	350 mm	
Measuring range	±1 mm	±1 mm	±2.5 mm	±2 mm	±5 mm	±4 mm	±15 mm	±14 mm	±15 mm	±12 mm	±50 mm	±48 mm	±135 mm	
Light source	Visible semiconductor laser (wavelength: 650 nm, 1 mW max., Class 2)													
Beam diameter	900 x 25 μm		2,000 x 35 μm		900 x 60 μm		900 x 60 μm		600 x 70 μm		900 x 100 μm		dia. 240 μm	
Linearity	±0.1% F.S.								±0.25% F.S.		±0.1% F.S.		±0.25% F.S.	±0.1% F.S.
Resolution	0.25 μm		0.4 μm		0.8 μm		2 μm		3 μm		5 μm		20 μm	
Temperature characteristic	0.04% F.S./°C		0.02% F.S./°C		0.02% F.S./°C		0.01% F.S./°C		0.02% F.S./°C		0.02% F.S./°C		0.04% F.S./°C	
Sampling cycle	110 μs													
Degree of protection	Cable length 0.5 m: IP66, cable length 2 m: IP67													

### Sensor controllers

Item			ZS-LDC11		ZS-LDC41	
No. of samples to average			1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, or 4096			
Number of mounted sensors			1 per sensor controller			
External interface	Connection method		Serial I/O: connector, Other: pre-wired (standard cable length: 2 m)			
	Serial I/O	USB 2.0	1 port, full speed (12 Mbps), MINI-B			
		RS-232C	1 port, 115,200 bps max.			
	Outputs	Judgement outputs	3 outputs: HIGH, PASS, and LOW NPN open-collector, 30 VDC, 50 mA max., residual voltage: 1.2 V max.		3 outputs: HIGH, PASS, and LOW PNP open-collector, 50 mA max., residual voltage: 1.2 V max.	
		Linear outputs	Selectable from 2 types of output, voltage or current (selected by slide switch on base). Voltage output: -10 to 10 V, output impedance: 40 . Current output: 4 to 20 mA, maximum load resistance: 300 .			
	Inputs	Laser OFF, ZERO reset timing, RESET	ON: Short-circuited with 0V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)		ON: Short-circuited to supply voltage or within 1.5 V of supply voltage OFF: Open (leakage current: 0.1 mA max.)	
Functions			Display:	Measured value, threshold value, voltage/current, received light amount, and resolution		
			Sensing:	Mode, gain, measurement object, head installation		
			Filter:	Smooth, average, and differentiation		
			Outputs:	Scaling, various hold values, and zero reset		
			I/O settings:	Linear (focus/correction), judgements (hysteresis and timer), non-measurement, and bank (switching and clear)		
			System:	Save, initialization, measurement information display, communications settings, key lock, language, and data load		
Status indicators			HIGH (orange), PASS (green), LOW (orange), LDON (green), ZERO (orange), and ENABLE (green)			
Segment display		Main display	8-segment red LED, 6 digits			
		Sub-display	8-segment green LED, 6 digits			
LCD			16 digits x 2 rows, Color of characters: green, Resolution per character: 5 x 8 pixel matrix			
Setting inputs		Setting keys	Direction keys (UP, DOWN, LEFT, and RIGHT), SET key, ESC key, MENU key, and function keys (1 to 4)			
		Slide switch	Threshold switch (2 states: High/Low), mode switch (3 states: FUN, TEACH, and RUN)			
Power supply voltage			21.6 V to 26.4 VDC (including ripple)			



## Smart inductive measurement sensor



ZX-E offers the best solution for the accurate measurement of metallic objects. It is highly recommended in harsh environments such as automotive and metal working machines.

- High resolution of 1  $\mu\text{m}$
- High-speed response time of 150  $\mu\text{s}$
- Easy sensor head replacement
- Modular platform concept for different sensing technologies
- Easy linearity adjustment for any metal



## Ordering information

## Sensor heads

Shape	Dimensions	Sensing distance	Accuracy <sup>*1</sup>	Model
Cylindrical	3 dia. x 18 mm	0.5 mm	1 $\mu\text{m}$	ZX-EDR5T
	5.4 dia. x 18 mm	1 mm		ZX-ED01T <sup>*2</sup>
	8 dia. x 22 mm	2 mm		ZX-ED02T <sup>*2</sup>
Screw-shaped	M10 x 22 mm	2 mm		ZX-EM02T <sup>*2</sup>
	M18 x 46.3 mm	7 mm		ZX-EM07MT <sup>*2</sup>
Flat	30 x 14 x 4.8 mm	4 mm		ZX-EV04T
Heat-resistant, cylindrical	M12 x 22 mm	2 mm		ZX-EM02HT

<sup>\*1</sup> For an average count of 4,096.

<sup>\*2</sup> Models with protective spiral tubes are also available. Add a suffix of "-S" to the above model numbers when ordering. (Example: ZX-ED01T-S)

## Amplifier units

Power supply	Output type	Model
DC	NPN	ZX-EDA11
	PNP	ZX-EDA41

**Note:** Compatible connection with the sensor head.

## Specifications

## Sensor heads

Model	ZX-EDR5T	ZX-ED01T	ZX-ED02T/EM02T	ZX-EM07MT	ZX-EV04T	ZX-EM02HT
Measurement range	0 to 0.5 mm	0 to 1 mm	0 to 2 mm	0 to 7 mm	0 to 4 mm	0 to 2 mm
Sensing object	Magnetic metals (Measurement ranges and linearities are different for non-magnetic metals. Refer to Engineering Data on B-67.)					
Standard reference object	18×18×3 mm		30×30×3 mm	60×60×3 mm		45×45×3 mm
	Material: ferrous (S50C)					
Accuracy *1	1 μm					
Linearity *2	±0.5% F.S.					±1% F.S.
Linear output range	Same as measurement range.					
Shock resistance (destruction)	500 m/s2, 3 times each in X, Y, and Z directions					
Degree of protection (Sensor head)	IEC60529, IP65		IEC60529, IP67			IEC60529, IP60

<sup>\*1</sup> Accuracy: The resolution is the deviation ( $\pm 3\sigma$ ) in the linear output when connected to the ZX-EDA amplifier unit. The above values indicate the deviations observed 30 minutes after the power is turned ON.  
(The resolution is measured with OMRON's standard reference object at 1/2 of the measurement range with the ZX-EDA set for the maximum average count of 4,096 per period.)

The resolution is given at the repeat accuracy for a stationary workpiece, and is not an indication of the distance accuracy. The resolution may be adversely affected under strong electromagnetic fields.

<sup>\*2</sup> Linearity: The linearity is given as the error in an ideal straight line displacement output when measuring the standard reference object. The linearity and measurement values vary with the object being measured.

## Amplifier units

Model	ZX-EDA11	ZX-EDA41
Measurement period	150 µs	
Possible average count settings <sup>*1</sup>	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1,024, 2,048, or 4,096	
Linear output <sup>*2</sup>	Current output: 4 to 20 mA/F.S., max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V <sup>*3</sup> ), Output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 50 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage within 1.5 V OFF: Open (leakage current: 0.1 mA max.)
Function	<ul style="list-style-type: none"> <li>• Measurement value display - set value / output value / resolution display</li> <li>• Linearity adjustment (materials selection) scaling</li> <li>• Display reverse - display OFF mode</li> <li>• Number of display digit changes - sample hold</li> <li>• Bottom hold, peak-to-peak hold - self-peak hold</li> <li>• Average hold - delay hold</li> <li>• Initial reset - linearity initialization</li> <li>• OFF-delay timer - one-shot timer</li> <li>• Non-measurement setting - direct threshold value setting</li> <li>• Automatic teaching - hysteresis width setting</li> <li>• Reset input - judgement output hold input</li> <li>• Linear output correction - (A-B) calculations<sup>*4</sup></li> <li>• K-(A+B) calculation<sup>*4</sup> - mutual interference prevention<sup>*4</sup></li> <li>• Sensor disconnection detection - zero reset memory</li> <li>• Key lock</li> </ul>	
Indications	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Voltage influence (including sensor)	0.5% F.S. of linear output value at ±20% of power supply voltage	
Power supply voltage	12 to 24 VDC ±10%, ripple (p-p): 10% max.	

<sup>\*1</sup> The response speed of the linear output is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

<sup>\*2</sup> The response speed of the judgement outputs is calculated as the measurement period × (average count setting + 1) (with fixed sensitivity).

<sup>\*3</sup> The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.

<sup>\*4</sup> Setting is possible via the monitor focus function.

<sup>\*4</sup> A calculating unit (ZX-CAL or ZX-CAL2) is required.



## Smart contact measurement sensor

ZX-T is ideal for applications where the target object may contain oil deposits or other micro-structures. In this case contact measurement is the most reliable way.

- Modular platform concept for different sensing technologies
- Air-retracting types for automated inspection
- Multipoint measurement with up to 8 sensors
- Pressing force alarm prevents malfunction
- Strong ball bearing structure assures long life time



## Ordering information

### Sensor heads

Size	Type	Sensing distance	Resolution (See note.)	Model
6 dia.	Short type	1 mm	0.1 μm	ZX-TDS01T
	Standard type	4 mm		ZX-TDS04T
	Low-load type			ZX-TDS04T-L
8 dia.	Standard type	10 mm	0.4 μm	ZX-TDS10T
	Ultra-low-load type			ZX-TDS10T-L
	Air lift type			ZX-TDS10T-V
	Air lift / air push type			ZX-TDS10T-VL

**Note:** The resolution refers to the minimum value that can be read when a ZX-TDA□1 amplifier unit is connected.

### Amplifier units

Power supply	Output type	Model
DC	NPN	ZX-TDA11
	PNP	ZX-TDA41

## Specifications

### Sensor heads

Item		ZX-TDS01T	ZX-TDS04T	ZX-TDS04T-L	ZX-TDS10T	ZX-TDS10T-V	ZX-TDS10T-L	ZX-TDS10T-VL
Vacuum retract (VR) and air push (AP) compatible					No	VR	No	VR / AP
Measurement range		1 mm	4 mm		10 mm			
Maximum actuator travel distance		Approx. 1.5 mm	Approx. 5 mm		10.5 mm			
Resolution <sup>*1</sup>		0.1 μm			0.4 μm			
Linearity <sup>*2</sup>		±0.3% F.S.			±0.5% FS			
Operating force <sup>*3</sup>		Approx. 0.7 N		Approx. 0.25 N	Approx. 0.7 N	Approx. 0.6 N	Approx. 0.065 N	0.09 to 1.41N
Air pressure	Vacuum retrating				-	-0.55 to 0.70 (bar)	-	-0.05 to 0.22 (bar)
	Air push					-		0.125 to 2 (bar)
Degree of protection	Sensor head	IEC60529, IP67		IEC60529, IP54	IP65		IP50	
	Preamplifier				IP40			
Mechanical durability		10,000,000 operations min.						
Ambient temperature		Operating: 0°C to 50°C (with no icing or condensation), Storage: -15°C to 60°C (with no icing or condensation)			Operating: 0 to 50°C (with no icing or condensation) Storage: -10 to 60°C (with no icing or condensation)			
Ambient humidity		Operating and storage: 35% to 85% (with no icing or condensation)						
Temperature characteristic <sup>*4</sup>	Sensor head	0.03% F.S./°C			±0.01% FS/°C			
	Preamplifier	0.01% F.S./°C			±0.01% FS/°C			
Vibration resistance					0.35 mm single amplitude at 10 to 55 Hz for 50 min each in the X, Y, and Z directions			
Shock resistance					150 m/S2 3 times each in 6 directions (up/down, left/right, and forward/backward)			
Connection method					Prewired connector (2 m from the sensor head to the preamplifier, 0.2 m from the preamplifier to the connector)			
Weight (packed state)		Approx. 100 g						
Materials	Sensor head	Stainless steel						
	Rubber sleeve				Viton		None	
	Preamplifier	Polycarbonate						
	Mounting brackets	Stainless steel						
Accessories		Instruction manual, preamplifier mounting brackets (ZX-XBT1)			Instruction manual, preamplifier mounting brackets (ZX-XBT1), Right-angle adapter <sup>*5</sup>			






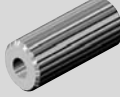
- \*1 The resolution is given as the minimum value that can be read when a ZX-TDA□1 amplifier unit is connected. This value is taken 15 minutes after turning ON the power with the average number of operations set to 256.
- \*2 The linearity is given as the error in an ideal straight line displacement output.
- \*3 These figures are representative values that apply for the measurement mid-point, and are for when the provided actuator is used, with the actuator moving downwards. If the actuator moves horizontally or upwards, the operating force will be reduced. Also, if an actuator other than the standard one is used, the operating force will vary with the weight of the actuator itself.
- \*4 These figures are representative values that apply for the mid-point of the measurement range.
- \*5 The ZX-TDS10□ comes with a right-angle adapter.

#### Amplifier units

Item	ZX-TDA11	ZX-TDA41
Measurement period	1 ms	
Possible average count settings *1	1, 16, 32, 64, 128, 256, 512, or 1,024	
Linear output *2	Current output: 4 to 20 mA/F.S., Max. load resistance: 300 Ω Voltage output: ±4 V (±5 V, 1 to 5 V <sup>*3</sup> ), Output impedance: 100 Ω	
Judgement outputs (3 outputs: HIGH/PASS/LOW)	NPN open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 1.2 V max.	PNP open-collector outputs, 30 VDC, 30 mA max. Residual voltage: 2 V max.
Zero reset input, timing input, reset input, judgement output hold input	ON: Short-circuited with 0-V terminal or 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)	ON: Supply voltage short-circuited or supply voltage of 1.5 V or less OFF: Open (leakage current: 0.1 mA max.)
Function	<ul style="list-style-type: none"> <li>• Measurement value display - present value/set value/output value display</li> <li>• Display reverse - ECO mode - number of display digit changes</li> <li>• Sample hold - peak hold - bottom hold, peak-to-peak hold</li> <li>• Self-peak hold - self-bottom hold - zero reset</li> <li>• Initial reset - direct threshold value setting - position teaching</li> <li>• Hysteresis width setting - timing inputs - reset input</li> <li>• Judgement output hold input - monitor focus - (A-B) calculations<sup>*4</sup></li> <li>• (A+B) calculations (See note 4.) - sensor disconnection detection</li> <li>• Zero reset memory - function lock - non-measurement setting</li> <li>• Clamp value setting - scale inversion - zero reset indicator</li> <li>• Span adjustment - warming-up display - pressing force alarm</li> </ul>	
Indicators	Judgement indicators: High (orange), pass (green), low (yellow), 7-segment main digital display (red), 7-segment sub-digital display (yellow), power ON (green), zero reset (green), enable (green)	
Power supply voltage	12 to 24 VDC ±10%, Ripple (p-p): 10% max.	
Current consumption	140 mA max. (with Sensor connected), For 24-VDC power supply voltage: 140 mA max. (with Sensor connected)	
Ambient temperature	Operating and storage: 0 to 50° C (with no icing or condensation)	
Temperature characteristic	0.03% F.S./° C	
Connection method	Prewired (standard cable length: 2 m)	
Weight (packed state)	Approx. 350 g	
Materials	Case: PBT (polybutylene terephthalate), Cover: Polycarbonate	

- \*1 The response speed of the linear output is calculated as the measurement period × (average count setting + 1).
- \*2 The response speed of the judgement outputs is calculated as the measurement period × (average count setting + 1).
- \*3 The output can be switched between a current output and voltage output using a switch on the bottom of the amplifier unit.
- \*4 Setting is possible via the monitor focus function.
- \*4 A calculating unit (ZX-CAL2) is required.

## Options (actuators)

Model	Type (material)	Screw section	Appearance	Application	Applicable sensor (see note.) ZX-TDS□T	
D5SN-	TB1	Ball type (steel)	Female screw M2.5 x 0.45		Measuring ordinary flat surfaces (standard actuator supplied with the ZX-TDS series)	○
	TB2	Ball type (carbide steel)	Female screw M2.5 x 0.45		Measurements where abrasion resistance is critical Measured objects: carbide (HR90) or lower.	○
	TB3	Ball type (ruby)	Female screw M2.5 x 0.45		Measurements where abrasion resistance is critical Measured objects: carbide (HR90) or higher.	○
	TN1	Needle type (carbide steel)	Male screw M2.5 x 0.45		Measuring the bottom of grooves and holes	△
	TF1	Flat (carbide steel)	Male screw M2.5 x 0.45		Measuring spherical objects	△
	TA	Conversion adapter (stainless steel)	Through-hole female screw M2.5 x 0.45		Mounting D5SN-TN1/-TF1 or commercially available actuators on ZX-TDS-series sensors	○

**Note:** ○ Replacement possible    △ Conversion Adapter required



## Smart parallel laser through beam sensor

ZX-LT parallel laser through beam sensor is recommended for precise object sensing such as width, diameter size or edge control.

- Small and light sensor heads for easy integration
- High-speed response time of 150  $\mu$ s for more stable detection
- Plug & play technology saves installation time
- Modular platform concept for different sensing technologies
- Wide range of sensor heads offering laser beam width from 1 mm to 30 mm

CE

## Ordering information

### Sensor head

Optical method	Measurement width	Sensing distance	Resolution <sup>*1</sup>	Size in mm (HxWxD)		Model
				Transmitter	Receiver	
Through-beam	1 mm dia.	0 to 2,000 mm	4 $\mu$ m	15x15x34	15x15x19	ZX-LT001
	5 mm	0 to 500 mm				ZX-LT005
	10 mm			20x20x42	20x20x25	ZX-LT010
	30 mm		12 $\mu$ m	64.25x70x22.6	64.25x54x22.6	ZX-LT030

<sup>\*1</sup> At average count of 64 times

### Amplifier units

Power supply	Output specifications	Model
DC	NPN output	ZX-LDA11-N
	PNP output	ZX-LDA41-N

**Note:** Compatible with sensor head connection.

## Specifications

### Sensor head (transmissive type)

Item model	ZX-LT001		ZX-LT005	ZX-LT010	ZX-LT030
Optical method	Through-beam				
Light source (wave length)	Visible-light semiconductor laser (wavelength 650 nm, 1 mW or less, Class 1)				
Measurement width	1 mm dia.	1 to 2.5 mm dia.	5 mm	10 mm	30 mm
Sensing distance	0 to 500 mm	500 to 2,000 mm	0 to 500 mm		
Min. sensing object	8 mm dia. opaque object	8 to 50 μm opaque object	opaque: 0.05 mm dia.	opaque: 0.1 mm dia.	opaque: 0.3 mm dia.
Resolution <sup>*1</sup>	4 μm <sup>*2</sup>	---	4 μm <sup>*3</sup>		12 μm
Protective structure	IEC 60529 IP40				IP 40

<sup>\*1</sup> The amount of fluctuation ( $\pm 3 \delta$ ) of the linear output when connected to an amplifier unit, converted to a detection span.

<sup>\*2</sup> When the average count is 64.5  $\mu$ m when the count is 32. The value when the smallest detection object shades the vicinity of the center of the 1 mm dia. detection span.

<sup>\*3</sup> When the average count is 64.5  $\mu$ m when the count is 32.

### Amplifier units

Item model	ZX-LDA11-N	ZX-LDA41-N
Measurement period	150 s	
Possible average count settings <sup>*1</sup>	1/2/4/8/16/32/64/128/256/512/1,024/2,048/4,096 times	
Temperature drift	When reflective head is connected: 0.01% F.S./°C, when transmissive head is connected: 0.1% F.S./°C	
Linear output <sup>*2</sup>	4 to 20 mA/F.S., maximum load resistance of 300 $\pm 4$ V ( $\pm 5$ V, 1 to 5 V <sup>*3</sup> ), output impedance of 100 $\Omega$	
Decision output (HIGH/PASS/LOW: 3 outputs) <sup>*1</sup>	NPN open collector output, 30 VDC 50 mA max., residual voltage 1.2 V or less	PNP open collector output, 30 V DC 50 mA max., residual voltage 2 V or less
Laser OFF input / zero reset input / timing input / reset	When ON: supply voltage 1.5 V or less, when OFF: open circuit (maximum leakage current 0.1 mA or less)	When ON: supply voltage 1.5 V or less, when OFF: open circuit (maximum leakage current 0.1 mA or less)
Functions	Measurement value display, setting value and incident level and resolution display, scaling, display reverse, display off mode, ECO mode, change number of display digits, sample hold, peak hold, bottom hold, peak to peak hold, self peak hold, self-bottom hold, intensity mode, zero reset, initial reset, on-delay timer, off-delay timer, one-shot timer, differential, sensitivity selection, keeping clamp change, threshold value settings, positioning teaching, two-point teaching, automatic teaching, hiss width variable, timing input, reset input, monitor focus, (A-B) operation, (A+B) operation <sup>*4</sup> , mutual interference <sup>*4</sup> , laser degradation detection zero reset memory, function lock	
Indicator lamp	Operation indicator lamp: high (orange), pass (green), low (yellow), 7-segment digital main display (red), 7-segment digital sub-display (yellow), laser ON (green), zero reset (green), enable display (green)	
Power supply voltage	12 to 24 VDC $\pm 10\%$ , ripple (p-p) : 10% max.	
Current consumption	200 mA or less (when sensor is connected)	

<sup>\*1</sup> The response speed of linear output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

The response speed of decision output (when the sensitivity is fixed) is calculated as (measurement period) x (average count setting + 1).

<sup>\*2</sup> Current/voltage can be switched using the switch on the bottom of the amplifier unit.

<sup>\*3</sup> Can be set with the monitor focus function.

<sup>\*4</sup> Computing unit is required.



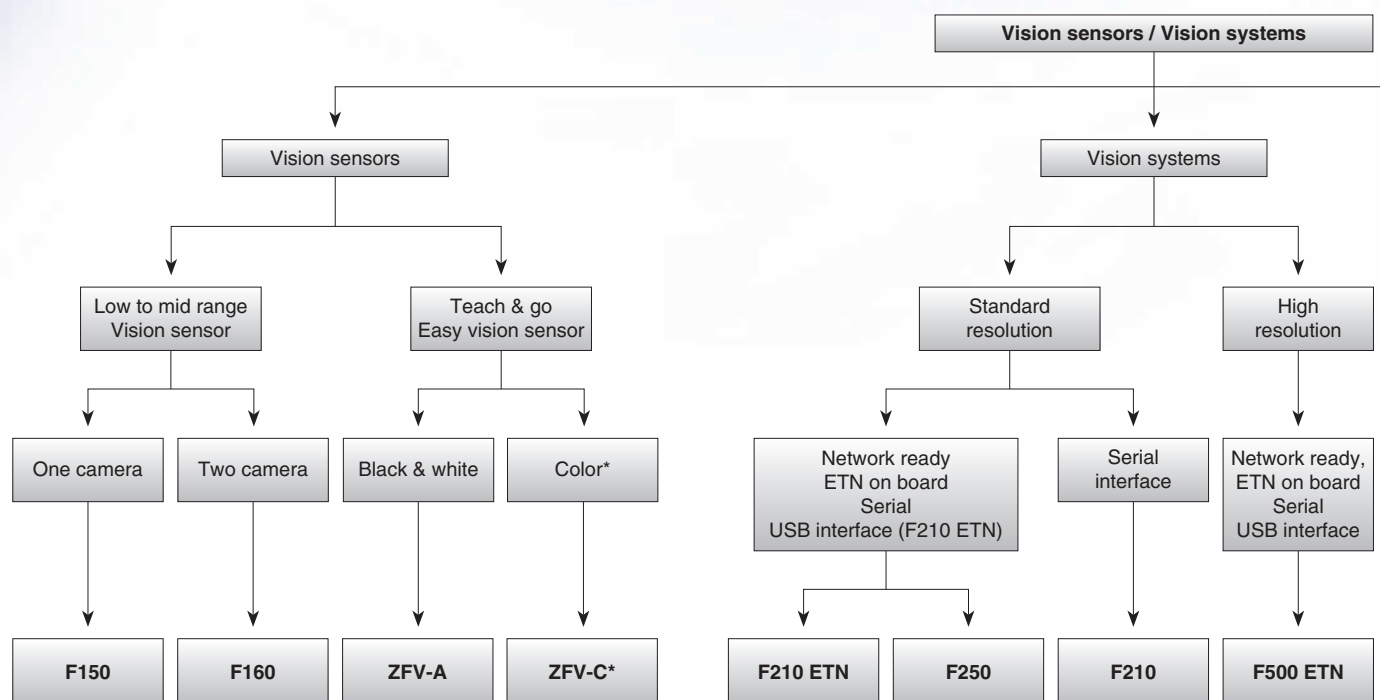
# Vision sensors & systems

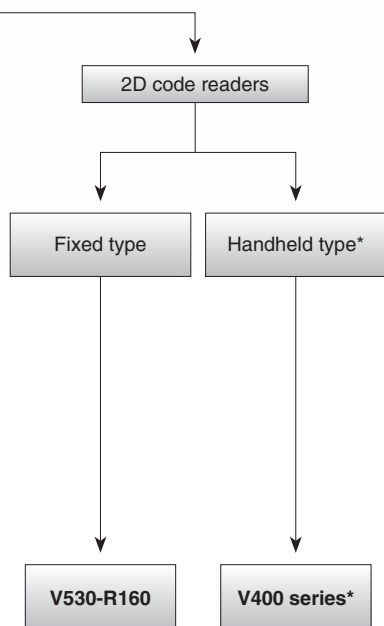
## Easy vision – teach & go

### ZFV smart vision sensor

Omron's new ZFV smart vision sensor is an image-processing system in a sensor format. It consists of two separate components, a camera head with an integrated light source and a processing unit. Parameter settings and lighting control are available at the touch of a button. A "smart" user interface allows parameter setting using a few buttons and the built-in colour LCD monitor. During operation, the display gives direct feedback showing results and images in real time. Easy vision – teach & go, for applications which can be solved in minutes – not hours or days.

- Brilliant colour display
- Real time result and image display
- Intuitive user interface
- One button teach – teach and go
- Up to seven inspection tools
- Adjustable inspection area and distance
- Integrated, adjustable LED light
- Up to 250 inspections per second












\*available in 2006

## Table of contents

<b>Selection table</b>		98
<b>Vision sensors</b>	ZFV	100
	F150	102
	F160	103
<b>Vision systems</b>	F210	104
	F250	105
	F500 / F210 ETN	106
<b>2D code reader</b>	V530-R160	107

# Selection table

		Vision sensors			Vision systems
					
Selection criteria	Model	ZFV	F150	F160	F210
	Number of connectable cameras	1	1 (2 with optional extension)	2	2
	Camera type	Digital black&white	Analogue black&white		
	Resolution (usable)	468 x 432	512 x 484	512 x 484	512 x 484
	Working distance mm	34	depends on selected lens		
	Min.				
	Max.	194			
	Field of view mm	5	depends on selected lens		
	Min.				
	Max.	50			
	Number of storable configurations	8	16	32 (expandable using CF card)	
	Number of tools/ configuration	1	16	32	limited only by memory space / depends on type of
Features	Cycle time	app. 4-25 ms depending on setup	Depends on setup and used tools		
	IP-Rating camera head	IP65	n/a		
	Supply voltage	24 VDC			
	Image processing tools	Up to seven (area, brightness, width, position, character, count, pattern)	App. 30 processing tools for object or defect recognition, measurements, calculations, input / output and more	App. 50 processing tools for object or defect recognition, measurements, calculations, input / output and more, including character recognition tool	App. 70 processing tools for object or defect recognition, measurements, calculations, input / output, display and more. Includes also character recognition and high precision edge code inspection tools.
	Image preprocessing		Smoothing, edge enhancement, edge extraction, background suppression	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable
	Optional macro programming interface				■
Communication	User interface	on board 'teach&go'	point to point GUI		
	Optional PC configuration software		Yes, via serial interface		
	Security tools				
	RS-232	Optional via ZS-DSU	■	■	■
	USB				
	Ethernet				
	Number of digital I/O	5 in / 3 out	11 in / 21 out	13 in / 22 out	13 in / 22 out
	Page	100	102	103	104

		Vision systems		2D code reader
				
Selection criteria	Model	F250	F210ETN / F500ETN	V530-R160
	Number of connectable cameras	4	2	2
	Camera type	Analogue black&white	Digital black&white	Analogue black&white
	Resolution (usable)	512x484	512x484 F210 ETN 1K x 1K F500 ETN	512x484
	Working distance mm	depends on selected lens		
	Min.			
	Max.			
	Field of view mm	depends on selected lens		
	Min.			
	Max.			
	Number of storable configurations	32 (expandable using CF card)		10
	Number of tools/configuration	limited only by memory space / depends on type of tools		n/a
Features	Cycle time	Depends on setup and used tools		Depends on code size, type and orientation
	IP-Rating camera head	n/a		
	Supply voltage	24 VDC		
	Image processing tools	App. 70 processing tools for object or defect recognition, measurements, calculations, input/output, display and more. Includes also character recognition and high precision edge code inspection tools. Hardware support fast object location	App. 80 processing tools for object or defect recognition, measurements, calculations, input/output, display and more. Includes also character recognition and high precision edge code inspection tools. Enhanced image and data log-ging functions	Data matrix ECC200: 10 × 10 to 64 × 64, 8 × 18, 8 × 32, 12 × 26, 12 × 36, 16 × 36, 16 × 48 Data matrix ECC000, ECC050, ECC080, ECC100, ECC140: 9 × 9 to 25 × 25 QR code (Model 1, 2): 21 × 21 to 41 × 41 (Version 1 to 6)
	Image preprocessing	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	Smoothing, edge enhancement, edge extraction, erosion, dilation, median, background suppression - multiple passes, configurable	n/a
Communication	Optional macro programming interface	■	■	
	User interface	point to point GUI		
	Optional PC configuration software		Yes, via Ethernet	
	Security tools		Yes, user log in, 3 user levels, change history log, etc., via optional PC software	
	RS-232	■	■	■
Communication	USB		■	
	Ethernet	10 Base T	10/100 Base T/TX	
	Number of digital I/O	21 in / 46 out	11 in / 21 out	5 in / 6 out
Communication	Page	105	106	107

■ Standard

□ No / not available



## Easy vision - teach & go

The ZFV proves that vision sensors can be 'teach&go'. Parameter settings are available at the touch of a button. A smart user interface allows intuitive configuration using a built-in colour monitor. In Run-mode, the display gives live feedback showing results and images in real time.

- Intuitive - 'teach&go' user interface
- Live - LCD display for setup and live inspection feedback
- Versatile - up to seven inspection tools included
- Scalable - add controllers to add functionality
- Flexible - adjustable working distance and area



## Ordering information

### Sets of sensor head and amplifier unit

Type	NPN	PNP
Narrow view / Single function	ZFV-R1010	ZFV-R1015
Narrow view / Standard	ZFV-R1020	ZFV-R1025
Wide view / Single function	ZFV-R5010	ZFV-R5015
Wide view / Standard	ZFV-R5020	ZFV-R5025

### Sensor heads

Type	Working length	Sensing area	Model
Narrow view	34 to 49 mm (variable)	5x4.6 mm (HxV) to 9x8.3 mm (HxV)	ZFV-SR10
Wide view	38 to 194 mm (variable)	10x9.2 mm (HxV) to 50x46 mm (HxV)	ZFV-SR50

### Amplifier units

Type	Power supply	Output type	Model
Single function	24 VDC ±10%	NPN	ZFV-A10
		PNP	ZFV-A15
Standard		NPN	ZFV-A20
		PNP	ZFV-A25

## Specifications

### Sensor heads

Item	ZFV-SR10 (Narrow view)	ZFV-SR50 (Wide view)
Setting distance (L)	34 to 49 mm	38 to 194 mm
Detection range (H x V)	5x4.6 mm to 9x8.3 mm	10x9.2 mm to 50x46 mm
Guide light	Provided (center, sensing area)	
Built-in lens	Focus: f15.65	Focus: f13.47
Object lighting method	Pulse lighting	
Object light source	Eight red LEDs	
Sensing element	1/3-inch CCD, partial scan	
Shutter	Electronic shutter, shutter time: 1/1,000 to 1/4,000	
Degree of protection	IEC60529, IP65	

### Amplifier units

Item	Single function models		Multi function models	
	ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Output method	NPN	PNP	NPN	PNP
Inspection items	Pattern (PTRN), Brightness (BRGT)		Patterns (PTRN), Brightness (BRGT), Area (AREA), Width (WID), Position (POS), Count (CNT), Characters (CHAR)	
Teaching area	Rectangular, one area			
Teaching area size	<ul style="list-style-type: none"><li>• Pattern (PTRN), Brightness (BRGT): Any rectangular area (256x256 max.)</li><li>• Area (AREA), Width (WID), Position (POS), Count (CNT), Characters (CHAR): Any rectangular area (full screen max.)</li></ul>			
Sensing area	Full screen			
Resolution	468Hx432V max.			
Bank selection	Supported for 8 banks.			
Response time	Pattern (PTRN), Brightness (BRGT): High-speed: 4 ms, Standard: 8 ms, High-precision: 12 ms (not using partial scan) Area (AREA), Width (WID), Position (POS), Count (CNT), Characters (CHAR): 128 x 128: 15 ms max.			
Other functions	Control output switching: ON for OK or ON for NG ON delay / OFF delay, One-shot output, 'ECO' mode			
Output signals	(1) Control output (OUTPUT), (2) Enable output (ENABLE), (3) Error output (ERROR)			
Input signals	(1) Simultaneous measurement input (TRIG) or continuous measurement input (TRIG), switched by using menu. (2) Bank selection inputs (BANK1 to BANK3) (3) Workpiece still teaching (TEACH) or workpiece moving teaching (TEACH), switched by using menu.			



Item	Single function models		Multi function models	
	ZFV-A10	ZFV-A15	ZFV-A20	ZFV-A25
Connecting to ZS-DSU	Image logging trigger	Stores NG images or all images.		
	Sampling rate	ZFV measurement cycle *1		
	Number of logged image	Logs up to 128 images in series		
	Number of connected	15 max. (ZFV: 5 Units max., ZS-LDC: 9 Units max., ZS-MDC *2: 1 Unit max.)		
	External bank function	Amplifier unit setting data can be saved to the memory card as bank data. Reading bank data enables bank switching.		
Sensor head interface	Digital interface			
Image display	Compact TFT 1.8-inch LCD (Display dots: 557x234)			
Indicators	● Judgement result indicator (OUTPUT)   ● Inspection mode indicator (RUN)			
Operation interface	● Cursor keys (up, down, left, right)   ● Setting key (SET)   ● Escape key (ESC) ● Operating mode switching (slide switch)   ● Menu switching (slide switch) ● Teaching / Display switching key (TEACH/VIEW)			
Power supply voltage	20.4 to 26.4 VDC (including ripple)			
Current consumption	600 mA max. (with sensor head connected)			

<sup>\*1</sup> This is the sampling rate when logging images. To log measurement data only, use the ZS-DSU settings.

<sup>\*2</sup> Image logging is not possible when the ZS-MDC is connected.





## Easy to use and highly efficient

The F150 offers the diverse measurement options of an image processing system but with the added benefits of fast start-up, easy operation via a graphical interface and an excellent price / value ratio. Easy-to-use on-screen dropdown menus allow fast and flexible parameter changes.

- Easy configuration with built in graphical user interface
- Variety of inspection tools: defect, pattern, rotation, edge, etc.
- 16 configurations can be stored in non-volatile memory
- One camera connection (two-camera option using two-camera unit)
- DeviceNet and PROFIBUS-DP models also available



## Ordering information

Name		Model	Remarks
Controller	Serial version	F150-C10E-3	NPN input / output
	Serial version	F150-C15E-3	PNP input / output
	CompoBus/D version	F150-C10E-3-DRT	NPN input / output
	PROFIBUS version	F150-C15E-3-PRT	PNP input / output
Camera	Camera with intelligent lighting	F150-SLC20	Field of view 20 mm <sup>□</sup> , adjustable
		F150-SLC50	Field of view 50 mm <sup>□</sup> , adjustable
	Camera with light	F150-SL20A	Field of view 20 mm <sup>□</sup>
		F150-SL50A	Field of view 50 mm <sup>□</sup>
	Camera only	F150-S1A	659Hx494V pixel
Extension unit		F150-A20	2 camera extension unit
Monitor		F150-M05L	5.5" color TFT LCD
Console		F150-KP	Standard console
Camera cable		F150-VS	Cable length 3m <sup>*1</sup>
Monitor cable		F150-VM	Cable length 2m <sup>*1</sup>

<sup>\*1</sup> Other length on request

## Specifications

### Controller: F150-C10E-3/15E-3 and F150-C10E-3-DRT/C15E-3-PRT

Number of connected cameras	1 unit / 2 units (using the F150-A20)
Processing resolution	512Hx484V
Number of scenes	16 scenes (can be saved to a computer through the RS-232C)
Image memory function	Up to 23 images can be saved
Processing method	Grey Levels (256) / Binary
Image pre-processing	Smoothing, edge enhancement, edge extraction, background cut-off
Binary levels	256 levels (per measurement area)
Position correction function	Correction directions: X, Y, $\theta$ Detection modes: binary center of gravity / main axis angle, model position: middle point, edge position
Number of measurement areas	16 areas/scene
Measured data	Area center of gravity, main axis angle, dark-light correlation value, dark-light search position, defect degree, edge position, edge number, density average, relative position
Calculation functions	Four arithmetic operations, distance, maximum value / minimum value, absolute value, others
Result output	Overall decision, computation result (decision) per measurement area, measurement / computation data (RS-232C and parallel output possible)
Monitor	1 ch (supports pin jack and over-scan monitor)
RS-232C	1 ch (Dsub 9-pin, female)
CompoBus/D	1 ch (F150-C10E-3-DRT)
PROFIBUS-DP	1 ch (F150-C15E-3-PRT)
Parallel input / output	F150-C10E-3 and F150-C15E-3: Inputs: 11 points, outputs: 21 points F150-C10E-3-DRT/C15E-3-PRT: Inputs: 1 point, outputs: 5 points (including control inputs / outputs)
Power supply voltage	20.4 to 26.4 VDC



## Intelligent sensor with high speed image processing

The F160 offers all features of the F150, including quick start-up, simple operation and an excellent price / value ratio. The main difference is that image capture and processing are accelerated many times. New functions include OCR, rotation search, customizable display and many more.

- Two camera connections - high-speed image acquisition
- Accelerated processing algorithms for all inspection tools
- Optical character recognition / verification tool
- Compact flash slot for storage of data and images
- Configurable user interface and monitor output

CE

### Ordering information

Name		Model	Remarks
Controller		F160-C10E-2	NPN input / output
		F160-C15E-2	PNP input / output
Double-speed camera	Camera with intelligent lighting	F160-SLC20	Field of view 20 mm □, adjustable
		F160-SLC50	Field of view 50 mm □, adjustable
	Camera only	F160-S1	659x494 pixel (HxV)
		F160-S2	With partial scan function.
Compatible F150 cameras	Camera with intelligent lighting	F150-SLC20	Field of view 20 mm □, adjustable
		F150-SLC50	Field of view 50 mm □, adjustable
	Camera with light	F150-SL20A	Field of view 20 mm □
		F150-SL50A	Field of view 50 mm □
	Camera only	F150-S1A	659Hx494V pixel
Console		F160-KP	Console with additional function keys
		F150-KP	Standard console
Color LCD monitor		F150-M05L	5.5" color TFT LCD
Memory card		F160-N64S(S)	Memory capacity 64 MB
Camera cable		F150-VS	For double-speed camera and compatible F150 cameras. Cable length: 3 m *1
Monitor cable		F150-VM	Cable length: 2 m *1
Parallel cable		F160-VP	Loose-wire cable for parallel I/O connectors. Cable length: 2 m

\*1 Other length on request

### Specifications

#### Controller: F160-C10E-2/-C15E-2

Connectable cameras	F150-S1A/SL20A/SL50A/SLC20/SLC50, F160-S1/S2/SLC20/SLC50, etc.	
Number of cameras connectable	1	2
Number of pixels	512Hx484V	
Number of scenes	32 scenes (Expansion possible using memory card)	
Image storage function	Maximum of 35 images stored	
Filtering	Smoothing (strong / weak), edge enhancement, edge extraction (horizontal, vertical, both horizontal and vertical), dilation, erosion, median, background suppression	
Position displacement compensation	Compensation directions: X, Y, and θ (360°) directions Detection methods: Binary center of gravity, axis angle, labeling, rotation search, gray search, edge position	
Number of measurement regions	32 regions per scene	
Measurement data	Gravity and area, gravity and axis, gray search, precise search, rotation search, flexible search, relative search, defect, area (variable box), defect (variable box), edge position, edge pitch, edge width, density average, labeling, OCR for 1 character, classification	
Data operation functions (expressions)	Number: 32 expressions can be set for judgements, data, and variables used in other expressions. Operations: Arithmetic operations, square root, absolute value, remainder, distance, angle, maximum, minimum, SIN, COS, ATAN, AND, OR, NOT	
Functions for customizing operations	Menu masking, password setting, shortcut keys	
Functions for customizing screens	Display items: Character strings (measured values, judgement results, times, user-specified characters, measurement region names) Specified parameters: Display color, position, size	
Number of slots for memory cards	1	
Monitor interface	1 channel (color, monochrome)	
Serial communications	RS-232C/22A 1 channel	
	13 inputs and 22 outputs including control I/O points	
Power supply voltage	20.4 to 26.4 VDC	



## Compact hardware, high end software

The F210 contains powerful algorithms such as Edge Code, Fine Matching and OCR / OCV. Inspection tasks can be configured easily via the user-friendly GUI. A Macro Function for OEMs and system integrators allows customization through which nearly every system function can be manipulated.

- Enhanced flexibility using branching and conditional operations
- Two camera connections
- Fine Matching tool-for-print quality inspection
- Edge Code (EC) technology for high-precision inspections
- High-speed Character Recognition / Verification tool



## Ordering information

Name		Model	Remarks
Controller		F210-C10	NPN input / output
		F210-C15	PNP input / output
Double-speed camera	Camera with intelligent lighting	F160-SLC20	Field of view 20 mm □, adjustable
		F160-SLC50	Field of view 50 mm □, adjustable
	Camera only	F160-S1	659Hx494V pixel
		F160-S2	With partial scan function.
Compatible F150 cameras	Camera with intelligent lighting	F150-SLC20	Field of view 20 mm □, adjustable
		F150-SLC50	Field of view 50 mm □, adjustable
	Camera with light	F150-SL20A	Field of view 20 mm □
		F150-SL50A	Field of view 50 mm □
	Camera only	F150-S1A	659Hx494V pixel
Console		F160-KP	Console with additional function keys
		F150-KP	Standard Console
Color LCD monitor		F150-M05L	5.5" color TFT LCD
Memory card		F160-N64S(S)	Memory capacity 64 MB
Camera cable		F150-VS	For double-speed camera and compatible F150 Cameras. Cable length: 3 m <sup>*1</sup>
Monitor cable		F150-VM	Cable length: 2 m <sup>*1</sup>
Parallel cable		F160-VP	Loose-wire cable for parallel I/O connectors. Cable length: 2 m
Application software		F500-UM3ME	with macro function
		F500-UM3FE	without macro function

<sup>\*1</sup> Other length on request.

## Specifications

### Controller: F210-C10/-15

Connectable cameras	F150-S1A/-SL20A/-SL50A/-SLC20/-SLC50, F160-S1/-S2/-SLC20/-SLC50, F300-S2R/-S3DR, etc.
Number of cameras connectable	2
Number of pixels	512Hx484V
Number of scenes	32 (Expansion possible using memory cards.)
Image storage function	Maximum of 35 images stored
Filtering	Smoothing (strong, weak), edge enhancement, edge extraction (horizontal, vertical, both), dilation, erosion, median, background suppression
Operation and settings	Installing measurement items using application software, and combining and setting measurement items by menu operations
Trend monitor function	Supported
Memory card slots	1
Monitor interface	1 channel
Serial communications	RS-232C/22A: 1 channel
Parallel I/O	13 inputs and 22 outputs
Strobe interface	2 channels (included in parallel outputs)
Power supply voltage	20.4 to 26.4 VDC



## Speed, flexibility, accuracy

The F250 offers all inspection tools such as the F210, and in addition to that a hardware accelerated, ultra fast object location. 4 camera ports allow multiple inspection stations within one system. With an Ethernet interface, the F250 can communicate with almost every company computer system.

- Hardware accelerated inspection tools for extreme speed applications
- Four camera connections, Real-time object location tools
- Enhanced flexibility using branching and conditional operations
- 2 CF slots for data storage and logging
- Ethernet interface, 67 digital I/Os, RS-232C

CE

## Ordering information

Name		Model	Remarks
Controller		F250-C50	NPN Input/Output
		F250-C55	PNP Input/Output
Double-speed camera	Camera with intelligent lighting	F160-SLC20	Field of view 20 mm <sup>□</sup> , adjustable
		F160-SLC50	Field of view 50 mm <sup>□</sup> , adjustable
	Camera only	F160-S1	659x494 pixel (HxV)
		F160-S2	Includes Partial Scan functionality
F150 Compatible cameras	Camera with intelligent lighting	F150-SLC20	Field of view 20 mm <sup>□</sup> , adjustable
		F150-SLC50	Field of view 50 mm <sup>□</sup> , adjustable
	Camera with lighting	F150-SL20A	Field of view 20 mm <sup>□</sup>
		F150-SL50A	Field of view 50 mm <sup>□</sup>
	Camera only	F150-S1A	659Hx494V pixel
Console		F160-KP	Console with additional function keys
		F150-KP	Standard console
LCD monitor		F150-M05L	5.5" color TFT LCD
Memory card		F160-N64S(S)	Memory capacity 64 MB
Application software		F500-UM3ME	with Macro function
		F500-UM3FE	without Macro function
Camera cable		F150-VS	Length of cable for double-speed camera and F150 common camera: 3 m <sup>*1</sup>
Monitor cable		F150-VM	Cable length: 2 m <sup>*1</sup>
Parallel cable		F160-VP	Length of pigtail cable for parallel input / output connector: 2 m

\*1 Other length on request.

## Specifications

### Controller: F250-C50/55

Connected camera	F150-S1A/SL20A/SL50A/SLC20/SLC50, F160-S1/S2/SLC20/SLC50
Number of connectable cameras	4
Processing resolution	512Hx484V
Number of scenes	32 scenes (expansion possible using memory card)
Image storage function	Maximum 35 images
Image pre-processing	Smoothing (strong / weak), edge enhancement, edge extraction (horizontal, vertical, both), erosion, dilation, median, background deletion
Operation and settings	Install measurement routines from a software application, combine and establish settings for measurement routines from menus.
Operation customization function	Password function, short-cut key function
Screen customization function	Display items: Character strings (measured values, decisions, time, any character string, measurement area names), graphics (straight lines, rectangles, circles, cross-hair cursors) Parameters specified: display color, position, size
Trend monitor function	Yes
Memory card slot	2 slots
Monitor	Composite video output: 1 CH, S-video output: 1 CH
Ethernet	10Base-T 1CH
Serial communication	RS-232C/22A 1CH
Parallel input / output	Inputs: 21 points, outputs: 46 points
Strobe	4 CH (included in parallel outputs)
Power supply voltage	20.4 to 26.4 VDC



## Ultimate power - high resolution, network - ready vision system

The F500 / F210ETN are network ready, digital vision systems. The optional software VisionComposerNET allows configuration and maintenance of a vision network from a central PC. For documentation or later audits, the system provides tools for logging images and results for later analysis.

- Two digital camera ports, high resolution (1 K x 1 K) with F500 ETN
- Advanced real time data logging and storage functions
- 10/100 Base TX Ethernet Port, USB, RS-232C/-422, 33 digital I/O
- Optional VisionComposerNET for remote configuration / maintenance
- Security tools, audit trail creation in security sensitive environment



## Ordering information

Name		Model	Remarks
Controller	Standard resolution	F210-C10-ETN	NPN input / output
	Standard resolution	F210-C15-ETN	PNP input / output
	High resolution	F500-C10-ETN	NPN input / output
	High resolution	F500-C15-ETN	PNP input / output
Camera	250 K Pixel	F210-S1	For F210ETN only
	1 M Pixel	F500-S1	For F500ETN only
Monitor		F150-M05L	5.5" color TFT LCD
		F150-M10L	10.4" color TFT LCD
Console		F150-KP	Standard console
		F-160-KP	Console with additional function keys
Memory cards		F160-N64S(S)	Memory capacity 64 MB
		F160-N256S	Memory capacity 256 MB
PC-Software		F500-CD	Optional remote configuration software (via ETN)
Application software		F500-UM3ME	With macro function
		F500-UM3FE	Without macro function
High precision lenses		F500-LE16	focal length 16 mm
		F500-LE25	focal length 25 mm
		F500-LE50	focal length 50 mm
Camera cable		F500-VS2	Available length 2 m, 5 m, 10 m
Monitor cable		F500-VM	Cable length 2 m
Parallel cable		F160-VP	Loose-wire cable for parallel I/O connectors. Cable length

## Specifications

Model	F210-C10-ETN/C15-ETN	F500-C10-ETN/C15-ETN
Connected camera	F210-S1	F500-S1
No. of connectable cameras	2	2
Processing resolution	512Hx484V	1024Hx1024V
No. of scenes	32 (can be increased using Memory Cards.)	
Image memory function	35 images max.	
Storage	64 MB non-volatile memory	256 MB non-volatile memory
Operation and settings	Measurement items installed using Applications Software. Menu operations used to combine measurement items. Vision Composer Net can be used for operation and settings.	
Serial communications	USB series B: 1 channel, RS-232C/22: 1 channel	
Network communications	Ethernet 100Base-TX/10Base-T	
Parallel I/O	11 inputs, 22 outputs	
Monitor interface	Composite video output: 1 channel, S-VIDEO output: 1 channel	
Memory card interface	Compact Flash card slot, 1 channel	
Power supply voltage	20.4 to 26.4 V DC	

### System requirements for F500-CD3E Vision composer net

CPU	Pentium III 600 MHz min.(Pentium III 1 GHz min. recommended)	
OS	Windows 2000 Professional, Service Pack 4 or higher Windows XP Home Edition, Service Pack 2 or higher Windows XP Professional, Service Pack 2 or higher	
Memory	192 MB min. (256 MB min. recommended)	
Hard disk	300 MB min. available space	
Monitor	Resolution: 1,024x768 min. Display colors: High Color (16-bit) min. (True Color (32-bit) min. recommended)	
Network	10BaseT-compliant network(100Base-TX recommended)	
Vision sensor	Controller	F210-C10-ETN/F210-C15-ETN, F500-C10-ETN/F500-C15-ETN
	Applications software	F500-UM Version 3.00 or later



## Fixed type reader solution for highly degraded codes

The V530-R160 2D-code reader is designed especially for reading direct marked codes on surfaces such as metal, plastic and glass. Its newly developed advanced algorithms allow reliable reading of codes made from dots (pin stamped), laser edged or ink jet.

- Reads direct marked Data Matrix and QR code
- Can read codes in all directions (360°)
- Trend monitoring, statistics functions for quality feedback
- Communication via RS-232C/-422 and 11 digital I/Os
- 2 camera connection

CE

## Ordering information

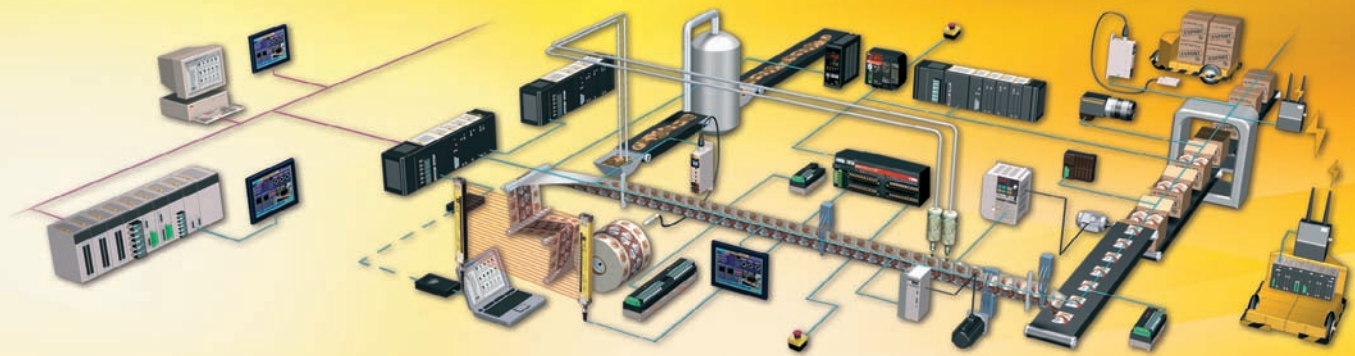
Name	Model No.	Remarks
Controller	V530-R160E	Controller NPN input / output
	V530-R160EP	Controller PNP input / output
Console	F150-KP	Standard console
Camera	F150-S1A	659Hx494V pixel
Camera cable	F150-VS	3 m cable
Monitor cable	F150-VM	2 m cable
Liquid crystal monitor	F150-M05L	Monitor 5.5" color TFT LCD
Parallel cable	F160-VP	Cable with loose wires for parallel I/O connector (2 m cable)
Memory card	F160-N64S(S)	Card capacity: 64 MB
RS-232C cable	XW2Z-200S-V	For IBM PC/AT or compatible computer (2 m cable)
	XW2Z-200T	For SYSMAC PLC (2 m cable)

## Specifications

Item	V530-R160E	V530-R160EP
Input / output type	NPN	PNP
Applicable codes	Data Matrix ECC200: 10 × 10 to 64 × 64, 8 × 18, 8 × 32, 12 × 26, 12 × 36, 16 × 36, 16 × 48 Data Matrix ECC000, ECC050, ECC080, ECC100, ECC140: 9 × 9 to 25 × 25 QR Code (Model 1, 2): 21 × 21 to 41 × 41 (Version 1 to 6)	
Readable direction	360°	
Number of pixels (resolution)	512Hx484V	
Number of connectable cameras	2 max.	
Image memory function	Maximum of 35 images stored (internal memory in controller).	
Operation method	Selected from menu.	
Processing method	Gray	
Memory card slot	1	
Monitor interface	1 channel (color / monochrome)	
Serial communications	RS-232C/22A, 1 channel	
Parallel I/O	5 inputs: TRIG-A, TRIG-B, TRIG-C, TRIG-D, and RESET 6 outputs: RUN, ERROR, OK/NG, BUSY, GATE, and ALARM	
Power supply voltage	20.4 to 26.4 VDC	



# Safety networks and units



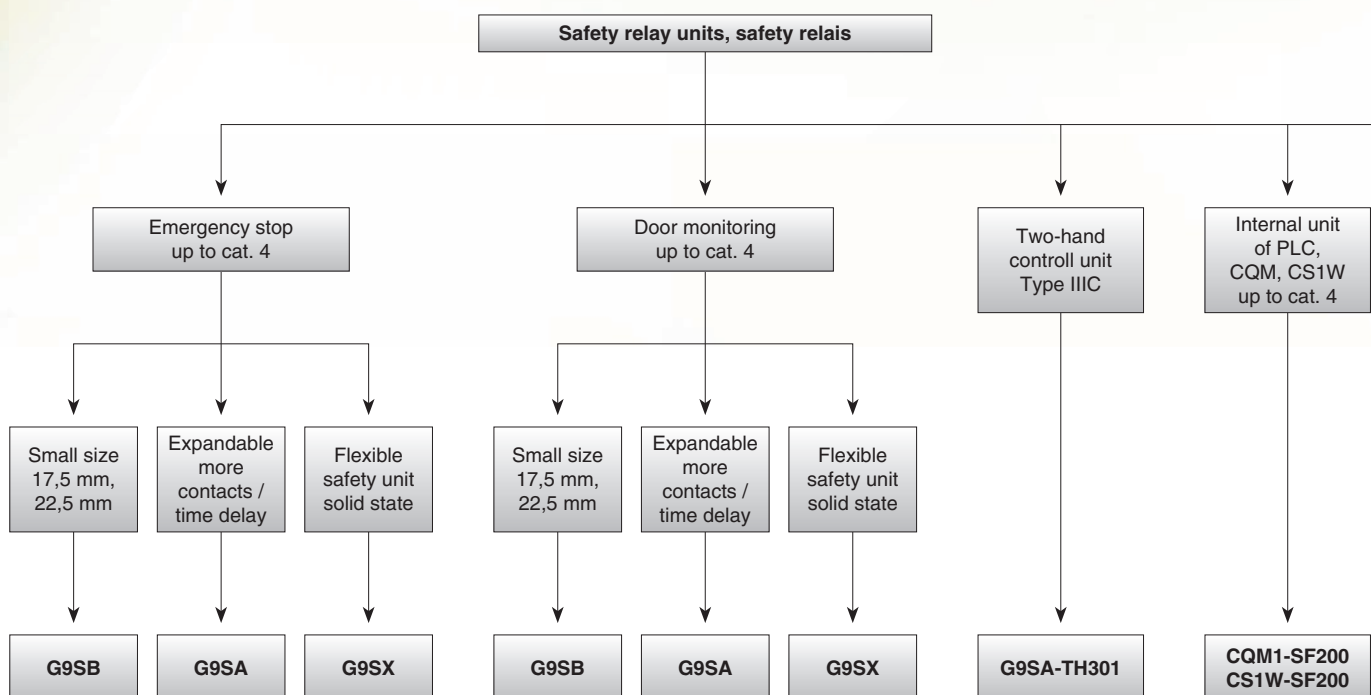
## Safety – total solutions for industrial safety

### Meeting safety requirements

The EU machinery directive 98 / 37 / EC is the foundation for the safety of machinery within The European Union. Since 1995 these documents have had a major impact on safety for workers and work equipment. The directive is in relation with more than 400 harmonised EN standards. To meet these requirements, familiarity and know-how is required to ensure that safety is combined with good ergonomic and economic principles. Therefore efficient and innovative safety sensors and components are invaluable.

Omron works closely with many leading machinery manufacturers and end users to develop practical solutions for industrial safety. These solutions include products for emergency-stop applications, safety guard door monitoring and interlocking as well as safety sensors for finger, hand, limb and body protection.

Our aim is to make the workplace a safer environment using cost-effective and ergonomically designed products.

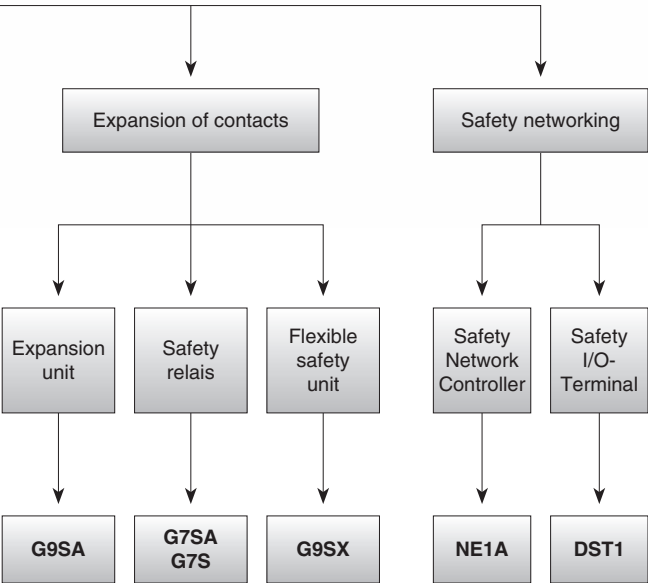


# DeviceNet safety offers more than a safe network

DeviceNet is an innovative industrial network system that enables a wide range of devices to be easily networked and managed remotely.

Everything can be seamlessly integrated into DeviceNet, making it one of the best industrial field busses around.






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



## Table of contents

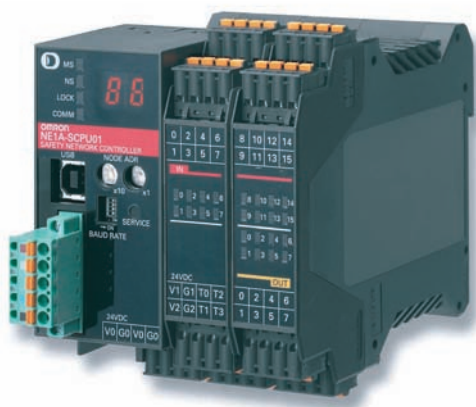
Selection table		111
Safety controller	NE1A-SCPU01	112
Safety I/O	DST1-ID/MD/MRD	113
Flexible safety unit	G9SX	115
Expandable relay unit	G9SA	116
Slim size safety unit	G9SB	117



		Safety bus system		Flexible safety unit	Safety relay units	
						
Selection criteria	Model	NEA1-SCPU01	DST1-ID12SL-1	G9SX	G9SA	G9SB
	Safety category (EN 954-1)	up to Category 4				
	Safety integrity level (IEC 61508)	SIL 3			-	-
	Reaction time	dependent on safety application program		15 ms	max. 10 ms	
	DeviceNet safety Bus interface	■	■	-	-	-
	EDM function	■	■	■	■	■
	Interlock function	■	■	■	■	■
	Logical 'AND' connection	-	-	■	-	-
Features	Relay expansion units	-	-	■	■	-
	Detachable cage clamp terminals	■	■	■	-	-
	Detachable screw terminals	-	-	■	-	-
	Safe timing functions	■	■	■	■	-
	USB-interface	■	-	-	-	-
Application	Programming software	■	-	-	-	-
	E-Stop application	■	■	■	■	■
	Door switch monitoring	■	■	■	■	■
	Safety light curtain monitoring	■	■	■	■	■
	EDM monitoring	■	■	■	■	■
	Interlock function	■	■	■	■	■
	Logic function blocks	■	-	-	-	-
	Safe ON delay timer	■	■	-	-	-
	Safe OFF delay timer	■	■	■	■	-
	Two-Hand control	■	■	-	■	-
Supply voltage	Manual/automatic reset	■	■	■	■	■
	24 VDC	■	■	■	■	■
In- and outputs	100 VAC - 240 VAC	-	-	-	■	-
	Safety inputs	■	■	■	■	■
	Test signal output	■	■	■	-	-
	Solid state safety outputs	■	■	■	-	-
	Safety relay outputs	-	■	■	3PST-NO, 5PST-NO	DPST-NO, 3PST-NO
	Auxiliary outputs	■	■	■	SPST-NC	SPST-NC
Page		112	113	115	116	117

■ Standard

□ No / not available



## Safety network controller NE1A

The NE1A hosts the safety application program. All local and DeviceNet safety-based in- and outputs are monitored and controlled by the NE1A. It manages up to 16 DeviceNet safety slaves and can be seamlessly integrated in a standard DeviceNet system.

- Removable cage-clamp terminals for easy installation
- Predefined and certified function blocks for easy programming
- LED display and status LEDs for advanced diagnostics
- System status on DeviceNet for easy troubleshooting and predictive maintenance
- Easy scalability through the addition of DeviceNet safety devices

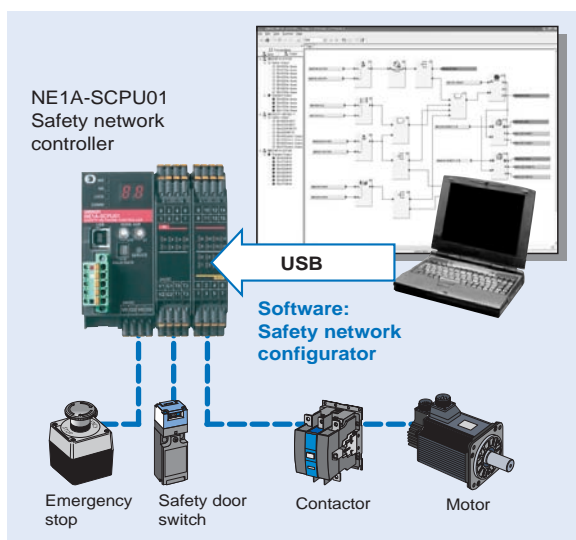


## Ordering information

### Stand-alone programmable controller

#### Programmable safety circuits

Using DeviceNet safety offers benefits far before the need for a safety network is obvious. The safety network controller uses predefined logical function blocks to set up the programmable safety system. Modifications of the safety system in the life cycle of a machine are done without tedious wiring.



Appearance	Appearance description	Part number
Safety network controller	16 PNP inputs 8 PNP outputs 4 test outputs 128 function block programming removable cage clamp terminals	NE1A-SCPU01

#### Software

Appearance	Appearance description	Part number
Safety network configurator	Installation disk (CD-ROM) IBM PC/AT compatible Windows 2000 or XP	WS02-CFSC1-E (English version)

**Note:** For further information please refer to chapter software.

## Specifications

### General specifications

DeviceNet communications power supply voltage	11 to 25 VDC (supplied from communications connector)
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)
I/O power supply voltage	
Consumption	Communications power supply
Current	24 VDC, 15 mA
	Internal circuit power supply
	24 VDC, 230 mA
Mounting method	35-mm DIN track
Ambient operating temperature	-10 °C +55 °C
Ambient storage temperature	-40 °C +70 °C
Degree of protection	IP20 (IEC 60529)

### Safety input specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each input terminal and G1
OFF voltage	5 VDC max. between each input terminal and G1
OFF current	1 mA max.
Input current	4.5 mA

### Safety output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max. per output
Residual voltage	1.2 V max. between each output terminal and V2

### Test output specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max. per output (see note.)
Residual voltage	1.2 V max. between each output terminal and V1



## DeviceNet safety I/O terminal block family



- Removable cage clamp terminals for easy installation
- up to 12 Inputs for safety signals
- 4 test pulse outputs to ensure crosstalk and short circuit detection
- up to 8 safety outputs (solid state or relay)
- Status LEDs for advanced diagnostics
- Mixed mode operation (safety and standard) for all in- and outputs

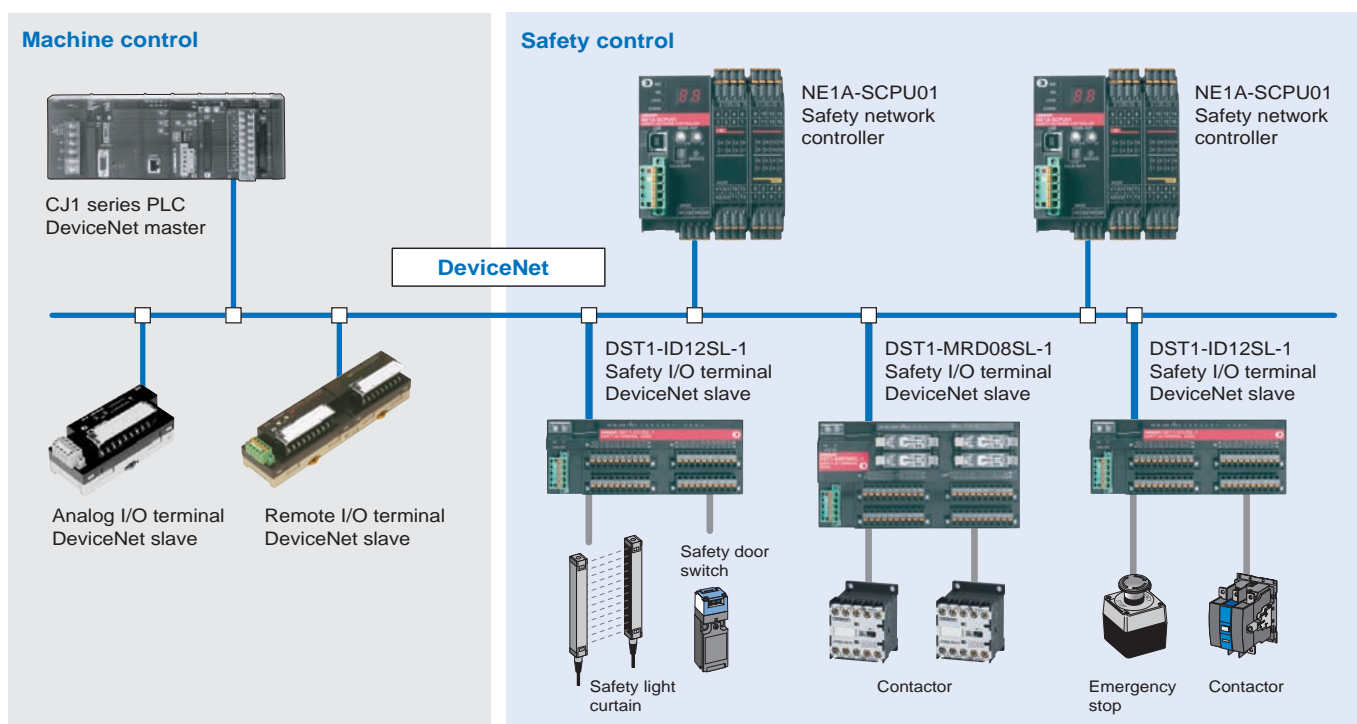


## Ordering information

### Safety network

#### Expand safety I/O through networks

Safety components distributed over many different installation locations required long and complicated wiring. Replacing the wiring with a network between safety components greatly improves productivity.



Appearance	Appearance description	Model
Input terminal	12 PNP inputs 4 Test outputs Removable cage clamp terminals	DST1-ID12SL-1
Mixed I/O terminal	8 PNP inputs 8 PNP outputs 4 Test outputs Removable cage clamp terminals	DST1-MD16SL-1
Mixed I/O terminal	4 PNP inputs 4 relay outputs (4 x 2-single pole) 4 Test outputs Removable cage clamp terminals	DST1-MRD08SL-1

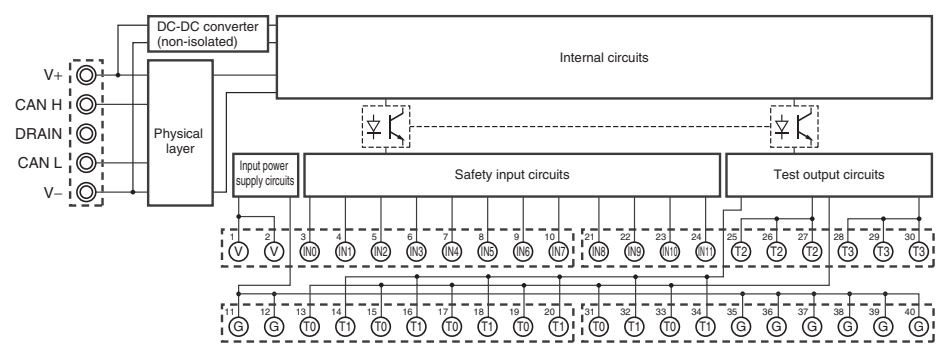


Specifications

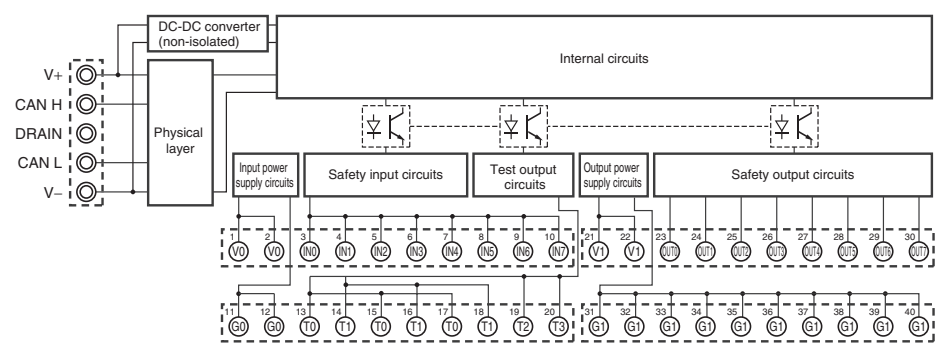
General specifications		Safety output specifications	
DeviceNet communications power supply voltage	11 to 25 VDC (supplied from communications connector)	Output type	Sourcing outputs (PNP)
Unit power supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)	Rated output current	0.5 A max. per output
I/O power supply voltage		Residual voltage	1.2 V max. between each output terminal and V1
Consumption current	DST1-ID12SL-1/MD16SL-1: 100 mA DST1-MRD08SL-1: 110 mA	Test output specifications	
Communications power supply		Output type	Sourcing outputs (PNP)
Mounting method	35-mm DIN track	Rated output current	0.7 A max. per point
Ambient operating temperature	-10 °C +55 °C	Residual voltage	1.2 V max. between each output terminal and V0
Ambient storage temperature	-40 °C +70 °C	Safety output specifications for relay outputs	
Degree of protection	IP20 (IEC 60529)	Relays	G7SA-2A2B, EN 50205 class A
Weight	DST1-ID12SL-1/MD16SL-1: 420 g DST1-MRD08SL-1: 600 g	Minimum applicable load	1 mA at 5 VDC
Safety input specifications		Rated load for a resistive load	240 VAC: 2 A, 30 VDC: 2 A
Input type	Sinking inputs (PNP)	Rated load for an inductive load	2 A at 240 VAC (cosφ= 0.3), 1 A at 24 VDC
ON voltage	11 VDC min. between each input terminal and G1	Mechanical life expectancy	5,000,000 operations min. (switching frequency of 7,200 operations/h)
OFF voltage	5 VDC max. between each input terminal and G1	Electrical life expectancy	100,000 operations min. (at rated load and switching frequency of 1,800 operations/h)
OFF current	1 mA max.		
Input current	6 mA		

Safety I/O terminals

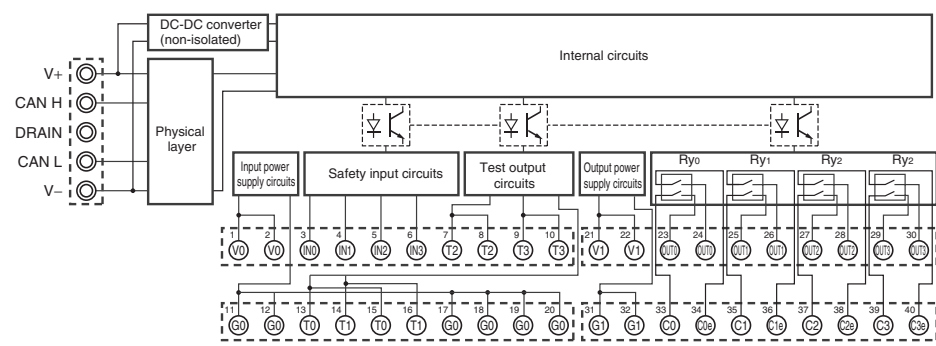
DST1-ID12SL-1



DST1-MD16SL-1



DST1-MRD08SL-1





## Flexible safety unit

G9SX-family modules can be connected by a logical "AND" function to implement partial/global stopping of a machine. Solid-state outputs, detailed LED diagnosis and clever feedback signals help to keep maintenance easy. The line-up is completed by expansion units with safe timing functions.

- Clear and transparent segmentation of safety functions by use of unique "AND" connection
- Solid-state outputs for long life and relay outputs in extension box available
- Detailed LED indications enable easy diagnosis
- Clever feedback signals for easy maintenance
- Category-4 according to EN954-1 and SIL 3 according to EN 61508



## Ordering information

### Advanced unit

Safety outputs		Auxiliary outputs	No. of input channels	Max. OFF-delay time <sup>*1</sup>	Rated voltage	Terminal block type	Model
Instantaneous	OFF-delayed						
P channel MOS-FET transistor output	P channel MOS FET transistor outputs	PNP transistor outputs	1 or 2 channels	0 to 15 in 16 steps	24 VDC	Screw terminals	G9SX-AD322-T15-RT
						Cage clamp terminals	G9SX-AD322-T15-RC

<sup>\*1</sup> The OFF-delay time can be set in 16 steps as follows: T15: 0/0.2/0.3/0.4/0.5/0.6/0.7/1/1.5/2/3/4/5/7/10/15 s

### Basic unit

Safety outputs		Auxiliary outputs	No. of input channels	Rated voltage	Terminal block type	Model
Instantaneous	OFF-delayed					
P channel MOS FET transistor output	---	PNP transistor output	1 or 2 channels	24 VDC	Screw terminals	G9SX-BC202-RT
					Cage clamp terminals	G9SX-BC202-RC

### Expansion unit

Safety outputs		Auxiliary outputs	OFF-delay time	Rated voltage	Terminal block type	Model
Instantaneous	OFF-delayed					
4 PST-NO (contact)	---	1 (solid state) PNP transistor output	---	24 VDC	Screw terminals	G9SX-EX401-RT
					Cage clamp terminals	G9SX-EX401-RC
---	4 PST-NO (contact)		Synchronized with G9S-X-AD - unit		Screw terminals	G9SX-EX041-T-RT
					Cage clamp terminals	G9SX-EX041-T-RC

## Specifications

### Power input

Item	G9SX-AD322-□	G9SX-BC202-□	G9SX-EX-□
Rated supply voltage	20.4 to 26.4 VDC (24 VDC -15% +10%)		

### Inputs

Item	G9SX-AD322-□	G9SX-BC202-□
Safety input	Operating voltage: 20.4 VDC to 26.4 VDC, internal impedance: approx. 2.8 kΩ	
Feedback/reset input		

### Outputs

Item	G9SX-AD322-□	G9SX-BC202-□
Instantaneous safety output	P channel MOS FET transistor output	P channel MOS FET transistor output
OFF-delayed safety output	Load current: Using 2 outputs or less: 1 A DC max. Using 3 outputs or more: 0.8 A DC max.	Load current: Using 1 output: 1 A DC max. Using 2 outputs: 0.8 A DC max.
Auxiliary output	PNP transistor output Load current: 100 mA max.	

### Expansion unit

Item	G9SX-EX-□
Rated load	250 VAC, 3A / 30 VDC, 3A (resistive load)
Rated carry current	3 A
Maximum switching voltage	250 VAC, 125 VDC

### Characteristics

Item	G9SX-AD322-□	G9SX-BC202-□	G9SX-EX-□
Operating time (OFF to ON state)	50 ms max. (Safety input: ON) 100 ms max. (Logical AND connection input: ON)	50 ms max. (Safety input: ON)	30 ms max.
Response time (ON to OFF state)	15 ms max.		10 ms max.
Durability Electrical	---		100,000 cycles min.
Mechanical	---		5,000,000 cycles min.
Ambient temperature	-10 °C +55 °C (with no icing or condensation)		



## Expandable safety relay unit

G9SA-family offers a complete line-up of compact and expandable safety relay units. Modules with safe OFF-delay timing are available as well as a two-hand controller. Simple multiplication of safety contacts is possible by using the connection on the front.

- 45 m-wide housing, expansion units are 17.5 m wide
- Safe OFF-delay timer
- Simple expansion connection
- Certification up to category 4 according to EN954-1 depending on the application



## Ordering information

### Emergency-stop units

Main contacts	Auxiliary contact	Number of input channels	Rated voltage	Model	Category
3PST-NO	SPST-NC	1 channel or 2 channels possible	24 VAC / VDC 100 to 240 VAC	G9SA-301	4
5PST-NO	SPST-NC	1 channel or 2 channels possible	24 VAC / VDC 100 to 240 VAC	G9SA-501	

### Emergency-stop OFF-delay units

Main contacts	OFF-delay contacts	Auxiliary contact	Number of input channels	OFF-delay time	Rated voltage	Model	Category
3PST-NO	DPST-NO	SPST-NC	1 channel or 2 channels possible	7.5 s	24 VAC / VDC 100 to 240 VAC	G9SA-321-T075	Main contacts: 4 OFF-delay contacts: 3
				15 s	24 VAC / VDC 100 to 240 VAC	G9SA-321-T15	
				30 s	24 VAC / VDC 100 to 240 VAC	G9SA-321-T30	

### Two-hand controller

Main contacts	Auxiliary contact	Number of input channels	Rated voltage	Model	Category
3PST-NO	SPST-NC	2 channels	24 VAC / VDC 100 to 240 VAC	G9SA-TH301	4 (IIIc, EN574)

### Expansion unit

The expansion unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

Main contacts	Auxiliary contact	Model	Category
3PST-NO	SPST-NC	G9SA-EX301	4

### Expansion units with OFF-delay outputs

The expansion unit connects to a G9SA-301, G9SA-501, G9SA-321, or G9SA-TH301.

Main contact form	Auxiliary contact	OFF-delay time	Model	Category
3PST-NO	SPST-NC	7.5 s	G9SA-EX031-T075	3
		15 s	G9SA-EX031-T15	
		30 s	G9SA-EX031-T30	

## Specifications

### Power input

Item	G9SA-301/TH301	G9SA-501	G9SA-321-T□
Power supply voltage	24 VAC/VDC: 24 VAC, 50/60 Hz, or 24 VDC 100 to 240 VAC: 100 to 240 VAC, 50/60 Hz		
Operating voltage range	85% to 110% of rated power supply voltage		

### Inputs

Item	G9SA-301/321-T□/TH301	G9SA-501
Input current	40 mA max.	60 mA max.

### Contacts

Item	G9SA-301/501/321-T□/TH301/EX301/EX031-T□
Resistive load (cos φ= 1)	
Rated load	250 VAC, 5 A
Rated carry current	5 A

### Characteristics

Item	G9SA-301/TH301	G9SA-501/321-T□	G9SA-EX301/EX031-T□
Operating time	30 ms max. (not including bounce time)		
Response time *1	10 ms max. (not including bounce time)		
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)	
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)	
Minimum permissible load (reference value)	5 VDC, 1 mA		
Ambient temperature	Operating: -25°C to 55°C (with no icing or condensation) Storage: -25°C to 85°C (with no icing or condensation)		

<sup>\*1</sup> The response time is the time it takes for the main contact to open after the input is turned OFF.



## Slim-size safety unit

G9SB is a family of slender safety relay units, providing two safety contacts in a 17.5 mm- and three safety contacts in a 22.5 mm-wide housing.

- 17.5 mm- and 22.5 mm-wide housing
- 1- and 2-input channel units
- Manual and automatic reset units
- Certification up to category 4 according to EN954-1 depending on the application



## Ordering information

Main contacts	Auxiliary contact	Number of input channels	Reset mode	Input type	Rated voltage	Model	Category (EN954-1)	Size
DPST-NO 2 safety contacts	None	2 channels	Auto-reset	Inverse	24 VAC / VDC	G9SB-2002-A	4	17.5 mm
		1 channel or 2 channels		+ common		G9SB-200-B		
		2 channels	Manual-reset	Inverse		G9SB-2002-C		
		1 channel or 2 channels		+ common		G9SB-200-D		
3PST-NO 3 safety contacts	SPST-NC	None (direct breaking)	Auto-reset	---	24 VDC	G9SB-3010	3	17.5 mm
		2 channels		Inverse	24 VAC / VDC	G9SB-3012-A	4	22.5 mm
		1 channel or 2 channels	Manual-reset	+ common		G9SB-301-B		
		2 channels		Inverse		G9SB-3012-C		
		1 channel or 2 channels		+ common		G9SB-301-D		
		2 channels		Inverse				

## Specifications

### Power input

Item	G9SB-200□□	G9SB-3010	G9SB-301□□
Power supply voltage	24 VAC / VDC: 24 VAC, 50/60 Hz, or 24VDC 24 VDC: 24 VDC		
Operating voltage range	85% to 110% of rated power supply voltage		
Power consumption	1.4 VA / 1.4 W max.	1.7 W max.	1.7 VA / 1.7 W max.

### Inputs

Item	G9SB-200□□	G9SB-3010	G9SB-301□□
Input current	25 mA max.	60 mA max. (See note.)	30 mA max.

**Note:** Indicates the current between terminals A1 and A2.

### Contacts

Item	G9SB-200□□	G9SB-3010	G9SB-301□□
	<b>Resistive load (<math>\cos\phi \approx 1</math>)</b>		
Rated load	250 VAC, 5 A		
Rated carry current	5 A		

### Characteristics

Item		G9SB-200□□	G9SB-3010	G9SB-301□□
Response time *1		10 ms max.		
Durability	Mechanical	5,000,000 operations min. (at approx. 7,200 operations/hr)		
	Electrical	100,000 operations min. (at approx. 1,800 operations/hr)		
Minimum permissible load (reference value)		5 VDC, 1 mA		
Ambient operating temperature		-25 °C +55 °C (with no icing or condensation)		

<sup>\*1</sup> The response time is the time it takes for the main contact to open after the input is turned OFF.



# Safety sensors

## F3SN/SH – total solutions for industrial safety

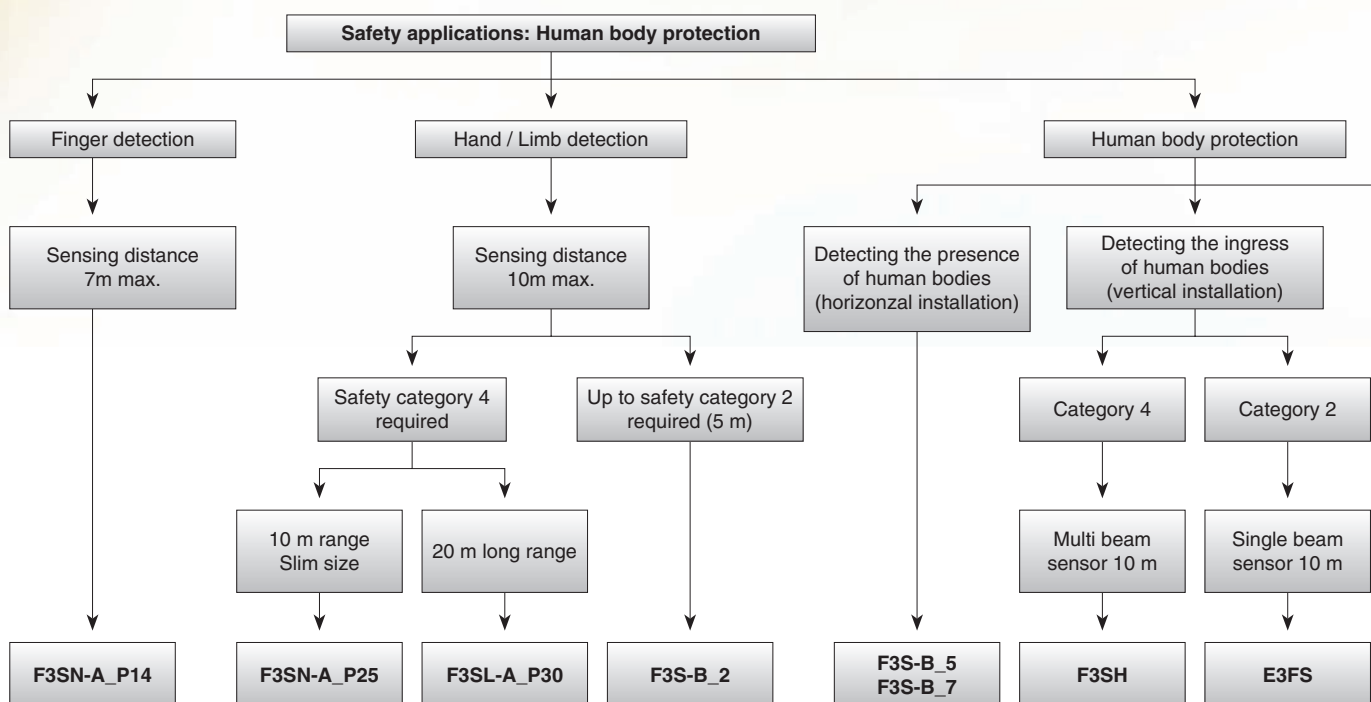
### Safety sensor solution for safe applications

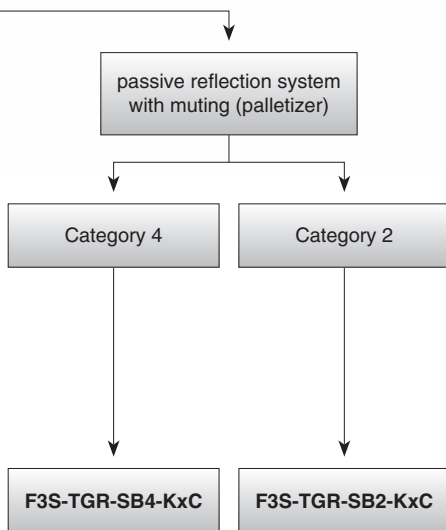
Omron, a leading manufacturer of sensors for industrial safety, extends its product range with two safety light curtains, the F3SN and the F3SH.

The F3SN is a type 4 sensor that provides finger and hand protection in areas where access to dangerous machine parts is required while systems are still operating.

The F3SH is a multi-beam safety sensor for body protection. If a person enters a dangerous zone the F3SH ensures that the hazardous equipment within that zone is shut off. Both of these type 4 safety sensors are invaluable in areas where operation, maintenance and repair work is a necessity in an industrial environment.

Their slim profile makes these sensors highly attractive prospects when installation space is a premium. The field of operation is extensive; protection heights vary from 189 mm to 1822 mm, with a detection distance of up to 10 meters. In addition, the modular construction of these sensors means that you have a wide variety of detection heights and resolutions to choose from.













## Table of contents

Selection table		120
Safety light curtain	F3SN-A / F3SH-A	123
	F3S-B	125
	F3SL	126
	F3S-TGR	127
Safety single beam	E3FS	128
Muting controller	F3SP-U4P	129



# Selection table

		Category 4	Category 2	Category 4	
					
Selection criteria	Model	F3SN-A	F3S-B	F3SL	F3SH-A
	Safety category	Category 4	Category 2	Category 4	
	Operating distance	0.2 - 7 m / 0.2 - 10 m	0.3 - 5 m	0.3 - 20 m	0.2 - 10 m
	Protective height	189 - 1,822 mm	300 - 1,650 mm	351 - 2,095 mm	900 mm
	Resolution	14, 25, 40, 70 mm	30, 55, 80 mm	30 mm	-
	Beam pitch	9, 15, 30, 60 mm	25, 50, 70 mm	22 mm	300 mm
	Reaction time	10 - 19.5 ms	20 - 45 ms	20 - 35 ms	10 ms
	Temperature range	-10 °C - 55 °C			
Features	Size of housing	30x30 mm	30x40 mm	35x50 mm	30x30 mm
	Blanking function	internal	option	internal	-
	Muting function	-	-	-	-
	EDM function	internal			
	Interlock function	internal			
	Series connection	option	option	-	option
	Mounting kits	option			
	Parameter setting	option (Console)	option (PC)	internal DIP switch	Option (Console)
Application	External control unit	-	-	-	-
	Optical heating	-	-	-	-
	Finger protection	■	-	-	-
	Hand protection	■	■	■	-
	Arm protection	■	■	■	-
	Body protection	■	■	■	■
	Presence detection	■	-	■	-
Supply voltage	Muting application	-	■	■	■
	Blanking application	■	■	■	-
In- and Outputs	24 VDC	■	■	■	■
	Safety outputs	2 PNP OSSD transistor outputs			
	Auxiliary output	2 PNP (non safety)	1 PNP (non safety)	1 PNP (non safety)	2 PNP (non safety)
	Test input	■	■	-	■
	EDM input	■	■	■	■
	Reset input	■	■	■	■
	Muting sensor input	-	-	-	-
	Page	123	125	126	123

		Category 2 and 4	Category 4	Category 2	
					
Selection criteria	Model	F3S-TGR	F3SS	E3FS + F3SP-U3P/U5P	F3SP-U4P
	Safety category	Category 4	Category 2	Category 2	Category 2
	Operating distance	0.5 - 6 m (active / passive) 0.5 - 5 m (active / passive)	0.3 - 60 m	0 - 10 m	-
	Protective height	500 - 900 m	-	-	-
	Resolution	-	-	-	-
	Beam pitch	300 mm, 400 mm, 500 mm	-	-	-
	Reaction time	16 ms	35 ms	32 ms	30 ms
	Temperature range	-10 °C - 55 °C	0 °C - 55 °C	-10 °C - 55 °C	-10 °C - 55 °C
	Size of housing	30x30 mm	50x115x90 mm	Sensor: M18 housing Control unit: 22,5/45 mm wide	45 mm wide
Features	Blanking function	-	-	-	-
	Muting function	internal	-	■	■
	EDM function	-	-	-	-
	Interlock function	internal	■	■	■
	Series connection	-	-	-	-
	Mounting kits	■	■	■	-
	Parameter setting	-	-	-	-
	External control unit	-	-	■	■
Application	Optical heating	-	■	-	-
	Finger protection	-	-	-	-
	Hand protection	-	-	-	-
	Arm protection	-	-	-	-
	Body protection	■	■	■	-
	Presence detection	-	-	-	-
	Muting application	■	■	■	■
Supply voltage	Blanking application	-	-	-	-
	24 VDC	■	■	■	-
In- and Outputs	Safety outputs	2 PNP OSSD transistor outputs		2 NO relay outputs	2 NO relay outputs
	Auxiliary output	-	-	-	-
	Test input	■	-	■	■
	EDM input	-	-	-	-
	Reset input	■	■	■	■
	Muting sensor input	■	-	■	■
Page		127	Please contact your OMRON representative	128	129

■ Standard

□ No / not available





## Category-4 safety light curtain / multi-beam safety sensor

The F3SN family is a category-4 safety light curtain with resolutions of 14, 25, 30 and 60 mm. An operating range of up to 10 m and protective heights from 189 to 1,822 mm are provided with no dead zone.

- Detection height = Sensor length
- Sensing distance up to 7 m (14 mm resolution) and 10 m for all other types
- LED bar for easy alignment and diagnosis
- Blanking function by using setup console
- Category-4 sensor complying with EN 61496-1



### Ordering information

#### Safety light curtain

Minimum detection object	Sensing distance	Series connection, connector	Model <sup>*1</sup>
14 mm dia. (finger protection)	0.2 to 7 m	No	F3SN-A□□□P14 F3SN-A□□□P14H
		Yes	F3SN-A□□□P14H-01
25 mm dia. (hand protection)	0.2 to 10 m	No	F3SN-A□□□P25
		Yes	F3SN-A□□□P25-01
40 mm dia. (for presence protection)	0.2 to 10 m	No	F3SN-A□□□P40
		Yes	F3SN-A□□□P40-01
70 mm dia. (for presence detection)	0.2 to 10 m	No	F3SN-A□□□P70
		Yes	F3SN-A□□□P70-01

<sup>\*1</sup> □□□□ in the model name indicates the detection width (mm).

#### Multi-beam safety sensor

Optical axis pitch	Sensing distance	Number of optical axes	Distance between optical axes at each end	Series connection, connector	Model
Body protection	0.2 to 10 m	4	900 mm	No	F3SH-A09P03
				Yes	F3SH-A09P03-01

### Accessories (order separately)

#### Setting console

Model	Accessories
F39-MC11	One branching connector, one connector cap, 2 m cable, instruction manual

### List of safety light curtains

#### F3SN-A□□□P14, F3SN-A□□□P14-01, F3SN-A□□□P14H-01

Model	Detection height	Number of optical axes
F3SN-A0207P14 (-01)	207	23
F3SN-A0297P14 (-01)	297	33
F3SN-A0405P14 (-01)	405	45
F3SN-A0495P14 (-01)	495	55
F3SN-A0603P14 (-01)	603	67
F3SN-A0711P14 (-01)	711	79
F3SN-A0801P14 (-01)	801	89
F3SN-A0909P14 (-01)	909	101
F3SN-A0999P14 (-01)	999	111
F3SN-A1107P14 (-01)	1,107	123
F3SN-A1197P14H(-01)	1,197	133
F3SN-A1359P14H(-01)	1,359	151
F3SN-A1503P14H(-01)	1,503	167
F3SN-A1611P14H(-01)	1,611	179

#### F3SN-A□□□P25, F3SN-A□□□P25-01

Model	Detection height	Number of optical axes
F3SN-A0307P25 (-01)	307	19
F3SN-A0457P25 (-01)	457	29
F3SN-A0607P25 (-01)	607	39
F3SN-A0907P25 (-01)	907	59
F3SN-A1057P25 (-01)	1,057	69
F3SN-A1207P25 (-01)	1,207	79
F3SN-A1357P25 (-01)	1,357	89
F3SN-A1507P25 (-01)	1,507	99
F3SN-A1657P25 (-01)	1,657	109
F3SN-A1807P25 (-01)	1,807	119

**Note:** Highlighted products are preferred stock types, other detection heights are available.

## Specifications

Model	Stand-alone	F3SN-A□□□□P14 <sup>*1</sup> <sup>*3</sup>	F3SN-A□□□□P25 <sup>*1</sup>	F3SN-A□□□□P40 <sup>*1</sup>	F3SN-A□□□□P70 <sup>*1</sup>	F3SH-A09P03
Item	Series connection	F3SN-A□□□□P14-01 <sup>*1</sup> <sup>*2</sup> <sup>*3</sup>	F3SN-A□□□□P25-01 <sup>*1</sup>	F3SN-A□□□□P40-01 <sup>*1</sup>	F3SN-A□□□□P70-01 <sup>*1</sup>	F3SH-A09P03-01
Sensor type	Type 4 Safety Light Curtain					
Operating range	0.2 to 7 m		0.2 to 10 m			
Beam pitch (P)	9 mm		15 mm	30 mm	60 mm	300 mm
Protective height (PH)	189 to 1611 mm PH = n × P		217 to 1822 mm PH = (n - 1) × P + 37	217 to 1807 mm PH = (n - 1) × P + 37	277 to 1777 mm PH = (n - 1) × P + 37	-
Outermost beam gap	-					900 mm
Detection capability	Non-transparent: 14 mm in diameter		Non-transparent: 25 mm in diameter	Non-transparent: 40 mm in diameter	Non-transparent: 70 mm in diameter	-
Effective aperture angle (EAA)	Within ±2.5° for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2					
Light source	Infrared LED (870 nm)					
Supply voltage (Vs)	24 VDC ±10% (ripple p-p 10% max.)					
OSSD	Two PNP transistor outputs, load current 300 mA max.					
Auxiliary output (non-safety output)	One PNP transistor output, load current 50 mA max.					
External indicator output (non-safety output) <sup>*4</sup>	One PNP transistor output, load current 40 mA max.					
Output operation mode	OSSD output: Light-ON Auxiliary output: Dark-ON (can be changed by the F39-MC11) External indicator output: Light-ON (can be changed by the F39-MC11) <sup>*4</sup>					
Input voltage	For test input, interlock selection input, reset input, and external relay monitor input voltages; ON voltage: 9 to 24 V (with a sink current of 3 mA max.), OFF voltage: 0 to 1.5 V or open					
Test functions	Self-test (after power ON, and during operation, one cycle during response time) External test (light emission stop function by test input)					
Safety-related functions	Auto reset/manual reset (interlock) <sup>*5</sup> EDM (external device monitoring) Fixed blanking <sup>*6</sup> Floating blanking <sup>*6</sup>					Auto reset mode/manual reset mode (interlock) <sup>*5</sup> EDM (external device monitoring)
Response time	ON to OFF: 10 to 15.5 ms max., 19.5 ms max. for 179 beams					ON to OFF: 10 ms max.
Ambient light intensity	Incandescent lamp: 3000 lx max. (light intensity on the receiver surface) Sunlight: 10000 lx max. (light intensity on the receiver surface)					
Ambient temperature	Operating: -10 °C +55 °C, storage: -30 °C +70 °C (with no icing or condensation)					
Degree of protection	IP65 (IEC60529)					
Connection method	M12 connector (8 pins)					
Materials	Case: Aluminum, cap: Zinc die-cast, optical cover: PMMA (acrylic resin)					
Size (cross section)	30x30 mm					

<sup>\*1</sup> The 4 digits in □□□□ in the model number represent the protective height. Use the formula given in the information on protective height specifications to calculate the height.

For example, if the beam gap is 9 mm, and the No. of beams is 21, the protective height will be 9×21 = 189 mm. The model with this protective height is F3SN-A0189P14.

<sup>\*2</sup> F3SN-A□□□□P14-01 is a customized model. Consult with your OMRON representative when ordering this model.

<sup>\*3</sup> For sizes above 1,125 mm add „H“ after P14, e.g. F3SN-A1143P14H. Ask for supplemental manual.

<sup>\*4</sup> Models ending in -01 only.

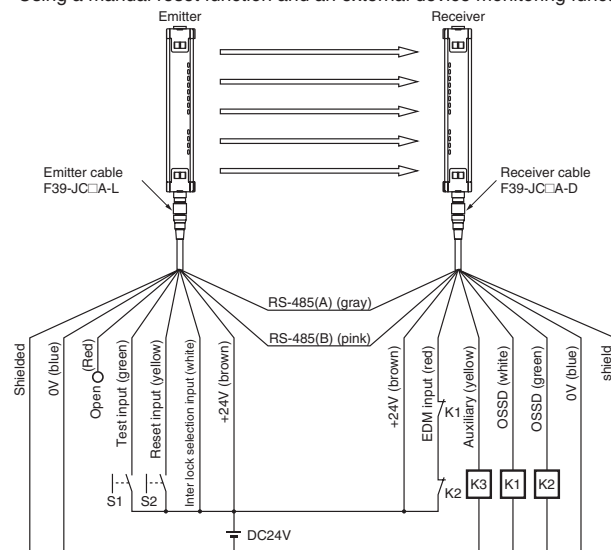
<sup>\*5</sup> For the factory setting, the manual reset mode is set to the “start / restart” interlock.

Using the F39-MC11 can select either the start interlock or the restart interlock.

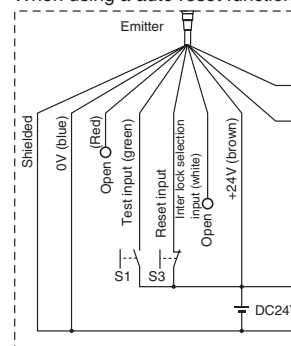
<sup>\*6</sup> For the factory setting, the function is not set. It can be enabled with the F39-MC11.

## Connection

Using a manual reset function and an external device monitoring function



When using a auto reset function



- external test switch
- interlock / lockout reset switch
- lock-out reset switch
- switch is not needed, connect to 24 V DC)
- 2: Relays for control of dangerous parts of machine.
- pad, PLC, etc. (for monitor)
- do not intend to use the external relay monitor,
- set the auxiliary output that is set for dark: ON
- ation to the external relay monitor input, or use
- F39-MC11 to disable the external relay monitor function.



## Category-2 safety light curtain

The F3S-B is a category-2 safety light curtain with resolutions of 30, 55 and 80 mm. An operating range of up to 5 m and protective heights from 300 mm to 1,650 mm are provided with a very small dead zone.

- Sensing distance up to 5 m
- LEDs for easy alignment and diagnosis
- Series connection of two sensors is possible
- Category-2 sensor complying with EN 61496-1



## Ordering information

Stand-alone	Optical resolution	No. of optical axes	Protective height	Stand-alone	Optical resolution	No. of optical axes	Protective height
F3S-B122P	30 mm	12	300 mm	F3S-B215P	55 mm	21	1,050 mm
F3S-B182P		18	450 mm	F3S-B245P		24	1,200 mm
F3S-B242P		24	600 mm	F3S-B275P		27	1,350 mm
F3S-B302P		30	750 mm	F3S-B305P		30	1,500 mm
F3S-B362P		36	900 mm	F3S-B335P		33	1,650 mm
F3S-B422P		42	1,050 mm	F3S-B047P	80 mm	4	300 mm
F3S-B482P		48	1,200 mm	F3S-B067P		6	450 mm
F3S-B542P		54	1,350 mm	F3S-B087P		8	600 mm
F3S-B602P		60	1,500 mm	F3S-B107P		10	750 mm
F3S-B662P		66	1,650 mm	F3S-B127P		12	900 mm
F3S-B065P	55 mm	6	300 mm	F3S-B147P	80 mm	14	1,050 mm
F3S-B095P		9	450 mm	F3S-B167P		16	1,200 mm
F3S-B125P		12	600 mm	F3S-B187P		18	1,350 mm
F3S-B155P		15	750 mm	F3S-B207P		20	1,500 mm
F3S-B185P		18	900 mm	F3S-B227P		22	1,650 mm

## Specifications

Type	F3S-B□□□P *1 Stand-alone	F3S-BM□□□□P□□ *1 Master unit for series connection	F3S-BS□□□□ *1 Slave unit for series connection
Sensor type	Type 2 Safety Light Curtain		
Optical-axis pitch	25 mm	50 mm	75 mm
Optical resolution (Detection capability)	Non-transparent: in diameter		
	30 mm	55 mm	80 mm
Protective height	300 / 450 / 600 / 750 / 900 / 1,050 / 1,200 / 1,350 / 1,500 / 1,650 mm		
Detection distance	0.3 to 5.0 m		
Response time	ON to OFF 20 ms to 45ms (stand-alone) ON to OFF 20 ms to 65ms (series connection)		
Supply voltage (Vs)	24 VDC ±20% (including 5 Vp-p ripple)		
Current consumption	400 mA max. (under no-load conditions)		
Light source	Infrared LED (880 nm wavelength).		
Effective aperture angle	Within ±5° for the emitter and receiver at a detection distance of at least 3 m according to IEC 61496-2		
Control output	Two PNP transistor outputs, load current 200 mA max.		
Instability output	PNP transistor output (non safety output)		
Protection circuit	Output short-circuit protection, power supply reverse connection protection		
External test function	Mode selection by connecting "External test input" line to: Active: 17 VDC to Vs, 10 mA max. duration time at least 15 ms Inactive: No connection or 0 to 2.5 VDC, 2 mA max.		
Relay monitoring function (optional)	Default inactive, selectable with F39-U1E		
Start interlock function (optional)	Default inactive, selectable with F39-U1E		
Blanking function (optional)	Default inactive, selectable with F39-U1E		
Connection method	For extension cable: 8 pins, M12 connector For series connection cable: 6 pins, M12 connector		
Ambient temperature	Operating: -10 °C +55 °C (with no icing or condensation)		
Degree of protection	IP65 (IEC60529)		
Size (cross section)	30x40 mm		

\*1 For detailed type names and optical specifications, see „Type Naming Rule“





## Category-4 safety light curtain for long-distance detection

The F3SL category-4 safety light curtain is ideal for applications where long operating ranges of up to 20 m are needed. A resolution of 30 mm ensures hand detection even in large machines and conveyor lines.

- Sensing distance up to 20 m
- LEDs for easy alignment and diagnosis
- Blanking function included
- EDM function included
- Category-4 sensor complying with EN 61496-1

### Ordering information

Sensor type	Sensing distance	Detection width (mm)	Model
Through-beam	0.3 to 20 m	351	F3SL-A0351P30
		523	F3SL-A0523P30
		700	F3SL-A0700P30
		871	F3SL-A0871P30
		1,046	F3SL-A1046P30
		1,219	F3SL-A1219P30
		1,394	F3SL-A1394P30
		1,570	F3SL-A1570P30
		1,746	F3SL-A1746P30
		1,920	F3SL-A1920P30
		2,095	F3SL-A2095P30

### Specifications

Item	Model	F3SL-A0351 P30	F3SL-A0523 P30	F3SL-A0700 P30	F3SL-A0871 P30	F3SL-A1046 P30	F3SL-A1219 P30	F3SL-A1394 P30	F3SL-A1570 P30	F3SL-A1746 P30	F3SL-A1920 P30	F3SL-A2095P 30
Sensing distance	0.3 to 20 m											
Optical axis pitch	22 mm											
Number of optical axes	16	24	32	40	48	56	64	72	80	88	96	
Protective height	351 mm	523 mm	700 mm	871 mm	1,046 mm	1,219 mm	1,394 mm	1,570 mm	1,746 mm	1,920 mm	2,095 mm	
Min. sensing object	Opaque object, 30-mm dia. or greater (52-mm or 74-mm dia. when using floating blanking)											
Effective aperture angle	Emitter / receiver: ±2.5° or less each (based on IEC61496-2 at detection distance of 3 m or greater)											
Light source	Infrared LED (850 nm)											
Supply voltage (Vs)	24 VDC ±20% including 5% ripple (p-p)											
Current consumption	Emitter: 285 mA or less, receiver: 1.4 A or less (including load output current)											
Control output	PNP transistor outputs x 2, load current 500 mA or less, Light ON											
Auxiliary output	Same signal as control output: PNP transistor outputs x 1 output (non-safety output), load current 100 mA or less											
Protective circuits	Output load short circuit protection, reverse power connection protection											
Safety functions	Start/restart interlock function (select enable/disable with DIP switch) • Blanking functions ① Channel select (fixed blanking) ② Floating blanking ③ No blanking (initial setting) Select ①, ②, or ③ with DIP switch. The optical axes for ① fixed blanking are set by a teach button.											
Diagnosis functions	• Self diagnosis functions when the power is turned on • External relay (MPCE) monitor function (connect external relay monitor input wire to contact b of external relay, 50 mA 24 VDC)											
Response time	ON to OFF 20 ms max.					ON to OFF 25 ms max.			ON to OFF 30 ms max.		ON to OFF 35 ms max.	
Ambient temperature	Operating / Storage: 0 °C to 55 °C (with no icing or condensation)											
Degree of protection	IP65 (IEC 60529)											
Connection method	M12 Connector											
Accessories	Test rod, mounting brackets (upper/lower), operation manual, special hex wrench for program button access, test load resistors (1 kΩ 2 resistors), surge protector (2)											
Size (cross section)	35x50 mm											



## Safety sensor for perimetrical guarding

The F3S-TGR perimetrical guards are available in category 2 and category 4 with integrated muting function. They are available as 2-, 3- and 4-beam guards with an operation range of up to 50 m.

- Sensing distance up to 50 m
- Muting function included (no additional controller needed)
- Two muting actuator shapes for easy muting applications
- Automatic and manual restart function included
- Category-2 and -4 sensor complying with EN 61496-1



## Ordering information

### Safety multi beam sensors

#### F3S-TGR-SB2-K□C mirror reflection type (type 2)

Number of optical axes	Sensing distance	Beam pitch	Model
2	0.5 to 6 m	500	F3S-TGR-SB2-K2C-500(MTL) <sup>*1</sup>
3	0.5 to 5 m	400	F3S-TGR-SB2-K3C-800(MTL) <sup>*1</sup>
4		300	F3S-TGR-SB2-K4C-900(MTL) <sup>*1</sup>

<sup>\*1</sup> For muting applications with transport in only one direction, please add the MTL behind the model name. Ex. F3S-TGR-SB4-K2C-500MTL.

#### F3S-TGR-SB4-K□C mirror reflection type (type 4)

Number of optical axes	Sensing distance	Beam pitch	Model
2	0.5 to 6 m	500	F3S-TGR-SB4-K2C-500(MTL) <sup>*1</sup>
3	0.5 to 5 m	400	F3S-TGR-SB4-K3C-800(MTL) <sup>*1</sup>
4		300	F3S-TGR-SB4-K4C-900(MTL) <sup>*1</sup>

<sup>\*1</sup> For muting applications with transport in only one direction, please add the MTL behind the model name. Ex. F3S-TGR-SB4-K2C-500MTL.

### Flexible muting connector box

SLC connection type	Other connection	Model
M12 8pin connector without cable	4 x muting sensor connection (4pin)	F39-TGR-SB-CMB1
M12 8pin connector with 100 mm cable	1 x muting lamp M12 (4pin) 1 x override / Test input M12 (4pin) 1 x cabinet connection M12 (8pin)	F39-TGR-SB-CMB2

## Specifications

### Safety sensors

	F3S-TGR-SB4-K□C-□□□(MTL)	F3S-TGR-SB2-K□C-□□□(MTL)
Sensor type	Type 4	Type 2
Operating range	F3S-TGR-SB□-K2C 0.5 - 6 m F3S-TGR-SB□-K3C/K4C 0.5 - 5 m	
Beam pitch and number of beam	F3S-TGR-SB□-K2C 500 mm 2 beam with mirror F3S-TGR-SB□-K3C 400 mm 3 beam with mirror F3S-TGR-SB□-K4C 300 mm 4 beam with mirror	
Effective aperture angle (EAA)	Within ±2.5°	Within ±5°
Light source	Infrared LED (880 nm)	
Supply voltage (Vs)	24 VDC ±20%	
OSSD	Two PNP transistor outputs, load current 500 mA max	
Output operation mode	Light - ON	
Test functions	Self-test (after power ON and during operation, one cycle during response time)	
Protection	Output short-circuit protection	
Response time	ON to OFF 16 ms max	
Ambient temperature	Operating: -10 °C +55 °C (with no icing or condensation)	
Degree of protection	IP65 (IEC 60529)	
Size (cross section)	38x48 mm	

### Muting connection box

Supply voltage (Vs)	24 VDC ±20%
Ambient temperature	Operating: -10 to +55 °C (with no icing or condensation)
Safety light curtain connector	M12 8 pins female
Cabinet connector	M12 8 pins male
Sensor connector	4 x M12 4 pins female
Muting sensor connector	M12 4 pins female
Test / override connectors	M12 4 pins female
Degree of protection	IP65 (IEC60529)



## Single-beam safety sensor in compact housing

The slender M18-sized E3FS is a category-2 safety single beam with an operating range of up to 10m. Plastic and metal housing, cable and M12-connector offer flexibility in application together with a control unit such as F3SP-U3P, F3SP-U4P or F3SP-U5P.

- Sensing distance up to 10m
- LEDs for easy alignment and diagnosis
- Cable and M12 plug categories
- Plastic and metal housing
- Category-2 sensor complying with EN 61496-1



## Ordering information

### Safety single beam sensors (Type 2)

Case material	Operation distance	Model	
Plastic	0 to 10 m	Cable type	E3FS-10B4
		Plug type	E3FS-10B4-P1
Nickel Brass		Cable type	E3FS-10B4-M
		Plug type	E3FS-10B4-M1-M

### Controller for safety single beam sensors

Sensors	Output contacts	Width	Model
1 to 2 Safety single beam sensors	2 NO 2.5 A	22.5 mm	F3SP-U3P-TGR
1 to 4 Safety single beam sensors		45 mm	F3SP-U5P-TGR

## Specifications

### Sensors

Sensing method	Through-beam
Controller	F3SP-U3P-TGR, F3SP-U5P-TGR
Supply voltage (Vs)	24 VDC $\pm$ 10% (ripple p-p 10% max.)
Effective aperture angle (EAA)	$\pm 5^\circ$ (at 3 m)
Current consumption	Emitter: 50 mA max. Receiver: 25 mA max.
Sensing distance	10 m
Standard sensing object	Opaque object: 11 mm min. in diameter
Response time	2.0 ms (E3FS only)
Control output	PNP transistor output, load current: 100 mA max.
Test input (emitter)	21.5 to 24 VDC: emitter OFF (source current: 3 mA max.) Open or 0 to 2.5 V: emitter ON (leakage current: 0.1 mA max.)
Ambient light intensity	Incandescent lamp: 3,000 lx max. (light intensity on the receiver surface) Sunlight: 10,000 lx max. (light intensity on the receiver surface)
Ambient temperature	Operating: -10 °C +55 °C, storage: -30 °C +70 °C (with no icing or condensation)
Degree of protection	IP67 (IEC 60529)
Light source	Infrared LED
Protection	Output short-circuit protection, reverse polarity protection

### Controllers

	F3SP-U3P	F3SP-U5P
Number of sensors	1 to 2 safety single beam sensor	1 to 4 safety single beam sensor
Width	22.5 mm	45 mm
Muting input	2 Inputs	4 Inputs
Safety related function	Override function Muting lamp Connection Interlock system (automatic and manual reset)	
Power supply voltage	24 VDC $\pm$ 10%	
Power consumption	420 mA max.	
Output contacts	2 NO 2.5 A (protected by fuse), 115 VAC max.	2 NO 2.5 A (protected by fuse), 250 VAC max.
Indicators	6 LED for status and diagnostics	
Degree of protection	IP20 (IEC 60529)	
Terminal	16 screw terminals, detachable blocks with '4pin'	32 screw terminals, detachable blocks with '4pin'
Response time	$\leq 30$ ms	
Ambient temperature	Operation: -10 °C +55 °C	
Housing material	Plastic; DIN rail mounting	



Safety light curtain controller with integrated muting function

The F3SP-U4P muting controller can handle up to two safety light curtains. It has a 45 mm-wide housing, two safety relay outputs with up to 2.5 A and additional functions such as muting-lamp monitoring and override function.

- Two independent muting functions with override
- Slim housing: 45 mm
- LEDs for status and diagnosis
- Detachable terminals
- Fully certified according to EN 61496-1



Ordering information

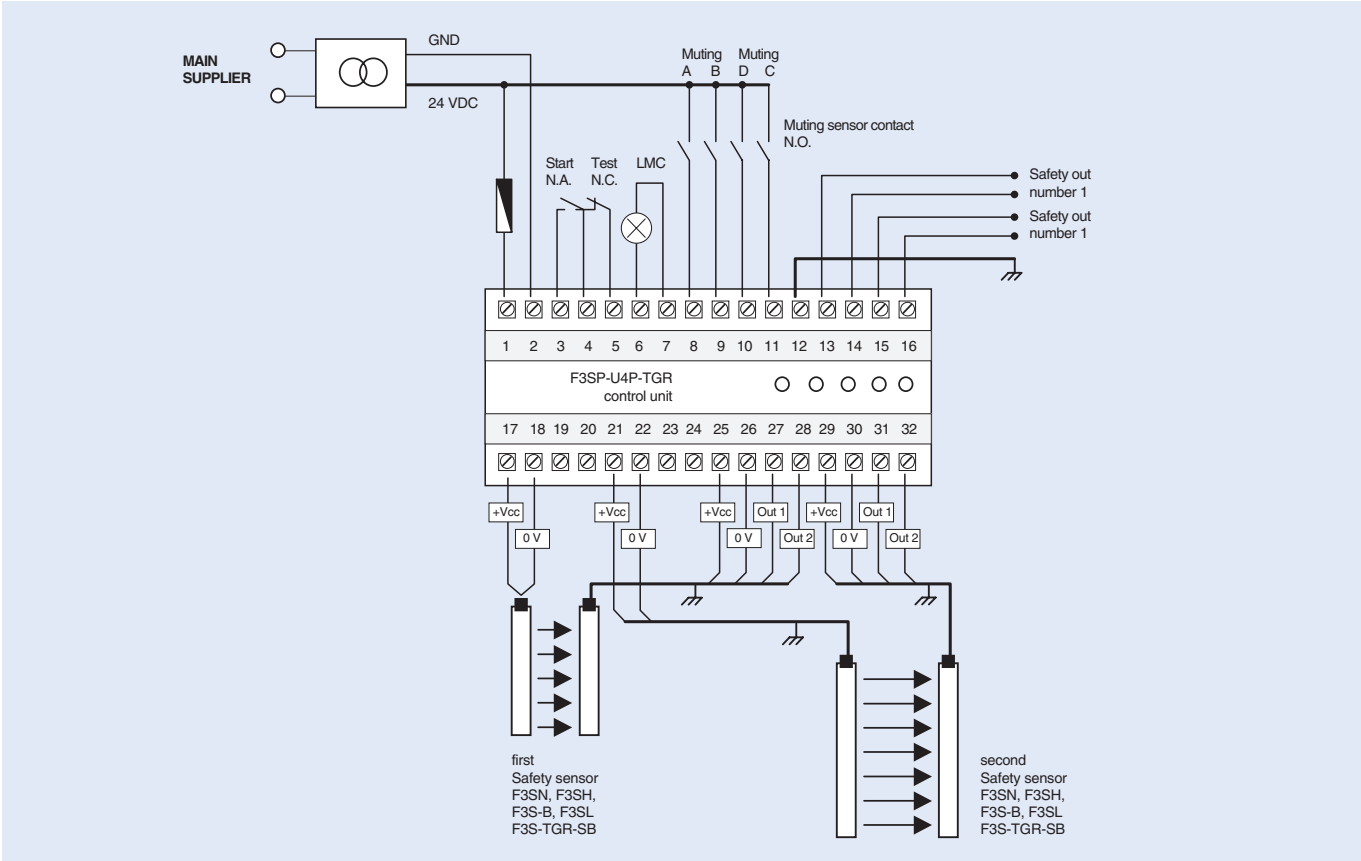
Description	Model
Muting controller for safety light curtain F3S-B, F3SN and F3SH	F3SP-U4P-TGR

Specifications

	F3SP-U4P-TGR
Power supply voltage	24 VDC $\pm 10\%$
Power consumption	420 mA max. (excl. SLC power consumption)
Output contacts	2 NO 2.5 A (protected by fuse)
Indicators	6 LEDs for status and diagnostics.
Degree of protection	IP20 (IEC 60529)
Terminal	32 screw terminals (1.5 mm <sup>2</sup> ), detachable blocks with 4 screws each
Response time	$\leq 30$ ms
Ambient temperature	Operating: $-10^{\circ}\text{C}$ + $55^{\circ}\text{C}$
Housing material	Plastic, DIN rail mounting

Wiring example

Control unit F3SP-U4P-TGR in a mixed configuration that allows the use of several OMRON safety light curtains and perimetrical guards.

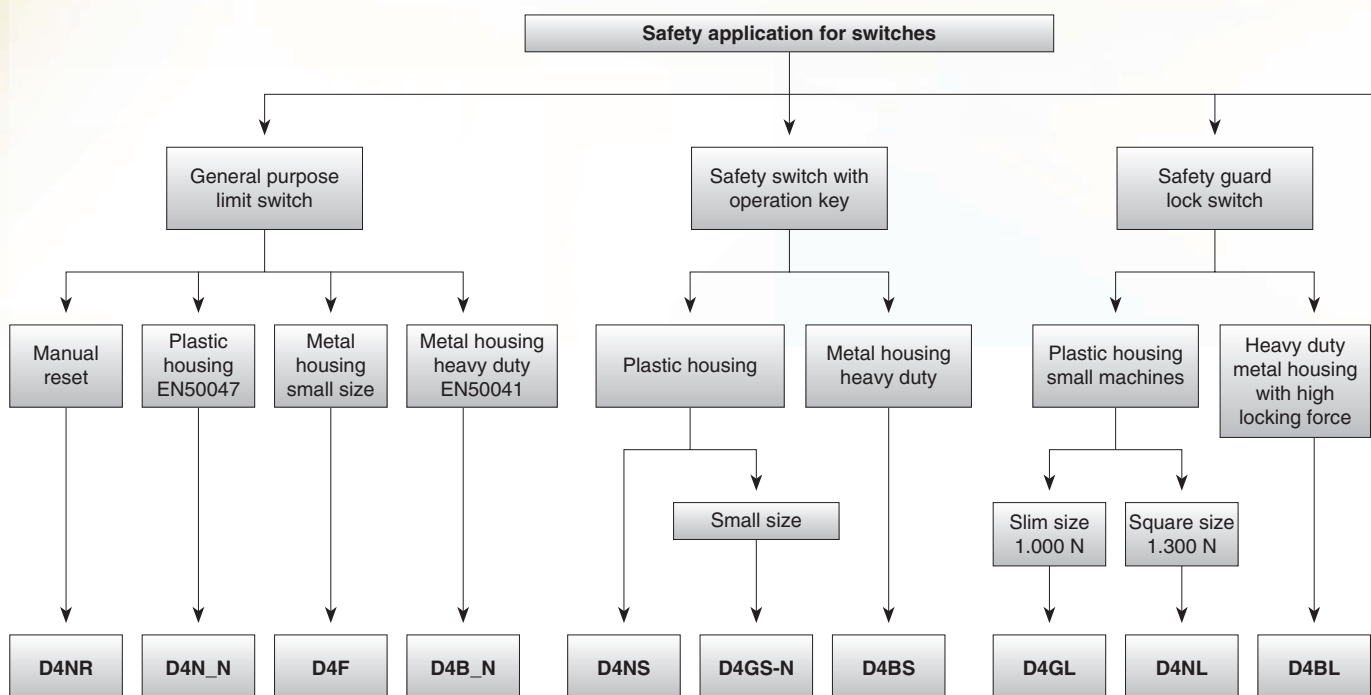


# Safety components

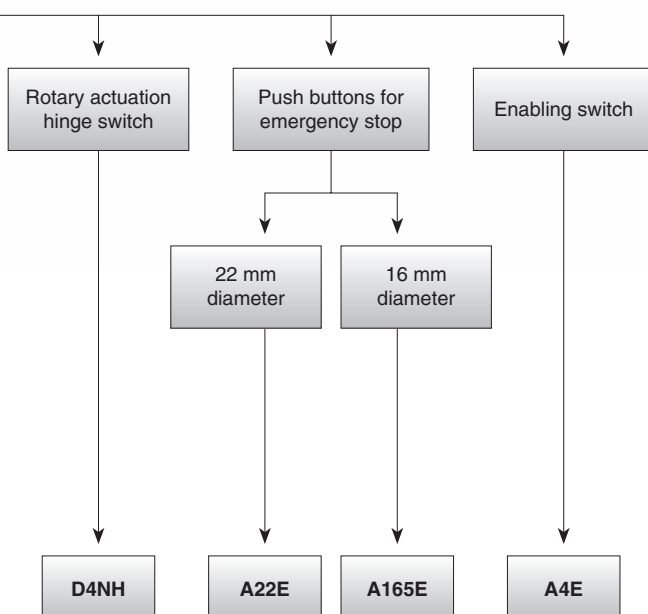
## D4N series – Next-generation safety switches

The D4N series is a new range of industrial safety switches that combines practical, cost-effective solutions with innovative features for the safe guarding and interlocking of machinery doors. There are six sub-families in the range, each providing its own capabilities for door-safety applications. These universal switches provide customers with a choice of over 1500 configurations, so there is literally a model for every requirement!

Many of the new features in these switches are unique. Make-before-break contacts, for example, provide enough time for vital process information to be saved before the system is shut down. More contacts have been added to the switches so that one is available to provide feedback data to the control system. Gold-clad contacts have been included for switching micro-loads and higher current more reliably. And all switches are tested to guarantee at least 1 million operations. No matter how safety-critical the requirement, Omron's D4N series has an excellent product solution for your application!














## Table of contents







<b>Selection table</b>		132
<b>Safety door switch</b>	D4NS	135
	D4BS	136
<b>Safety hinge switch</b>	D4NH	137
<b>Non contact switch</b>	D40B	138
<b>Safety guard lock</b>	D4NL	139
	D4GL	140
	D4BL	141
<b>Safety limit switch</b>	D4N	142
	D4B-N	144
	D4N-R	145
<b>E-stop switch</b>	A165E	146
<b>Force guide relay / enabling switch</b>	G7SA	147



## Selection table

		Safety door switches			Non-contact safety door switches	Safety door-lock switches		
								
Selection criteria	Model	D4NS	D4BS	D4NH	D40B	D4NL	D4GL	D4BL
	Housing	Plastic	Metal	Plastic	Plastic	Plastic	Plastic	Metal
	Connector type M12	■	-	■	-	-	-	-
	Head mounting	4 directions	4 directions	-	-	4 directions	4 directions	4 directions
	Actuation	Straight	Straight	Hinge	-	Straight	Straight	Straight
	Key holding force	-	-	-	-	1,300 N	1,000 N	700 N
	Protection class	IP67						
Features	Conformity	EN50047, EN1088			EN1088			
	Conduit size PG13.5	■	■	■	-	■	■	■
	Conduit size M20	■	■	■	-	■	■	■
	Conduit size G1/2	■	■	■	-	■	■	■
	Conduit size 1/2-14NPT	■	■	■	-	-	-	-
	Cable length 3, 5, 10 m	-	-	-	■	-	-	-
	Gold clad contacts	■	■	■	■	■	■	■
	Operation key adjustable	■	■	■	-	■	■	■
	Mechanical lock / 24 VDC solenoid release	-	-	-	-	■	■	■
	Mechanical lock / 110 VAC solenoid release	-	-	-	-	■	-	■
	Mechanical lock / 230 VAC solenoid release	-	-	-	-	■	-	-
	24 VDC solenoid lock / mechanical release	-	-	-	-	■	■	■
	110 VAC solenoid lock mechanical release	-	-	-	-	■	-	-
	240 VAC solenoid lock, mechanical release	-	-	-	-	■	-	-
Application	Shaft actuator	-	-	■	-	-	-	-
	Arm lever actuator	-	-	■	-	-	-	-
	High temperature sensor	-	-	-	■	-	-	-
Contact configuration	Door monitoring	■	■	■	■	■	■	■
	Door locking	-	-	-	-	■	■	■
	1NC / 1NO SL	■	■	■	-	-	-	-
	2NC SL	■	■	■	-	-	-	-
	2NC / 1NO	-	-	-	-	-	-	-
	2NC / 1NO SL	■	-	■	-	-	-	-
	3NC SL	■	-	■	-	-	-	-
	1NC / 1NO (MBB contact)	■	-	■	-	-	-	-
	2NC / 1NO (MBB contact)	■	-	■	-	-	-	-
	1NO / 1NC	-	-	-	■	-	-	-
	2NO / 1NC	-	-	-	■	-	-	-
	1NC / 1NO SL + 1NC / 1NO SL	-	-	-	-	■	■	-
	1NC / 1NO SL + 2NC SL	-	-	-	-	■	■	-
	1NC / 1NO SL + 1NC SL	-	-	-	-	-	-	■
	2NC SL + 1NC / 1NO SL	-	-	-	-	■	■	-
	2NC / 1NO SL + 1NC / 1NO SL	-	-	-	-	■	-	-
	2NC/1NO SL + 2NC SL	-	-	-	-	■	■	-
	2NC SL + 2NC SL	-	-	-	-	■	■	-
	2NC SL + 1NC SL	-	-	-	-	-	-	■
	3NC SL + 1NC / 1NO SL	-	-	-	-	■	■	-
	3NC SL + 2NC SL	-	-	-	-	■	■	-
Page		135	136	137	138	139	140	141

# Safety components

		Safety limit switches			E-stop switches		Safety relay and enabling switches
							
Selection criteria	Model	D4N	D4B-N	D4N-R	A22E	A165E	G7SA
	Housing	Plastic	Metal	Plastic			
	M12 Plug connector	■	-	-	-	-	-
	Protection class	IP67			IP65		
	Operating temperature range	-30 °C - 70 °C	-40 °C - 80 °C	-30 °C - 70 °C	-20 °C - 70 °C	-10 °C - 55 °C	-40 °C - 85 °C
	Head size	-	-	-	30 mm, 40 mm, 60 mm	30 mm, 40 mm	-
	Number of poles	-	-	-	-	-	4pole and 6pole
	Flux tight	-	-	-	-	-	■
	Conformity	EN50047, EN1088			EN 60947-5-1		EN50205
Features	Conduit size PG13.5	■	■	■	-	-	-
	Conduit size M20	■	■	■	-	-	-
	Conduit size G1/2	■	■	■	-	-	-
	Conduit size 1/2-14NPT	■	■	■	-	-	-
	Gold clad contacts	■	■	■	-	-	■
	Actuators						
	Resin roller, resin lever	■	-	-	-	-	-
	Resin roller, metal lever	■	■	■	-	-	-
	Metal roller, metal lever	■	-	-	-	-	-
	Bearing lever, metal lever	■	-	-	-	-	-
	Adj. resin roller, metal lever	■	■	■	-	-	-
	Adj. rubber roller, metal lever	■	-	■	-	-	-
	Adj. rod lever	-	■	■	-	-	-
	Top plunger	■	■	■	-	-	-
	Top roller plunger	■	■	■	-	-	-
	Roller arm lever	■	-	-	-	-	-
	Cat whisker	■	-	-	-	-	-
	Plastic rod	■	■	■	-	-	-
	Fork lever lock	■	-	-	-	-	-
	Lighted head	-	-	-	■	■	-
	Push lock - pull reset	-	-	-	■	-	-
	Push lock, turn reset	-	-	-	■	■	-
	Push lock, lock key reset	-	-	-	■	-	-
Application	Relay socket	-	-	-	-	-	■
	Position monitoring	■	■	■	-	-	-
	E-stop application	-	-	-	■	■	-
	General safety application	-	-	-	-	-	■
Contact configuration	1NC/1NO snap action	■	■	■	-	-	-
	2NC snap action	■	-	-	-	-	-
	1NC/1NO slow action	■	■	■	-	-	-
	2NC slow action	■	■	■	-	-	-
	2NC/1NO slow action	■	-	-	-	-	-
	3NC slow action	■	-	-	-	-	-
	1NC / 1NO (MBB slow action)	■	-	-	-	-	-
	2NC / 1NO (MBB slow action)	■	-	-	-	-	-
Contact configuration	SPST (NC)	-	-	-	■	■	-
	DPST (NC)	-	-	-	■	■	-
	SPST (NO) + SPST (NC)	-	-	-	■	-	-
	TPST (NC)	-	-	-	-	■	-
	4PST-NO + DPST-NC	-	-	-	-	-	■
	3PST-NO + 3PST-NC	-	-	-	-	-	■
	3PST-NO + SPST-NC	-	-	-	-	-	■
	DPST-NO + DPST-NC	-	-	-	-	-	■
	5PST-NO + SPST-NC	-	-	-	-	-	■
Page		142	144	145	Please contact your OMRON representative		147

■ Standard

□ No / not available





## Safety door switch with plastic housing

The D4NS line-up includes three-contact models with 2NC / 1NC and 3NC contact forms in addition to the previous contact forms, 1NC / 1NO and 2NC. Models with M12 connectors and conduit opening, such as M20, are also available.

- Line-up with three contacts: 2NC / 1NC and 3NC contact forms
- Line-up with two contacts 1NC / 1NO and 2NC
- M12 connector types available
- Standardised gold-clad contacts for high contact reliability
- Applicable for standard loads and micro loads



## Ordering information





  : Models with approved direct opening contacts.

### Switches

Type	Contact configuration		Conduit opening/connector	Model
1-conduit	Slow-action	1NC / 1NO	M20	<b>D4NS-4AF</b>
		2NC	M20	<b>D4NS-4BF</b>
		2NC / 1NO	M20	<b>D4NS-4CF</b>
		3NC	M20	<b>D4NS-4DF</b>
	Slow-action MBB contact	1NC / 1NO	M20	<b>D4NS-4EF</b>
		2NC / 1NO	M20	<b>D4NS-4FF</b>
2-conduit	Slow-action	1NC / 1NO	M20	<b>D4NS-8AF</b>
		2NC	M20	<b>D4NS-8BF</b>
		2NC / 1NO	M20	<b>D4NS-8CF</b>
	Slow-action MBB contact	1NC / 1NO	M20	<b>D4NS-8EF</b>
	Slow-action MBB contact	2NC / 1NO	M20	<b>D4NS-8FF</b>
1-conduit, with connector	Slow-action	1NC / 1NO	M12 connector	<b>D4NS-9AF</b>
		2NC	M12 connector	<b>D4NS-9BF</b>
	Slow-action MBB contact	1NC / 1NO	M12 connector	<b>D4NS-9EF</b>

**Note:** Additionally conduit sizes G1/2, 1/2-14NPT and Pg13,5 are available.

### Operation keys (order separately)

Type		Model	Type		Model
Horizontal mounting		D4DS-K1	Adjustable mounting (horizontal)		D4DS-K3
Vertical mounting		D4DS-K2	Adjustable mounting (horizontal/vertical)		D4DS-K5

## Specifications

<b>Degree of protection</b>		IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)
<b>Durability</b> <sup>*1</sup>	<b>Mechanical</b>	1,000,000 operations min.
	<b>Electrical</b>	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
<b>Operating speed</b>		0.05 to 0.5 m/s
<b>Operating frequency</b>		30 operations/minute max.
<b>Direct opening force</b> <sup>*2</sup>		60 N min.
<b>Direct opening travel</b> <sup>*2</sup>		10 mm min.
<b>Minimum applicable load</b>		Resistive load of 1 mA at 5 VDC (N-level reference value)
<b>Protection against electric shock</b>		Class II (double insulation)
<b>Pollution degree (operating environment)</b>		3 (EN60947-5-1)
<b>Contact gap</b>		2 x 2 mm min
<b>Conditional short-circuit current</b>		100 A (EN60947-5-1)
<b>Rated open thermal current (I<sub>th</sub>)</b>		10 A (EN60947-5-1)
<b>Ambient temperature</b>		Operating: -30° C to 70° C with no icing

<sup>\*1</sup> The durability is for an ambient temperature of 5° C to 35° C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

<sup>\*2</sup> These figures are minimum requirements for safe operation.

**Note:** - The above values are initial values.



## Safety door switch with metal housing

The D4BS line-up includes two-contact models with 1NC/1NO and 2NC in a robust metal housing. Models with M12 connectors and conduit opening, such as M20, are also available.




- Robust metal housing
- Line-up with two contacts: 1NC / 1NO and 2NC
- M12 connector types available
- Standardised gold-clad contacts for high contact reliability
- Applicable for standard loads and micro loads



### Ordering information

Type	Mounting direction	Conduit size	1NC/1NO (slow-action)	2NC (slow-action)
1-conduit	Front-side mounting	Pg13.5	D4BS-15FS	D4BS-1AFS
		M20	D4BS-45FS	D4BS-4AFS
3-conduit		Pg13.5	D4BS-55FS	D4BS-5AFS
		M20	D4BS-85FS	D4BS-8AFS

### Operation keys (order separately)

Type		Model
Horizontal mounting		D4BS-K1
Vertical mounting		D4BS-K2
Adjustable mounting (horizontal)		D4BS-K3

### Specifications

Degree of protection <sup>*1</sup>	IP67 (EN60947-5-1)
Durability <sup>*2</sup>	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10 A at 250 VAC, resistive load)
Operating speed	0.1 m/s to 0.5 m/s
Operating frequency	30 operations/min max.
Rated frequency	50/60 Hz
Contact gap	2 x 2 mm min.
Direct opening force <sup>*3</sup>	19.61 N min. (EN60947-5-1)
Direct opening travel <sup>*3</sup>	20 mm min. (EN60947-5-1)
Full stroke	23 mm min.
Conventional enclosed thermal current (I <sub>th</sub> )	20 A (EN60947-5-1)
Conditional short-circuit current	100 A (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Protection against electric shock	Class I (with ground terminal)
Ambient temperature	Operating: -40°C to 80°C (with no icing)

<sup>\*1</sup> Although the switch box is protected from dust, oil, or water penetration, do not use the D4BS in places where dust, oil, water, or chemicals may penetrate through the key hole on the head, otherwise switch damage or malfunctioning may occur.

<sup>\*2</sup> The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%. Contact your OMRON sales representative for more detailed information on other operating environments.

<sup>\*3</sup> These figures are minimum requirements for safe operation.

**Note:** The above values are initial values.

## Safety door hinge switch



D4NH safety-door hinge switches are available with one or two built-in contacts, shaft or arm lever actuator and various conduit types, e.g. M20.

- Direct opening mechanism
- Shaft or arm lever actuator
- Wide temperature range
- Metric conduit types available



### Ordering information

Actuator	Conduit size		Built-in switch mechanism		
			1NC / 1NO (slow-action)	2NC (slow-action)	2NC / 1NO (slow-action)
Shaft	1-conduit	M20	<b>D4NH-4AAS</b>	<b>D4NH-4BAS</b>	<b>D4NH-4CAS</b>
		M12 connector	<b>D4NH-9AAS</b>	<b>D4NH-9BAS</b>	---
	2-conduit	M20	D4NH-8AAS	D4NH-8BAS	<b>D4NH-8CAS</b>
Arm lever	1-conduit	M20	<b>D4NH-4ABC</b>	<b>D4NH-4BBC</b>	<b>D4NH-4CBC</b>
		M12 connector	<b>D4NH-9ABC</b>	<b>D4NH-9BBC</b>	---
	2-conduit	M20	D4NH-8ABC	D4NH-8BBC	<b>D4NH-8CBC</b>

Actuator	Conduit size		Built-in switch mechanism		
			3NC (slow-action)	1NC / 1NO MBB (slow-action)	2NC / 1NO MBB (slow-action)
Shaft	1-conduit	M20	D4NH-4DAS	<b>D4NH-4EAS</b>	<b>D4NH-4FAS</b>
		M12 connector	---	<b>D4NH-9EAS</b>	---
Arm lever	1-conduit	M20	D4NH-4DBC	<b>D4NH-4EBC</b>	<b>D4NH-4FBC</b>
		M12 connector	---	<b>D4NH-9EBC</b>	---

**Note:** Conduit types with G1/2, 1/2-14NPT and Pg13,5 are also available.

**bold** = Preferred stock item

### Specifications

<b>Degree of protection</b>		IP67 (EN60947-5-1)
<b>Durability</b>	<b>Mechanical</b>	1,000,000 operations min.
	<b>Electrical</b>	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
<b>Operating speed</b>		2 to 360°/s
<b>Operating frequency</b>		30 operations/minute max.
<b>Protection against electric shock</b>		Class II (double insulation)
<b>Pollution degree (operating environment)</b>		3 (EN60947-5-1)
<b>Contact gap</b>		Snap-action: 2x9.5 mm min Slow-action: 2x2 mm min
<b>Conditional short-circuit current</b>		100 A (EN60947-5-1)
<b>Rated open thermal current (<math>I_{th}</math>)</b>		10 A (EN60947-5-1)
<b>Ambient temperature</b>		Operating: -30°C to 70°C with no icing





## Compact non-contact door switch

Three types of sensors and two control units present the D40B family. Standard sensors are available with 3 m and 10 m cabling. The high temperature sensor (up to +125 °C) is equipped with a 5 m cable. If requested, all sensor types are available with an auxiliary output.

- Contact-free detection of the closing/opening of a door
- Non contact=no abrasion=no particles
- Washable actuator
- Easy cleaning - there is no key hole
- Good coverage of mechanical tolerances



## Ordering information

### Sensors (switches/actuators)

Classification	Shape	Auxiliary output	Cable length	Model
Standard sensor		None	3 m / 10 m	D40B-1B3 / D40B-1B10
		1 NC	3 m / 10 m	D40B-1D3 / D40B-1D10
Elongated sensor		None	3 m / 10 m	D40B-2B3 / D40B-2B10
		1 NC	3 m / 10 m	D40B-2D3 / D40B-2D10
High-temperature type sensor		1 NC	5 m	D40B-3D5C
		1 NO		D40B-3E5C

**Note:** A sensor used in combination with a controller is classified category 3.

### Controllers

Safety contacts	Auxiliary contacts/output <sup>*1</sup>	Rated voltage	Model
1 NO	1 NC	24 VAC/VDC	D40B-J1
2 NO	1 NC	24 VAC/VDC 110/230 VAC	D40B-J2

<sup>\*1</sup> Non-safety output.

## Specifications

### Sensor (switch/actuator)

Item	Type	Standard sensor	High-temperature type sensor
Switching distance (nominal value)		OFF -> ON: 5 mm ON -> OFF: 15 mm	OFF -> ON: 9 mm ON -> OFF: 17 mm
Operating temperature		-10 °C +55 °C	-25 °C +125 °C
Degree of protection		IP67 (IEC 60947-5-1)	
Material		ABS	Stainless steel

### Controller

Item	Type	D40B-J1	D40B-J2
Power supply voltage		24 VAC / VDC	24 VAC / VDC or 110/230 VAC (selectable)
Allowable voltage range		Power supply voltage $\pm 15\%$	
Rated load	Safety contacts	250 VAC, 4 A, $\cos\phi=1$ , 30 VDC, 2 A, $\cos\phi=1$	
	Auxiliary contacts / output <sup>*1</sup>	230 VAC, 100 mA, $\cos\phi=1$ , 24 VDC, 100 mA, $\cos\phi=1$	
Response time		25 ms max.	
Operating temperature		-10 °C +55 °C	

<sup>\*1</sup> D40B-J1: MOS output; D40B-J2: contact output.



## Guard-lock safety door switch

The D4NL guard-lock safety-door switches are available with four or five built-in contacts. When locked, they have a key holding force of up to 1300 N. Mechanical lock/solenoid release types and vice versa set up the complete range in combination with various conduit types, e.g. M20.

- Safety-door switch with electromagnetic lock or unlock mechanism
- Models with four or five built-in contacts
- Strong key holding force: 1300 N
- For standard loads and micro loads
- Keys are compatible with D4GL and D4NS



## Ordering information



 : Models with approved direct opening contacts.



For 110V and 230V version ask your local OMRON representative

Lock and release types	Contact configuration	Conduit opening	Model
Mechanical lock solenoid release	1NC / 1NO + 1NC / 1NO	M20	D4NL-4AFA-B
	1NC / 1NO + 2NC	M20	D4NL-4BFA-B
	2NC + 1NC / 1NO	M20	D4NL-4CFA-B
	2NC + 2NC	M20	D4NL-4DFA-B
	2NC / 1NO + 1NC / 1NO	M20	D4NL-4EFA-B
	2NC / 1NO + 2NC	M20	D4NL-4FFA-B
	3NC + 1NC / 1NO	M20	D4NL-4GFA-B
	3NC + 2NC	M20	D4NL-4HFA-B

**Note:** - Conduit sizes of G1/2 and Pg 13,5 are also available.  
- Solenoid: 24 VDC, Orange LED: 10 to 115 VAC/VDC

## Operation keys

Type		Model
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

Type		Model
Adjustable mounting (horizontal)		D4DS-K3
Adjustable mounting (horizontal / vertical)		D4DS-K5

## Specifications

<b>Degree of protection</b>	IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)
<b>Durability</b> <sup>*1</sup>	
<b>Mechanical</b>	1,000,000 operations min.
<b>Electrical</b>	500,000 operations min. for a resistive load of 3 A at 250 VAC
<b>Operating speed</b>	0.05 to 0.5 m/s
<b>Operating frequency</b>	30 operations/minute max.
<b>Rated frequency</b>	50/60 Hz
<b>Contact gap</b>	2x2 mm min
<b>Direct opening force</b> <sup>*2</sup>	60 N min. (EN60947-5-1)
<b>Direct opening travel</b> <sup>*2</sup>	10 mm min. (EN60947-5-1)
<b>Holding force</b>	1,300 N min.
<b>Minimum applicable load</b>	Resistive load of 1 mA at 5 VDC (N-level reference value)
<b>Thermal current (I<sub>th</sub>)</b>	10 A (EN60947-5-1)
<b>Conditional short-circuit current</b>	100 A (EN60947-5-1)
<b>Pollution degree (operating environment)</b>	3 (EN60947-5-1)
<b>Protection against electric shock</b>	Class II (double insulation)
<b>Ambient temperature</b>	Operating: -10° C to 55° C (with no icing or condensation)

<sup>\*1</sup> The durability is for an ambient temperature of 5° C to 35° C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

<sup>\*2</sup> These figures are minimum requirements for safe operation.

**Note:** The above values are initial values.



## Guard-lock safety door switch

The D4GL guard-lock safety-door switches are available with four or five built-in contacts. When locked, they have a key holding force of up to 1000 N. Mechanical lock/solenoid release types and vice versa set up the complete range in combination with various conduit types, e.g. M20.

- Slim safety-door switch with electromagnetic lock or unlock mechanism
- Models with four or five built-in contacts
- Strong key holding force: 1000 N
- For standard loads and micro loads
- Keys are compatible with D4NL and D4NS



### Ordering information



 : Models with approved direct opening contacts.



Lock and release types	Contact configuration	Conduit size	Model
Mechanical lock solenoid release	1NC / 1NO + 1NC / 1NO	M20	D4GL-4AFA-A
	1NC / 1NO + 2NC	M20	D4GL-4BFA-A
	2NC + 1NC / 1NO	M20	D4GL-4CFA-A
	2NC + 2NC	M20	D4GL-4DFA-A
	2NC / 1NO + 1NC / 1NO	M20	D4GL-4EFA-A
	2NC / 1NO + 2NC	M20	D4GL-4FFA-A
	3NC + 1NC / 1NO	M20	D4GL-4GFA-A
	3NC + 2NC	M20	D4GL-4HFA-A

Lock and release types	Contact configuration	Conduit size	Model
Solenoid lock mechanical release	1NC / 1NO + 1NC / 1NO	M20	D4GL-4AFG-A
	1NC / 1NO + 2NC	M20	D4GL-4BFG-A
	2NC + 1NC / 1NO	M20	D4GL-4CFG-A
	2NC + 2NC	M20	D4GL-4DFG-A
	2NC / 1NO + 1NC / 1NO	M20	D4GL-4EFG-A
	2NC / 1NO + 2NC	M20	D4GL-4FFG-A
	3NC + 1NC / 1NO	M20	D4GL-4GFG-A
	3NC + 2NC	M20	D4GL-4HFG-A

**Note:** - conduit sizes of G1/2 and Pg13,5 are also available.  
- solenoid: 24 VDC, orange/green LED: 24 VDC

### Operation keys (order separately)

Type		Model
Horizontal mounting		D4DS-K1
Vertical mounting		D4DS-K2

Type		Model
Adjustable mounting (horizontal)		D4DS-K3
Adjustable mounting (horizontal / vertical)		D4DS-K5

### Specifications

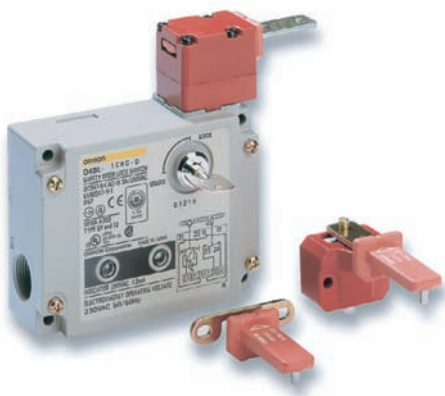
<b>Degree of protection</b>	IP67 (EN60947-5-1) (This applies for the switch only. The degree of protection for the key hole is IP00.)
<b>Durability</b> <sup>*1</sup>	<b>Mechanical</b> 1,000,000 operations min.
	<b>Electrical</b> 500,000 operations min. for a resistive load of 4 mA at 24 VDC; 150,000 operations min. for a resistive load of 1 A at 125 VAC in 2 circuits and 4 mA at 24 VDC in 2 circuits
<b>Operating speed</b>	0.05 to 0.5 m/s
<b>Operating frequency</b>	30 operations/minute max.
<b>Rated frequency</b>	50/60 Hz
<b>Contact gap</b>	2x2 mm min.
<b>Direct opening force</b> <sup>*2</sup>	60 N min. (EN60947-5-1)
<b>Direct opening travel</b> <sup>*3</sup>	10 mm min. (EN60947-5-1)
<b>Holding force</b>	1,000 N min.
<b>Minimum applicable load</b>	Resistive load of 4 mA at 24 VDC (N-level reference value)
<b>Thermal current (I<sub>th</sub>)</b>	2.5 A (EN60947-5-1)
<b>Conditional short-circuit current</b>	100 A (EN60947-5-1)
<b>Pollution degree (operating environment)</b>	3 (EN60947-5-1)
<b>Protection against electric shock</b>	Class II (double insulation)
<b>Ambient temperature</b>	Operating: -10° C to 55° C with no icing

<sup>\*1</sup> The durability is for an ambient temperature of 5° C to 35° C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

<sup>\*2</sup> These figures are minimum requirements for safe operation.

<sup>\*3</sup> These figures are minimum requirements for safe operation.

**Note:** The above values are initial values.



## Guard-lock safety door switch with metal housing

The D4BL guard-lock safety-door switches are available with three built-in contacts. They are mechanically locked when the key is inserted and have a solenoid release. An auxiliary release key ensures easy maintenance and unlocks the door in case of power failure.




- Automatically mechanical lock
- Auxiliary release key for easy maintenance
- Tough aluminium die-cast body
- Horizontal and vertical conduit opening
- Head direction can easily be changed



### Ordering information

Lock method	Conduit size	Voltage for solenoid	Without indicator 1NC/1NO+ 1NC (slow-action)	With LED indicator 1NC/1NO+ 1NC (slow-action)	Without indicator 2NC+ 1NC (slow-action)	With LED indicator 2NC+ 1NC (slow-action)
Mechanical lock	PG13.5	24 VDC	D4BL-1CRA	D4BL-1CRA-A	D4BL-1DRA	D4BL-1DRA-A
		110 VAC	D4BL-1CRB	D4BL-1CRB-A	D4BL-1DRB	D4BL-1DRB-A
	M20	24 VDC	D4BL-4CRA	D4BL-4CRA-A	D4BL-4DRA	D4BL-4DRA-A
		110 VAC	D4BL-4CRB	D4BL-4CRB-A		
Solenoid lock	Pg 13.5	24 VDC	D4BL-1CRG	D4BL-1CRG-A	D4BL-1DRG	D4BL-1DRG-A
	M20	24 VDC		D4BL-4CRG-A		

### Operation keys (order separately)

Type		Model	Type		Model
Horizontal mounting		D4BL-K1	Adjustable mounting (horizontal)		D4BL-K3
Vertical mounting		D4BL-K2			

### Specifications

Degree of protection	IP67 (EN60947-5-1)	
Durability <sup>*1</sup>	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10 A resistive load at 250 VAC)	
Operating speed	0.05 to 0.5 m/s	
Operating frequency	30 operations/min max.	
Rated frequency	50/60 Hz	
Operating characteristics	Direct opening force: 19.61 N min. (EN60947-5-1) Direct opening travel: 20 mm min. (EN60947-5-1)      All stroke: 23 mm min.	
Holding force	700 N min. (GS-ET-19)	
Thermal current (I <sub>th</sub> )	10 A (EN60947-5-1)	
Pollution degree (operating environment)	3 (EN60947-5-1)	
Protection against electric shock	Class I (with ground terminal)	
Ambient temperature	Operating: -10°C to 55°C (with no icing)	

<sup>\*1</sup> The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%.

**Note:** The above values are initial values.

#### Solenoid coil characteristics

Item	24 VDC mechanical lock models	110 VAC mechanical lock models	24 VAC solenoid lock models
Rated operating voltage	24 VDC +10%/-15% (100% ED)	110 VAC ±10% (50/60 Hz)	24 VDC +10%/-15% (100% ED)
Current consumption	Approx. 300 mA	Approx. 98 mA	Approx. 300 mA

#### Indicator characteristics

Item	LED
Rated voltage	10 to 115 VAC/VDC
Current leakage	Approx. 1 mA
Color (LED)	Orange, green



## Safety-limit switch with plastic housing

The D4N-family is a complete line-up of safety-limit switches. They are available with one, two or three built-in contacts and a wide range of head and actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20 and M12 connector types, are provided.

- Direct opening mechanism
- Various actuators
- Double insulation
- Gold-plated contacts for handling micro loads
- Metric conduit types available



### Ordering information

Actuator	Conduit size		Built-in switch mechanism					
			1NC / 1NO (snap-action)		1NC / 1NO (slow-action)		2NC (slow-action)	
			Direct opening	Model	Direct opening	Model	Direct opening	Model
Roller lever (resin lever, resin roller)	1-conduit	M20		<b>D4N-4120</b>		<b>D4N-4A20</b>		D4N-4B20
		M12 connector		<b>D4N-9120</b>		<b>D4N-9A20</b>		D4N-9B20
Plunger	1-conduit	M20		<b>D4N-4131</b>		<b>D4N-4A31</b>		D4N-4B31
		M12 connector		<b>D4N-9131</b>		<b>D4N-9A31</b>		D4N-9B31
	2-conduit	M20		<b>D4N-8131</b>		D4N-8A31		D4N-8B31
Roller plunger	1-conduit	M20		<b>D4N-4132</b>		<b>D4N-4A32</b>		D4N-4B32
		M12 connector		<b>D4N-9132</b>		<b>D4N-9A32</b>		D4N-9B32
	2-conduit	M20		D4N-8132		<b>D4N-8A32</b>		D4N-8B32
One-way roller arm lever (horizontal)	1-conduit	M20		<b>D4N-4162</b>		<b>D4N-4A62</b>		D4N-4B62
		M12 connector		<b>D4N-9162</b>		<b>D4N-9A62</b>		D4N-9B62
	2-conduit	M20		D4N-8162		<b>D4N-8A62</b>		D4N-8B62
One-way roller arm lever (vertical)	1-conduit	M20		<b>D4N-4172</b>		D4N-4A72		D4N-4B72
Adjustable roller lever, form lock (metal lever, resin roller)	1-conduit	M20		<b>D4N-412G</b>		<b>D4N-4A2G</b>		D4N-4B2G
		M12 connector		<b>D4N-912G</b>		<b>D4N-9A2G</b>		D4N-9B2G
Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20		<b>D4N-412H</b>		<b>D4N-4A2H</b>		D4N-4B2H
		M12 connector		<b>D4N-912H</b>		<b>D4N-9A2H</b>		D4N-9B2H

**Note:** Conduit sizes 1/2-14NPT, G1/2 and Pg13,5 are also available.

**Bold** = preferred stock item



### Switches with two contacts and MBB contacts

Actuator	Conduit size		Built-in switch mechanism					
			1NC / 1NO (snap-action)		1NC / 1NO (slow-action)		2NC (slow-action)	
			Direct opening	Model	Direct opening	Model	Direct opening	Model
Roller lever (resin lever, resin roller)	1-conduit	M20		<b>D4N-4C20</b>		D4N-4E20		<b>D4N-4F20</b>
		M12 connector		---		<b>D4N-9E20</b>		---
	2-conduit	M20		<b>D4N-8C20</b>		D4N-8E20		<b>D4N-8F20</b>
Roller plunger	1-conduit	M20		<b>D4N-4C32</b>		D4N-4E32		<b>D4N-4F32</b>
		M12 connector		---		<b>D4N-9E32</b>		---
	2-conduit	M20		<b>D4N-8C32</b>		D4N-8E32		<b>D4N-8F32</b>
One-way roller arm lever (horizontal)	1-conduit	M20		<b>D4N-4C62</b>		D4N-4E62		<b>D4N-4F62</b>
		M12 connector		---		<b>D4N-9E62</b>		---
	2-conduit	M20		<b>D4N-8C62</b>		D4N-8E62		<b>D4N-8F62</b>

**Note:** Conduit sizes 1/2-14NPT, G1/2 and Pg13,5 are also available.

**Bold** = preferred stock item

## General-purpose switches with two contacts

Actuator	Conduit size		Built-in switch mechanism							
			1NC / 1NO (snap-action)		2NC (snap-action)		1NC / 1NO (slow-action)		2NC (slow-action)	
			Direct opening	Model	Direct opening	Model	Direct opening	Model	Direct opening	Model
Cat whisker 	1-conduit	M20	---	<b>D4N-4180</b>	---	D4N-4280	---	---	---	D4N-4B80
Plastic rod 	1-conduit	M20	---	<b>D4N-4187</b>	---	D4N-4287	---	---	---	D4N-4B87

**Note:** Conduit sizes 1/2-14NPT, G1/2 and Pg13,5 are also available.

**Bold** = preferred stock item

## Specifications

Degree of protection		IP67 (EN60947-5-1)
Durability <sup>*1</sup>	Mechanical	15,000,000 operations min. / Fork lever 10,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 mm/s (D4-1120)
Operating frequency		30 operations/minute max.
Minimum applicable load		Resistive load of 1 mA at 5 VDC (N-level reference value)
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2x0.5 mm min Slow-action: 2x2 mm min
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current ( $I_{th}$ )		10 A (EN60947-5-1)
Ambient temperature		Operating: -30°C to 70°C with no icing

<sup>\*1</sup> The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

**Note:** - The above values are initial values.





## Safety-limit switch with metal housing

The D4BN family is a complete line-up of safety-limit switches in metal housing. They are available with one or two built-in contacts and a wide range of head and actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20, are provided.

- Direct opening mechanism
- Various actuators
- Robust metal housing
- Gold-plated contacts for handling micro loads
- Metric conduit types available



## Ordering information

### Switches (EN50041)

		1NC / 1NO (snap-action)	1NC / 1NO (slow-action)	2NC (slow-action)
Side rotary	Roller lever (form A)	D4B-4111N	D4B-4511N	D4B-4A11N
	Adjustable roller lever	D4B-4116N	D4B-4516N	D4B-4A16N
	Adjustable rod lever (form D)	D4B-4117N	D4B-4517N	D4B-4A17N
Top plunger	Plain (form B)	D4B-4170N	D4B-4570N	D4B-4A70N
	Roller (form C)	D4B-4171N	D4B-4571N	D4B-4A71N
Wobble lever	Coil spring	D4B-4181N	---	---
	Plastic rod	D4B-4187N	---	---

**Note:** Conduit sizes G1/2 and Pg 13,5 are also available

### 3-conduit Switch

		1NC / 1NO (snap-action)	1NC / 1NO (slow-action)	2NC (slow-action)
Side rotary	Roller lever (form A)	D4B-8111N	---	---
	Adjustable roller lever	D4B-8116N	---	---
	Adjustable rod lever (form D)	D4B-8117N	---	---
Top plunger	Plain (form B)	---	---	---
	Roller (form C)	D4B-8171N	---	D4B-8A71N
Wobble lever	Coil spring	---	---	---
	Plastic rod	---	---	---

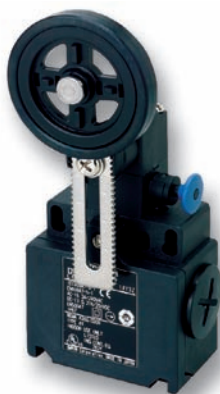
*italic* = safety limit switch, mechanical form lock

## Specifications

Item		Snap-action	Slow-action
Durability <sup>*1</sup>	Mechanical	30,000,000 operations min.	10,000,000 operations min.
	Electrical	500,000 operations min. (at a 250 VAC, 10 A resistive load)	
Operating speed		1 mm/s to 0.5 m/s	
Operating frequency		Mechanical: 120 operations/min Electrical: 30 operations/min	
Rated frequency		50/60 Hz	
Contact resistance		25 mΩ max. (initial value)	
Pollution degree (operating environment)		3 (EN60947-5-1)	
Conditional short-circuit current		100 A (EN60947-5-1)	
Conventional enclosed thermal current (I <sub>th</sub> )		20 A (EN60947-5-1)	
Protection against electric shock		Class I (with ground terminal)	
Ambient temperature		Operating: -40 °C to 80 °C (with no icing) <sup>*2</sup>	
Degree of protection		IP67 (EN60947-5-1)	

<sup>\*1</sup> The durability is for an ambient temperature of 5 °C to 35 °C and ambient humidity of 40% to 70%. For further conditions, consult your OMRON sales representative.

<sup>\*2</sup> -25 °C to 80 °C for the flexible-rod type.







## Safety-limit switch with manual reset

The D4NR family is a complete line-up of safety-limit switches with manual reset. They are available with one, two or three built-in contacts and a wide range of actuator types. To set up easy installation and maintenance, various conduit types, e.g. M20 and M12 connector types, are provided.

- Direct opening mechanism
- Various actuators
- Pull-reset switches
- Gold-plated contacts for handling micro loads
- Metric conduit types available



## Ordering information

Actuator	Conduit size		Built-in switch mechanism	
			1NC / 1NO (slow-action)	2NC / 1NO (slow-action)
 Roller lever (resin lever, resin roller)	1-conduit	M20	<b>D4N-4A20R</b>	<b>D4N-4C20R</b>
		M12 connector	<b>D4N-9A20R</b>	---
 Adjustable roller lever, form lock (metal lever, rubber roller)	1-conduit	M20	<b>D4N-4A2HR</b>	<b>D4N-4C2HR</b>
		M12 connector	<b>D4N-9A2HR</b>	---
 Plunger	1-conduit	M20	<b>D4N-4A31R</b>	<b>D4N-4C31R</b>
		M12 connector	<b>D4N-9A31R</b>	---
 Roller plunger	1-conduit	M20	<b>D4N-4A32R</b>	<b>D4N-4C32R</b>
		M12 connector	<b>D4N-9A32R</b>	---
	2-conduit	M20	D4N-8A32R	D4N-8C32R

**Note:** Conduit types with G1/2, 1/2-14NPT and Pg13,5 are also available.

**Bold** = preferred stock item

## Specifications

Degree of protection		IP67 (EN60947-5-1)
Durability	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 mm/s to 0.5 m/s (D4N-1A20R)
Operating frequency		30 operations/minute max.
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Contact gap		Snap-action: 2 x 0.5 mm min Slow-action: 2 x 2 mm min
Rated open thermal current ( $I_{th}$ )		10 A (EN60947-5-1)
Ambient temperature		Operating: -30° C to 70° C with no icing

## Emergency stop switch



The A165E line-up offers E-stop switches with various head types. For flexible application, a wide range of accessories is provided. To set up easy installation and maintenance, various contact combinations are available.

- Direct opening mechanism with minimum contact separation of 3 mm
- Safety lock mechanism prevents misuse
- Short mounting depth
- Modular construction; easy installation using snap-in switch



## Ordering information

Illumination	Rated voltage	Pushbutton color	Pushbutton size	Terminal	Contact	Standard load (125 VAC at 5 A, 250 VAC at 3 A, 30 VDC at 3 A)
LED	24 VDC	Red	30 dia.	Solder terminal	SPST-NC	A165E-LS-24D-01
None	---				DPST-NC	A165E-LS-24D-02
					SPST-NC	A165E-S-01
					DPST-NC	A165E-S-02
LED	24 VDC		40 dia.		TPST-NC	A165E-S-03U
					SPST-NC	A165E-LM-24D-01
					DPST-NC	A165E-LM-24D-02
None	---				SPST-NC	A165E-M-01
					DPST-NC	A165E-M-02
					TPST-NC	A165E-M-03U

**Note:** The above models have a surface indication of "RESET." Models with "STOP" indication are also available. For further information, contact your OMRON representative.

## Accessories (order separately)

Item	Type	Model	Precautions
Yellow plate	Yellow, 45 dia.	A16Z-5070	Use this as an emergency stop nameplate.
Panel plug	Rectangular	A16ZJ-3003	Used for covering the panel cutouts for future panel expansion.
	Square	A16ZA-3003	
	Round	A16ZT-3003	
Tightening tool	---	A16Z-3004	Useful for repetitive mounting. Be careful not to tighten excessively.
Extractor	---	A16Z-5080	Convenient for extracting the switch and lamp.

## Specifications

Rated voltage	Resistive load		Features	Characteristics
	A165E series	A165E□-U series		
125 VAC	5 A	1 A	Operating force (OF) max.	14.7 N
250 VAC	3 A	0.5 A	Releasing force (RF) min.	0.1 N·m
30 VDC	3 A	1 A	Pretravel (PT)	3.5±0.5 mm (3±0.5 mm in case of A165E□-U series)
Minimum applicable load	150 mA at 5 VDC	1 mA at 5 VDC		

Emergency stop switch		
Allowable operating frequency	Mechanical	20 operations/minute max.
	Electrical	10 operations/minute max.
Insulation resistance		100 MΩ min. (at 500 VDC)
Dielectric strength		1,000 VAC, 50/60 Hz for 1 min between terminals of same polarity 2,000 VAC, 50/60 Hz for 1 min between terminals of different polarity and also between each terminal and ground 1,000 VAC, 50/60 Hz for 1 min between lamp terminals *1
Durability	Mechanical	100,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature		Operating: -10°C to 55°C (with no icing or condensation) Storage: -25°C to 65°C (with no icing or condensation)
Protection against electric shock		Class II

\*1 LED not mounted. Test them with the LED removed.



## Relays with forcibly guided contacts

The slim G7SA relay family with forcibly guided contacts is available as a four- or six-pole type in various contact combinations and offers reinforced insulation. Terminals are arranged for easy PCB layout. It can be soldered directly to a PCB or used together with the P7SA sockets.

- Forcibly guided contacts
- Conforms to EN 50205
- 6 A at 240 VAC and 6 A at 24 VDC for resistive loads
- Reinforced insulation between inputs and outputs and poles
- 4- and 6-pole relays available



## Ordering information

### Relays with forcibly guided contacts

Type	Sealing	Poles	Contacts	Rated voltage	Model
Standard	Flux-tight	4 poles	3PST-NO, SPST-NC	24 VDC <sup>*1</sup>	G7SA-3A1B
			DPST-NO, DPST-NC		G7SA-2A2B
		6 poles	5PST-NO, SPST-NC		G7SA-5A1B
			4PST-NO, DPST-NC		G7SA-4A2B
			3PST-NO, 3PST-NC		G7SA-3A3B

<sup>\*1</sup> 12 VDC, 21 VDC, 48 VDC are available on request.

### Sockets

Type	LED indicator	Poles	Rated voltage	Model
Track-mounting	Track mounting and screw mounting possible	4 poles	24 VDC	P7SA-10F-ND
		6 poles		P7SA-14F-ND
Back-mounting	PCB terminals	4 poles	---	P7SA-10P
		6 poles		P7SA-14P

## Specifications

### Coil

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Max. voltage	Power consumption
24 VDC	4 poles: 15 mA 6 poles: 20.8 mA	4 poles: 1,600 Ω 6 poles: 1,152 Ω	75% max. (V)	10% min. (V)	110% (V)	4 poles: approx. 360 mW 6 poles: approx. 500 mW

**Note:** Refer to datasheet for details

### Contacts

Load	Resistive load (cos φ = 1)	Load	Resistive load (cos φ = 1)
Rated load	6 A at 250 VAC, 6 A at 30 VDC	Max. switching current	6 A
Rated carry current	6 A	Max. switching capacity (reference value)	1,500 VA, 180 W
Max. switching voltage	250 VAC, 125 VDC		

### Relays with forcibly guided contacts

<b>Contact resistance</b>		100 mΩ max. (The contact resistance was measured with 1 A at 5 VDC using the voltage-drop method.)
<b>Operating time <sup>*1</sup></b>		20 ms max.
<b>Response time <sup>*1</sup></b>		10 ms max. (The response time is the time it takes for the normally open contacts to open after the coil voltage is turned OFF.)
<b>Release time <sup>*1</sup></b>		20 ms max.
<b>Insulation resistance</b>		100 MΩ min. (at 500 VDC) (The insulation resistance was measured with a 500 VDC megger at the same places that the dielectric strength was measured.)
<b>Dielectric strength <sup>*2</sup> <sup>*3</sup></b>		Between coil contacts/different poles: 4,000 VAC, 50/60 Hz for 1 min (2,500 VAC between poles 3-4 in 4-pole Relays or poles 3-5, 4-6, and 5-6 in 6-pole Relays.) Between contacts of same polarity: 1,500 VAC, 50/60 Hz for 1 min
<b>Durability</b>	<b>Mechanical</b>	10,000,000 operations min. (at approx. 36,000 operations/hr)
	<b>Electrical</b>	100,000 operations min. (at the rated load and approx. 1,800 operations/hr)
<b>Min. permissible load <sup>*4</sup></b>		5 VDC, 1 mA (reference value)
<b>Ambient temperature <sup>*5</sup></b>		Operating: -40°C to 85°C (with no icing or condensation)
<b>Ambient humidity</b>		Operating: 35% to 85%
<b>Approved standards</b>		EN61810-1 (IEC61810-1), EN50205, UL508, CSA22.2 No. 14

<sup>\*1</sup> These times were measured at the rated voltage and an ambient temperature of 23°C. Contact bounce time is not included.

<sup>\*2</sup> Pole 3 refers to terminals 31-32 or 33-34, pole 4 refers to terminals 43-44, pole 5 refers to terminals 53-54, and pole 6 refers to terminals 63-64.

<sup>\*3</sup> When using a P7SA socket, the dielectric strength between coil contacts/different poles is 2,500 VAC, 50/60 Hz for 1 min.

<sup>\*4</sup> Min. permissible load is for a switching frequency of 300 operations/min.

<sup>\*5</sup> When operating at a temperature between 70°C and 85°C, reduce the rated carry current (6 A at 70°C or less) by 0.1 A for each degree above 70°C.

**Note:** The values listed above are initial values.

# Electromechanical relays

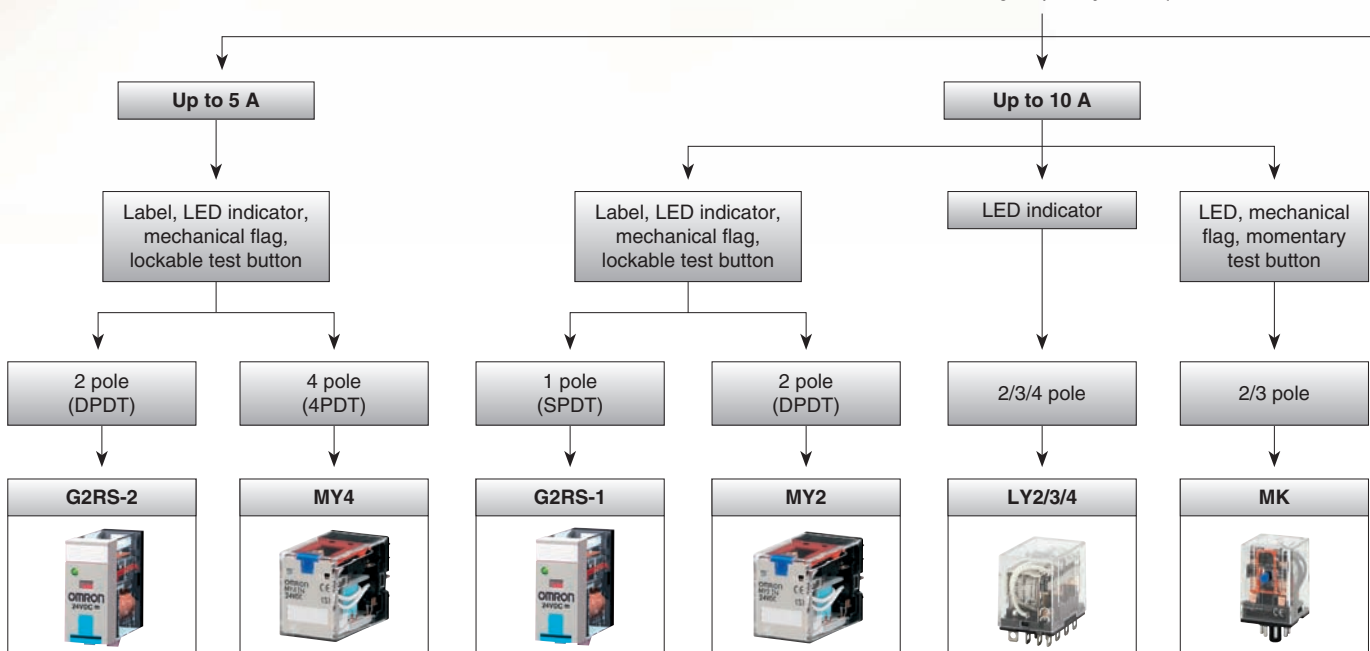
## The general-purpose relay outperforming all others!

### The MYS gives you peace of mind

The MYS general-purpose relay series sets the standard in terms of performance and reliability. With features like LED indicators and colour-coded two-way action test buttons, these truly versatile relays bring enhanced flexibility for more user-friendly installation, commissioning and operation. They meet all relevant international standards, including UL, CSA, VDE, LR and CE. And they are available with screw terminal or Screw-Less Clamp (SLC) terminal sockets for maximum installation flexibility. No wonder they're first choice among relay users!



What switching capacity is required?

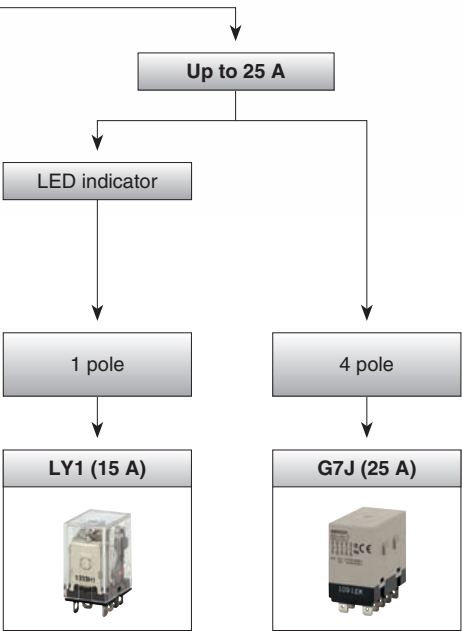




# Ever get excited about relays?

## Let G2RS turn you on!

Since pioneering the widespread use of slim-line interface relays over a decade ago Omron has consistently set new standards in relay design, and G2RS relays are no exception. They offer unrivalled reliability, performance and product choice, which makes them the preferred choice for relay users. They meet all relevant international standards, including UL, CSA, VDE, LR and CE. And plug-in relay users have the choice of screw terminal or Screw-Less Clamp (SLC) terminal sockets for maximum installation flexibility. The G2RS series make relays exciting again!






## Table of contents




Selection table		150
General purpose relays	G2RS	152
	MY	153
	LY	155
	MK-I-S	156
	G7J	157



# Selection table

Category		Control panel relay									
Selection criteria											
	Family	G2RS				MY			LY		
	Label	With label							Without label		
	Flag	Mechanical flag							No mechanical flag		
	1 pole	■	■	■					■		
	2 pole				■	■				■	■
	3 pole										
	4 pole						■	■			
	Contacts	SPDT	SPTS-NO bifurcated	SPDT bifurcated	DPDT	DPDT	4PDT	4PDT bifurcated	SPDT	DPDT	DPDT bifurcated
Features	LED indicator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Momentary test button	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	Lockable test button	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	Min. load	100 mA	1 mA	1 mA	10 mA	1 mA	1 mA	0.1 mA	100 mA	100 mA	10 mA
	Max. current	10 A	1 A	1 A	5 A	10 A	5 A	5 A	15 A	10 A	7 A
	SLC socket	■	■	■	■	■	■	■			
	Sealed type						<input type="checkbox"/>	<input type="checkbox"/>			
	Plug-in / solder terminals	■	■	■	■	■	■	■	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	PCB terminals					■	■	■	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Quick connect terminals										
	Diode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AC voltage	Varistor					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6 V					■	■	■	■	■	■
	12 V					■	■	■	■	■	■
	24 V	■	■	■	■	■	■	■	■	■	■
	48 / 50 V					■	■	■	■	■	■
	110 / 120 V	■	■	■	■	■	■	■	■	■	■
DC voltage	220 / 240 V	■	■	■	■	■	■	■	■	■	■
	6 V	■	■	■	■	■	■	■	■	■	■
	12 V	■	■	■	■	■	■	■	■	■	■
	24 V	■	■	■	■	■	■	■	■	■	■
	48 / 50 V	■	■	■	■	■	■	■	■	■	■
	110 / 120 V					■	■	■	■	■	■
	Page	152				153			155		

# Electromechanical relays

Category				Control panel relay							
Selection criteria											
	Family	LY		MK-I		MK-S		G7J			
	Label	Without label		Without label							
	Flag	No mechanical flag		Mechanical flag							
	1 pole							■			
	2 pole			■		■			■		
	3 pole	■			■		■			■	
	4 pole		■								■
Contacts	3PDT	4PDT	DPDT	3PDT	DPDT	3PDT	SPST-NC	DPST-NO / -NC	3PDT-NO	4PST-NO	
Features	LED indicator	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
	Momentary test button					■	■				
	Lockable test button										
	Min. load	100 mA	100 mA	10 mA	10 mA	10 mA	10 mA	100 mA 10 mA	100 mA	100 mA 10 mA	100 mA 10 mA
	Max. current	10 A	10 A	10 A	10 A	10 A	10 A	8 A	25 A	25 A	25 A
	SLC socket										
	Sealed type										
	Plug-in / solder terminals	<input type="checkbox"/>	<input type="checkbox"/>	■	■	■	■	■	■	■	■
	PCB terminals	<input type="checkbox"/>	<input type="checkbox"/>					■	■	■	■
	Quick connect terminals							■	■	■	■
	Diode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Varistor			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
AC voltage	6 V	■	■	■	■	■	■				
	12 V	■	■	■	■	■	■				
	24 V	■	■	■	■	■	■	■	■	■	■
	48 / 50 V	■	■	■	■	■	■	■	■	■	■
	110 / 120 V	■	■	■	■	■	■	■	■	■	■
	220 / 240 V	■	■	■	■	■	■	■	■	■	■
DC voltage	6 V	■	■	■	■	■	■				
	12 V	■	■	■	■	■	■	■	■	■	■
	24 V	■	■	■	■	■	■	■	■	■	■
	48 / 50 V	■	■	■	■	■	■	■	■	■	■
	110 / 120 V	■	■	■	■	■	■	■	■	■	■
Page		155		156		157					

■ Standard

☐ Available

☐ No / not available



## Plug-in relays with enhanced features for even more applications

The G2RS relay sets new standards in feature design and reliability. These slimline interface relays give enhanced features and flexibility for more user-friendly installation, commissioning and operation. G2RS comes with standard nameplate and mechanical indicator.

- Space saving - 16 mm with socket
- SPDT type 10 A, DPDT type 5 A
- LED indicator, colour coded green for DC versions, red for AC versions
- Test button, momentary and lockable, blue for DC, red for AC versions
- Screwless clamp-terminal sockets available



### Ordering information

Contact Form	Diode	LED indicator	Test button	Gold Clad 3 um	Model (□□□ = Coil Voltage + AC/DC)	Common Coil Voltages <sup>*1</sup>	
						DC	AC
SPDT (1 pole)	no	no	no	no	G2R-1-S□□□(S)	24	230
	no	yes	no	no	G2R-1-SN□□□(S)	12, 24	24, 110, 230
	no	yes	yes	no	G2R-1-SNI□□□(S)	24	12, 24, 110, 230
	no	yes	yes	yes	G2R-1-SNI-AP3□□□(S)		230
	yes	no	no	no	G2R-1-SD□□□(S)	24	
	yes	yes	no	no	G2R-1-SND□□□(S)	12, 24	
	yes	yes	yes	no	G2R-1-SNDI□□□(S)	24	
	yes	yes	yes	yes	G2R-1-SNDI-AP3□□□(S)	24	
DPDT (2 pole)	no	no	no	no	G2R-2-S□□□(S)	24	24, 110, 240
	no	yes	no	no	G2R-2-SN□□□(S)	12, 24, 48	24, 110, 230
	no	yes	yes	no	G2R-2-SNI□□□(S)	12, 24	12, 24, 110, 230
	no	yes	yes	yes	G2R-2-SNI-AP3□□□(S)		230
	yes	no	no	no	G2R-2-SD□□□(S)	12, 24	
	yes	yes	no	no	G2R-2-SND□□□(S)	12, 24	
	yes	yes	yes	no	G2R-2-SNDI□□□(S)	12, 24	
	yes	yes	yes	yes	G2R-2-SNDI-AP3□□□(S)	24	

\*1 Other coil voltages available. Please see specifications

### Accessories

Contact form	Surface-mounting socket DIN-rail			Back-mounting socket
	Screw-less clamp terminal	Clip for screw-less clamp terminal	Screw terminal	PCB terminals
SPDT (1 pole)	P2RF-05S (R99-11name plate (option))	P2CM-S (option)	P2RF-05-E	P2R-05P
DPDT (2 pole)	P2RF-08S (R99-11name plate (option))	P2CM-S (option)	P2RF-08-E	P2R-08P

### Specifications

#### Coil ratings

Rated voltage		Must operate voltage % of rated voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC	24 V, 110 V, 120 V, 230 V, 240 V	80% max.	30% max.	110%	0.9 VA (60 Hz)
DC	6 V, 12 V, 24 V, 48 V	70% max.	15% max.	110%	0.53 W

#### Technical data

Item	1-pole	2-pole
Operating time	15 ms max.	15 ms max.
Release time	AC: 10 ms max., DC: 5 ms max.	AC: 15 ms max., DC: 10 ms max.
Dielectric strength	5,000 VAC (coil-contact)	5,000 VAC (coil-contact)
Ambient temperature	Operating: -40 °C to 70 °C (no icing or condensation)	
Size in mm	35.5Hx13Wx29D	

#### Contact ratings

Number of poles	1-pole		2-pole	
Load	Resistive load	Inductive load	Resistive load	Inductive load
Rated load	10 A at 250 VAC 10 A at 30 VDC	7.5 A at 250 VAC 5 A at 30 VDC	5 A at 250 VAC 5 A at 30 VDC	2 A at 250 VAC 3 A at 30 VDC
Rated carry current	10 A		5 A	
Max. switching voltage	440 VAC, 125 VDC		380 VAC, 125 VDC	
Max. switching current	10 A		5 A	
Max. switching power	2,500 VA, 300 W	1,875 VA, 150 W	1,250 VA, 150 W	500 VA, 90 W
Failure rate (reference value)	100 mA at 5 VDC		10 mA at 5 VDC	
Mechanical life	AC: 10,000,000 operations min., DC: 20,000,000 operations min.			
Electrical life	100,000 operations min.			



## Versatile plug-in relay that sets the standard

Since they were first introduced, over 500 million of these mini power relays have rolled off the production line. This truly versatile relay has become the standard, bringing enhanced features and flexibility for more user-friendly installation, commissioning and operation.

- 10 A (DPDT) and 5 A (4PDT) contact types, gold-clad contacts (MY4)
- Mechanical and LED indication
- Push-to-test button - momentary and lockable
- Labelling facility
- Hermetically sealed (MYH) and latching (MY2K) and PCB types available



### Ordering information

Contact Form	Diode	LED indicator	Lockable test button	Model (□□□ = Coil Voltage + AC/DC)		Common Coil Voltages <sup>*1</sup>	
				Standard Coil Polarity	Reversed Coil Polarity	DC	AC
DPDT	no	no	no	MY2□□□(S)		12, 24	12, 24, 110/120, 220/240
				MY2N□□□(S)		24	24, 220/240
				MY2IN□□□(S)		12, 24	24, 110/120, 220/240
	yes	yes	no	MY2N-D2□□□(S)		24	
				MY2IN-D2□□□(S)		24	
					MY2IN1□□□(S)	24	
4PDT	no	no	no	MY4□□□(S)		12, 24, 48 100/110	12, 24, 48/50, 110/120, 220/240
				MY4N□□□(S)		12, 24, 100/110	24, 110/120, 220/240
				MY4IN□□□(S)		12, 24	12, 24, 48/50, 110/120, 220/240
	yes	yes	yes		MY4IN1□□□(S)	24	
				MY4N-D2□□□(S)		12, 24	
				MY4IN-D2□□□(S)		24	
					MY4IN1-D2□□□(S)	24, 48	

<sup>\*1</sup> Other coil voltages available. Please see specification.

**Note:** - MY4 also available with bifurcated contacts => example MY4Z  
 - MY2 and MY4 AC 110/120, 220/240 types also available with suppression => example MY4N-CR

### Accessories

Contact form	Front Mounting Socket DIN-rail Screwless Clamp	Clip for Screw-less clamp terminal	Label	Socket bridge
DPDT (2 pole)	PYF08S	PYCM08S	R99-11 name plate (option)	PYDM-08SR / SB
4DPDT (4 pole)	PYF14S	PYCM14S	R99-11 name plate (option)	PYDM-14SR / SB

Contact form	Front Mounting Socket DIN-rail / Screw mounting		Metal Spring Clip	Plastic Holding Clip	Label
	Input Common / NO-NC	Out- / input separated			
DPDT (2 Pole)	PYF14-ESN	PYF14-ESS	PYC-0	PYC-35	PYC TR1
4PDT (4 pole)	PYF14-ESN	PYF14-ESS	PYC-0	PYC-35	PYC TR1
DPDT (2 Pole)	PYF08A-E / PYF08A-N <sup>*1</sup>				
4PDT (4 pole)	PYF14A-E / PYF14A-N <sup>*1</sup>				

<sup>\*1</sup> Clip PYC-A1 (option), except MY2IN type, these use clip PYC-E1 (option).

## Specifications

## Coil ratings

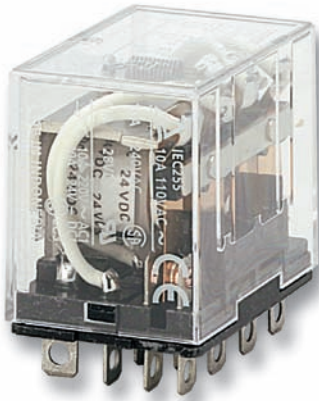
Rated voltage		Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
		% of rated voltage			
AC	6 V, 12 V, 24 V, 48 / 50 V	80% max	30% min.	110%	1.0 to 1.2 VA (60 Hz)
	110 / 120 V, 220 / 240 V				0.9 to 1.1 VA (60 Hz)
DC	6 V, 12 V, 24 V, 48 V, 100 / 110 V		10% min.		0.9 W

## Contact ratings

Item	2-pole		4-pole		4-pole (bifurcated)	
	Resistive load	Inductive load	Resistive load	Inductive load	Resistive load	Inductive load
Rated load	5 A at 250 VAC	2 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC	3 A at 250 VAC	0.8 A at 250 VAC
	5 A at 30 VDC	2 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC	3 A at 30 VDC	1.5 A at 30 VDC
Rated carry current	10 A		5 A			
Max. switching voltage	250 VAC, 125 VDC		250 VAC, 125 VDC			
Max. switching current	10 A		5 A			
Max. switching power	2,500 VA, 300 W	1,250 VA, 300 W	1,250 VA, 150 W	500 VA, 150 W	1,250 VA, 150 W	500 VA, 150 W
Failure rate (reference value)	5 VDC at 1 mA		1 VDC at 1 mA		1 VDC at 100 µA	
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.				20,000,000 operations min.	
Electrical life	500,000 operations min.		200,000 operations min.		100,000 operations min.	

## Technical data

Operating time	20 ms max.
Release time	20 ms max.
Dielectric strength	2,000 VAC
Ambient temperature	Operating: -55 °C to 70 °C (no icing)
Size in mm	28Hx21.5Wx36D



## A miniature power relay

The LY series is equipped with arc barrier and built-in diode. LY comes in single-, double-, three- and four-pole models. The available mounting types are DIN-rail by socket, PCB & flange mounting.

- SPDT, DPDT, 3PDT and 4PDT contact types
- DIN-rail by socket, PCB and flange mounting types available
- 10 A rated load



## Ordering information

Contact form	LED indicator	Diode	Terminals			Model <sup>*1</sup> (□□□ = Coil Voltage + AC/DC)	Common Coil Voltages <sup>*2</sup>	
			Plug-in / Solder	PCB	Upper-Mounting Plug-in/solder		DC	AC
DPDT (2 Pole)	no	no	no	yes	no	LY2-0□□□	24	
			yes	no		LY2□□□	12, 24	12, 24, 48, 100/110, 110/120, 220/240
	yes	yes	no		yes	LY2F□□□		220/240
			yes		no	LY2N□□□	24	
3PDT (3 Pole)	no	no				LY2N-D2□□□	24	
4PDT (4 Pole)	no					LY3□□□	24	
	yes	yes				LY4□□□	12, 24, 100/110, 125	24, 100/110, 230
						LY4N-D2□□□	24	n/a

<sup>\*1</sup> For other options like CR suppression please see specifications.

<sup>\*2</sup> Other coil voltages available. Please see specification.

## Accessories

Contact form	Model				
		Front-connecting socket for DIN-rail / Screw terminals	Clip	Back Connecting socket	PCB Terminals
SPDT / DPDT (1, 2 Pole)	PTF08A-E		PYC-A1	PT08	PT08-0
3PDT (3 Pole)	PTF11-A		PYC-A1	PT11	PT11-0
4PDT (4 Pole)	PTF14A-E		PYC-A1	PT14	PT14-0

## Specifications

### Coil ratings

Poles	Rated voltage	Must operate voltage	Must release voltage	Max. voltage	Power consumption (approx.)
		% of rated voltage			
1 or 2	AC 6 V, 12 V, 24 V, 50 V	80% max.	30% min.	110%	1.0 to 1.2 VA (60 Hz)
	100 / 110 V, 110 / 120 V, 200 / 220 V, 220 / 240 V				0.9 to 1 VA (60 Hz)
	DC 6 V, 12 V, 24 V, 48 V, 100 / 110 V		10% min.		0.9 W
3	AC 6 V, 12 V, 24 V, 50 V, 100 / 110 V, 200 / 220 V	80% max.	30% min.	110%	1.6 to 2.0 VA (60 Hz)
	DC 6 V, 12 V, 24 V, 48 V, 100 / 110 V				1.4 W
4	AC 6 V, 12 V, 24 V, 50 V, 100 / 110 V, 200 / 220 V	80% max.	30% min.	110%	1.95 to 2.5 VA (60 Hz)
	DC 6 V, 12 V, 24 V, 48 V, 100 / 110 V				1.5 W

### Technical data

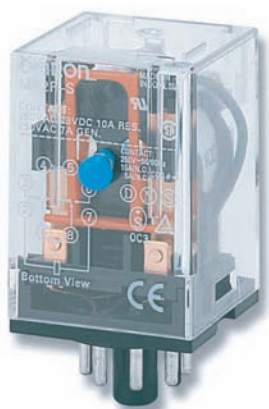
Operating time	25 ms max.
Release time	25 ms max.
Dielectric strength	1,000 VAC
Ambient temperature <sup>*1</sup>	-25 °C to 70 °C

<sup>\*1</sup> See datasheet for more details.

### Contact ratings

Relay	Single contact 1-pole		Single contact 2-,3- or 4-pole		Bifurcated contacts 2-pole	
Load	Resistive load	Inductive load	Resistive load	Inductive load	Resistive load	Inductive load
Rated load	110 VAC at 15 A	110 VAC at 10 A	110 VAC at 10 A	110 VAC at 7.5 A	110 VAC at 5 A	110 VAC at 4 A
	24 VDC at 15 A	24 VDC at 7 A	24 VDC at 10 A	24 VDC at 5 A	24 VDC at 5 A	24 VDC at 4 A
Rated carry current	15 A		10 A		7 A	
Max. switching voltage	250 VAC, 125 VDC		250 VAC, 125 VDC		250 VAC, 125 VDC	
Max. switching current	15 A		10 A		7 A	
Max. switching power	1,700 VA	1,100 VA	1,100 VA	825 VA	550 VA	440 VA
	360 W	170 W	240 W	120 W	120 W	100 W
					10 mA at 5 VDC	
Failure rate (reference value)	100 mA at 5 VDC					
Mechanical life	AC: 50,000,000 operations min., DC: 100,000,000 operations min.					
	1-, 2-, 4-pole: 200,000 operations min., 2-pole: 500,000 operations min.					





## Exceptionally reliable general-purpose relay

The MK relay breaks relatively large load currents despite its small size. The silver contacts ensure a long life (min. 100,000 operations). Standard models are UL, CSA, SEV, DEMKO, NEMKO, SEMKO, TÜV (IEC) and VDE and conform to CENELEC standards.

- 8-pin DPDT and 11-pin 3PDT contact types
- Mechanical indicator and LED indicators
- Push-to-test button
- Diode and varistor surge suppression
- 10 A rated load

### Ordering information

Contact Form	Mechanical Indicator & Push to Test Button & Dust Cover	LED Indicator	Diode	Model <sup>*1</sup> (□□□ = Coil Voltage + AC/DC)	Common Coil Voltages <sup>*2</sup>	
					DC	AC
DPDT (2 Pole)	yes	no	no	MK2P-S□□□	12, 24, 110,	24, 110, 230
		yes		MK2PN-S□□□	24	24, 230
3PDT (3 Pole)		no		MK3P5-S□□□	12, 24, 48, 110	12, 24, 110, 230
			yes	MK3PD-5-S□□□	24	
		yes	no	MK3PN-5-S□□□	12, 24	24, 110, 230
			yes	MK3PND-5-S□□□	24	

<sup>\*1</sup> Many various terminal arrangements possible please see specifications.

<sup>\*2</sup> Other coil voltages available. Please see specifications.

### Accessories

Contact Form	Surface Mounting Socket for DIN-rail / Screw mounting	Clip
DPDT (2 Pole)	PF083A-E	PFC-A1
3PDT (3 Pole)	PF113A-E	PFC-A1

### Specifications

#### Coil ratings

Rated voltage		Must operate voltage % of rated voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC	6 V, 12 V, 24 V, 50 V, 100 V, 110 V 120 V, 200 V, 220 V, 230 V, 240 V	80% max.	30% min.	90% to 110%	2.3 VA (60 Hz) 2.7 VA (50 Hz)
DC	6 V, 12 V, 24 V, 48 V, 100 V, 110 V		15% min.		1.5 W

#### Contact ratings

Load	2- or 3-pole	
	Resistive load	Inductive load
Contact material	Ag	
Rated load	10 A at 250 VAC 10 A at 28 VDC	7 A at 250 VAC
Rated carry current	10 A	
Max. switching voltage	250 VAC, 250 VDC	
Max. switching current	10 A	
Max. switching power	2,500 VA, 280 W	1,750 VA
Mechanical life	10,000,000 operations min.	

#### Technical data

Operating time	AC: 20 ms max., DC: 30 ms max.
Release time	20 ms max.
Dielectric strength	2,500 VAC (coil-contact)
Ambient temperature	Operating: -10 °C to 40 °C (no icing or condensation)
Size in mm	34.5Hx34.5Wx52.5D



## A high-capacity multi-pole relay used like a contactor

With a rated load current of 25 A due to the miniature hinge for maximum switching power, the G7J can switch both motor loads as well as resistive and inductive loads. G7J has no contact chattering for momentary voltage drops up to 50% of its rated voltage.

- 4PST-NO, 3PST-NO/SPST-NC or DPST-NO/DPST-NC contact types
- Quick-connect, PCB or screw terminals
- 25 A rated load
- Compatible with momentary voltage drops
- Can be used like a contactor



### Ordering information

Contact form	Mounting		Terminal <sup>*1</sup>		Model <sup>*2</sup> (□□□ = Coil Voltage + AC/DC)	Common Coil Voltages <sup>*3</sup>	
	PCB	W-bracket mounting	PCB	Screw		DC	AC
4PST-NO	yes	no	yes	no	G7J-4A-P□□□	24	200/240
	no	yes	no	yes	G7J-4A-B□□□	24	
3PST-NO / SPST-NC	yes	no	yes	no	G7J-3A1B-P□□□	24	
	no	yes	no	yes	G7J-3A1B-B□□□	24	
DPST-NO / DPST-NC	yes	no	yes	no	G7J-2A2B-P□□□	24	

<sup>\*1</sup> Quick-connect also available for W-Bracket mounting upon request.

<sup>\*2</sup> For other options like Bifurcated Contacts please see specifications.

<sup>\*3</sup> Other coil voltages available. Please see specifications.

### Accessories

Name	Model	Applicable relay
W-bracket	R99-04 for G5F	G7J4-A-B, G7J-3A1B-B, G7J-4A-T, G7J-3A1B-T, G7J-2A2B-T

### Specifications

#### Coil ratings

Rated voltage		Must operate voltage % of rated voltage	Must release voltage	Max. voltage	Power consumption (approx.)
AC	24, 50, 100 to 120, 200 to 240	75% max.	15% min.	110%	1.8 to 2.6 VA
DC	6, 12, 24, 48, 100		10% min.		2.0 W

#### Contact ratings

Item	4-pole		
	Resistive load	Inductive load	Resistive load
Contact material	Ag alloy		
Rated load	NO: 25 A at 220 VAC (24 A at 230 VAC) NC: 8 A at 220 VAC (7.5 A at 230 VAC)		NO: 25 A at 30 VDC NC: 8 A at 30 VDC
Rated carry current	NO: 25 A (1 A), NC: 8 A (1 A)		
Max. switching voltage	250 VAC		125 VDC
Max. switching current	NO: 25 A (1 A), NC: 8 A (1 A)		
Mechanical life	1,000,000 operations min.		
Electrical life	100,000 operations min.		

#### Technical data

Operating time	50 ms max.
Release time	50 ms max.
Dielectric strength	4,000 VAC
Ambient temperature	Operating: -25 °C to 60 °C (no icing)

# Solid state relays

Omron offers a comprehensive range of solid state relays (SSRs) that provides the perfect load switching for temperature control applications. These SSRs are a fast, reliable and cost-effective partner to our temperature controllers.

Combinations of temperature controller and SSR are available to handle almost any application, including heater bands for plastics extrusion processes, packaging machinery and heater elements in general manufacturing.

What switching capacity is required?

Up to 90 A power relay

Multi-channel power controller

Number of phases?

Single-phase

Three-phase

Up to 8 solid state relays

Type and size?

Compact flat pack style up to 90 A

Integrated heat sink, replaceable powercartridge up to 60 A

Integrated heat sink

G3NA

G3PA

G3PB

G3PB

G3ZA



## Now there's a clever way to regulate heater power

### G3ZA – compact and easy to integrate!






The G3ZA can control up to 8 solid state relays (SSRs) via a single RS-485 2-wire link to your PLC or PC. There's no need for conversion units or digital output cards – the G3ZA automatically converts the power control signal into a more manageable trigger signal for standard SSRs.

This multi-channel power controller uses a special trigger method and offset control to provide precise heater power regulation. It's faster than standard SSR switching, and it's less noisy and more cost-effective than phase angle control. Available in four versions, the compact G3ZA is easy to install, program and operate.



## Table of contents

Selection table		160
Panel mounted	G3NA	161
	G3PA	163
	G3PB	164
Power controller	G3ZA	165

Category		Control panel mounting type				Power regulator
Selection criteria						
	Model	G3NA	G3PA	G3PB	G3PB	G3ZA
	Type of load	Normal resistors Middle and long wave IR heater Transformers and inductors		Normal resistors Middle and long wave IR heater	Normal resistors	Depends on the SSR used Distributes loop / control output levels (mV%) to SSRs
	1-phase control	■	■	■		Depends on the SSR used
	2-phase control				■	Depends on the SSR used
	3-phase control				■	Depends on the SSR used
	Function	Heater control, motor control	Heater control	Heater control	Heater control	Intelligent power control
	Max. current rating	50 A	60 A	45 A	45 A	Depends on the SSR used
Load voltage / current [VAC]	24 to 240	■	■			
	100 to 240			■		■
	200 to 480	■	■	■	■	■ 400 to 480
Load voltage / current [VDC]	5 to 200	■				
Input voltages [VDC or VAC]	5 to 24 VDC	■	■			
	12 to 24 VDC		■	■	■	
	24 VAC		■			
	100 to 120 VAC	■				
	200 to 240 VAC	■				
Features	Built-in heat sink		■	■	■	
	Zero-cross	■	■	■	■	
	Built-in varistor	■			■	
	LED operation indicator	■	■	■	■	■
	Protective cover	■	■	■	■	
	3-phase loads via 3 single-phase SSRs	■	■		■	
	Replaceable power cartridge	■	■			
	Alarm output					■
	Built-in failure detection		■			■
	SSR open circuits detection					■
	SSR short circuits detection					■
Mounting	DIN-rail	■	■	■	■	■
	Screw	■	■	■	■	■
	Page	161	163	164		165

■ Standard

□ Available

□ No / not available





## A wide range of models with 5 to 90 A output currents

All models feature the same compact dimensions to provide a uniform mounting pitch. A built-in varistor effectively absorbs external surges. The operation indicator enables monitoring operation.

- 5 - 90 A output current
- 24 - 480 VAC / 5 - 200 VDC output voltages
- Built-in varistor
- Operation indicator (red LED)
- Protective cover for greater safety



### Ordering information

Applicable output load		Zero cross function	Isolation	Rated input voltage	Must operate voltage	Must release voltage	Load current with / without heatsink at 40 °C	Model		
24 to 240 VAC	5 A	Yes	Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 - 5 A / 0.1 - 3 A	G3NA-205B-UTU DC5-24		
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-205B-UTU AC100-120		
	10 A			200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-205B-UTU AC200-240		
			Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 - 10 A / 0.1 - 4 A	G3NA-210B-UTU DC5-24		
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-210B-UTU AC100-120		
			200 to 240 VAC	150 VAC max.	40 VAC min.	G3NA-210B-UTU AC200-240				
	20 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 - 20 A / 0.1 - 4 A	<b>G3NA-220B-UTU DC5-24</b>		
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-220B-UTU AC100-120		
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-220B-UTU AC200-240		
	40 A		Phototriac	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 - 40 A / 0.1 - 6 A	G3NA-240B-UTU DC5-24		
			Photocoupler	100 to 120 VAC	75 VAC max.	20 VAC min.		G3NA-240B-UTU AC100-120		
				200 to 240 VAC	150 VAC max.	40 VAC min.		G3NA-240B-UTU AC200-240		
75 A	Phototriac			5 to 24 VDC	4 VDC max.	1 VDC min.	1 - 75 A / 1 - 7 A	<b>G3NA-275B-UTU DC5-24</b>		
								<b>G3NA-275B-UTU AC100-240</b>		
	Photocoupler						100 to 240 VAC		1 - 90 A / 1 - 7 A	<b>G3NA-290B-UTU DC5-24</b>
										<b>G3NA-290B-UTU AC100-240</b>
90 A	Phototriac	5 to 24 VDC								
5 to 200 VDC	10 A	No	Photocoupler	5 to 24 VDC	4 VDC max.	1 VDC min.	0.1 - 10 A / 0.1 - 4 A	G3NA-D210B-UTU DC5-24		
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-D210B-UTU AC100-240		
200 to 480 VAC	10 A	Yes		5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 - 10 A / 0.2 - 4 A	<b>G3NA-410B DC5-24</b>		
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-410B AC100-240		
	20 A			5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 - 20 A / 0.2 - 4 A	<b>G3NA-420B DC5-24</b>		
				100 to 240 VAC	75 VAC max.	20 VAC min.		G3NA-420B AC100-240		
	40 A			5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 - 40 A / 0.2 - 6 A	<b>G3NA-440B DC5-24</b>		
				100 to 240 VAC	75 VAC max.	20 VAC min.		<b>G3NA-440B AC100-240</b>		
	50 A			5 to 24 VDC	4 VDC max.	1 VDC min.	0.2 - 50 A / 0.2 - 6 A	G3NA-450B DC5-24		
				100 to 240 VAC	75 VAC max.	20 VAC min.				
	75 A			5 to 24 VDC	4 VDC max.	1 VDC min.	1 - 75 A / 1 - 7 A	<b>G3NA-475B-UTU DC5-24</b>		
				100 to 240 VAC	75 VAC max.	20 VAC min.		<b>G3NA-475B-UTU AC100-240</b>		
90 A	5 to 24 VDC	4 VDC max.	1 VDC min.	1 - 90 A / 1 - 7 A	<b>G3NA-490B-UTU DC5-24</b>					
	100 to 240 VAC	75 VAC max.	20 VAC min.		<b>G3NA-490B-UTU AC100-240</b>					

**Bold** = preferred stock item

### Accessories

Name	Model	Applicable SSRs
One-touch mounting plates	R99-12 FOR G3NA	
Mounting bracket	R99-11 FOR G3NA	G3NA-240B, G3NA-440B
Slim models enabling DIN-rail mounting	<b>Y92B-N50</b>	G3NA-205B, G3NA-210B, G3NA-D210B, G3NA-410B
	Y92B-N100	G3NA-220B, G3NA-420B
	<b>Y92B-N150</b>	G3NA-240B, G3NA-440B
Slim models enabling DIN-rail mounting	Y92B-P250	G3NA-450B
	Y92B-P250NF	G3NA-275B-UTU, G3NA-290B-UTU, G3NA-475B-UTU, G3NA-490B-UTU
Low-cost models	Y92B-A100	G3NA-205B, G3NA-210B, G3NA-D210B, G3NA-220B, G3NA-410B, G3NA-420B
	Y92B-A150N	G3NA-240B, G3NA-440B
	Y92B-A250	G3NA-440B

**Bold** = preferred stock item



## Specifications

Operating voltage range	5 to 24 VDC: 4 to 32 VDC 100 to 120 VAC: 75 to 132 VAC 200 to 240 VAC: 150 to 264 VAC
Output ON voltage drop	G3NA-2: 1.6 V (RMS) max. G3NA-4: 1.8 V (RMS) max. G3NA-D2: 1.5 V max.
Leakage current	5 mA (100 V) / 10 mA (200 V) G3NA-D2: 5 mA max. (200 VDC)
Load voltage range	200 to 480 VAC: 180 to 528 VAC 24 to 240 VAC: 19 to 264 VAC 5 to 200 VDC: 4 to 220 VDC
Ambient temperature	Operating: -30 to 80 °C
Operate & release time	1/2 of load power source cycle + 1 ms max. (DC input) 1/2 of load power source cycle + 1 ms max. (DC input)
G3NA-D2	1 ms max. (DC input; release 5 ms), 30 ms max. (AC input)
Size in mm	58Hx43Wx27D



## Extremely thin relays with integrated heat sinks

Optimum design of the heat sink has contributed to the downsizing of this product. The power element cartridges of G3PA are easily replaceable for easy maintenance. G3PA can be mounted on a DIN-rail or using screws.

- 10 - 50 A output current
- 240 - 480 VAC output voltages
- Applicable with 3-phase loads
- Replaceable power element cartridges
- All features can be delivered with or without heat sink



## Ordering information

Rated output load		Zero cross function	Rated input voltage	Rated voltage	Operating voltage range	Input current impedance	Voltage level		Size in mm (HxWxD)	Model
							Must operate voltage	Must release voltage		
24 to 240 VAC	10 A	Yes	5 to 24 VDC	5 to 24 VDC	4 to 30 VDC	7 mA max.	4 VDC max.	1 VDC min.	100x27x100	G3PA-210B-VD DC5-24
	20 A								100x37x100	G3PA-220B-VD DC5-24
	40 A								100x47x100	G3PA-240B-VD DC5-24
	60 A								100x110x100	G3PA-260B-VD DC5-24
	10 A		24 VAC	24 VAC	19.2 to 26.4 VAC	1.4 kΩ ±20%	19.2 VAC max.	4.8 VAC min.	100x27x100	G3PA-210B-VD AC24
	20 A								100x37x100	G3PA-220B-VD AC24
	40 A								100x47x100	G3PA-240B-VD AC24
	60 A								100x110x100	G3PA-260B-VD AC24
180 to 400 VAC	20 A	12 to 24 VDC	12 to 24 VDC	9.6 to 30 VDC	7 mA max.	9.2 VDC max.	1 VDC min.	100x37x100	G3PA-420B-VD DC12-24	
	30 A							100x47x100	G3PA-430B-VD DC12-24	
200 to 480 VAC	20 A							100x37x100	G3PA-420B-VD-2 DC12-24	
	30 A							100x47x100	G3PA-430B-VD-2 DC12-24	
	50 A							100x110x100	G3PA-450B-VD-2 DC12-24	

**Bold** = preferred stock item

## Accessories

### Replacement parts: power device cartridges

Carry current	Load voltage range	Model	Applicable SSR
10 A	19 to 264 VAC	<b>G32A-A10-VD DC5-24</b>	G3PA-210B-VD DC5-24
		G32A-A10-VD AC24	G3PA-210B-VD AC24
20 A		<b>G32A-A20-VD DC5-24</b>	G3PA-220B-VD DC5-24
		G32A-A20-VD AC24	G3PA-220B-VD AC24
40 A		<b>G32A-A40-VD DC5-24</b>	G3PA-240B-VD DC5-24
		G32A-A40-VD AC24	G3PA-240B-VD AC24
60 A		G32A-A60-VD DC5-24	G3PA-260B-VD DC5-24
		G32A-A60-VD AC24	G3PA-260B-VD AC24

### Replacement parts: power device cartridges

Carry current	Load voltage range	Model	Applicable SSR
20 A	150 to 440 VAC	<b>G32A-A420-VD DC12-24</b>	G3PA-420B-VD DC12-24
30 A		G32A-A430-VD DC12-24	G3PA-430B-VD DC12-24
20 A	180 to 528 VAC	G32A-A420-VD-2 DC12-24	G3PA-420B-VD-2 DC12-24
30 A		G32A-A430-VD-2 DC12-24	G3PA-430B-VD-2 DC12-24
50 A		G32A-A450-VD-2 DC12-24	G3PA-450B-VD-2 DC12-24

**Bold** = preferred stock item

Current flow	Model	Applicable SSR
10 A	G32A-D20	G3PA-210B-VD, G3PA-210BL-VD, G3PA-220B-VD, G3PA-220BL-VD, G3PA-420B-VD, G3PA-420BL-VD
20 A		
30 A	G32A-D40	G3PA-430B-VD, G3PA-430BL-VD, G3PA-240B-VD, G3PA-240BL-VD
40 A		

## Specifications

Isolation	Phototriac coupler
Indicator	Yes
Ambient temperature	Operating: -30 °C to 80 °C
Load voltage range	200 - 480 VAC: 180 to 528 VAC 24 - 240 VAC: 19 to 264 VAC 180 to 400 VAC: 150 to 440 VAC
Output ON drop	1.6 V (RMS) max.
Operate time	0.5 of load power source cycle + 1 ms max. (DC input, -B models) 1.5 of load power source cycle + 1 ms max. (AC input) 1 ms max. (-BL models)
Release time	0.5 of load power source cycle + 1 ms max. (DC input) 1.5 of load power source cycle + 1 ms max. (AC input)



## Compact, slim-profile SSR with heat sink for heater control

The compact design of G3PB has been achieved by optimising the shape of the heat sink. The G3PB range provides you with a choice between DIN-rail mounting and screw mounting.

- Single and three phase, 15 - 45 A output current
- 100 - 480 VAC output voltages
- Applicable with 1-, 2- and 3-phase loads
- All features can be delivered with or without heat sink
- Conforms to CE marking, EN (VDE approval), CSA and VDE standards



### Ordering information

Phases	Main circuit voltage	Rated output load	Applicable load current (at 40 °C)	Permissible I <sup>2</sup> t (half 60 Hz wave)	Applicable heater capacity (with class - 1 AC resistive load)	Size in mm (HxWxD)	Number of poles	Model number
1	100 to 240 VAC	15 A	0.1 - 15 A	128 A <sup>2</sup> s	6 kW max.	100x22.5x100		<b>G3PB-215B-VD DC12-24</b>
		25 A	0.1 - 25 A	1,350 A <sup>2</sup> s	10 kW max.			<b>G3PB-225B-VD DC12-24</b>
		35 A	0.5 - 35 A		14 kW max.	100x44.5x100		<b>G3PB-235B-VD DC12-24</b>
		45 A	0.5 - 45 A		18 kW max.			<b>G3PB-245B-VD DC12-24</b>
	200 to 480 VAC	15 A	0.1 - 15 A	128 A <sup>2</sup> s	6 kW max.	100x22.5x100		<b>G3PB-515B-VD DC12-24</b>
		25 A	0.1 - 25 A	1,350 A <sup>2</sup> s	10 kW max.			<b>G3PB-525B-VD DC12-24</b>
		35 A	0.5 - 35 A		14 kW max.	100x44.5x100		<b>G3PB-535B-VD DC12-24</b>
		45 A	0.5 - 45 A		18 kW max.			<b>G3PB-545B-VD DC12-24</b>
3	100 to 240 VAC	15 A	0.2 - 15 A	260 A <sup>2</sup> s	5.1 kW max.	150.5x80x150.5	3	<b>G3PB-215B-3N-VD DC12-24</b>
							2	<b>G3PB-215B-2N-VD DC12-24</b>
		25 A	0.2 - 25 A	2,660 A <sup>2</sup> s	8.6 kW max.	150.5x80x150.5	3	<b>G3PB-225B-3N-VD DC12-24</b>
							2	<b>G3PB-225B-2N-VD DC12-24</b>
		35 A	0.5 - 35 A		12.1 kW max.	150.5x80x150.5	3	<b>G3PB-235B-3N-VD DC12-24</b>
							2	<b>G3PB-235B-2N-VD DC12-24</b>
		45 A	0.5 - 45 A		15.5 kW max.	150.5x110x150.5	3	<b>G3PB-245B-3N-VD DC12-24</b>
						150.5x80x150.5	2	<b>G3PB-245B-2N-VD DC12-24</b>
	200 to 480 VAC	15 A	0.5 - 15 A	260 A <sup>2</sup> s	12.5 kW max.	150.5x80x150.5	3	<b>G3PB-515B-3N-VD DC12-24</b>
							2	<b>G3PB-515B-2N-VD DC12-24</b>
		25 A	0.5 - 25 A	1,040 A <sup>2</sup> s	20.7 kW max.	150.5x80x150.5	3	<b>G3PB-525B-3N-VD DC12-24</b>
							2	<b>G3PB-525B-2N-VD DC12-24</b>
		35 A	0.5 - 35 A		29.0 kW max.	150.5x80x150.5	3	<b>G3PB-535B-3N-VD DC12-24</b>
							2	<b>G3PB-535B-2N-VD DC12-24</b>
		45 A	0.5 - 45 A		37.4 kW max.	150.5x110x150.5	3	<b>G3PB-545B-3N-VD DC12-24</b>
						150.5x80x150.5	2	<b>G3PB-545B-2N-VD DC12-24</b>

**Bold** = preferred stock item

### Specifications

Rated input voltage	12 to 24 VDC
Operating voltage range	9.6 to 30 VDC
Rated input current (impedance)	10 mA max. (at 24 VDC)
Zero cross function	Yes
Must operate voltage	9.6 VDC max.
Must release voltage	1 VDC min.
Isolation method	Phototriac coupler
Operation indicator	Yes (yellow)
Load voltage range	200 to 480 VAC models: 180 to 528 VAC 100 to 240 VAC models: 75 to 264 VAC
Operate time	1/2 of load power source cycle +1 ms max.
Release time	1/2 of load power source cycle +1 ms max.
Leakage current	10 mA (at 200 VAC)
Ambient temperature	Operating: -30 °C to 80 °C



## Multi-channel power controller = smarter SSR usage

The G3ZA receives manipulated variables generated by control loops or manual settings via a simple-to-wire RS-485. It regulates the heater power with high precision by driving up to eight standard SSRs. Moreover, the offset control reduces peak power in the supply net.

- Multi-channel power controller
- Controls up to eight standard solid state relays
- Easy integration with PLC
- Compact size
- Available with heater alarms (four channels) or without (eight channels)



### Ordering information

Name	Number of control channels	Heater burnout detection	Load power supply voltage	Model
Multi-channel power controller	4	Supported	100 to 240 VAC	G3ZA-4H203-FLK-UTU
			400 to 480 VAC	G3ZA-4H403-FLK-UTU
	8	Not supported	100 to 240 VAC	G3ZA-8A203-FLK-UTU
			400 to 480 VAC	G3ZA-8A403-FLK-UTU

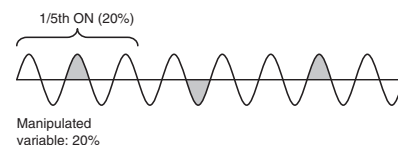
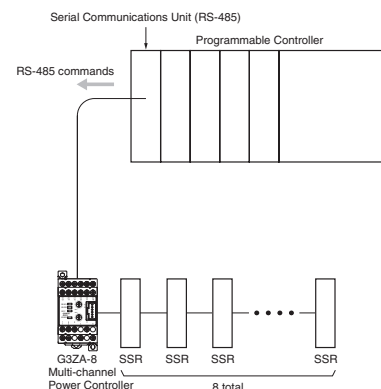
### Accessories

Name	Hole diameter	Model
Current transformer (CT)	5.8 dia.	<b>E54-CT1</b>
	12.0 dia.	<b>E54-CT3</b>

**Bold = preferred stock item**

### Specifications

Item	Load power supply voltage range	
	100 to 240 VAC	400 to 480 VAC
Power supply voltage	100 to 240 VAC (50 / 60 Hz)	
Operating voltage range	85 to 264 VAC	
Power consumption	16 VA max.	
Load power supply voltage	100 to 240 VAC	400 to 480 VAC
Load power supply voltage range	75 to 264 VAC	340 to 528 VAC
Manipulated variable input	0.0% to 100.0% (via RS-485 communications)	
Current transformer input	Single-phase AC, 0 to 50 A (primary current of CT)	
Trigger output	One voltage output for each channel, 12 VDC ±15%, max. load current: 21 mA (with built-in short-circuit protection circuit)	
Alarm output	NPN open collector, one output Max. applicable voltage: 30 VDC Max. load current: 50 mA Residual voltage: 1.5 V max. Leakage current: 0.4 mA max.	
Indications	LED indicators	
Ambient operating temperature	-10 °C to 55 °C (with no icing or condensation)	
Ambient operating humidity	25% to 85%	
Storage temperature	-25 °C to 65 °C (with no icing or condensation)	
Performance		
Current indication accuracy	±3 A (for models with heater burnout detection)	
Insulation resistance	100 MΩ min. (at 500 VDC) between primary and secondary	
Dielectric strength	2,000 VAC, 50 / 60 Hz for 1 min between primary and secondary	
Vibration resistance	Vibration frequency: 10 to 55 Hz, acceleration: 50 m/s <sup>2</sup> in X, Y, and Z directions	
Shock resistance	300 m/s <sup>2</sup> three times each in six directions along three axes	
Weight	Approx. 200 g (including terminal cover)	
Degree of protection	IP20	
Memory protection	EEPROM (non-volatile memory) (number of writes: 100,000)	
Installation environment	Overvoltage category III, pollution degree 2 (according to IEC 60664-1)	
Approved standards	UL508 (Listing), CSA22.2 No. 14 EN50178 EN61000-6-4 (EN55011: 1998, A1: 1999 Class A, Group 1) EN61000-6-2: 2001	
Size in mm	76Hx45Wx111D	



### Optimum cycle control

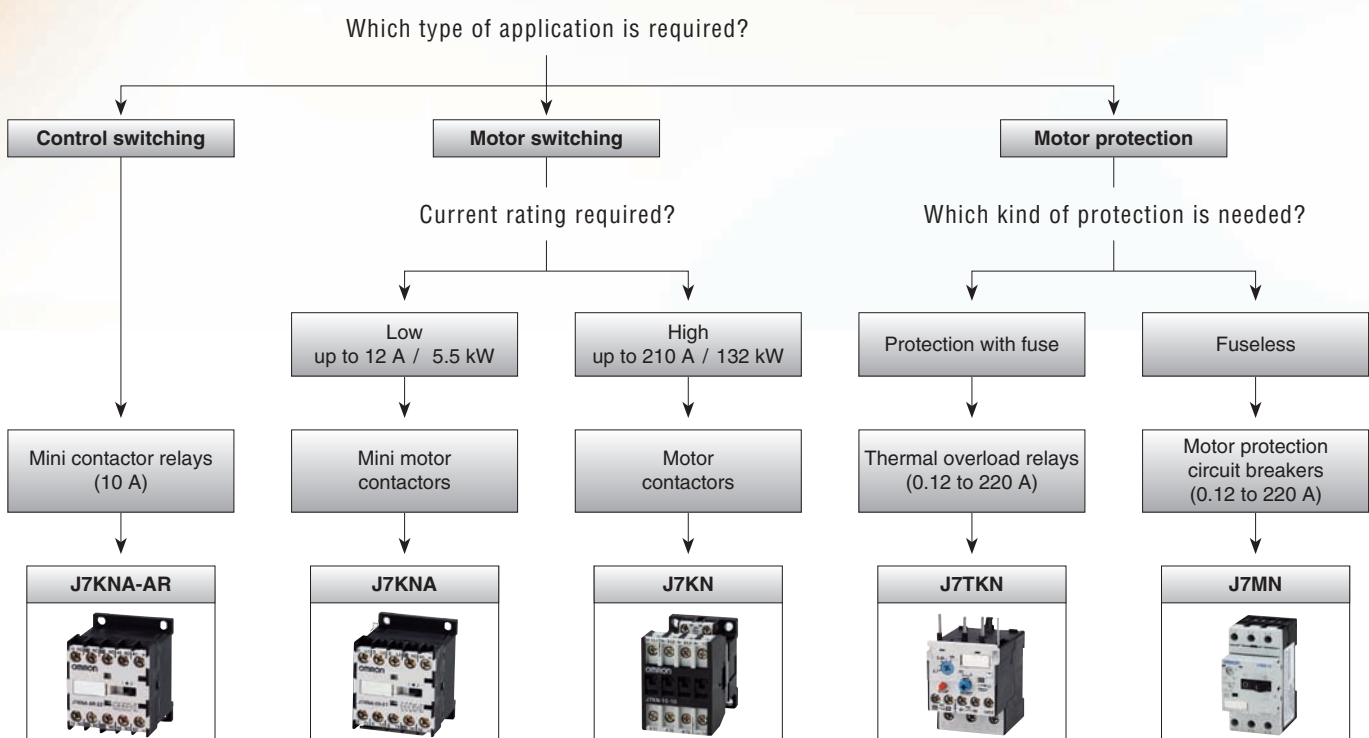
- Optimum cycle control is performed by driving SSRs according to load power detection and trigger signals. (Zero-cross SSRs are used.)
- Noise is suppressed while ensure high-speed response by turning outputs ON and OFF each half cycle to achieve high-precision temperature control.

# Low voltage switch gear

The J7 family of contactors, thermal overload relays, and motor protection circuit breakers is designed using state-of-the-art technology, and produced to a very high quality. These products are tough and reliable. The motor contactor range up to 37 kW can operate in temperatures from  $-40^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$ ! They offer impressive power-handling capabilities on very compact footprints.

Constructed according to European and International standards, these contactors, thermal overload relays and motor protection circuit breakers conform to EN / IEC and are approved by UL / CSA, enabling them to be used in any part of the world.

They are suitable for any industrial application and will appeal to panel builders, OEMs and engineers in the automotive, chemical and heavy power industries looking for the best choice in top-quality products from one supplier.










## Table of contents

Selection table		168
Mini contactor relays	J7KNA-AR	172
Mini motor contactors	J7KNA	173
Motor contactors	J7KN	174
Thermal overload relays	J7TKN	176
Motor protection circuit breakers	J7MN	178




# Selection table

Category		Mini contactor relay		
Selection criteria				
	Model	J7KNA-AR-40	J7KNA-AR-31	J7KNA-AR-22
	Mounting	35 mm DIN-rail or base		
	Distinction number according to EN 50011	40E	31E	22E
	AC15 230 V [A]	3	3	3
	AC15 400 V [A]	2	2	2
	Thermal rated current I <sub>g</sub> [A]	10	10	10
Auxiliary contacts	Thermal overload relay			
	Integrated auxiliary contacts	4 NO	3 NO + 1 NC	2 NO + 2 NC
	Additional auxiliary contacts block	J73-KN-A-11 (1 NO + 1 NC) J73-KN-A-02 (2 NC) J73-KN-A-40 (4 NO)		
AC power consumption of coils	Inrush [VA]	25	25	25
	Sealed [VA]	4 - 5	4 - 5	4 - 5
DC power consumption of coils	Inrush [W]	2.5	2.5	2.5
	Sealed [W]	2.5	2.5	2.5
Cable cross-section	Solid or stranded [mm <sup>2</sup> ]	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5
	Flexible [mm <sup>2</sup> ]	0.75 – 2.5	0.75 – 2.5	0.75 – 2.5
	Cables per clamp	2	2	2
Auxiliary contact	I <sub>th</sub>	10 A	10 A	10 A
	AC15 at 230 V	3 A	3 A	3 A
Features	Rated insulation voltage U <sub>i</sub>	690 VAC	690 VAC	690 VAC
	AC operated	■	■	■
	DC operated	■	■	■
	4 pole version	□	□	□
	Short circuit protection	20 A	20 A	20 A
Page		172		

Category		Mini motor contactor		Motor contactors						
Selection criteria										
	Model	J7KNA-09	J7KNA-12	J7KN-10	J7KN-14	J7KN-18	J7KN-22	J7KN-24	J7KN-32	J7KN-40
	Mounting	35 mm DIN-rail or base								
	AC1 up to 690 V [A]	20		25		32		50	65	80
	Motor AC3 up to 400 V [A]	9	12	10	14	18	22	24	32	40
	Motor AC3 380 - 415 V [kW]	4	5.5	4	5.5	7.5	11	11	15	18.5
	Motor AC3 660 - 690 V [kW]	4	5.5	5.5	7.5	10	10	15	18.5	18.5
Auxiliary contacts	Thermal overload relay	J7TKN-A		J7TKN-B				J7TKN-C		
	Integrated auxiliary contacts	1 NO / 1 NC	1 NO / 1 NC	1 NO / 1 NC	1 NO / 1 NC	1 NO / 1 NC	1 NO / 1 NC			
	Additional auxiliary contacts block	J73KN-AM-11 (1 NO + 1 NC) J73KN-AM-02 (2 NC) J73KN-AM-22 (2 NO + 2 NC)		J73KN-B-10 (1 NO) J73KN-B-01 (1 NC)				J73KN-B-10 (1 NO) J73KN-B-01 (1 NC) J73KN-C-11S (1 NO + 1 NC)		
AC power consumption of coils	Inrush [VA]	25	25	33 – 45	33 – 45	33 – 45	33 – 45	90 – 115	90 – 115	90 – 115
	Sealed [VA]	4 – 5	4 – 5	7 – 10	7 – 10	7 – 10	7 – 10	9 – 13	9 – 13	9 – 13
DC power consumption of coils	Inrush [W]	2.5	2.5	75	75	75	75	140	140	140
	Sealed [W]	2.5	2.5	2	2	2	2	2	2	2
Cable cross-section	Solid or stranded [mm <sup>2</sup> ]	0.75 – 2.5	0.75 – 2.5	0.75 – 6	0.75 – 6	0.75 – 6	0.75 – 6	1.5 – 25	1.5 – 25	1.5 – 25
	Flexible [mm <sup>2</sup> ]	0.75 – 2.5	0.75 – 2.5	1 – 4	1 – 4	1 – 4	1 – 4	2.5 – 16	2.5 – 16	2.5 – 16
	Cables per clamp	2	2	2	2	2	2	1	1	1
Auxiliary contact	I <sub>th</sub>	10 A	10 A	16 A	16 A	16 A	16 A			
	AC15 at 230 V	3 A	3 A	12 A	12 A	12 A	12 A			
Features	Rated insulation voltage U <sub>i</sub>	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC
	AC operated	■	■	■	■	■	■	■	■	■
	DC operated	■	■	■	■	■	■	■	■	■
	4 pole version	■								
	Short circuit protection	20 A	20 A	25 A	25 A	25 A	25 A			
	Page	173		174						

# Low voltage switch gear



Category		Motor contactors							
Selection criteria									
	Model	J7KN-50	J7KN-62	J7KN-74	J7KN-85	J7KN-110	J7KN-150	J7KN-175	J7KN-200
	Mounting	35 mm DIN-rail or base			Base				
	AC1 up to 690 V [A]	110	120	130	150	170	200	250	350
	Motor AC3 up to 400 V [A]	50	62	74	85	110	150	175	200
	Motor AC3 380 - 415 V [kW]	22	30	37	45	55	75	90	110
	Motor AC3 660 - 690 V [kW]	30	37	45	55	55	75	110	132
Auxiliary contacts	Thermal overload relay	J7TKN-D			J7TKN-E		J7TKN-F		
	Integrated auxiliary contacts				2 NO + 2 NC	2 NO + 2 NC	1 NO / 1 NC	1 NO / 1 NC	2 NO + 2 NC
AC power consumption of coils		J73KN-B-10 (1 NO) J73KN-B-01 (1 NC) J73KN-C-11S (1 NO + 1 NC)							
	Additional auxiliary contacts block								
DC power consumption of coils	Inrush [VA]	140 – 165	140 – 165	140 – 165	280 – 350	350 – 420	550	550	1100
	Sealed [VA]	13 – 18	13 – 18	13 – 18	16 – 23	23 – 29	130	130	66
Cable cross-section	Inrush [W]	200	200	200	170	320	160	160	530
	Sealed [W]	6	6	6	2	4	5	5	21
Auxiliary contact	Solid or stranded [mm <sup>2</sup> ]	4 – 50	4 – 50	4 – 50	10 – 70	10 – 70	95	120	185
	Flexible [mm <sup>2</sup> ]	10 – 35	10 – 35	10 – 35	6 – 50	16 – 50	Screw	Screw	Screw
	Cables per clamp	1	1	1	1	1	1	1	1
Features	I <sub>th</sub>	16 A	16 A		16 A	16 A	10 A	10 A	10 A
	AC15 at 230 V	12 A	12 A		12 A	12 A	3 A	3 A	3 A
Features	Rated insulation voltage U <sub>i</sub>	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC	690 VAC
	AC operated	■	■	■	■	■	■	■	■
	DC operated	■	■	■	■	■			
	4 pole version								
Features	Short circuit protection				25 A	25 A	10 A	10 A	10 A
	Page	174							

■ Standard

□ Available

□ No / not available

# Selection table

Category		Motor protection circuit breaker																							
Selection criteria																									
	Model	J7M N- 12- E16	J7M N- 12- E2	J7M N- 12- E25	J7M N- 12- E32	J7M N- 12- E4	J7M N- 12- E5	J7M N- 12- E63	J7M N- 12- E8	J7M N- 12- 1	J7M N- 12- 1E2 5	J7M N- 12- 1E6	J7M N- 12- 2	J7M N- 12- 2E5	J7M N- 12- 3E2	J7M N- 12- 4	J7M N- 12- 5	J7M N- 12- 6E3	J7M N- 12- 8	J7M N- 12- 10	J7M N- 12- 12	J7M N- 25- E16	J7M N- 25- E2	J7M N- 25- E25	J7M N- 25- E32
	Family	J7MN-12																				J7MN-25			
	Type	Switch type																				Rotary type			
	Current range	0.11 - 12 A																				0.16 - 25 A			
	Rated current [A]	0.16	0.2	0.25	0.32	0.4	0.5	0.63	0.8	1	1.25	1.6	2	2.5	3.2	4	5	6.3	8	10	12	0.16	0.2	0.25	0.32
	Suitable for motors 3 ~ 400 V [kW]			0.06	0.09		0.12	0.18		0.25	0.37	0.55	0.75		1.1	1.5		2.2	3	4	5.5			0.06	0.09
	Current thermal overload release [A]	0.11 – 0.16	0.14 –0.2	0.18 – 0.25	0.22 –0.32	0.28 –0.4	0.35 –0.5	0.45 –0.63	0.55 –0.8	0.7– 1	0.9– 1.25	1.1– 1.6	1.4– 2	1.8– 2.5	2.2– 3.2	2.8– 4	3.5– 5	4.5– 6.3	5.5– 8	7 – 10	9 – 12	0.11 – 0.16	0.14 –0.2	0.18 – 0.25	0.22 – 0.32
	Setting range instantaneous short-circuit release [A]	2.1	2.6	3.3	4.2	5.2	6.5	8.2	10	13	16	21	26	33	42	52	65	82	104	130	156	2.1	2.6	3.3	4.2
	Short-circuit breaking capacity at 3 ~ 400V [kA]	100																	50			100			
Accessories	Transverse auxiliary contact block	J73MN-11F																							
	Auxiliary contact block for left hand side mounting	J73MN-11S																							
	Signalling switch for left hand side mounting																					J73MN-T-11S			
	Undervoltage release	J74MN-U-N1																							
	Shunt release	J74MN-S-N2																							
	Moulded plastic enclosures (IP55)	J74MN-PF12																				J74MN-PF25			
	Moulded plastic front plates (IP55)	J74MN-P12																				J74MN-P25			
	Holder for front plate																					J74MN-PH			
	Door-coupling rotary mechanisms (black and red / yellow)																					J74MN-DC-B			
	Emergency-stop door-coupling rotary mechanisms (red / yellow)																					J74MN-DC-RY			
	Three-phase busbar system up to 5 MPCB	J74MN-L3-1/2, J74MN-L3-1/3 J74MN-L3-1/4 J74MN-L3-1/5																							
	Line side terminal	J74MN-TC12																				J74MN-TC25			
	Shroud	J74MN-DS																							
	Adapter for mechanical fixing of MPCB and contactor	J74MN-HU																							
	Link module	J74KN-VD-12																				J74KN-VD-25			
Terminal block	J74MN-TB25																								
Page	178																								

## Low voltage switch gear

### Motor protection circuit breaker



J7MN-25-E4	J7MN-25-E5	J7MN-25-E63	J7MN-25-E8	J7MN-25-1	J7MN-25-1E25	J7MN-25-1E6	J7MN-25-2	J7MN-25-2E	J7MN-25-3E	J7MN-25-4	J7MN-25-5	J7MN-25-6E3	J7MN-25-8	J7MN-25-10	J7MN-25-12E5	J7MN-25-16	J7MN-25-20	J7MN-25-22	J7MN-25-25	J7MN-50-25	J7MN-50-32	J7MN-50-40	J7MN-50-45	J7MN-50-50	J7MN-100-63	J7MN-100-75	J7MN-100-90	J7MN-100-100		
J7MN-25																				J7MN-50					J7MN-100					
Rotary type																														
0.16 - 25 A																				32 - 50 A					45 - 100 A					
0.4	0.5	0.63	0.8	1	1.25	1.6	2	2.5	3.2	4	5	6.3	8	10	12.5	16	20	22	25	25	32	40	45	50	63	75	90	100		
	0.12	0.18		0.25	0.37	0.55	0.75		1.1	1.5		2.2	3	4	5.5	7.5			11	11	15	18.5	18.5	22	30	37	37	45		
0.28-0.4	0.35-0.5	0.45-0.63	0.55-0.8	0.7-1	0.9-1.25	1.1-1.6	1.4-2	1.8-2.5	2.2-3.2	2.8-4	3.5-5	4.5-6.3	5.5-8	7-10	9-12.5	11-16	14-20	17-22	20-25	18-25	22-32	28-40	36-45	40-50	45-63	57-75	70-90	80-100		
5.2	6.5	8.2	10	13	16	21	26	33	42	52	65	82	104	130	163	208	260	286	325	325	416	520	585	650	819	975	1170	1235		
100																50										100				
J73MN-11F																														
J73MN-11S																														
J73MN-T-11S																														
J74MN-U-N1																														
J74MN-S-N2																														
J74MN-PF25																														
J74MN-P25																														
J74MN-PH																														
J74MN-DC-B																														
J74MN-DC-RY																														
J74MN-L3-1/2 J74MN-L3-1/3 J74MN-L3-1/4 J74MN-L3-1/5																														
J74MN-TC25																														
J74MN-DS																														
J74MN-HU																														
J74KN-VD-25																														
J74MN-TB25																														
178																														

☐ No / not available



## Main mini contactor relay, 4-pole

Three basic units can be combined with different additional auxiliary contacts. 4-pole, 6-pole and 8-pole versions in different configurations are possible as well as different coil voltages (AC and DC). Accessories such as suppressors are available.

- Mirror contacts
- Screw fixing and snap fitting (35 mm DIN-rail)
- Rated current = 10 A ( $I_{th}$ )
- Suitable for electronic devices (DIN 19240)
- Finger proof (BGV A2)



## Ordering information

Operation	Contacts		Distinctive number according to DIN EN 50011	Ratings		Thermal rated current I <sub>th</sub> , A	Model	Coil voltage <sup>*1</sup> , replace □□□ with:				
	NO	NC		AC15 230 V A	400 V A							
4-pole, with screw terminals								VAC			VDC	
AC	4	0	40 E	3	2	10	J7KNA-AR-40 □□□	24	110	230		
	3	1	31 E	3	2	10	J7KNA-AR-31 □□□	24	110	230		
	2	2	22 E	3	2	10	J7KNA-AR-22 □□□	24	110	230		
DC solenoid	4	0	40 E	3	2	10	J7KNA-AR-40 □□□				24D	110D
	3	1	31 E	3	2	10	J7KNA-AR-31 □□□				24D	110D
	2	2	22 E	3	2	10	J7KNA-AR-22 □□□				24D	110D
DC solenoid with diode	4	0	40 E	3	2	10	J7KNA-AR-40 □□□□				24VS	
	3	1	31 E	3	2	10	J7KNA-AR-31 □□□□				24VS	
	2	2	22 E	3	2	10	J7KNA-AR-22 □□□□				24VS	

<sup>\*1</sup> Other coil voltages available on request

**Bold** = preferred stock item

## Accessories

Contacts		Ratings		Thermal rated current $I_{th}$ , A	Model
NO	NC	AC15 230 V A	400 V A		
1	1	3	2	10	J73KN-A-11
0	2	3	2	10	J73KN-A-02
4	0	3	2	10	J73KN-A-40
2	2	3	2	10	J73KN-A-22

**Bold** = preferred stock item

## Specifications

Suffix to contactor type e.g. J7KNA-09-10-24	Voltage marking at the coil for		Rated control voltage $U_s$ range for			
	50 Hz V	60 Hz V	50 Hz min. V	max. V	60 Hz min. V	max. V
24	24	24	22	24	24	24
110	110 - 115	120 - 125	110	115	120	125
230	220 - 230	240	220	230	240	250

Size in mm	57.5Hx45Wx49D
------------	---------------



## Motor contactors from 4 - 5.5 kW for normal duty switching

This modular system consists of main contactors and additional contact blocks. The basic units can be combined with auxiliary contacts (top mounting). Reversed versions, including integrated mechanical interlock, are available as well as 3-main-pole and 4-main-pole versions.

- 4 kW and 5.5 kW versions are available
- Different coil voltages (AC and DC)
- Mini and normal-size versions are available
- The contactors can be mounted with screw fixing and snap fitting on a DIN-rail
- All components are finger proof

## Ordering information

Operation	Poles	Rating AC2, AC3			Rated current		Auxiliary contact		Overload relay	Size in mm (HxWxD)	Model	Coil voltage *1 , replace □□□ with:				
		380 V 400 V 415 V kW	500 V kW	660 V 690 V kW	AC3 400 V A	AC1 690 V A										
							NO	NC								
AC / DC solenoid	3	4	4	4	9	20	1	0	J7TKN-A	57.5x45x49	J7KNA-09-10 □□□	24	110	230	400	24D
							0	1	J7TKN-A		J7KNA-09-01 □□□	24	110	230	400	24D
		5.5	5.5	5.5	12	20	1	0	J7TKN-A		J7KNA-12-10 □□□	24	110	230	400	24D
							0	1	J7TKN-A		J7KNA-12-01 □□□	24	110	230	400	24D
	4	4	4	4	9	20	0	0	J7TKN-A		J7KNA-09-4 □□□	24	110	230	400	24D
DC solenoid with diode	3	4	4	4	9	20	1	0	J7TKN-A		J7KNA-09-10 □□□					24VS
							0	1	J7TKN-A		J7KNA-09-01 □□□					24VS
		5.5	5.5	5.5	12	20	1	0	J7TKN-A		J7KNA-12-10 □□□					24VS
							0	1	J7TKN-A	J7KNA-12-01 □□□					24VS	
AC / DC solenoid	3 reversing contactors	4	4	4	9	20	0	1	J7TKN-A	57.5x94.5x50	J7KNA-09-01 W □□□	24	110	230	400	24D
		5.5	5.5	5.5	12	20	0	1	J7TKN-A		J7KNA-12-01 W □□□	24	110	230	400	24D
DC solenoid with diode		4	4	4	9	20	0	1	J7TKN-A		J7KNA-09-01 W □□□					24VS
		5.5	5.5	5.5	12	20	0	1	J7TKN-A		J7KNA-12-01 W □□□					24VS

\*1 Other coil voltages available on request

**Bold** = preferred stock item

## Accessories

Auxiliary contacts				
Contacts		Rated current		Model
NO	NC	AC15 230 V	400 V	
1	1	3 A	2 A	J73KN-AM-11
0	2	3 A	2 A	J73KN-AM-02
2	2	3 A	2 A	J73KN-AM-22
Auxiliary contacts for reversing contactors				
1	1	3 A	2 A	J73KN-AM-11V
1	1	3 A	2 A	J73KN-AM-11X
Link modules between MPCB & contactors				
For MPCB J7MN12 / J7MN25				J74MN-VK1 12-25
Insulated wiring system for J7KNA				
Reversing or parallel contactors				J75-WK11
Star-delta combination				J75-WK12

**Bold** = preferred stock item

## Specifications

Suffix to contactor type e.g. J7KNA-09-10-24	Voltage marking at the coil for		Rated control voltage U <sub>s</sub> range for				Main contacts	J7KNA-09-□□□	J7KNA-12-□□□
	50 Hz V	60 Hz V	50 Hz min. V	max. V	60 Hz min. V	max. V	Rated insulation voltage U <sub>i</sub>	690 VAC	690 VAC
24	24	24	22	24	24	24	Making capacity I <sub>eff</sub> at U <sub>s</sub> = 690 VAC	165 A	165 A
110	110 - 115	120 - 125	110	115	120	125	Breaking capacity I <sub>eff</sub> cos φ = 0,65	400 VAC 500 VAC 690 VAC	100 A 90 A 80 A
230	220 - 230	240	220	230	240	250	Mechanical life AC operated	5 x 10 <sup>6</sup>	5 x 10 <sup>6</sup>
							DC operated	15 x 10 <sup>6</sup>	15 x 10 <sup>6</sup>
							Short time current 10 s current	96 A	120 A





## Motor contactors from 4 - 110 kW for normal and heavy-duty switching.

This modular system consists of main contactors and additional contact blocks. The basic units can be combined with auxiliary contacts. DC-DC versions, integrated mechanical interlock, are available as well as 3-main-pole and 4-main-pole versions.

- Basic units can be combined with auxiliary contacts (top/side mounting)
- 3-main-pole and 4-main-pole versions are possible
- The power range covers 4 to 110 kW
- Different coil voltages (AC and DC)

### Ordering information

Operation	Poles	AC3 400 V rated motor current	Rating AC2, AC3			Rated current	Auxiliary contact		Overload relay	Size in mm (HxWxD)	Model	Coil voltage *1, replace □□□ with:							
			380 V 400 V 415 V kW	500 V kW	660 V 690 V kW		AC1 690 V A	NO				NC	VAC			VDC			
AC / DC	3	10 A	4	5.5	5.5	25	1	0	J7TKN-B	67x45x82.5	J7KN-10-10 □□□	24	110	230	400	24D	110D		
			4	5.5	5.5	25	0	1			J7KN-10-01 □□□	24	110	230	400	24D	110D		
		14 A	5.5	7.5	7.5	25	1	0			J7KN-14-10 □□□	24	110	230	400	24D	110D		
			5.5	7.5	7.5	25	0	1			J7KN-14-01 □□□	24	110	230	400	24D	110D		
		18 A	7.5	10	10	32	1	0			J7KN-18-10 □□□	24	110	230	400	24D	110D		
			7.5	10	10	32	0	1			J7KN-18-01 □□□	24	110	230	400	24D	110D		
		22 A	11	10	10	32	1	0	J7KN-22-10 □□□	24	110	230	400	24D	110D				
			11	10	10	32	0	1	J7KN-22-01 □□□	24	110	230	400	24D	110D				
		24 A	11	15	15	50	0	0	J7TKN-C	78x45x104.5	J7KN-24 □□□	24	110	230	400	24D	110D		
			15	18.5	18.5	65	0	0			J7KN-32 □□□	24	110	230	400	24D	110D		
		40 A	18.5	18.5	18.5	80	0	0	J7TKN-D	112x60x113	J7KN-40 □□□	24	110	230	400	24D	110D		
			22	30	30	110	0	0			J7KN-50 □□□	24	110	230	400	24D	110D		
		62 A	30	37	37	120	0	0	J7TKN-E	134x90x119	J7KN-62 □□□	24	110	230	400	24D	110D		
			37	45	45	130	0	0			J7KN-74 □□□	24	110	230	400	24D	110D		
		85 A	45	55	55	150	2	2	J7TKN-E	134x90x119	J7KN-85-22 □□□	24	110	230	400				
											J7KN-85-21 □□□					24D	110D		
												J7KN-110-22 □□□	24	110	230	400			
		DC operated solenoid motor contactor	3	10 A	4	5.5	5.5	25	1	0	J7TKN-B	67x45x82.5	J7KNG-10-10 □□□					24D	110D
4	5.5				5.5	25	0	1	J7KNG-10-01 □□□							24D	110D		
14 A	5.5			7.5	7.5	25	1	0	J7KNG-14-10 □□□							24D	110D		
	5.5			7.5	7.5	25	0	1	J7KNG-14-01 □□□							24D	110D		
18 A	7.5			10	10	32	1	0	J7KNG-18-10 □□□							24D	110D		
	7.5			10	10	32	0	1	J7KNG-18-01 □□□							24D	110D		
22 A	11			10	10	32	1	0	J7TKN-B J7TKN-C	78x45x104.5	J7KNG-22-10 □□□					24D	110D		
	11			10	10	32	0	1			J7KNG-22-01 □□□					24D	110D		
24 A	11			15	15	50	0	0			J7KNG-24 □□□					24D	110D		
32 A	15			18.5	18.5	65	0	0			J7KNG-32 □□□					24D	110D		
AC / DC	3	40 A	18.5	18.5	18.5	80	0	0	J7TKN-F	170x110x162	J7KNG-40 □□□					24D	110D		
		150 A	75	75	75	230	0	0			J7KN-151 □□□	24	110	230	400	24	110		
		175 A	90	90	90	250	0	0			J7KN-176 □□□	24	110	230	400	24	110		
AC for fuse- less load feeders	3	200 A	110	132	132	350	2	2	J7TKN-B J7TKN-C	202x130x190	J7KN-200-21 □□□	24	110	230	400	24	110		
		10 A	4	5.5	5.5	25	1	0		67x45x82.5	J7KN-10-10 □□□ VK3	24	110	230	400	24D	110D		
			4	5.5	5.5	25	0	1			J7KN-10-01 □□□ VK3	24	110	230	400	24D	110D		
		14 A	5.5	7.5	7.5	25	1	0			J7KN-14-10 □□□ VK3	24	110	230	400	24D	110D		
			5.5	7.5	7.5	25	0	1			J7KN-14-01 □□□ VK3	24	110	230	400	24D	110D		
		18 A	7.5	10	10	32	1	0			J7KN-18-10 □□□ VK3	24	110	230	400	24D	110D		
			7.5	10	10	32	0	1			J7KN-18-01 □□□ VK3	24	110	230	400	24D	110D		
		22 A	11	10	10	32	1	0			J7KN-22-10 □□□ VK3	24	110	230	400	24D	110D		
			11	10	10	32	0	1			J7KN-22-01 □□□ VK3	24	110	230	400	24D	110D		

<sup>\*1</sup> Other coil voltages available on request

**Bold** = preferred stock item

Operation	Poles	AC3 400 V rated motor current	Rating AC2, AC3		Rated current	Auxiliary contact		Overload relay	Size in mm (HxWxD)	Model	Coil voltage <sup>*1</sup> , replace □□□ with:						
			380 V 400 V 415 V kW	AC1 400 V kW		AC1 690 V A	NO				NC	VAC				VDC	
AC	4	10 A	4	17.5	25	0	0		67x45x82.5	J7KN-10-4 □□□	24	110	230	400			
		14 A	5.5	17.5	25	0	0			J7KN-14-4 □□□	24	110	230	400			
		18 A	7.5	22	32	0	0			J7KN-18-4 □□□	24	110	230	400			
		22 A	11	22	32	0	0			J7KN-22-4 □□□	24	110	230	400			
DC solenoid mo- tor contactor	4	10 A	4	17.5	25	0	0		67x45x82.5	<b>J7KNG-10-4 □□□</b>					<b>24D</b>	110D	
		14 A	5.5	17.5	25	0	0			J7KNG-14-4 □□□					24D	110D	
		18 A	7.5	22	32	0	0			<b>J7KNG-18-4 □□□</b>					<b>24D</b>	110D	
		22 A	11	22	32	0	0			<b>J7KNG-22-4 □□□</b>					<b>24D</b>	110D	
AC / DC		150 A	75	159	230	0	0		170x110x162	J7KN-151-4 □□□	24	110	230	400	24	110	
		175 A	90	173	250	0	0			<b>J7KN-176-4 □□□</b>	24	110	<b>230</b>	400	24	110	

\*1 Other coil voltages available on request **Bold** = preferred stock item

## Accessories

Auxiliary contact blocks	Rated operational current			Contacts		Model
Suitable for:	AC15 230 V A	AC15 400 V A	AC1 690 V A	NO	NC	
J7KN-10... to -74...	3	2	10	1	-	J73KN-B-10
	3	2	10	-	1	J73KN-B-01
	3	2	10	-	-	J73KN-B-10U
	3	2	10	-	-	J73KN-B-01U
	6	4	25	1	-	J73KN-B-10A
	6	4	25	-	1	J73KN-B-01A
J7KN-151... to -176...	3	2	10	1	1	J73KN-D-11F
	3	2	10	2	2	J73KN-D-22F
	3	2	10	1	1	J73KN-D-11S
J7KN-24... to KN-110 and J7KN-200	3	2	10	1	1	J73KN-C-11S
	3	2	10	2	2	J73KN-E-22
Pneumatic timers	Function		Time range	Contacts		Model
Suitable for:				NO	NC	
J7KN-10... to -40...	ON-delay		0.1 - 40 s	1	-	J74KN-B-TP40DA
	ON-delay		10 - 180 s	1	-	J74KN-B-TP180DA
	OFF-delay		0.1 - 40 s	-	1	J74KN-B-TP40IA
	OFF-delay		10 - 180 s	-	1	J74KN-B-TP180IA
Mechanical interlocks	Interlocks contactor with contactor					Model
Mounting	Model + Model					
Horizontal	J7KN-10 to -40 + J7KN-10 to -40					J74KN-B-ML
	J7KN-24 to -74 + J7KN-24 to -74					J74KN-C-ML
	J7KN-85 to -110 + J7KN-85 to -110					J74KN-D-ML
	J7KN-151 to -176 + J7KN-151 to -176					J74KN-E-ML

Suppressor units	Type		Applicable coil voltage	Model	
Suitable for contactors					
J7KNA	AC / DC	Varistor snap-on coil terminals	110 - 230 V	J74KN-A-VG230	
J7KN10-J7KN22	AC / DC		250 - 415 V	J74KN-A-VG400	
J7KN10-J7KN74	AC / DC	Varistor snap-on top of contactor	110 - 230 V	J74KN-B-VG230	
	AC / DC		250 - 415 V	J74KN-B-VG400	
J7KNA	AC / DC	RC-unit snap-on contactor	12 - 48 V	J74KN-D-RC24	
	AC / DC		48 - 127 V	J74KN-D-RC110	
	AC / DC		110 - 230 V	J74KN-D-RC230	
J7KN10-J7KN74	AC / DC	RC-unit snap-on contactor	12 - 48 V	<b>J74KN-C-RC24</b>	
	AC / DC		48 - 127 V	J74KN-C-RC110	
	AC / DC		110 - 230 V	<b>J74KN-C-RC230</b>	
J7KN85-J7KN110	AC / DC	RC-unit to fix via fixing band or adhesive strip with contactor	12 - 24 V	<b>J74KN-B-RC48</b>	
	AC / DC		110 - 250 V	<b>J74KN-B-RC230</b>	
	AC / DC		250 - 415 V	J74KN-B-RC400	
Additional terminals single pole		Cable cross-sections to clamp (mm <sup>2</sup> )			Model
Suitable for contactors		Solid or stranded	Flexible	Flexible with multi-core cable end	
J7KN50 - KN74		4 - 35	6 - 25	4 - 25	<b>J74KN-LG-9030</b>
J7KN151 - KN176		16 - 120		16 - 95	<b>J74KN-LG-11224</b>
Terminal covers		Specification			Model
Suitable for contactors					
J7KN151 - KN176		One unit			<b>J74KN-LG-10404</b>
Marking systems		Specification			Model
Description					
Marking plate		2-section without marking, divisible			<b>J74KN-P487-1</b>
Marking plate		4-section without marking, divisible			<b>J74KN-P245-1</b>

## Specifications

Coil voltages	Suffix to contactor type:								
Contact type	20	24	48	90	110	180	230	400	500
J7KN-10 to J7KN-74		<b>yes</b>	yes		<b>yes</b>	yes	<b>yes</b>	<b>yes</b>	yes
J7KN-85 to J7KN-110	<b>yes</b>	<b>yes</b>	yes	yes	<b>yes</b>	yes	<b>yes</b>	<b>yes</b>	yes
J7KN-151 to J7KN-200		yes	yes		yes		<b>yes</b>	<b>yes</b>	

**Bold** = standard coil voltages



## Thermal overload relays for J7 contactors

J7TKN relays protect motors against thermal overload. They can be mounted on the contactor or separately. The relays comply with IEC 947 (single-phase sensitivity).

- Series of overload relays covering a setting range from 0.24 A to 220 A
- All components are finger proof

### Ordering information

Applicable contactors	Setting range		Size in mm (HxWxD)	Model
	D.O.L. (A)	Star-delta (A)		
J7KNA-09..., J7KNA-12...	0.12 - 0.18		38.8x48.5x77	J7TKN-A-E18
	0.18 - 0.27			J7TKN-A-E27
	0.27 - 0.4			J7TKN-A-E4
	0.4 - 0.6			J7TKN-A-E6
	0.6 - 0.9			J7TKN-A-E9
	0.8 - 1.2			J7TKN-A-1E2
	1.2 - 1.8			<b>J7TKN-A-1E8</b>
	1.8 - 2.7			<b>J7TKN-A-2E7</b>
	2.7 - 4			<b>J7TKN-A-4</b>
	4 - 6	7 - 10.5		<b>J7TKN-A-6</b>
	6 - 9	10.5 - 15.5		<b>J7TKN-A-9</b>
	8 - 11	14 - 19		<b>J7TKN-A-11</b>
	10 - 14	18 - 24		<b>J7TKN-A-14</b>
J7KN-10... to J7KN-40...	0.12 - 0.18		63.5x45x70	J7TKN-B-E18
	0.18 - 0.27			J7TKN-B-E27
	0.27 - 0.4			J7TKN-B-E4
	0.4 - 0.6			J7TKN-B-E6
	0.6 - 0.9			<b>J7TKN-B-E9</b>
	0.8 - 1.2			<b>J7TKN-B-1E2</b>
	1.2 - 1.8			<b>J7TKN-B-1E8</b>
	1.8 - 2.7			<b>J7TKN-B-2E7</b>
	2.7 - 4			<b>J7TKN-B-4</b>
	4 - 6	7 - 10.5		<b>J7TKN-B-6</b>
	6 - 9	10.5 - 15.5		<b>J7TKN-B-9</b>
	8 - 11	14 - 19		<b>J7TKN-B-11</b>
	10 - 14	18 - 24		<b>J7TKN-B-14</b>
	13 - 18	23 - 31		<b>J7TKN-B-18</b>
	17 - 24	30 - 41		<b>J7TKN-B-24</b>
	23 - 32	40 - 55		J7TKN-B-32
J7KN-24... to J7KN-40...	28 - 42	48 - 73	47x67x90	<b>J7TKN-C-42</b>
J7KN-50... to J7KN-74...	40 - 52	70 - 90	57x69x93	J7TKN-D-52
	52 - 65	90 - 112		J7TKN-D-65
	60 - 74	104 - 128		J7TKN-D-74
J7KN-85... to J7KN-150...	60 - 90	104 - 156	101x107x102	J7TKN-E-90
	80 - 120	140 - 207		J7TKN-E-120
J7KN-175... to J7KN-200...	100 - 150	175 - 260	113x190x176	J7TKN-F-150
	140 - 220	240 - 380		J7TKN-F-210

**Bold** = preferred stock item

### Accessories

Busbar sets		
For overload relays	For contactors	Model
J7TKN-F-150	J7KN-151, J7KN-176	<b>J74TK-SU-176</b>
J7TKN-F-210	J7KN-200	J74TK-SU-200

Sets for single mounting				
For overload relays	Cable cross-section to clamp (mm <sup>2</sup> )			Model
	Solid or stranded	Flexible	Flexible with multi-core cable	
J7TKN-A	0.75 - 6	0.75 - 4	0.5 - 4	<b>J74TK-M</b>
J7TKN-B	0.75 - 6	0.75 - 4	0.5 - 4	<b>J74TK-SM</b>

**Bold** = preferred stock item

## Specifications

Type		J7TKN-A	J7TKN-B	J7TKN-C	J7TKN-D	J7TKN-E	J7TKN-F
Rated insulation voltage U <sub>i</sub>		690 VAC					
Permissible ambient temperature	Operation	-25 to 60 °C					
	Storage	-50 to 70 °C					
Trip class according to IEC 947-4-1		10 A				20 A	
Cable cross-section Main connector	Solid or stranded mm <sup>2</sup>	0.75 - 6 0.75 - 2.5	0.75 - 6	0.75 - 10	4 - 35		
	Flexible mm <sup>2</sup>	0.75 - 4 0.5 - 2.5	1 - 4	0.75 - 6	6 - 25		
	Flexible with multi-core cable end mm <sup>2</sup>	0.5 - 2.5 0.5 - 1.5	0.75 - 4	0.75 - 6	4 - 25		
Cables per clamp	Number	1 + 1	2	2	1		
Auxiliary connector	Solid mm <sup>2</sup>	0.75 - 2.5					
	Flexible mm <sup>2</sup>	0.5 - 2.5					
	Flexible with multi-core cable end mm <sup>2</sup>	0.5 - 1.5					
Cables per clamp	Number	2					
Auxiliary contacts							
Rated insulation voltage U <sub>i</sub>	same potential	690 VAC					
	different potential	440 VAC		250 VAC		440 VAC	
Rated operational current I <sub>e</sub> Utilization category AC15	24 V	5 A	3 A	4 A		5 A	
	230 V	3 A	2 A	2.5 A	2.5 A	3 A	3 A
	400 V	2 A	1 A	1.5 A	1.5 A	2 A	2 A
	690 V	0.6 A	0.5 A	0.6 A			
Rated operational current I <sub>e</sub> Utilization category DC13	24 V	1.2 A	1 A	1.2 A			
	110 V	0.15 A					
	220 V	0.1 A					
Short circuit protection (without welding 1 kA)	Highest fuse rating gL (gG)	6 A	4 A	6 A			
Setting range		to 23 A	All	28 - 42 A	52 - 65 A	All	
Power loss per current path (max.)	Minimum setting value	1.1 W	1.1 W	1.3 W	2.9 W	1.1 W	
	Maximum setting value	2.3 W	2.3 W	3.3 W	4.5 W	2.5 W	



## J7MN is a range of motor-protection circuit breakers from 0.11 - 100 A

J7MN starters protect motors against thermal overload and short circuit. Additional auxiliary contacts (standard and trip indicating) are available, optional are: undervoltage and shunt release; insulated enclosures for surface and flush mounting; lockable rotary handles and 3-phase common links.

- Available rated operational currents of 12 A, 25 A, 50 A and 100 A
- Switching capacity is 50 kA / 415 V for all versions
- OMRON offers four different-sized versions
- MPCBs can be mounted with screw fixing and snap fitting on a DIN-rail
- All components are finger proof

### Ordering information

Rated current In A	Suitable for motors 3 ~ 400 V kW	Current setting range		Short-circuit breaking capacity at 3 ~ 400 V kA	Size in mm (HxWxD)	Model
		Thermal overload release A	Instantaneous short-circuit release A			
0.16	-	0.11 - 0.16	2.1	100	90x45x76	J7MN-12-E16
0.2	-	0.14 - 0.2	2.6	100		J7MN-12-E2
0.25	0.06	0.18 - 0.25	3.3	100		J7MN-12-E25
0.32	0.09	0.22 - 0.32	4.2	100		J7MN-12-E32
0.4	-	0.28 - 0.4	5.2	100		<b>J7MN-12-E4</b>
0.5	0.12	0.35 - 0.5	6.5	100		<b>J7MN-12-E5</b>
0.63	0.18	0.45 - 0.63	8.2	100		J7MN-12-E63
0.8	-	0.55 - 0.8	10	100		<b>J7MN-12-E8</b>
1	0.25	0.7 - 1.1	13	100		<b>J7MN-12-1</b>
1.25	0.37	0.9 - 1.25	16	100		<b>J7MN-12-1E25</b>
1.6	0.55	1.1 - 1.6	21	100		<b>J7MN-12-1E6</b>
2	0.75	1.4 - 2.2	26	100		<b>J7MN-12-2</b>
2.5	-	1.8 - 2.5	33	100		<b>J7MN-12-2E5</b>
3.2	1.1	2.2 - 3.2	42	100		<b>J7MN-12-3E2</b>
4	1.5	2.8 - 4	52	100		<b>J7MN-12-4</b>
5	-	3.5 - 5	65	100		<b>J7MN-12-5</b>
6.3	2.2	4.5 - 6.3	82	100	97x45x91	<b>J7MN-12-6E3</b>
8	3	5.5 - 8	104	50		<b>J7MN-12-8</b>
10	4	7 - 10	130	50		<b>J7MN-12-10</b>
12	5.5	9 - 12	156	50		<b>J7MN-12-12</b>
0.16	-	0.11 - 0.16	2.1	100		J7MN-25-E16
0.2	-	0.14 - 0.2	2.6	100		J7MN-25-E2
0.25	0.06	0.18 - 0.25	3.3	100		J7MN-25-E25
0.32	0.09	0.22 - 0.32	4.2	100		J7MN-25-E32
0.4	-	0.28 - 0.4	5.2	100		<b>J7MN-25-E4</b>
0.5	0.12	0.35 - 0.5	6.5	100		<b>J7MN-25-E5</b>
0.63	0.18	0.45 - 0.63	8.2	100		<b>J7MN-25-E63</b>
0.8	-	0.55 - 0.8	10	100		<b>J7MN-25-E8</b>
1	0.25	0.7 - 1	13	100		<b>J7MN-25-1</b>
1.25	0.37	0.9 - 1.25	16	100		<b>J7MN-25-1E25</b>
1.6	0.55	1.1 - 1.6	21	100		<b>J7MN-25-1E6</b>
2	0.75	1.4 - 2	26	100		<b>J7MN-25-2</b>
2.5	-	1.8 - 2.5	33	100		<b>J7MN-25-2E5</b>
3.2	1.1	2.2 - 3.2	42	100		<b>J7MN-25-3E2</b>
4	1.5	2.8 - 4	52	100		<b>J7MN-25-4</b>
5	-	3.5 - 5	65	100		<b>J7MN-25-5</b>
6.3	2.2	4.5 - 6.3	82	100		<b>J7MN-25-6E3</b>
8	3	5.5 - 8	104	100		<b>J7MN-25-8</b>
10	4	7 - 10	130	100		<b>J7MN-25-10</b>
12.5	5.5	9 - 12.5	163	100		<b>J7MN-25-12E5</b>
16	7.5	11 - 16	208	50		<b>J7MN-25-16</b>
20	-	14 - 20	260	50		<b>J7MN-25-20</b>
22	-	17 - 22	286	50		J7MN-25-22
25	11	20 - 25	325	50		<b>J7MN-25-25</b>

**Bold** = preferred stock item

Rated current In A	Suitable for motors 3 ~ 400 V kW	Current setting range		Short-circuit breaking capacity at 3 ~ 400 V kA	Size in mm (HxWxD)	Model
		Thermal overload release A	Instantaneous short-circuit release A			
25	11	18 - 25	325	50	140x55x144	J7MN-50-25
32	15	22 - 32	416	50		<b>J7MN-50-32</b>
40	18.5	28 - 40	520	50		<b>J7MN-50-40</b>
45	-	36 - 45	585	50		J7MN-50-45
50	22	40 - 50	650	50		J7MN-50-50
63	30	45 - 63	819	50	165x70x169	J7MN-100-63
75	37	57 - 75	975	50		J7MN-100-75
90	-	70 - 90	1,170	50		J7MN-100-90
100	45	80 - 100	1,235	50		J7MN-100-100

**Bold** = preferred stock item

## Accessories

Description	Version	For circuit breaker	Type
<b>Transverse auxiliary contact block</b>			
Contact block	1 NO + 1 NC	All	<b>J73MN-11F</b>
<b>Auxiliary contact block for left hand side mounting (max. 1 pc. per circuit breaker)</b>			
Contact block	1 NO + 1 NC 9 mm	All	<b>J73MN-11S</b>
<b>Signalling switch for left hand side mounting (max. 1 pc. per circuit breaker)</b>			
Signalling switch	1 NO + 1 NC each Individual tripped and short-circuit signalling	J7MN-25 J7MN-50	J73MN-T-11S
<b>Auxiliary releases for right hand side mounting (max 1 pc. per circuit breaker)</b>			
Undervoltage release. Trips the circuit breaker when the voltage is interrupted. Prevents the motor from being restarted accidentally when the voltage is restored, suitable for EMERGENCY STOP according to VDE 0113	AC 50 Hz	AC 60 Hz	
	110 V	120 V	All
	230 V	240 V	All
	400 V	400 V	All
Shunt release. Trips the circuit breaker when the release coil is energized	50 / 60 Hz 100% ON	50 / 60 Hz, DC 5 s ON	
	210 - 240 V	190 - 330 V	All
<b>Terminal block</b>			
Terminal block	Up to 600 V according to UL 489 not for transverse auxiliary contact block	J7MN-25 J7MN-100	J74MN-TB25 J74MN-TB100

**Note:** For enclosures & front plates, insulated 3-phase busbar systems and components & mounting parts for fuseless load feeders, please refer to the datasheet.

**Bold** = preferred stock item

## Specifications

Type		J7MN-12	J7MN-25	J7MN-50	J7MN-100
Number of poles		3	3	3	3
Max. rated current Inmax (= max. rated operational current I <sub>o</sub> )	A	12	25	50	100
Permissible ambient temperature	Storage / transport	-50 °C to 80 °C			
	Operation	-20 °C to 70 °C			
Rated operational voltage U <sub>e</sub>	V	690			
Rated frequency	Hz	50 / 60			
Rated insulation voltage U <sub>i</sub>	V	690			
Rated impulse withstand voltage U <sub>imp</sub>	kV	6			
Utilization category	IEC 60 947-2 (circuit breaker)	A			
	IEC 60 947-4-1 (motor starter)	AC-3			
Class	According to IEC 60 947-4-1	10			
DC short-circuit breaking capacity (time constant t = 5 ms)	1 conducting path DC 150 V	10 kA			
	2 conducting paths in series DC 300 V	10 kA			
	3 conducting paths in series DC 450 V	10 kA			
Degree of protection	According to IEC 60 529	IP20	IP20	IP20	IP20
Phase failure sensitivity	According to IEC 60 947-4-1	Yes			
Explosion protection	According to EC Directive 94/19/EC	Yes			
Isolator characteristics	According to IEC 60 947-3	Yes			
Main and EM. STOP switch characteristics	According to IEC 60 204-1 (VDE113)	Yes			
Safe isolation between main and auxiliary circuits	Up to 400 V + 10%	Yes			
	Up to 415 V + 5%	Yes			
According to DIN VDE 0106 Part 101					
Mechanical endurance	Operating cycles	100,000	100,000	50,000	50,000
Electrical endurance		100,000	100,000	25,000	25,000
Max. operating frequency per hour (motor starts)	1 / h	15	15	15	15
Permissible mounting position		Any, according to IEC 60 447 start command "I" right-hand side or top			



# Monitoring products

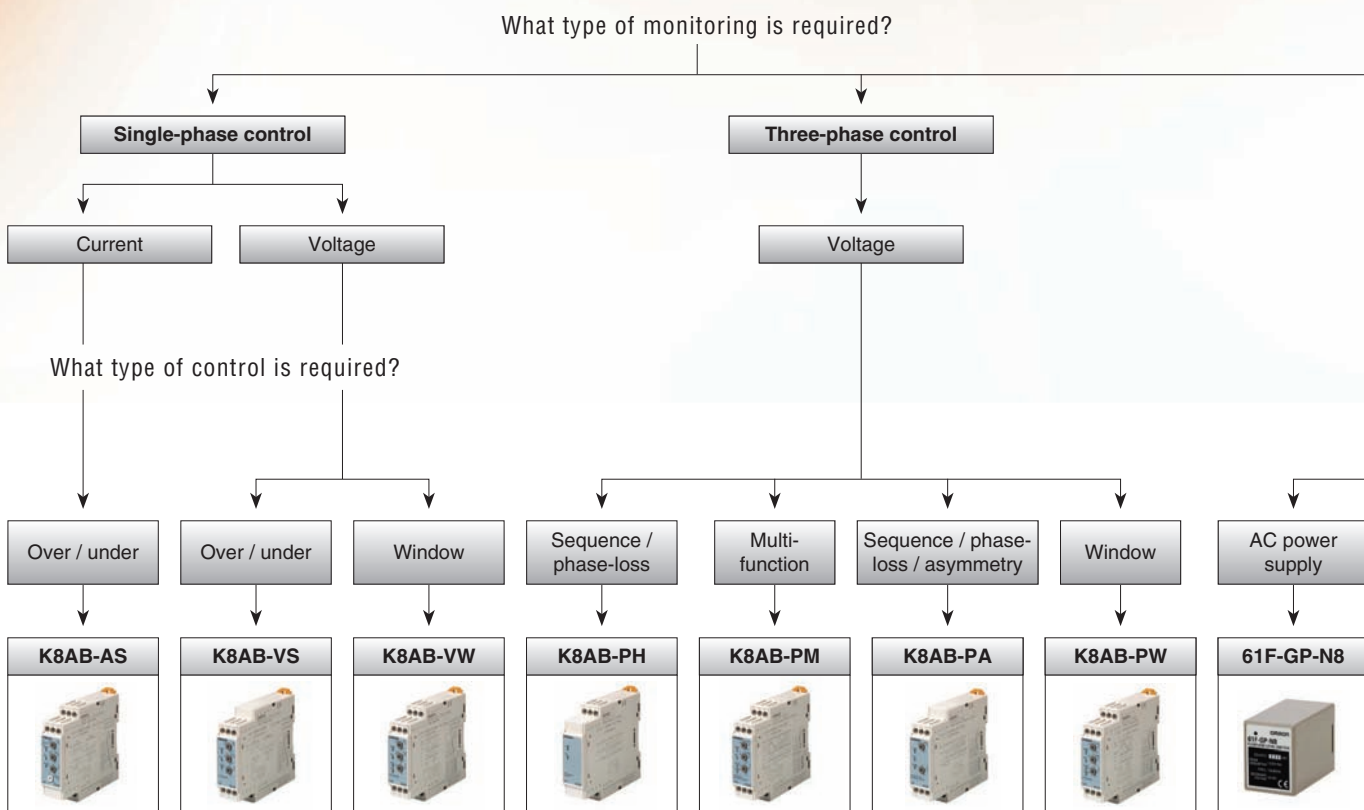
## A complete new monitoring product range in 22.5 mm housing

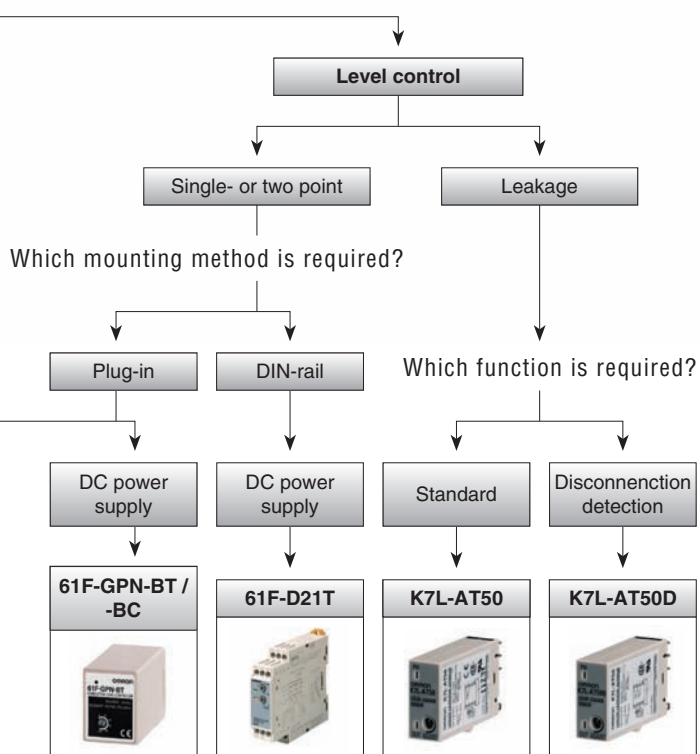
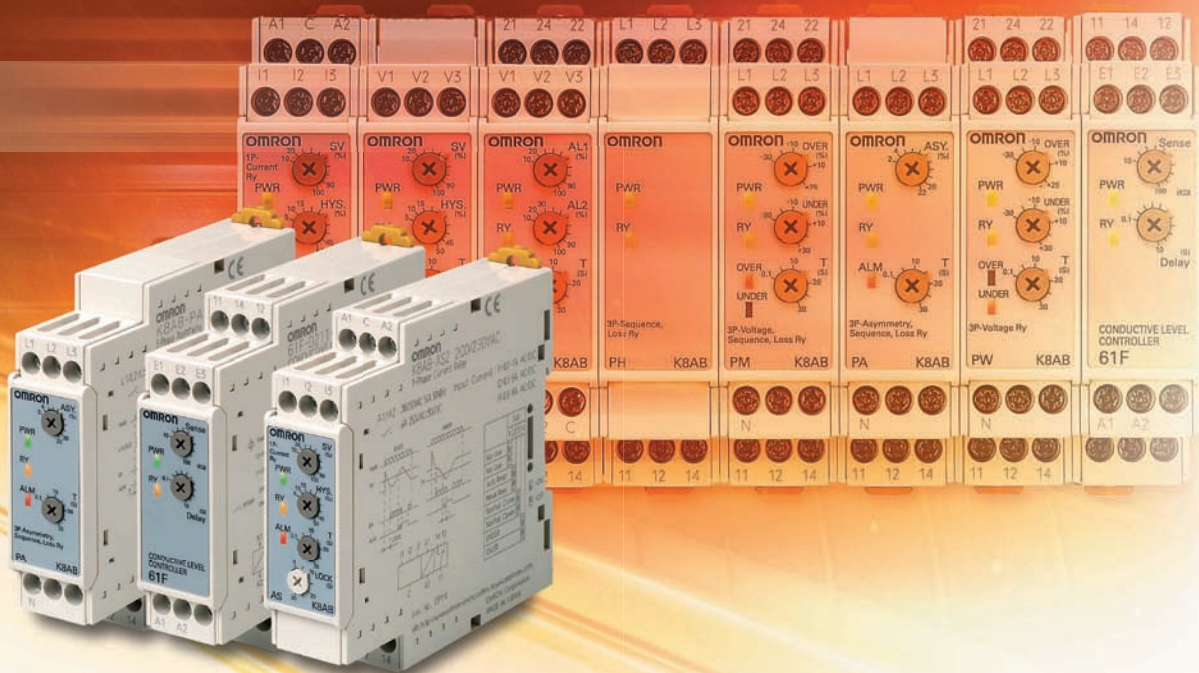
### The smart way to protect your system!

The K8 series offers a complete range of first-class quality monitoring products, all in compact 22.5 mm wide DIN-rail housing. The K8 series includes single-phase relays that monitor current or voltage variations, three-phase relays that monitor phase-sequence, phase asymmetry, phase-loss or voltage variations, and a conductive level controller.

With innovative features, these relays provide timely warnings of system errors. This series of just eight models offers you a flexible one-stop-shopping solution for your monitoring requirements.

Typical applications include monitoring generator voltages, providing chain breakage protection for conveyors, checking battery voltage, protecting pumps against idle running, monitoring phase sequence or phase loss on escalators, and monitoring liquid levels in tanks.


















## Table of contents

<b>Selection table</b>	182
<b>1 phase control</b>	K8AB-AS 184
	K8AB-VS 185
	K8AB-VW 186
<b>3 phase control</b>	K8AB-PH 187
	K8AB-PM 188
	K8AB-PA 189
	K8AB-PW 190
<b>Conductive level controller</b>	61F-GP-N8 191
	61F-GPN-BT / BC 193
	61F-D21T 194
<b>Leakage controller</b>	K7L 195

# Selection table

Category		1-phase current	1-phase voltage		Phase-sequence phase-loss	3-phase phase-sequence phase-loss	3-phase asymmetry and phase-sequence phase-loss
Selection criteria							
	Model	K8AB-AS	K8AB-VS	K8AB-VW	K8AB-PH	K8AB-PM	K8AB-PA
	Detection method	Conductive					
	Specialty	Ideal for current monitoring for industrial heaters and motors.	Ideal for voltage monitoring for industrial facilities and equipment.	Ideal for voltage monitoring for industrial facilities and equipment.	Ideal for phase-sequence and phase-loss monitoring for industrial facilities and equipment.	Ideal for monitoring 3-phase power supplies for industrial facilities and equipment.	Ideal for 3-phase voltage asymmetry monitoring for industrial facilities and equipment.
	Sensing range (configurable)	20 mA to 10 A, current transformer: 100 / 200 A	60 mV to 600 V	60 mV to 600 V	Same as supply voltage		
Supply voltage AC	24 VAC	■	■	■			
	100 VAC						
	110 VAC						
	115 VAC	■	■	■			
	120 VAC						
	200 VAC						
	220 VAC						
	230 VAC	■	■	■			
	240 VAC						
	200 - 500 VAC				■		
	200 - 240 VAC					■ (-PM1, 3-wire)	■ (-PA1, 3-wire)
	115 - 138 VAC					■ (-PM1, 4-wire)	■ (-PA1, 4-wire)
Supply voltage DC	24 VDC	■	■	■			
	12 .. 24 VDC						
	Transistor NPN						
	Transistor PNP						
Control output	Relay	■ (1 SPDT)	■ (1 SPDT)	■ (2 SPDT)	■ (1 SPDT)	■ (2 SPDT)	■ (1 SPDT)
	LED operation indicator	■	■	■	■	■	■
Features	Adjustable sensitivity						
	Electrode types						
Page		184	185	186	187	188	189

3-phase voltage	Conductive level controller				Liquid leakage sensor amplifier	
						
K8AB-PW	61F-GP-N8	61F-GPN-BT	61F-GPN-BC	61F-D21T	K7L-AT50	K7L-AT50D
<b>Conductive</b>						
Ideal for monitoring 3-phase power supplies for industrial facilities and equipment.	Single or two-point	AC sine wave between electrodes for stable detection with no electrolysis	AC sine wave between electrodes for stable detection with no electrolysis	Ideal for level control for industrial facilities and equipment	Sensor amplifier, AC sine wave between electrodes for stable detection with no electrolysis	Sensor amplifier with disconnection detection function
Same as supply voltage	4 to 50 kΩ	0 to 100 kΩ	1 to 100 kΩ	10 to 100 kΩ	0 to 50 MΩ	1 to 50 MΩ
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<input type="checkbox"/>	<input type="checkbox"/>					
<input checked="" type="checkbox"/> (-PW1, 3-wire)						
<input checked="" type="checkbox"/> (-PW1, 4-wire)						
<input checked="" type="checkbox"/> (-PW2, 3-wire)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
<input checked="" type="checkbox"/> (-PW2, 4-wire)						
<input checked="" type="checkbox"/> (2 SPDT)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
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		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Electrode holder: PS-□S, PS-31, BF-1 and BS-1				Liquid leakage sensor band F03-16PE	
190	191	193		194	195	



Standard



Available



No / not available





## Single-phase current relay

These single-phase current relays monitor over- and undercurrents. Manual resetting and automatic resetting are supported by one relay. The start-up lock and operating time can be set separately. The relay warning status is easily monitored with the LED indicator.

- Single-phase current relay
- In 22.5 mm wide industrial housing
- Under or over control
- Supply voltages: 24 VAC / 24 VDC / 115 VAC / 230 VAC
- Easy wiring with ferrules




## Ordering information

Measuring current	Supply voltage	Model
2 to 20 mA AC / DC, 10 to 100 mA AC / DC, 50 to 500 mA AC / DC	24 VDC	<b>K8AB-AS1 24 VDC</b>
	24 VAC	<b>K8AB-AS1 24 VAC</b>
	100-115 VAC	<b>K8AB-AS1 100-115 VAC</b>
	200-230 VAC	<b>K8AB-AS1 200-230 VAC</b>
0.1 to 1 A AC / DC, 0.5 to 5 A AC / DC, 0.8 to 8 A AC / DC	24 VDC	<b>K8AB-AS2 24 VDC</b>
	24 VAC	<b>K8AB-AS2 24 VAC</b>
	100-115 VAC	<b>K8AB-AS2 100-115 VAC</b>
	200-230 VAC	<b>K8AB-AS2 200-230 VAC</b>
10 to 100 A AC, 20 to 200 A AC	24 VDC	<b>K8AB-AS3 24 VDC</b>
	24 VAC	<b>K8AB-AS3 24 VAC</b>
	100-115 VAC	<b>K8AB-AS3 100-115 VAC</b>
	200-230 VAC	<b>K8AB-AS3 200-230 VAC</b>

## Accessories

**Bold** = preferred stock item

Current transformer	Input range	Applicable relay	Model
	10 to 100 A AC, 20 to 200 A AC	K8AB-AS3	<b>K8AC-CT200L</b>

**Note:** The K8AB-AS3 is designed to be used in combination with the K8AC-CT200L (direct input not possible)

## Specifications

<b>Ambient temperature</b>		Operating: -20 °C to 60 °C (with no condensation or icing), storage: -40 °C to 70 °C (with no condensation or icing)
<b>Operating voltage range</b>		85% to 110% of rated operating voltage
<b>Rated power supply frequency</b>		50 / 60 Hz $\pm 5$ Hz (AC power supply)
<b>Output relays (SPDT)</b>	<b>Resistive load</b>	6 A at 250 VAC ( $\cos\phi = 1$ ), 6 A at 30 VDC (L / R = 0 ms)
	<b>Inductive load</b>	1 A at 250 VAC ( $\cos\phi = 0.4$ ), 1 A at 30 VDC (L / R = 7 ms)
	<b>Minimum load</b>	10 mA at 5 VDC
	<b>Maximum contact voltage</b>	250 VAC
	<b>Maximum contact current</b>	6 A AC
	<b>Maximum switching capacity</b>	1,500 VA
	<b>Life expectancy</b>	Mechanical: 10,000,000 operations, electrical: make: 50,000 times, break: 30,000 times
<b>Crimp terminals</b>		Two solid wires of 2.5 mm <sup>2</sup> , two crimp terminals of 1.5 mm <sup>2</sup> with insulation sleeves, can be tightened together
<b>Degree of protection</b>		Terminal section: IP20, rear case: IP40
<b>Case material</b>		ABS resin (self-extinguishing resin) UL94-V0
<b>Weight</b>		200 g
<b>Operating power</b>	<b>Non-isolated power supply</b>	24 VDC (1 W)
	<b>Isolated power supply</b>	24 VAC (3 VA), 100 to 115 VAC (4 VA), 200 to 230 VAC (5 VA)
<b>Operate (SV)</b>	<b>Operating value setting range</b>	10% to 100% of maximum rated input value
	<b>Operating value</b>	100% operation at set value
<b>Reset (HYS.)</b>	<b>Hysteresis</b>	5% to 50% of operating value
	<b>Resetting method</b>	Manual reset / automatic reset (switchable) Manual reset: turn OFF operating power for 1 s or longer
<b>Operating time (T)</b>		0.1 to 30 s (value when input rapidly changes from 0% to 120%)
<b>Operating power ON lock (LOCK)</b>		0 to 30 s (value when input rapidly changes from 0% to 120%, lock timer starts upon input 30% of SV)
<b>Setting accuracy</b>		$\pm 10\%$ of full scale
<b>Time error</b>		$\pm 10\%$ of set value (minimum error: 50 ms)
<b>Input frequency</b>		K8AB-AS1 / -AS2: DC input, 45 to 65 Hz; K8AB-AS3: 45 to 60 Hz
<b>Continuous input</b>	<b>K8AB-AS1 / -AS2</b>	Continuous input: 115% of maximum input, 10 s max.: 125% of maximum input
	<b>K8AB-AS3</b>	Continuous input: 240 A, 30 s max.: 400 A, 1 s max.: 1,200 A
<b>Indicators</b>		Power (PWR): green LED, relay output (RY): yellow LED, alarm outputs (ALM): red LED
<b>Size in mm</b>		90Hx22.5Wx100D



## Single-phase voltage relay

These single-phase voltage relays are for monitoring over- and undervoltages. Manual resetting and automatic resetting are supported by one relay. Relay warning status can easily be monitored using the LED indicator.

- Single-phase voltage relay
- In 22.5 mm-wide industrial housing
- Under or over control
- Supply voltages: 24 VAC / 24 VDC / 115 VAC / 230 VAC
- Easy wiring with ferrules



## Ordering information

Measuring voltage	Supply voltage	Model
6 to 60 mV AC / DC, 10 to 100 mV AC / DC, 30 to 300 mV AC / DC	24 VDC	<b>K8AB-VS1 24 VDC</b>
	24 VAC	<b>K8AB-VS1 24 VAC</b>
	100-115 VAC	<b>K8AB-VS1 100-115 VAC</b>
	200-230 VAC	<b>K8AB-VS1 200-230 VAC</b>
1 to 10 VAC / VDC, 3 to 30 VAC / VDC, 15 to 150 VAC / VDC	24 VDC	<b>K8AB-VS2 24 VDC</b>
	24 VAC	<b>K8AB-VS2 24 VAC</b>
	100-115 VAC	<b>K8AB-VS2 100-115 VAC</b>
	200-230 VAC	<b>K8AB-VS2 200-230 VAC</b>
20 to 200 VAC / VDC, 30 to 300 VAC / VDC, 60 to 600 VAC / VDC	24 VDC	<b>K8AB-VS3 24 VDC</b>
	24 VAC	<b>K8AB-VS3 24 VAC</b>
	100-115 VAC	<b>K8AB-VS3 100-115 VAC</b>
	200-230 VAC	<b>K8AB-VS3 200-230 VAC</b>

**Bold** = preferred stock item

## Specifications

Ambient operating temperature		-20 °C to 60 °C (with no condensation or icing)
Storage temperature		-40 °C to 70 °C (with no condensation or icing)
Operating voltage range		85% to 110% of rated operating voltage
Rated power supply frequency		50 / 60 Hz ±5 Hz (AC power supply)
Output relays	Resistive load	6 A at 250 VAC (cosϕ= 1), 6 A at 30 VDC (L / R = 0 ms)
	Inductive load	1 A at 250 VAC (cosϕ= 0.4), 1 A at 30 VDC (L / R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm <sup>2</sup> , two crimp terminals of 1.5 mm <sup>2</sup> with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case color		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Mounting		Mounted to DIN-rail or via M4 screws
Operating power	Non-isolated power supply	24 VDC (1 W)
	Isolated power supply	24 VAC (4 VA), 100 to 115 VAC (4 VA), 200 to 230 VAC (5 VA)
Operate (SV)	Operating value setting range	10% to 100% of maximum rated input value
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% to 50% of operating value
	Resetting method	Manual reset / automatic reset (switchable) Manual reset: turn OFF operating power for 1 s or longer
Operating time (T)		0.1 to 30 s (value when input rapidly changes from 0% to 120%)
Power ON lock (LOCK)		1 s or 5 s error ±0.5 s (value when input rapidly changes from 0% to 100%. The operating time is the shortest at this point)
Setting accuracy		±10% of full scale
Time error		±10% of set value (minimum error: 50 ms)
Input frequency		40 to 500 Hz
Input impedance		K8AB-VS1: 9 kΩ min., K8AB-VS2: 100 kΩ min., K8AB-VS3: 1 MΩ min.
Indicators		LED power (PWR): green LED, relay output (RY): yellow LED, alarm output (ALM): red LED
Output relays		One SPDT relay (6 A at 250 VAC, resistive load)
Size in mm		90Hx22.5Wx100D





## Single-phase voltage relay, window type

For monitoring over- and undervoltages simultaneously. Manual resetting and automatic resetting are supported by one relay. Separate settings and outputs are supported for over- and undervoltages. Relay warning status can easily be monitored with the LED indicator.

- Single-phase voltage window relay
- In 22.5 mm-wide industrial housing
- Under and over, low / low or high / high control
- Supply voltages: 24 VAC / 24 VDC / 115 VAC / 230 VAC
- Easy wiring with ferrules



### Ordering information

Measuring voltage	Supply voltage	Model
6 to 60 mV AC / DC, 10 to 100 mV AC / DC, 30 to 300 mV AC / DC	24 VDC	<b>K8AB-VW1 24 VDC</b>
	24 VAC	<b>K8AB-VW1 24 VAC</b>
	100-115 VAC	<b>K8AB-VW1 100-115 VAC</b>
	200-230 VAC	<b>K8AB-VW1 200-230 VAC</b>
1 to 10 V AC / DC, 3 to 30 V AC / DC, 15 to 150 V AC / DC	24 VDC	<b>K8AB-VW2 24 VDC</b>
	24 VAC	<b>K8AB-VW2 24 VAC</b>
	100-115 VAC	<b>K8AB-VW2 100-115 VAC</b>
	200-230 VAC	<b>K8AB-VW2 200-230 VAC</b>
20 to 200 V AC / DC, 30 to 300 V AC / DC, 60 to 600 V AC / DC	24 VDC	<b>K8AB-VW3 24 VDC</b>
	24 VAC	<b>K8AB-VW3 24 VAC</b>
	100-115 VAC	<b>K8AB-VW3 100-115 VAC</b>
	200-230 VAC	<b>K8AB-VW3 200-230 VAC</b>

**Bold** = preferred stock item

### Specifications

<b>Ambient operating temperature</b>		-20 °C to 60 °C (with no condensation or icing)
<b>Storage temperature</b>		-40 °C to 70 °C (with no condensation or icing)
<b>Operating voltage range</b>		85% to 110% of rated operating voltage
<b>Rated power supply frequency</b>		50 / 60 Hz $\pm$ 5 Hz (AC power supply)
<b>Output relays (SPDT)</b>	<b>Resistive load</b>	6 A at 250 VAC ( $\cos\phi = 1$ ), 6 A at 30 VDC (L / R = 0 ms)
	<b>Inductive load</b>	1 A at 250 VAC ( $\cos\phi = 0.4$ ), 1 A at 30 VDC (L / R = 7 ms)
	<b>Minimum load</b>	10 mA at 5 VDC
	<b>Maximum contact voltage</b>	250 VAC
	<b>Maximum contact current</b>	6 A AC
	<b>Maximum switching capacity</b>	1,500 VA
	<b>Mechanical life</b>	10,000,000 operations
	<b>Electrical life</b>	Make: 50,000 times, break: 30,000 times
<b>Crimp terminals</b>		Two solid wires of 2.5 mm <sup>2</sup> , two crimp terminals of 1.5 mm <sup>2</sup> with insulation sleeves, can be tightened together
<b>Degree of protection</b>		Terminal section: IP20, rear case: IP40
<b>Case color</b>		Munsell 5Y8/1 (ivory)
<b>Case material</b>		ABS resin (self-extinguishing resin) UL94-V0
<b>Weight</b>		200 g
<b>Mounting</b>		Mounted to DIN-rail or via M4 screws
<b>Operating power</b>	<b>Non-isolated power supply</b>	24 VDC (1 W)
	<b>Isolated power supply</b>	24 VAC (4 VA), 100 to 115 VAC (4 VA), 200 to 230 VAC (5 VA)
<b>Operation (AL1 and AL2)</b>	<b>Operating value setting range</b>	10% to 100% of maximum rated input value
	<b>Operating value</b>	100% operation at set value
<b>Reset (HYS.)</b>	<b>Hysteresis</b>	5% of operating value (fixed)
	<b>Resetting method</b>	Manual reset / automatic reset (switchable) Manual reset: turn OFF operating power for 1 s or longer
<b>Operating time (T)</b>		0.1 to 30 s (value when input rapidly changes from 0% to 120%)
<b>Power ON lock (LOCK)</b>		1 s or 5 s error $\pm$ 0.5 s (value when input rapidly changes from 0% to 100%)
<b>Setting accuracy</b>		$\pm$ 10% of full scale
<b>Time error</b>		$\pm$ 10% of set value (minimum error: 50 ms)
<b>Input frequency</b>		40 to 500 Hz
<b>Input impedance</b>		K8AB-VW1: 9 k $\Omega$ min., K8AB-VW2: 100 k $\Omega$ min., K8AB-VW3: 1 M $\Omega$ min.
<b>Indicators</b>		Power (PWR): green LED, relay output (RY): yellow LED, alarm outputs (ALM 1 / 2): red LED
<b>Output relays</b>		Two SPDT relays (6 A at 250 VAC, resistive load), normally closed operation (normally ON)
<b>Size in mm</b>		90Hx22.5Wx100D



### 3-phase sequence, phase-loss relay

K8AB-PH simultaneously monitors phase sequence and phase loss for 3-phase 3-wire power supplies. The relay warning status can easily be monitored using the LED indicator. Suitable for industrial facilities and equipment.

- 3-phase sequence, phase-loss relay
- Monitors both functions at once
- Measuring range: 200 to 500 VAC
- Power supply voltage is the same as measuring voltage
- Operation reaction time: 0.1 s maximum



### Ordering information

Rated input voltage	Model
200 to 500 VAC	<b>K8AB-PH1</b>

**Bold** = preferred stock item

### Specifications

Ambient operating temperature		-20 °C to 60 °C (with no condensation or icing)
Storage temperature		-40 °C to 70 °C (with no condensation or icing)
Altitude		2,000 m max.
Voltage fluctuation range		85% to 110% of rated input voltage
Input frequency		50 / 60 Hz $\pm$ 5 Hz (AC power supply)
Output relays	Resistive load	6 A at 250 VAC ( $\cos\phi = 1$ ), 6 A at 30 VDC (L / R = 0 ms)
	Inductive load	1 A at 250 VAC ( $\cos\phi = 0.4$ ), 1 A at 30 VDC (L / R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Terminal screw tightening torque		1.2 Nm
Degree of protection		Terminal section: IP20, rear case: IP40
Case color		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Mounting		Mounted to DIN-rail or via M4 screws
Rated input voltage	Non-isolated	200 to 500 VAC (15 VA)
Phase-sequence, phase-loss operating time		0.1 s max. (value when rated operating voltage changes quickly from 0% to 100%) (relays are normally ON and turn OFF for phase-sequence or loss phase errors)
Resetting method		Automatic reset
Input frequency		45 to 65 Hz
Input impedance		100 k $\Omega$ min.
Indicators		Power (PWR): green LED, relay output (RY): yellow LED
Output relays		One SPDT relay (6 A at 250 VAC, resistive load)
Size in mm		90Hx22.5Wx100D



## 3-phase voltage, phase-sequence, phase-loss relay

K8AB-PM monitors overvoltages, undervoltages, phase sequence and phase loss for 3-phase, 3-wire or 4-wire power supplies, in one unit. This relay features a switch setting for 3-phase, 3-wire or 3-phase, 4-wire power supply.

- Worldwide power specifications supported by one unit
- Phase sequence, phase loss: operation reaction time 0.1 s maximum
- Overvoltages or undervoltages: operation time setting from 0.1 to 30 s
- Relay warning status can easily be monitored using the LED indicator
- Easy wiring with ferrules

CE

### Ordering information

Rated input		Model
3-phase 3-wire mode	200, 220, 230, 240 VAC	<b>K8AB-PM1</b>
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	<b>K8AB-PM2</b>
3-phase 4-wire mode	220, 230, 240, 277 VAC	

**Bold** = preferred stock item

### Specifications

Ambient operating temperature		-20 °C to 60 °C (with no condensation or icing)
Ambient operating humidity		25% to 85%
Voltage fluctuation range		85% to 110% of rated input voltage
Input frequency		50 / 60 Hz $\pm 5$ Hz (AC power supply)
Output relays	Resistive load	6 A at 250 VAC ( $\cos\phi = 1$ ), 6 A at 30 VDC (L / R = 0 ms)
	Inductive load	1 A at 250 VAC ( $\cos\phi = 0.4$ ), 1 A at 30 VDC (L / R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm <sup>2</sup> , two crimp terminals of 1.5 mm <sup>2</sup> with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case color		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Mounting		Mounted to DIN-rail or via M4 screws
Rated input voltage	K8AB-PM1	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AB-PM2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Operation (overvoltage or undervoltage)	Operating value setting range	Overvoltage = -30% to 25% of maximum rated input voltage <sup>*1</sup> Undervoltage = -30% to 25% of maximum rated input voltage <sup>*1</sup>
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	Overvoltage / undervoltage	0.1 to 30 s (value when input rapidly changes from 0% to 120%)
	Phase-sequence, phase-loss	0.1 s max. (value when input rapidly changes from 0% to 100%)
Power ON lock (LOCK)		1 s or 5 s error $\pm 0.5$ s (value when input rapidly changes from 0% to 100%. The operating time is the shortest at this point)
Setting accuracy		$\pm 10\%$ of full scale
Time error		$\pm 10\%$ of set value (minimum error: 50 ms)
Input frequency		45 to 65 Hz
Input impedance		100 k $\Omega$ min.
Indicators		Power (PWR): green LED, relay output (RY): yellow LED, alarm outputs (ALM 1 / 2): red LED
Output relays		Two SPDT relays (6 A at 250 VAC, resistive load), normally closed operation (normally ON) (separate outputs possible for overvoltages and undervoltages)
Size in mm		90Hx22.5Wx100D

<sup>\*1</sup> The rated input voltage is switched with a switch



## 3-phase asymmetry, phase-sequence, phase-loss relay

Monitors voltage asymmetry, phase sequence and phase loss for 3-phase 3-wire or 4-wire power supplies, in one unit.

- Worldwide power specifications supported by one unit
- Phase sequence, phase loss: operation reaction time 0.1 s maximum
- Asymmetry: operation time setting from 0.1 to 30 s
- Reset method: automatic
- Power ON lock: 1 s or 5 s

CE

### Ordering information

Rated input		Model
3-phase 3-wire mode	200, 220, 230, 240 VAC	<b>K8AB-PA1</b>
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	<b>K8AB-PA2</b>
3-phase 4-wire mode	220, 230, 240, 277 VAC	

**Bold** = preferred stock item

### Specifications

Ambient operating temperature		-20 °C to 60 °C (with no condensation or icing)
Storage temperature		-40 °C to 70 °C (with no condensation or icing)
Altitude		2,000 m max.
Voltage fluctuation range		85% to 110% of rated input voltage
Input frequency		50 / 60 Hz $\pm$ 5 Hz (AC power supply)
Output relays	Resistive load	6 A at 250 VAC ( $\cos\phi = 1$ ), 6 A at 30 VDC (L / R = 0 ms)
	Inductive load	1 A at 250 VAC ( $\cos\phi = 0.4$ ), 1 A at 30 VDC (L / R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm <sup>2</sup> , two crimp terminals of 1.5 mm <sup>2</sup> with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case color		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Rated input voltage	K8AB-PA1	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	K8AB-PA2	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Asymmetry operation (ASY.)	Operating value setting range	Asymmetry rate: 2% to 22%
	Operating value	100% operation at set value Asymmetry operating value = rated input voltage x asymmetry set value [%] The asymmetry operation will function when the difference between the highest and lowest voltage phases equals or exceeds the asymmetry operating value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	Asymmetry	0.1 s to 30 s (value when input rapidly changes from 0% to 120%)
	Phase-sequence, phase-loss	0.1 s max. (value when input rapidly changes from 0% to 100%)
Power ON lock (LOCK)		1 s or 5 s (value when input rapidly changes from 0% to 100%. The operating time is the shortest at this point)
Setting accuracy		$\pm$ 10% of full scale
Time error		$\pm$ 10% of set value (minimum error: 50 ms)
Input frequency		45 to 65 Hz
Input impedance		100 k $\Omega$ min.
Indicators		Power (PWR): green LED, relay output (RY): yellow LED, alarm outputs (ALM 1 / 2): red LED
Output relays		One SPDT relay (6 A at 250 VAC, resistive load), normally closed operation (normally ON)
Size in mm		90Hx22.5Wx100D



## 3-phase voltage relay

Monitors overvoltages and undervoltages for 3-phase 3-wire or 4-wire power supplies, in one unit. Switch setting for 3-phase 3-wire or 3-phase 4-wire power supply.

- Overvoltages or undervoltages: operation time setting from 0.1 to 30 s
- Relay warning status can easily be monitored using the LED indicator
- Separate outputs possible for overvoltages and undervoltages
- Reset method: automatic
- Power ON lock: 1 s or 5 s

CE

## Ordering information

Rated input		Model
3-phase 3-wire mode	200, 220, 230, 240 VAC	<b>K8AB-PW1</b>
3-phase 4-wire mode	115, 127, 133, 138 VAC	
3-phase 3-wire mode	380, 400, 415, 480 VAC	<b>K8AB-PW2</b>
3-phase 4-wire mode	220, 230, 240, 277 VAC	

**Bold** = preferred stock item

## Specifications

Ambient operating temperature		-20 °C to 60 °C (with no condensation or icing)
Storage temperature		-40 °C to 70 °C (with no condensation or icing)
Altitude		2,000 m max.
Voltage fluctuation rang		85% to 110% of rated input voltage
Input frequency		50 / 60 Hz $\pm$ 5 Hz (AC power supply)
Output relays	Resistive load	6 A at 250 VAC ( $\cos\phi=1$ ), 6 A at 30 VDC (L / R = 0 ms)
	Inductive load	1 A at 250 VAC ( $\cos\phi=0.4$ ), 1 A at 30 VDC (L / R = 7 ms)
	Minimum load	10 mA at 5 VDC
	Maximum contact voltage	250 VAC
	Maximum contact current	6 A AC
	Maximum switching capacity	1,500 VA
	Mechanical life	10,000,000 operations
	Electrical life	Make: 50,000 times, break: 30,000 times
Crimp terminals		Two solid wires of 2.5 mm <sup>2</sup> , two crimp terminals of 1.5 mm <sup>2</sup> with insulation sleeves, can be tightened together
Degree of protection		Terminal section: IP20, rear case: IP40
Case color		Munsell 5Y8/1 (ivory)
Case material		ABS resin (self-extinguishing resin) UL94-V0
Weight		200 g
Rated input voltage	<b>K8AB-PW1</b>	3-phase, 3-wire mode: 200, 220, 230, 240 VAC, 3-phase, 4-wire mode: 115, 127, 133, 138 VAC
	<b>K8AB-PW2</b>	3-phase, 3-wire mode: 380, 400, 415, 480 VAC, 3-phase, 4-wire mode: 220, 230, 240, 277 VAC
Operation (overvoltage and undervoltage)	Operating value setting range	Overvoltage = -30% to 25% of maximum rated input voltage <sup>*1</sup> Undervoltage = -30% to 25% of maximum rated input voltage <sup>*1</sup>
	Operating value	100% operation at set value
Reset (HYS.)	Hysteresis	5% of operating value (fixed)
	Resetting method	Automatic reset
Operating time (T)	Overvoltage / undervoltage	0.1 to 30 s (value when input rapidly changes from 0% to 120%)
Power ON lock (LOCK)		1 s or 5 s (value when input rapidly changes from 0% to 100%. The operating time is the shortest at this point)
Setting accuracy		$\pm$ 10% of full scale
Time error		$\pm$ 10% of set value (minimum error: 50 ms)
Input frequency		45 to 65 Hz
Input impedance		100 k $\Omega$ min.
Indicators		Power (PWR): green LED, relay output (RY): yellow LED, alarm outputs (ALM 1 / 2): red LED
Output relays		Two SPDT relays (6 A at 250 VAC, resistive load), normally closed operation (normally ON) (separate outputs possible for overvoltages and undervoltages)
Size in mm		90Hx22.5Wx100D

<sup>\*1</sup> The rated input voltage is switched with a switch



## Compact plug-in (8-pin) level controller

The 61F-GP-N8 can be used for single- or two-point level control of conductive materials, both liquids and solids. These products are equipped with a red LED operation indicator.

- Low-voltage (AC) electrodes (8 VAC or 24 VAC)
- Operation range: 4 - 15 k $\Omega$ , 70 - 300 k $\Omega$
- Detection method: conductive
- Probes need to be ordered separately
- Conforms to EMC and LVD directives, UL / CSA approved



### Ordering information

Application	Type	Model number
Ordinary purified water or sewage water	General purpose type	<b>61F-GP-N8 24AC</b>
		<b>61F-GP-N8 110AC</b>
		<b>61F-GP-N8 230AC</b>
Ordinary purified water, where the distance between sewage pumps and water tanks or between receiver tanks and supply tanks is long or where remote control is required	Long-distance type	2 km
		61F-GP-N8L 24AC 2KM
		61F-GP-N8L 110AC 2KM
		61F-GP-N8L 230AC 2KM
	4 km	61F-GP-N8L 24AC 4KM
		61F-GP-N8L 110AC 4KM
		61F-GP-N8L 230AC 4KM
Liquids with high specific resistance such as distilled water	High sensitivity type	<b>61F-GP-N8H 24AC</b>
		61F-GP-N8H 110AC
		<b>61F-GP-N8H 230AC</b>
Liquids with low specific resistance such as salt water, sewage water, acid chemicals, alkali chemicals	Low sensitivity type	61F-GP-N8D 24AC
		61F-GP-N8D 110AC
		61F-GP-N8D 230AC
Ordinary purified or sewage water, with two-wired-type electrode holder (incorporating a resistor of 6.8 k $\Omega$ )	Two-wired type	61F-GP-N8R 24AC
		61F-GP-N8R 110AC
		61F-GP-N8R 230AC

**Bold** = preferred stock item

### Accessories

Electrode holders					
Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Model
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70 °C	3	<b>PS-3S</b>
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1,000 mm	<b>PS-31-300MM</b> <b>PS-31-1000MM</b>
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150 °C (without water drips or vapor on the electrode holder surface)	1	<b>BF-1</b>
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250 °C (without water drips or vapor on the surface of the electrode holder)	1	<b>BS-1</b>
Electrode separators				Number of electrodes	Model
				1	F03-14 1P
				3	<b>F03-14 3P</b>
Electrodes, connecting, and lock nuts					
Applicable liquids	Material	Component	Indication mark	Inscription	Model
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line		<b>F03-01 SUS201</b>
		Connecting nut			<b>F03-02 SUS201</b>
		Lock nut			F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines		<b>F03-01 SUS316</b>
		Connecting nut		6	<b>F03-02 SUS316</b>
		Lock nut		316	<b>F03-03 SUS316</b>

**Bold** = preferred stock item



## Specifications

Model	61F-GP-N8	61F-GP-N8L	61F-GP-N8H	61F-GP-N8D	61F-GP-N8R
Supply voltage	24, 100, 110, 120, 200, 220, 230 or 240 VAC; 50 / 60 Hz				
Operating voltage range	85% to 110% of rated voltage				
Interelectrode voltage	8 VAC		24 VAC	8 VAC	
Interelectrode current	Approx. 1 mA AC max.		Approx. 0.4 mA AC max.	Approx. 1 mA AC max.	
Power consumption	Approx. 3.5 VA max.				
Response time	Operate: 80 ms max., release: 160 ms max.				
Cable length	1 km max.	2 km max. 4 km max.	50 m max.	1 km max.	800 m max.
Control output	1 A, 250 VAC (inductive load: $\cos\phi=0.4$ ), 3 A, 250 VAC (resistive load)				
Ambient temperature	Operating: -10 °C to 55 °C				
Life expectancy	Electrical: 100,000 operations min., mechanical: 5,000,000 operations min				
Size in mm	49.4Hx38Wx84D				



## Compact plug-in (11-pin) level controller (DC supply)

This controller is for single- or two-point level control. 24 VDC supply allows for usage in locations without AC power supply. Relay contact chattering usually caused by waves has been eliminated by using open collector output, reducing contact wear.

- Adjustable sensitivity: operation range: 0 - 100 k $\Omega$
- Red LED for operation indicator
- Conforms to EMC and LVD directives
- UL / CSA approved
- Probes need to be ordered separately



### Ordering information

Product name	Output	Model
Conductive level controller	Open collector (NPN)	<b>61F-GPN-BT 24VDC</b>
	Relay contact (SPST-NO)	<b>61F-GPN-BC 24VDC</b>
Front socket		PF113A-E

**Bold** = preferred stock item

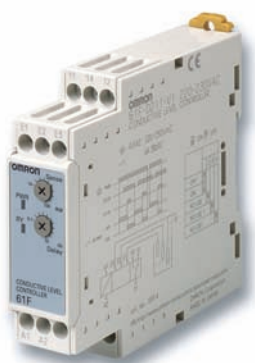
### Accessories

Electrode holders					
Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Model
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70 °C	3	<b>PS-3S</b>
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1000 mm	<b>PS-31-300MM</b> <b>PS-31-1000MM</b>
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150 °C (without water drips or vapor on the electrode holder surface)	1	<b>BF-1</b>
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250 °C (without water drips or vapor on the surface of the electrode holder)	1	<b>BS-1</b>
Electrode separators				Number of electrodes	Model
				1	F03-14 1P
				3	<b>F03-14 3P</b>
Electrodes, connecting, and lock nuts					
Applicable liquids	Material	Component	Indication mark	Inscription	Model
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line		<b>F03-01 SUS201</b>
		Connecting nut			<b>F03-02 SUS201</b>
		Lock nut			F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines		<b>F03-01 SUS316</b>
		Connecting nut		6	<b>F03-02 SUS316</b>
		Lock nut		316	<b>F03-03 SUS316</b>

**Bold** = preferred stock item

### Specifications

Model	61F-GPN-BT	61 F-GPN-BC
Rated voltage	24 VDC	
Allowable voltage range	85% to 110% of the rated voltage	
Interelectrode voltage	5 VAC max.	
Error	For scale of 0: +10 k $\Omega$ , for scale of 100: $\pm$ 10 k $\Omega$	
Release resistance	200% max. of the operation resistance	
Switching between supply and drainage	Terminals 7 and 8 open: automatic drainage operation; terminals 7 and 8 shorted: automatic supply operation	
Output specifications	Open collector (NPN) 30 VDC, 100 mA max.	SPST-NO; 5 A, 240 VAC (resistive load) 2 A, 240 VAC (inductive load: $\cos\phi = 0.4$ )
Life expectancy		Electrical: 100,000 operations min. Mechanical: 20,000,000 operations min.
Wiring distance	100 m max.	
Ambient operating temperature	-10 °C to 55 °C	
Response time	Operating: 1.5 s max., releasing: 3.0 s max.	
Size in mm	49.4Hx38Wx84D	



## 22.5 mm wide conductive level controller

- The 61F-D21T is a conductive level controller in a 22.5 mm wide industrial housing. Via DIP switches its function (supply or drainage) can be selected. This product is for single- or two-point level control.
- Time delay function up to 10 s
- Supply voltages: 24 VAC / 115 VAC / 220 to 230 VAC
- Control output: relay 6 A at 250 VAC resistive load
- Probes cable length: max. 100 m from controller
- LED indicator: green for power ON, yellow for output relay



### Ordering information

Supply voltage	Model
24 VAC	<b>61F-D21T-V1 24 VAC</b>
115 VAC	<b>61F-D21T-V1 115 VAC</b>
220 to 230 VAC	<b>61F-D21T-V1 220 to 230 VAC</b>

**Bold** = preferred stock item

### Accessories

Electrode holders					
Applications	Mounting style	Insulator material	Max. temperature	Number of electrodes	Model
For city water and other general use. Easy-to-replace separate versions for maintenance.	Flange	Phenol resin	70 °C	3	<b>PS-3S</b>
When mounting space is limited. Special 3-pole holder of small size and light weight.	Screw	Phenol resin		3, 300 mm 3, 1000 mm	<b>PS-31-300MM</b> <b>PS-31-1000MM</b>
Use for sewage, sea water, etc., having a low specific resistance.	Flange	Ceramics	150 °C (without water drips or vapor on the electrode holder surface)	1	<b>BF-1</b>
For resistance to high pressure. Use in tanks with high temperature or pressure.	Screw	PTFE	250 °C (without water drips or vapor on the surface of the electrode holder)	1	<b>BS-1</b>
Electrode separators				Number of electrodes	Model
				1	F03-14 1P
				3	<b>F03-14 3P</b>
Electrodes, connecting, and lock nuts					
Applicable liquids	Material	Component	Indication mark	Inscription	Model
Purified city water, industrial water, sewage	Equivalent to SUS 304 (AISI-304)	Electrode (1 m long)	1 line		<b>F03-01 SUS201</b>
		Connecting nut			<b>F03-02 SUS201</b>
		Lock nut			F03-03 SUS201
Purified city water, industrial water, sewage, dilute alkaline solution	SUS316 (AISI-316)	Electrode (1 m long)	2 lines		<b>F03-01 SUS316</b>
		Connecting nut		6	<b>F03-02 SUS316</b>
		Lock nut		316	<b>F03-03 SUS316</b>

**Bold** = preferred stock item

### Specifications

Rated voltage	24 VAC, 115 VAC, 220 to 230 VAC
Operating voltage range	85% to 110% of rated voltage
Voltage between electrodes	6 VAC p-p (approx. 20 Hz)
Power consumption	5 VA max.
Operating resistance	10 kΩ to 100 kΩ (variable)
Reset resistance	250 kΩ max.
Response time	Approx. 0.1 to 10 s (variable)
Cable length	100 m max. with completely insulated (600 V) cable with 3 conductors (0.75 mm <sup>2</sup> )
Control output	6 A at 250 VAC for resistive load at 20 °C, 1 A at 250 VAC for inductive load cosφ= 0.4 at 20 °C
Indicators	Green LED: power, yellow LED: control output
Ambient temperature	Operating: -20 °C to 60 °C, storage: -30 °C to 70 °C (with no condensation or icing)
Size in mm	90Hx22.5Wx100D



## Ultra-miniature liquid leakage sensor amplifier

This very compact plug-in leakage controller fits into OMRON's G2R 8-pin sockets (P2RF-08-E). K7L detects a wide variety of liquids, ranging from water to liquid chemicals with low conductivity.

- Operation range: up to 50 MΩ
- Four sensing ranges available
- Detection method: conductive
- Two LEDs: green for power supplied, red for output indication
- Conforms to EMC and LVD Directives, UL / CSA approved

### Ordering information

Product name	Characteristics	Model number
Liquid leakage sensor amplifier	Standard	<b>K7L-AT50</b>
	With disconnection function set	K7L-AT50D
	With disconnection function set sensor amplifier only	K7L-AT50D-S

**Bold** = preferred stock item

Product name		Characteristics	Model number
Sensors	Sensing band	Standard model (material polyethylene)	F03-16PE 5M
		For temperature and chemical resistance (material polyethylene PTFE)	F03-16PT 5M
		For flexibility and superior workability (material; plastic fiber braided cable)	F03-16SF 5M
		For flexibility and visual confirmation of leakage (material; plastic fiber braided cable)	F03-16SFC 5M
	Point sensor	Easier to wipe off than the band type	F03-16PS
		Electrodes have PTFE coating to resist chemicals	F03-16PS-F

**Bold** = preferred stock item

### Accessories

Product name	Characteristics	Model number
Terminal blocks (10 pcs)		F03-20
DIN-rail mounted socket	With finger protection	<b>P2RF-08-E</b>
	Without finger protection	P2RF-08

**Bold** = preferred stock item

Product name		Characteristics	Model number
Mounting brackets and stickers	Sensing band stickers	Used for F03-16SF(C)	F03-25
		Used for F03-16PE (adhesive tape)	F03-26PES
		Used for F03-16PE (screws) (30 pcs)	F03-26PEN
		Used for F03-16PT (screws)	F03-26PTN
	Point sensor mounting brackets	Used for F03-16PS	F03-26PS

**Bold** = preferred stock item

### Specifications

Rated power supply voltage	12 to 24 VDC (allowable voltage fluctuation range: 10 to 30 VDC)
Operate resistance	0 Ω to 50 MΩ, variable Range 0: 0 to 250 kΩ Range 1: 0 to 600 kΩ Range 2: 0 to 5 MΩ Range 3: 0 to 50 MΩ
Release resistance	105% min. of operate resistance
Output configuration	NPN open-collector transistor output with 100 mA at 30 VDC max.
Wiring distance	Connecting cable: 50 m max. Sensing band length: 10 m max.
Ambient temperature	Operating: -10 °C to 55 °C
Power consumption	1 W max.
Response time	Operate: 800 ms max., release: 800 ms max.
Weight	Approx. 14 g
Disconnection detection function (K7L-AT50D & K7L-AT50D-S only)	Detection signal: 10 VDC max., 200 ms, detection time: 10 s max. Release: by resetting the power supply
Size in mm	28.8Hx12.8Wx46D

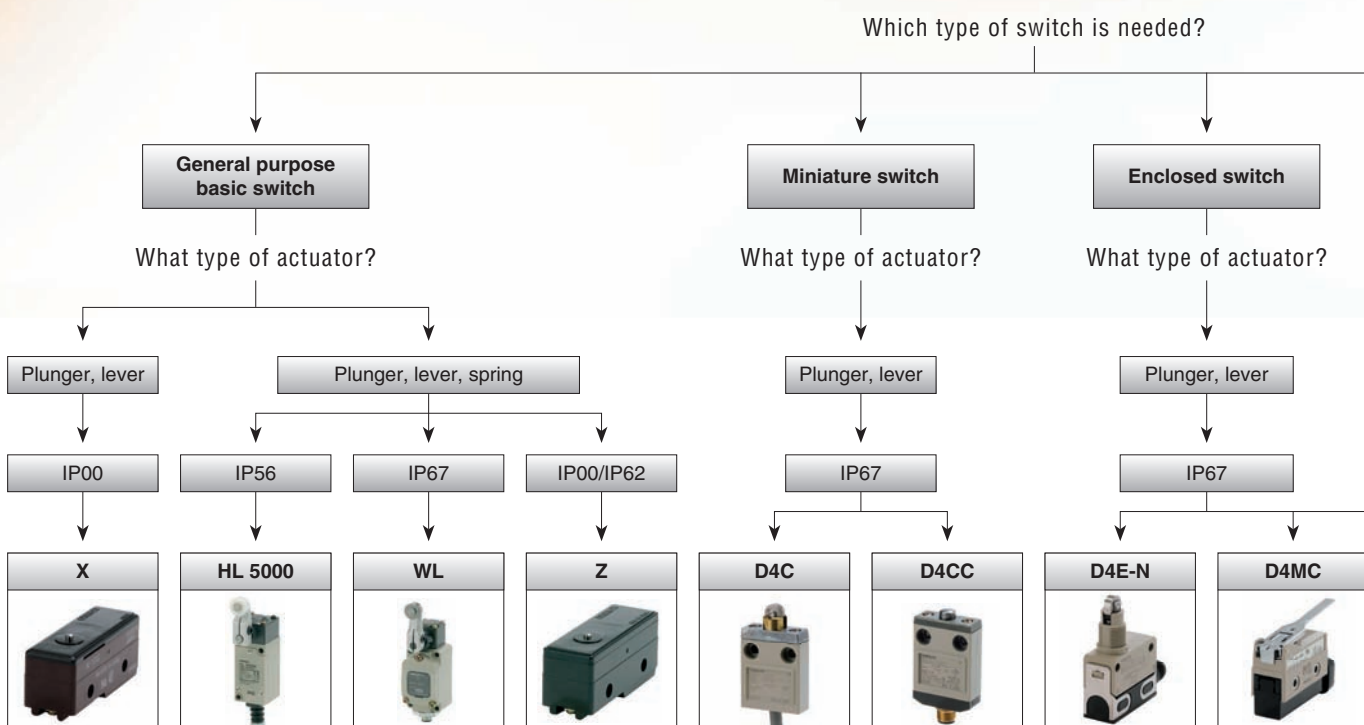
# Limit switches

Omron designs and manufactures an extensive range of high-quality limit switches that bring easier, more effective switching solutions to machines and systems.

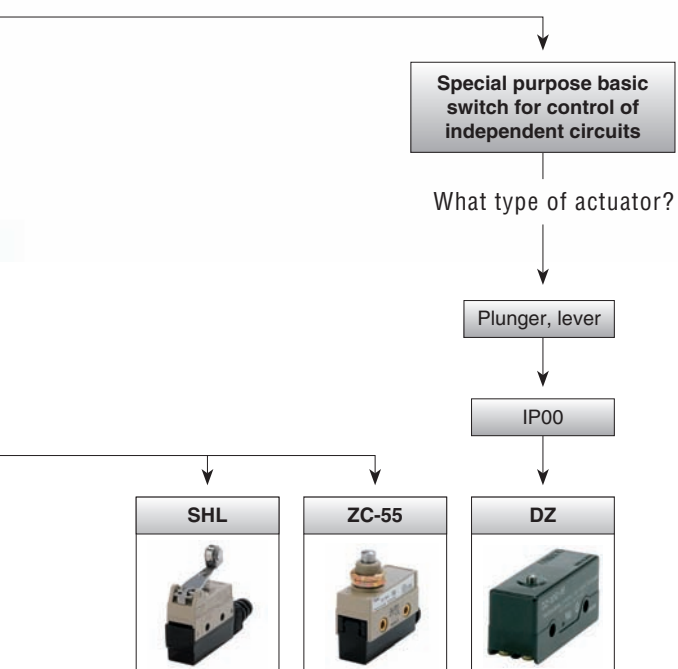
Models are available with a variety of roller lever heads, as well as various types of plunger heads. Better seals, higher resistance to shock and stronger covers make these switches the perfect solution for any industrial application, even in extreme environmental conditions.

These general purpose limit switches are ideal for use in applications across the industry including lifts, garages, production lines, safety doors, machine tools, automotive, security, domestic goods and vending machines.

- More contacts for increased functionality
- Compact, space-saving design without compromising on safety performance
- Robust construction for operating in the harshest of conditions
- Cost-effective, high-performance switches meeting the highest safety standards
- UL / CSA, TÜV, BIA, SUVA approvals
- Designed for global use












































































































## Table of contents

<b>Selection table</b>		198
<b>Standard switches</b>	HL5000	201
	WL	202
<b>Miniature switches</b>	D4C	203
	D4CC	204
<b>Enclosed switches</b>	D4E-_N	205
	D4MC	206
	SHL	207
	ZC-55	208
	DZ	209
<b>General purpose Z-size</b>	X	210
	Z	211



# Selection table

			Type	General purpose basic switch	Two circuit limit switch	Enclosed switch	Miniature limit switch	Small sealed switch	Enclosed switch	
Selection criteria										
	Model			HL-5000	WL	D4C	D4CC	D4E-N	D4MC	
	Category			General purpose switches	Special purpose switches					
	Degree of protection	IEC	IP65	IP67				IP67		
		JIS	Jet-proof	Immersion-proof						
	Rated current [A]	5 VDC								
		12 to 24 VDC								
		30 VDC	5			4	1	1	6	
		125 / 250 VDC								
		24 VAC								
		115 VAC							0.5	
		125 VAC	5	10	5	1	5	10		
100 to 240 VAC										
250 VAC		5	10	5				10		
480 VAC		10					3			
500 VAC		10								
Features	Microload type				0.1 A	0.1 A		0.1 A	0.1 A	
	Operation indicator				■	■	■			
Actuators	Adjustable rod lever		■							
	Adjustable roller lever		■							
	Bevel plunger				■	■				
	Center roller lever					■				
	Coil spring		■							
	Cross roller plunger				■	■				
	Fork lever lock			■						
	Hinge lever								■	
	Hinge roller lever								■	
	Hinge cross roller lever									
	Horizontal plunger			■						
	Horizontal roller plunger			■						
	Horizontal ball plunger			■						
	Leaf spring									
	Long hinge lever									
	Low force hinge lever									
	Low force wire hinge lever									
	One-way action hinge roller lever									
	One-way action short hinge roller lever								■	
	One-way action roller lever							■		
	Panel mount plunger					■			■	
	Panel mount pin plunger					■	■			
	Panel mount roller plunger					■	■		■	
	Panel mount cross roller plunger					■	■		■	
	Pin plunger					■	■	■		
	Plastic rod						■			
	Reverse hinge lever									
	Reverse hinge roller lever									
	Reverse short hinge roller lever									
	Roller leaf spring									
	Roller lever									
	Roller lever		■			■		■		
	Roller plunger					■	■	■		
	Sealed cross roller plunger					■	■	■		
	Sealed plunger		■			■	■	■		
	Sealed plunger roller		■	■	■	■	■	■		
	Short hinge cross roller lever									
	Short hinge lever								■	
	Short hinge roller lever									
	Short spring plunger									
	Side plunger				■					
	Side roller plunger horizontal				■					
Side roller plunger vertical				■						
Slim spring plunger										
Spring plunger										
Top ball plunger				■						
Top plunger				■						
Unidirectional short hinge roller lever										
Variable rod lever		■								
Variable roller lever		■	■							
	Page		201	202	203	204	205	206		

Type			Enclosed switch		Special purpose basic switch	General purpose basic switch	
Selection criteria							
	Model		SHL55	ZC-55	DZ	X - 10	Z - 1..
	Category		Special purpose switches			General purpose switches	
	Degree of protection	IEC	IP67		IP00		IP00 / IP62 (drip-proof)
		JIS	Immersion-proof				
	Rated current [A]	5 VDC					
		12 to 24 VDC					
		30 VDC	5	6			
		125 / 250 VDC				10 / 3 A	
		24 VAC					
		115 VAC	0.4	0.5	0.5		
		125 VAC	10	10	10		15
		100 to 240 VAC					
250 VAC		10	10	10		15	
480 VAC	2		2		0.1		
500 VAC							
Features	Microload type		0.1 A				0.1 A
	Operation indicator						
Actuators	Adjustable rod lever						
	Adjustable roller lever						
	Bevel plunger						
	Center roller lever						
	Coil spring						
	Cross roller plunger						
	Fork lever lock						
	Hinge lever		■	■	■	■	■
	Hinge roller lever		■	■	■	■	■
	Hinge cross roller lever						■
	Horizontal plunger						
	Horizontal roller plunger						
	Horizontal ball plunger						
	Leaf spring						■
	Long hinge lever						■
	Low force hinge lever		■			■	■
	Low force wire hinge lever						■
	One-way action hinge roller lever		■	■			
	One-way action short hinge roller lever		■	■			
	One-way action roller lever						
	Panel mount plunger		■	■		■	■
	Panel mount pin plunger		■			■	
	Panel mount roller plunger		■	■		■	■
	Panel mount cross roller plunger		■	■		■	■
	Pin plunger		■	■	■	■	■
	Plastic rod						
	Reverse hinge lever					■	■
	Reverse hinge roller lever					■	■
	Reverse short hinge roller lever					■	■
	Roller leaf spring						■
	Roller lever						
	Roller lever						
	Roller plunger						
	Sealed cross roller plunger			■			
	Sealed plunger						
	Sealed plunger roller			■			
	Short hinge cross roller lever						■
	Short hinge lever		■	■		■	■
	Short hinge roller lever		■	■	■	■	■
	Short spring plunger						■
	Side plunger						
	Side roller plunger horizontal						
	Side roller plunger vertical						
	Slim spring plunger						■
	Spring plunger						■
	Top ball plunger						
	Top plunger						
	Unidirectional short hinge roller lever						■
Variable rod lever							
Variable roller lever							
	Page	207	208	209	210	211	





## Economical, miniature limit switch

With a highly rigid, dust- and drip-proof construction, HL-5000 can be used in a variety of heavy industrial applications.

- Highly rigid construction (head and cover snugly fit in box)
- Smooth operation with greater overtravel
- Easy-to-wire conduit-opening design
- Models with grounding terminals conform to the CE marking
- Jet-proof IP65



## Ordering information

Application		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Size in mm (HxWxD) excluding actuator	Model
Roller lever		7.35 N	0.98 N	20°	50°	12°		82.4x33x34	<b>HL-5000G</b>
Adjustable roller lever		7.35 N	0.98 N	20°	50°	12°			<b>HL-5030G</b>
Adjustable rod lever		7.35 N	0.98 N	20°	50°	12°			<b>HL-5050G</b>
Sealed plunger		8.83 N	1.47 N	1.5 mm	4 mm	1 mm	30 ±0.8 mm	60.6x33x34	<b>HL-5100G</b>
Sealed roller plunger		8.83 N	1.47 N	1.5 mm	4 mm	1 mm	40 ±0.8 mm		<b>HL-5200G</b>
Coil spring		1.47 N		30 mm					<b>HL-5300G</b>

**Bold** = preferred stock item

## Specifications

Ratings	Non-inductive load				Inductive load			
Rated voltage	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	5 A		1.5 A	0.7 A	3 A		2 A	1 A
250 VAC	5 A		1 A	0.5 A	3 A		1.5 A	0.8 A
12 VDC	5 A		3 A		4 A		3 A	
24 VDC	5 A		3 A		4 A		3 A	
Inrush current	NC				24 A max.			
	NO				12 A max.			
Degree of protection	IP65							
Life expectancy	Mechanical: 10,000,000 operations min. (under rated conditions)							
Operating speed	5 mm / s to 0.5 m / s (HL-5000)							
Operating frequency	Mechanical: 120 operations/min, electrical: 30 operations/min							
Rated frequency	50 / 60 Hz							
Ambient temperature	Operating: -5 °C to 65 °C (with no icing)							
Ambient humidity	Operating: 95% max.							
Weight	Approx. 130 to 190 g							



## Wide selection of two-circuit limit switches

A wide selection of models is available, including overtravel models with greater OT, lamp-equipped models for checking operation, low-temperature and heat-resistant models and micro-load models. Various plungers and levers are also available.

- Two-circuit limit switch
- Direct and pre-wiring
- Metal housing, immersion-proof IP67
- Ground terminal models are approved by EN and IEC and bear the CE marking
- UL, CSA



## Ordering information

Actuator		Ground terminal	
		No	Yes
Adjustable roller lever: standard		WLCA12	<b>WLCA12-G</b>
Adjustable roller lever: standard		WLCA12-2	WLCA12-2G
Adjustable roller lever: overtravel 90°		<b>WLCA12-2N</b>	WLCA12-2NG
Roller lever: standard model (R38)		<b>WLCA2</b>	<b>WLCA2-2G</b>
Rod lever: standard		WLCA2-2	<b>WLCA2-G</b>
Rod lever: overtravel 90°		WLCA2-2N	WLCA2-2NG
Roller lever: standard, standard model (R50)		WLCA2-7	WLCA2-7G
Roller lever: standard, standard model (R63)		WLCA2-8	WLCA2-8G
Fork lever lock: protective, WL-5A100		WLCA32-41	<b>WLCA32-41G</b>
Fork lever lock: protective, WL-5A104		WLCA32-43	<b>WLCA32-43G</b>
Adjustable rod lever: standard		<b>WLCL</b>	<b>WLCL-G</b>
Adjustable rod lever: overtravel 90°, 25 to 140 mm		WLCL-2N	WLCL-2NG
Plunger: top plunger		WLD	<b>WLDG</b>
Plunger: top roller plunger		WLD2	<b>WLD2-G</b>
Plunger: top ball plunger		WLD3	WLD3-G
Adjustable rod lever: overtravel, high sensitivity, 80°, 350 to 380 mm		WLGL	WLGL-G
Flexible rod: coil spring		WLNJ	<b>WLNJ-G</b>
Flexible rod: coil spring, resin rod		WLNJ-2	WLNJ-2G
Flexible rod: coil spring, multi-wire		WLNJ-30	WLNJ-30G
Flexible rod: steel wire		WLNJ-S2	<b>WLNJ-S2-G</b>
Plunger: horizontal roller plunger		WLSD2	<b>WLSD2-G</b>
Plunger: horizontal ball plunger		WLSD3	WLSD3-G
Plunger: horizontal plunger		WLSD	WLSD-G

**Note:** For other model please refer to the datasheet

**Bold** = preferred stock item

## Specifications

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
120 VAC	10 A	60 A	6 A	7,200 VA	720 VA
240 VAC		30 A	3 A		
480 VAC		15 A	1.5 A		
600 VAC		12 A	1.2 A		

Agency	Standard	File No.
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
TÜV Rheinland	EN60947-5-1	R9551016

<b>Size in mm</b>	68.7Hx40Wx42D (excluding the actuator)
-------------------	--

Type	Rated voltage	Non-inductive load				Inductive load			
		Resistive load		Lamp load		Inductive load		Motor load	
		NC	NO	NC	NO	NC	NO	NC	NO
Standard, overtravel (except high-sensitivity models), and high-precision models.	125 VAC	10 A		3 A	1.5 A	10 A		5 A	2.5 A
	250 VAC	10 A		2 A	1 A	10 A		3 A	1.5 A
	500 VAC	10 A		1.5 A	0.8 A	3 A		1.5 A	0.8 A
	8 VDC	10 A		6 A	3 A	10 A		6 A	
	14 VD	10 A		6 A	3 A	10 A		6 A	
	30 VDC	6 A		4 A	3 A	6 A		4 A	
	125 VD	0.8 A		0.2 A	0.2 A	0.8 A		0.2 A	
Overtravel (high-sensitivity models)	250 VDC	0.4 A		0.1 A	0.1 A	0.4 A		0.1 A	
	125 VAC	5 A							
	250 VAC	5 A							
	125 VDC	0.4 A							
	250 VD	0.2 A							



## Compact, 16 mm-thick, cable-type switch

The D4C range of switches offers a wide choice of actuators. All switches are liquid and dust resistant, conforming to IEC IP67. Various types are available: pre-wired, low temperature, viscosity resistant, etc.

- Enclosed miniature limit switch, only 16 mm thick
- Metal housing with triple-sealed construction
- LED indicator for easy monitoring
- Ganged mounting for multiple switching
- Mechanical life expectancy = 10 million, switching / min = 30



## Ordering information

Actuator		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Standard cable models
								S-FLEX VCTF Cable 3 m
Pin plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	15.7±1 mm	<b>D4C-1201</b>
Sealed plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	24.9±1 mm	D4C-1231
Roller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5±1 mm	<b>D4C-1202</b>
Sealed roller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3±1 mm	<b>D4C-1232</b>
Crossroller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5±1 mm	<b>D4C-1203</b>
Sealed crossroller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3±1 mm	D4C-1233
Coil spring		1.47 N		15°				D4C-1250
Roller lever		5.69 N	1.47 N	25°	40°	3°		D4C-1220
Roller lever (high-sensitivity model)		5.69 N	1.47 N	10±3°	50°	3°		D4C-1224
Center roller lever plunger		6.67 N	1.47 N	10±3°	50°	3°		D4C-1260

**Note:** For other product specifications please refer to the datasheet

**Bold** = preferred stock item

## Specifications

Agency	Standard	File number
TÜV Rheinland	EN60947-5-1	R9451333/J9950970
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746

Model	Rated voltage	Non-inductive load				Inductive load				Inrush current	
		Resistive load		Lamp load		Inductive load		Motor load		NC	NO
		NC	NO	NC	NO	NC	NO	NC	NO		
D4C-1□□□	125 VAC	5 A	5 A	1.5 A	0.7 A	3 A	3 A	1.3 A	1.3 A	20 A max.	10 A max.
	250 VAC	5 A	5 A	1 A	0.5 A	2 A	2 A	1.5 A	0.8 A		
	8 VDC	5 A	5 A	2 A	2 A	5 A	4 A	3 A	3 A		
	14 VD	5 A	5 A	2 A	2 A	4 A	4 A	3 A	3 A		
	30 VDC	4 A	4 A	2 A	2 A	3 A	3 A	3 A	3 A		
	125 VD	0.4 A	0.4 A	0.05 A	0.4 A	0.4 A	0.4 A	0.05 A	0.05 A		
	250 VDC	0.2 A	0.2 A	0.03 A	0.2 A	0.2 A	0.2 A	0.03 A	0.03 A		

**Note:** For other loads, please refer to the datasheet

Degree of protection	IP67
Durability	Mechanical: 10,000,000 operations min. Electrical: 200,000 operations min. (5A at 250 VAC, resistive load)
Operating speed	0.1 mm to 0.5 m / s (in case of plunger) 1 mm to 1 m / s (in case of roller lever)
Operating frequency	Mechanical: 120 operations / min Electrical: 30 operations / min
Short-circuit protective device (SCPD)	10 A fuse type gG (IEC269)
Ambient temperature	Operating: -10 °C to 70 °C (with no icing)
Weight	With 3 m VCTF cable: 360 g; with 5 m VCTF cable: 540 g
Size in mm	49 or 51.5Hx34Wx16D (excluding the actuator)





## Compact, 16 mm thick connector-type switch

The D4CC family of limit switches comes as standard with a triple-seal construction (IP67), cable connectors for easy switch replacement and an operation indicator for easy monitoring.

- Miniature limit switch
- Various models including roller lever
- Switches are only 16 mm thick with connector
- Cable connectors for easy switch replacement
- Immersion proof; IEC IP67, UL and CSA (type 3, 4 and 13)



## Ordering information

Actuator		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	1 A at 125 VAC Without indicator	1 A at 30 VDC Without indicator
Pin plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	15.7 ±1 mm	D4CC-1001	D4CC-3001
Roller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5 ±1 mm	D4CC-1002	D4CC-3002
Crossroller plunger		11.77 N	4.41 N	1.8 mm	3 mm	0.2 mm	28.5 ±1 mm	D4CC-1003	D4CC-3003
High-sensitivity roller lever		5.69 N	1.47 N	10 ±3°	50°	3°		D4CC-1024	D4CC-3024
Sealed pin plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	24.9 ±1 mm	D4CC-1031	D4CC-3031
Sealed roller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3 ±1 mm	D4CC-1032	D4CC-3032
Sealed crossroller plunger		17.65 N	4.41 N	1.8 mm	3 mm	0.2 mm	34.3 ±1 mm	D4CC-1033	D4CC-3033
Plastic rod		1.47 N		15°				D4CC-1050	D4CC-3050
Center roller lever		6.67 N	1.47 N	10 ±3°	50°	3°		D4CC-1060	D4CC-3060

## Accessories

Type	Appearance	Number of conductors	Cable length	Model
VAC		4	2 m	XS2F-A421-D90-A
			5 m	XS2F-A421-G90-A
			10 m	XS2F-A421-J90-A
VDC			2 m	<b>XS2F-D421-D80-A</b>
			5 m	<b>XS2F-D421-G80-A</b>
			10 m	<b>XS2F-D421-J80-A</b>

**Bold** = preferred stock item

## Specifications

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
120 VAC	1.0 A	3.6 A	3.6 A	432 VA	72 VA

Agency	Standard	File number
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	1 A	1 A	1 A	0.7 A	1 A	1 A	1 A	1 A
30 VDC	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A

Degree of protection	IP67
Durability	Mechanical: 10,000,000 operations min., electrical: 200,000 operations min. (1 A at 125 VAC, resistive load)
Operating speed	Plunger: 0.1 mm to 0.5 m / s, roller lever: 1 mm to 1 m / s
Operating frequency	Mechanical: 120 operations/min, electrical: 30 operations/min
Ambient temperature	Operating: -10 °C to 70 °C (with no icing)
Weight	Approx. 120 g (in the case of D4CC-1002)
Size in mm	57 or 59.5Hx34Wx16D (excluding the actuator)











## Slim, compact sealed switch

D4E-N comes with flat springs that improve the lever ratio of the built-in switch, ensuring smooth snap action and long life expectancy. Its one-touch connector eliminates the need for tedious wiring operations and reduces downtime.

- Protection cover protects the built-in switch from dust and oil
- Plunger incorporates a tough, long-lasting seal cap
- Minute load model with gold cladding is optimal for electronic control
- IP67



## Ordering information

Actuator		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	One-touch connector type		Screw terminal type
								General purpose		General purpose
								AC	DC	
Roller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	31.4 ±0.8 mm	D4E-1A00N	D4E-1A10N	D4E-1A20N
Crossroller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	31.4 ±0.8 mm	D4E-1B00N	D4E-1B10N	D4E-1B20N
Plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	25.4 ±0.8 mm	D4E-1C00N	D4E-1C10N	D4E-1C20N
Sealed roller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	41.3 ±0.8 mm	<b>D4E-1D00N</b>	<b>D4E-1D10N</b>	<b>D4E-1D20N</b>
Sealed crossroller plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	41.3 ±0.8 mm	D4E-1E00N	D4E-1E10N	D4E-1E20N
Sealed plunger		11.77 N	4.90 N	1.5 mm	3 mm	(0.1 mm)	30 ±0.8 mm	D4E-1F00N	D4E-1F10N	D4E-1F20N
Roller lever		3.92 N	0.78 N	2 mm	4 mm	(0.3 mm)	23.1 ±0.8 mm	D4E-1G00N	D4E-1G10N	D4E-1G20N
One-way action roller lever		3.92 N	0.78 N	2 mm	4 mm	(0.3 mm)	34.3 ±0.8 mm	D4E-1H00N	D4E-1H10N	D4E-1H20N

**Bold** = preferred stock item

## Accessories

Type	Number of conductors	Current	Cable length	Applicable models	Model
Straight	4	AC	2 m	D4E-□□00N	XS2F-A421-D90-A
			5 m		XS2F-A421-G90-A
	4	DC	2 m	D4E-□□10N	<b>XS2F-D421-D80-A</b>
			5 m		<b>XS2F-D421-G80-A</b>

**Bold** = preferred stock item

## Specifications

Rated voltage	Non-inductive load				Inductive load				Microload	
	Resistive load		Lamp load		Inductive load		Motor load		Resistive load	
	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	5 (1) A		1.5 (1) A		3 (1) A		2 (1) A	1 (1) A	0.1 A	
250 VAC	5 (1) A		1.5 (1) A		3 (1) A		1 A	0.5 A		
8 VDC	5 (1) A				1.5 (1) A				0.1 A	
14 VDC	5 (1) A				1.5 (1) A				0.1 A	
30 VDC	5 (1) A				1.5 (1) A				0.1 A	
125 VDC	0.5 A				0.05 A					
250 VDC	0.25 A				0.03 A					

**Note:** The above current ratings are for a standard current and the values in parentheses are for models with a connector

Agency	Standard	File number
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
TÜV Rheinland	EN60947-5-1	R9551015

Degree of protection	IP67
Durability	Mechanical: 10,000,000 operations min., electrical: 500,000 operations min. (5 A at 250 VAC, resistive load) 5,000,000 operations min. (10 mA at 24 VDC, resistive load)
Operating speed	0.1 mm to 0.5 m / sec
Operating frequency	Mechanical: 120 operations/min Electrical: 30 operations/min
Ambient temperature	Operating: -10 °C to 80 °C (with no icing)
Weight	Approx. 86 g (in case of roller plunger)
Size in mm	32.9Hx18Wx57D (excluding the actuator)



## Economical, high-utility enclosed switch

D4MC provides users with high precision and a long life (10,000,000 mechanical operations). It is sealed with a gasket diaphragm without use of any adhesive or pin, making it suitable for applications demanding higher mechanical strength and for dust-proof and drip-proof applications.

- Various models, plungers and levers available
- Panel-mount versions have the same operating position as the Z basic switch
- IP67, UL, CSA



## Ordering information

Actuator		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Model
Panel mount plunger		5.88 N	0.98 N	1.6 mm	5 mm	0.2 mm	21.8 ±1.2 mm	<b>D4MC-5000</b>
Panel mount roller		5.88 N	0.98 N	1.6 mm	5 mm	0.2 mm	33.4 ±1.2 mm	<b>D4MC-5020</b>
Panel mount crossroller		5.88 N	0.98 N	1.6 mm	5 mm	0.2 mm	33.4 ±1.2 mm	<b>D4MC-5040</b>
Short hinge lever		2.55 N	0.34 N	---	2.5 mm	1.7 mm	25 ±1 mm	D4MC-1020
Hinge lever		1.67 N	0.25 N	---	4 mm	3 mm	25 ±1 mm	<b>D4MC-1000</b>
Hinge roller lever		1.96 N	0.39 N	---	5 mm	3 mm	40 ±1 mm	<b>D4MC-2000</b>
Short hinge roller		2.94 N	0.39 N	---	2 mm	1.5 mm	40 ±1 mm	<b>D4MC-2020</b>
One-way action short hinge roller		2.94 N	0.39 N	---	2 mm	1.5 mm	50 ±1 mm	D4MC-3030

**Note:** Use molded terminal models when using the switch under one of the following conditions:  
dusty, high amount of dripping oil or high humidity

**Bold** = preferred stock item

## Specifications

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10 A		3 A	1.5 A	10 A		5 A	2.5 A
250 VAC	10 A		2.5 A	1.25 A	10 A		3 A	1.5 A
480 VAC	3 A		1.5 A	0.75 A	2.5 A		1.5 A	0.75 A
8 VDC	10 A		3 A	1.5 A	6 A		5 A	2.5 A
14VDC	10 A		3 A	1.5 A	6 A 0.75		5 A	2.5 A
30 VDC	6 A		3 A	1.5 A	5 A		5 A	2.5 A
125VDC	0.5 A		0.4 A		0.05 A		0.05 A	
250 VDC	0.25 A		0.2 A		0.03 A		0.03 A	

Rated voltage	Carry current	Current	
		Make	Break
120 VAC	10 A	60 A	6 A
240 VAC		30 A	3 A

Degree of protection	IP67 (NEMA250: 6.6P)
Life expectancy	Mechanical: 10,000,000 operations min., electrical: 500,000 operations min.
Operating speed	0.05 mm / s to 0.5 m / s (at panel mount plunger)
Operating frequency	Mechanical: 120 operations/min, electrical: 20 operations / min
Pollution degree (operating environment)	3 (IEC947-5-1)
Protection against electric shock	Class II
PTI (tracking characteristics)	175
Switch category	D (IEC335)
Rated operating current (I <sub>e</sub> )	10 A
Rated operating voltage (U <sub>e</sub> )	250 VAC
Ambient temperature	Operating: -10 °C to 80 °C (with no icing)
Weight	Approx. 71 g (at panel mount plunger)
Size in mm	45Hx21.7Wx55D (excluding the actuator)



## Subminiature, enclosed IP67 switch

The SHL switch features a long life and high precision due to its built-in coil spring, housed in rigid zinc die-cast alloy casting. Its mechanical life expectancy is 10 million operations.

- Alternating contact
- Micro load and general load
- Switching / min = 30
- Immersion-proof IP67
- IEC, EN, UL



## Ordering information

Actuator		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Standard model	Micro voltage
Plunger		9.81 N	1.96 N	1.5 mm	2 mm	0.5 mm	34 ±0.8 mm	SHL-D55	SHL-D55-01
Panel mount plunger		9.81 N	1.96 N	1.5 mm	2 mm	0.5 mm	34 ±0.8 mm	SHL-Q55	SHL-Q55-01
Panel mount roller plunger		9.81 N	1.96 N	1.5 mm	2 mm	0.5 mm	43 ±0.8 mm	<b>SHL-Q2255</b>	<b>SHL-Q2255-01</b>
Panel mount crossroller plunger		9.81 N	1.96 N	1.5 mm	2 mm	0.5 mm	43 ±0.8 mm	<b>SHL-Q2155</b>	SHL-Q2155-01
Short hinge lever		3.14 N	0.78 N	8 mm	3 mm	2.5 mm	21.5 ±1 mm	<b>SHL-W55</b>	SHL-W55-01
Hinge lever		2.35 N	0.44 N	13 mm	5 mm	4 mm	21.5 ±1 mm	<b>SHL-W155</b>	SHL-W155-01
Short hinge roller lever		3.92 N	0.78 N	8 mm	3 mm	2.5 mm	33 ±1 mm	<b>SHL-W255</b>	SHL-W255-01
Hinge roller lever		2.55 N	0.49 N	13 mm	5.5 mm	4 mm	33.5 ±1 mm	<b>SHL-W2155</b>	SHL-W2155-01
One-way action short hinge roller lever		3.92 N	0.78 N	8 mm	3 mm	2.5 mm	44.5 ±1 mm	<b>SHL-W355</b>	SHL-W355-01
One-way action hinge roller lever		2.55 N	0.49 N	13 mm	5.5 mm	4 mm	44.5 ±1 mm	SHL-W3155	SHL-W3155-01

**Bold** = preferred stock item

## Specifications

Rated voltage	Non-inductive load				Inductive load				Inrush current	
	Resistive load		Lamp load		Inductive load		Motor load		NCNO	
	NC	NO	NC	NO	NC	NO	NC	NO		
125 VAC	10 A		1.5 A		3 A		2.5 A		15 A max.	
250 VAC	10 A		1.5 A		2 A		1.5 A			
480 VAC	2 A		—		—		—			
8 VDC	10 A		2 A		5 A		2 A			
14 VDC	10 A		2 A		5 A		2 A			
30 VDC	5 A		1.5 A		1.5 A		1.5 A			
125 VDC	0.4 A		0.4 A		0.05 A		0.05 A			
250 VDC	0.2 A		0.2 A		0.03 A		0.03 A			

Agency	Standard	File number
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45746
TÜV Rheinland	EN60947-5-1	R9451332

Degree of protection	IP67 (EN60947-5-1)
Durability	Mechanical: 10,000,000 operations min., electrical: 500,000 operations min.
Operating speed	0.1 mm to 0.5 m / s (hinge lever models)
Operating frequency	Mechanical: 120 operations / min, electrical: 30 operations / min
Rated frequency	50 / 60 Hz
Pollution degree (operating environment)	3 (EN60947-5-1)
Short-circuit protective device (SCPD)	10 A fuse type gG (IEC269)
Conditional short-circuit current	100 A (EN60947-5-1)
Conventional enclosed thermal current ( $I_{the}$ )	5 A (EN60947-5-1)
Ambient temperature	Operating: -10 °C to 80 °C (no icing)
Weight	Approx. 62 to 72 g
Size in mm	32.9Hx17.5Wx73.5D (excluding the actuator)



## Small, high-precision enclosed switch

The ZC-55 switch is a modified version of the Z basic switch as a built-in switch. The mounting pitch is the same. It requires less operating force than conventional limit switches. ZC-55 is economical and has a long life expectancy.

- Metal housing
- Alternating contact
- Switching / min = 20
- Immersion-proof IP67
- UL, CSA and EN



## Ordering information

Actuator		Operating force max. (OF)	Release force max. (RF)	Pre travel (PT)	Over travel (OT)	Movement differential (MD)	Operating position (OP)	Model
Plunger		11.8 N	4.90 N	1.5 mm	2.4 mm	0.2 mm	32.4 ±0.8 mm	ZC-D55
Panel mount plunger		11.8 N	4.90 N	1.5 mm	3 mm	0.2 mm	32.2 ±0.8 mm	<b>ZC-Q55</b>
Panel mount roller plunger		11.8 N	4.90 N	1.5 mm	4 mm	0.2 mm	32.2 ±0.8 mm	<b>ZC-Q2255</b>
Panel mount crossroller plunger		11.8 N	4.90 N	1.5 mm	5 mm	0.2 mm	32.2 ±0.8 mm	<b>ZC-Q2155</b>
Sealed roller plunger		6.86 N	1.67 N	1.5 mm	2.5 mm	0.2 mm	47.4 ±0.8 mm	<b>ZC-N2255</b>
Sealed crossroller plunger		6.86 N	1.67 N	1.5 mm	2.5 mm	0.2 mm	47.4 ±0.8 mm	ZC-N2155
Short hinge lever		3.92 N	0.78 N	6 mm	1 mm	28.5±1.2 mm	34.7 mm	<b>ZC-W55</b>
Hinge lever		2.75 N	0.59 N	8.4 mm	1.4 mm	28.5±1.2 mm	36.7 mm	ZC-W155
Short hinge roller lever		3.92 N	0.78 N	6 mm	1 mm	43±1.2 mm	49.2 mm	ZC-W255
Hinge roller lever		2.75 N	0.59 N	8.4 mm	1.4 mm	43±1.2 mm	51.3 mm	ZC-W2155
One-way action short hinge roller lever		3.92 N	0.78 N	6 mm	1 mm	53±1.2 mm	59.2 mm	ZC-W355
One-way action hinge roller lever		2.75 N	0.59 N	8.4 mm	1.4 mm	53±1.2 mm	61.2 mm	ZC-W3155

**Bold** = preferred stock item

## Specifications

Rated voltage	Non-inductive load				Inductive load			
	Resistive load		Lamp load		Inductive load		Motor load	
	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10 A		3 A	1.5 A	10 A		5 A	2.5 A
250 VAC	10 A		2.5 A	1.25 A	10 A		3 A	1.5 A
8 VDC	10 A		3 A	1.5 A	6 A		5 A	2.5 A
14 VDC	10 A		3 A	1.5 A	6 A		5 A	2.5 A
30 VDC	6 A		3 A	1.5 A	5 A		5 A	2.5 A
125 VDC	0.5 A		0.4 A	0.4 A	0.05 A		0.05 A	0.05 A
250 VDC	0.25 A		0.2 A	0.2 A	0.03 A		0.03 A	0.03 A

Agency	Standard	File number
UL	UL508	E76675
CSA	CSA C22.2 No. 14	LR45258
TÜV Rheinland	EN60947-1, EN60947-5-1	J9650089

Degree of protection	IP67
Durability	Mechanical: 10,000,000 operations min., electrical: 500,000 operations min.
Operating speed	0.05 mm to 0.5 m / s (at pin plunger)
Operating frequency	Mechanical: 120 operations/min, electrical: 20 operations/min
Pollution degree (operating environment)	3 (IEC947-5-1)
PT1 (tracking characteristics)	175
Rated operating current (I <sub>e</sub> )	10 A
Rated operating voltage (U <sub>e</sub> )	250 VAC
Ambient temperature	Operating: -10 °C to 80 °C (with no icing)
Weight	Approx. 92 g (in case of ZC-Q22(21)55)
Size in mm	41Hx21.7Wx55D (excluding the actuator)



## DPDT basic switch for controlling two independent circuits

DZ switches are ideal for switching circuits operating on two voltages and for controlling two independent circuits. DZ is interchangeable with OMRON Z basic switches, as both switches are identical in mounting-hole dimensions, mounting pitch and pin-plunger position.

- Incorporates two completely independent built-in switches
- IP00



### Ordering information

Actuator		Over travel (OT)	Solder terminal	Screw terminal
Pin plunger		0.13 mm min.	DZ-10G-1A	DZ-10G-1B
Hinge lever		1.6 mm min.	<b>DZ-10GW-1A</b>	DZ-10GW-1B
Short hinge roller lever		0.9 mm min.	<b>DZ-10GW22-1A</b>	DZ-10GW22-1B
Hinge roller lever		1.2 mm min.	DZ-10GW2-1A	DZ-10GW2-1B

**Note:** For other models please refer to the datasheet

**Bold** = preferred stock item

### Specifications

Rated voltage	Non-inductive load				Inductive load				Inrush current	
	Resistive load		Lamp load		Inductive load		Motor load			
	NC	NO	NC	NO	NC	NO	NC	NO	NC	NO
125 VAC	10 A		2 A	1 A	6 A		2.5 A	1.5 A	30 A max.	15 A max.
250 VAC	10 A		1.5 A	0.7 A	4 A		1.5 A	1 A		
8 VDC	10 A		3 A	1.5 A	6 A		2 A	2.5 A		
14 VDC	10 A		3 A	1.5 A	6 A		2 A	2.5 A		
30 VDC	10 A		3 A	1.5 A	4 A		1.5 A	1.5 A		
125 VDC	0.5 A		0.5 A		0.05 A		0.05 A			
250 VDC	0.25 A		0.25 A		0.03 A		0.03 A			

Agency	Standard	File number
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642

Operating speed	0.1 mm to 1 m / s (at pin plunger)
Operating frequency	Mechanical: 240 operations / min, electrical: 20 operations / min
Durability	Mechanical: 1,000,000 operations min., electrical: 500,000 operations min.
Ambient temperature	Operating: -25 °C to 80 °C (with no icing)
Weight	Approx. 30 to 50 g
Size in mm	30Hx17.4Wx49.2D





## Direct-current switch with built-in magnetic blow-out

X switches incorporate a small permanent magnet in the contact mechanism to deflect the arc to effectively extinguish it. These switches have the same shape and mounting procedure as the Z basic switches.

- General-purpose basic switch
- Direct-current switch with built-in magnetic blow-out
- IP00



### Ordering information

Actuator		Solder	Screw
Pin plunger		X-10G	X-10G-B
Slim spring		X-10GS	X-10GS-B
Short spring		X-10GD	X-10GD-B
Panel mount		X-10GQ	X-10GQ-B
Panel mount		X-10GQ22	X-10GQ22-B
Panel mount cross		X-10GQ21	X-10GQ21-B
Leaf spring		X-10GL	X-10GL-B
Short hinge lever		X-10GW21	X-10GW21-B
Hinge lever		X-10GW	<b>X-10GW-B</b>
Low-force hinge		X-10GW4	X-10GW4-B
Short hinge roller		X-10GW22	<b>X-10GW22-B</b>
Hinge roller lever		X-10GW2	X-10GW2-B
Reverse hinge		X-10GM	X-10GM-B
Reverse short		X-10GM22	X-10GM22-B
Reverse hinge		X-10GM2	X-10GM2-B

**Bold** = preferred stock item

### Specifications

Rated voltage	Non-inductive load				Inductive load				Agency	Standard	File number
	Resistive load		Lamp load		Inductive load		Motor load		UL	UL508	E41515
	NC	NO	NC	NO	NC	NO	NC	NO	CSA	CSA C22.2 No. 55	LR21642
8 VDC	10 A		3 A	1.5 A	10 A	10 A	5 A	2.5 A			
14 VDC	10 A		3 A	1.5 A	10 A	10 A	5 A	2.5 A			
30 VDC	10 A		3 A	1.5 A	10 A	10 A	5 A	2.5 A			
125 VDC	10 A		3 A	1.5 A	7.5 A	6 A	5 A	2.5 A			
250 VDC	3 A		1.5 A	0.75 A	2 A	1.5 A	2 A	1.5 A			
Operating speed	0.1 mm to 1 m / s										
Operating frequency	Mechanical: 240 operations/min, electrical: 20 operations/min										
Durability	Mechanical: 1,000,000 operations min., electrical: 100,000 operations min.										
Degree of protection	IP00										
Degree of protection against electric shock	Class I										
Proof tracking index (PTI)	175										
Ambient temperature	Operating: -25 °C to 80 °C (with no icing)										
Weight	Approx. 27 to 63 g										
Size in mm	24.2Hx49.2Wx17.5D (excluding the actuator)										



## Standard high-precision switch

Z basic switches provide a large switching capacity of 15 A with very high repeat accuracy. They come in a wide range of variations in contact form for your selection: basic, split-contact, maintained-contact and adjustable-contact gap types.

- General-purpose basic switch
- A series of standard models for micro loads is available
- High-precision switching
- A wide range of variations in contact
- Drip-proof IP00 / IP62

## Ordering information

Ratings	Contact gap	Actuator		Model	
				Solder terminal	Screw terminal
15 A	0.5 mm	Pin plunger		<b>Z-15G</b>	<b>Z-15G-B</b>
		Short spring plunger		<b>Z-15GD</b>	<b>Z-15GD-B</b>
		Leaf spring (high OF)		Z-15GL	Z-15GL-B
		Roller leaf spring		<b>Z-15GL2</b>	Z-15GL2-B
		Reverse hinge lever		Z-15GM	Z-15GM-B
		Reverse hinge roller lever		<b>Z-15GM2</b>	Z-15GM2-B
		Reverse hinge short roller lever		Z-15GM22	Z-15GM22-B
		Panel mount plunger (medium OP)		<b>Z-15GQ</b>	<b>Z-15GQ-B</b>
		Panel mount plunger (low OP)		Z-15GQ3	Z-15GQ3-B
		Panel mount plunger (high OP)		Z-15GQ8	Z-15GQ8-B
		Panel mount cross roller plunger		<b>Z-15GQ21</b>	<b>Z-15GQ21-B</b>
		Panel mount roller plunger		<b>Z-15GQ22</b>	<b>Z-15GQ22-B</b>
		Slim spring plunger		Z-15GS	Z-15GS-B
		Hinge lever (low OF)		<b>Z-15GW</b>	<b>Z-15GW-B</b>
		Hinge roller lever		<b>Z-15GW2</b>	<b>Z-15GW2-B</b>
		Short hinge lever		Z-15GW21	Z-15GW21-B
		Short hinge roller lever		<b>Z-15GW22</b>	<b>Z-15GW22-B</b>
		Unidirectional short hinge roller lever (low OF)		<b>Z-15GW2277</b>	Z-15GW2277-B
		Hinge roller lever (large roller)		Z-15GW25	Z-15GW25-B
		Hinge lever (medium OF)		Z-15GW3	Z-15GW3-B
		Low-force hinger lever		<b>Z-15GW4</b>	<b>Z-15GW4-B</b>
		Hinge lever (high OF)		Z-15GW32	Z-15GW32-B
		Short hinge cross roller lever		Z-15GW49	Z-15GW49-B
		Hinge cross roller lever		Z-15GW54	Z-15GW54-B

**Note:** Many other types are also available, please refer to the full datasheet.

**Bold** = preferred stock item

## Specifications

Agency	Standard	File number
UL	UL508	E41515
CSA	CSA C22.2 No. 55	LR21642
TÜV Rheinland	EN61058-1	R9451585
Degree of protection	General purpose: IP00, drip-proof: IP62	
Degree of protection against electric shock	Class I	
Proof tracking index (PTI)	175	
Switch category	D (IEC335-1)	
Ambient operating temperature	General purpose: -25 °C to 80 °C (with no icing) Drip-proof: -15 °C to 80 °C (with no icing)	
Size in mm	24.2Hx49.2Wx17.5D (excluding the actuator)	

# Pushbutton switches

Our pushbutton switches include models from 16 mm to 22 mm in diameter. Available in different varieties of shapes, sizes, colours and functions, this pushbutton switch range allows you to select the right product for your application.

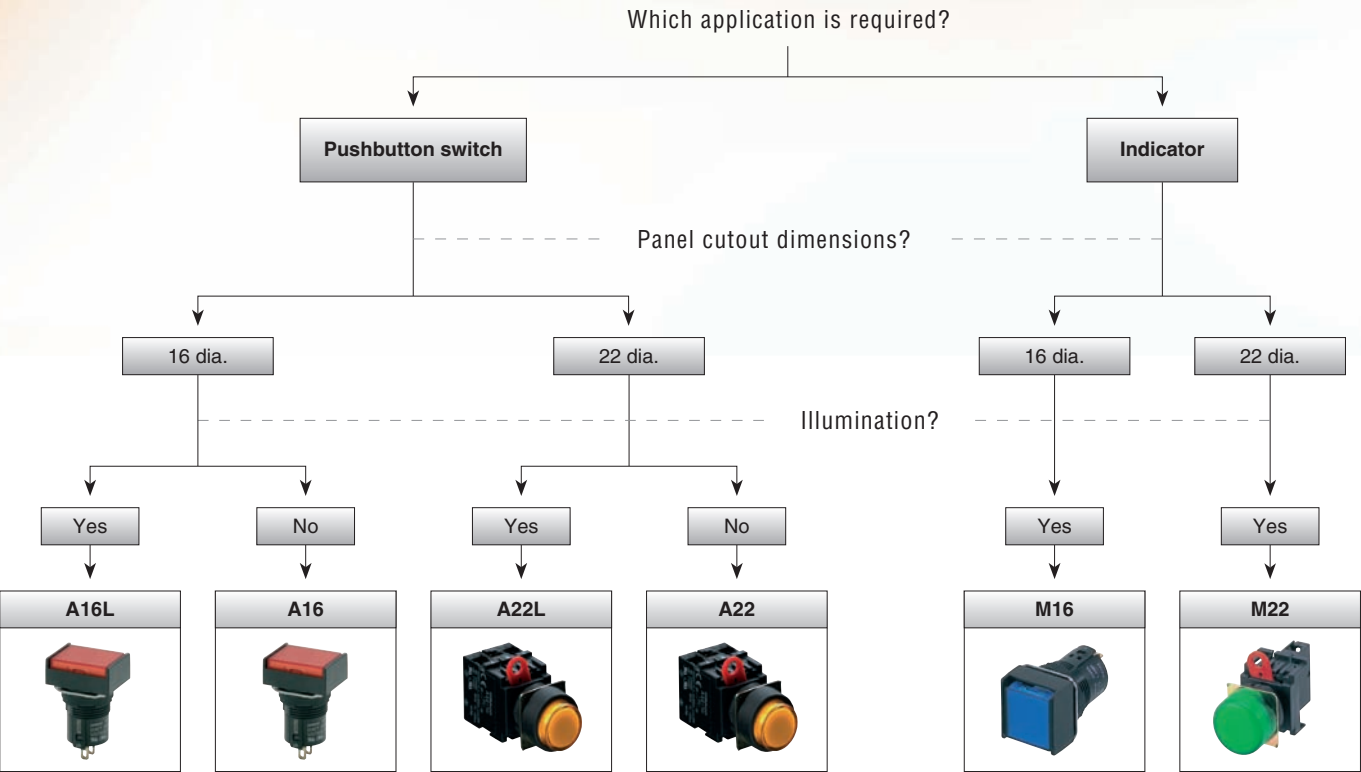
**Omron's pushbutton switches feature:**









- Range of installation diameters 16 to 22 mm
- Versions with safety standard IP40 and IP65, oil-tight
- Very low installation depth: only 28.5 mm
- 1 or 2 SPDTs
- Variety of shapes: rectangular, square, round
- Illuminated and non-illuminated variants



## Table of contents

Selection table		213
Pushbutton switches	A16	214
	A22	216
Indicators	M16	218
	M22	219



Category		Pushbutton switch		Indicator	
Selection criteria					
	Model	A16	A22	M16	M22
	Mounting	Nut-mounting			
	Size	16 mm	22 mm	16 mm	22 mm
	Shape				
Pushbutton colour	Incandescent lamp-lighted	Red	■	■	■
		Yellow	■	■	■
		Pure yellow	■	■	■
		Green	■	■	■
		White	■	■	■
	LED-lighted	Blue	■	■	■
		Red	■	■	■
		Yellow	■	■	■
		Pure yellow	■	■	■
		Green	■	■	■
	Non-lighted	White	■	■	■
		Blue	■	■	■
		Red	■	■	■
		Yellow	■	■	■
		Green	■	■	■
		White	■	■	■
		Blue	■	■	■
		Black	■	■	■
Features	Momentary operation	■	■	■	■
	Self-holding	■	■	■	■
	Number of contacts	2	6	2	6
	IP rating	IP40 / IP65	IP65	IP40 / IP65	IP65
	Legend plate	■	■	■	■
Switch ratings [A]	125 VAC	5	10	5	10
	250 VAC	3	6	3	6
	30 VDC	3	10	3	10
	Rated load	5 A at 125 VAC, 3 A at 250 VAC, 3 A at 30 VDC	10 A at 110 VAC, 6 A at 220 VAC	5 A at 125 VAC, 3 A at 250 VAC, 3 A at 30 VDC	10 A at 110 VAC, 6 A at 220 VAC
Terminals	Solder	■	■	■	■
	PCB	■	■	■	■
	Screw-less Clamp	■	■	■	■
Operating voltage	5 VDC	■	■	■	■
	12 VDC	■	■	■	■
	24 VDC	■	■	■	■
Form	SPDT	■	■	■	■
	DPDT	■	■	■	■
	SPST-NO	■	■	■	■
	SPST-NC	■	■	■	■
	SPST-NO + SPST-NC	■	■	■	■
	DPST-NO	■	■	■	■
	DPST-NC	■	■	■	■
Page		214	216	218	219

■ Standard

□ Available

□ No / not available



## 16 mm pushbutton switch

These subassembled pushbutton switches have a modular construction: pushbutton + case + lamp (if applicable) + switch. A16 is a nut-mounted pushbutton switch with a short mounting depth of less than 28.5 mm below panel.

- Wide variety of control and signal devices: lighted, non-lighted and buzzer
- Quick and easy assembly, snap-in switch
- Wide range of switching capacity from standard load to micro load
- High reliability, IP65
- UL, cUL, CSA and VDE approved, conforms to EN60947-5-1 and IEC947-5-1



### Ordering information




Type	Colour	Degree of protection					
		IP40			Oil-resistant IP65		
		Rectangular	Square	Round	Rectangular	Square	Round
Non-lighted LED Incandescent lamp	Red	<b>A16L-JR</b>	<b>A16L-AR</b>	A16L-TR	<b>A165L-JR</b>	A165L-AR	<b>A165L-TR</b>
	Yellow	A16L-JY	<b>A16L-AY</b>	A16L-TY	<b>A165L-JY</b>	<b>A165L-AY</b>	<b>A165L-TY</b>
	Pure yellow	A16L-JPY	A16L-APY	A16L-TPY	A165L-JPY	A165L-APY	A165L-TPY
	White	<b>A16L-JW</b>	<b>A16L-AW</b>	A16L-TW	<b>A165L-JW</b>	<b>A165L-AW</b>	<b>A165L-TW</b>
	Blue	A16L-JA	A16L-AA	<b>A16L-TA</b>	A165L-JA	<b>A165L-AA</b>	<b>A165L-TA</b>
Non-lighted	Black	A16L-JB	A16L-AB	A16L-TB	<b>A165L-JB</b>	A165L-AB	<b>A165L-TB</b>
LED	Green	<b>A16L-JGY</b>	<b>A16L-AGY</b>	<b>A16L-TGY</b>	A165L-TGY	A165L-AGY	A165L-TGY
Non-lighted / incandescent lamp	Green	<b>A16L-JG</b>	<b>A16L-AG</b>	<b>A16L-TG</b>	<b>A165L-JG</b>	<b>A165L-AG</b>	<b>A165L-TG</b>

**Bold** = preferred stock item

### Cases

Appearance	Classification			Model	
				IP40	Oil-resistant IP65
	IP40	Momentary operation	Rectangular (2-way guard)	<b>A16-CJM</b>	<b>A165-CJM</b>
			Square	<b>A16-CAM</b>	<b>A165-CAM</b>
			Round	<b>A16-CTM</b>	<b>A165-CTM</b>
	Alternate operation		Rectangular (2-way guard)	<b>A16-CJA</b>	<b>A165-CJA</b>
			Square	<b>A16-CAA</b>	<b>A165-CAA</b>
			Round	<b>A16-CTA</b>	<b>A165-CTA</b>

### Switches

Appearance	Classification				Model		
	Lighted / non-lighted (common use)	Standard load / microload (common use)	SPDT	Solder terminal	<b>A16-1</b>		
			DPDT		<b>A16-2</b>		
				SPDT	PCB terminal	<b>A16-1P</b>	
				DPDT		<b>A16-2P</b>	
					DPDT	Screw-less clamp	<b>A16-2S</b>

### Switches with reduced voltage lighting

Appearance	Classification				Model
	100 V	Standard load / microload (common use)	SPDT	Solder terminal	A16-T1-1
			DPDT		A16-T1-2
	100 V 200 V		DPDT	Screw-less clamp	A16-T1-2S
					A16-T2-2S




### Lamps

Type	Colour	5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	<b>A16-24DSR</b>
	Yellow	A16-5DSY	A16-12DSY	<b>A16-24DSY</b>
	Green	A16-5DSG	A16-12DSG	<b>A16-24DSG</b>
	White <sup>*1</sup>	A16-5DSW	A16-12DSW	<b>A16-24DSW</b>
	Blue	<b>A16-5DA</b>	A16-12DA	<b>A16-24DA</b>
Type		5 VAC / VDC	12 VAC / VDC	24 VAC / VDC
Incandescent lamp		<b>A16-5</b>	<b>A16-12</b>	<b>A16-24</b>

**Bold** = preferred stock item

<sup>\*1</sup> Use the white LED together with white or pure yellow pushbuttons.

## Accessories

Name	Appearance	Classification	Remarks	Model
Switch guards		For rectangular models	Cannot be used with the dust cover	<b>A16ZJ-5050</b>
		For square and round models		<b>A16ZA-5050</b>
Dust covers		For rectangular models	Cannot be used with the switch guard	<b>A16ZJ-5060</b>
		For round models		A16ZA-5060
		For round models		A16ZT-5060
Panel plugs		For rectangular models	Used for covering the panel cutouts for future panel expansion	A16ZJ-3003
		For square models		A16ZA-3003
		For round models		A16ZT-3003

**Bold** = preferred stock item

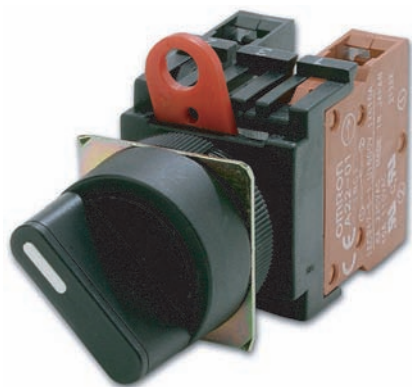
## Specifications

Allowable operating frequency	Mechanical	Momentary operation: 120 operations / minute max. Alternate operation: 60 operations / minute max.
	Electrical	20 operations / minute max.
Durability	Mechanical	Momentary operation: 2,000,000 operations min. Alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Ambient temperature		Operating: -10 °C to 55 °C (with no icing or condensation) Storage: -25 °C to 65 °C (with no icing or condensation)
Weight		Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)
Size in mm		Round / square: 18Hx18Wx28.5D rectangular: 18Hx24Wx28.5D

Operating characteristics	Pushbutton switch			
	IP40		Oil-resistant IP65	
	SPDT	DPDT	SPDT	DPDT
Operating force (OF) max.	2.45 N	4.41 N	2.94 N	4.91 N
Releasing force (RF) min.	0.29 N			
Total travel (TT)	Approx. 3 mm			
Pretravel (PT) max.	2.5 mm			
Lock stroke (LTA) min.	0.5 mm			

Item		Screw-less clamp			
Recommended wire size		0.5 mm <sup>2</sup> twisted wire or 0.8 mm dia. solid wire			
Usable wires and tensile strength	Twisted wire	0.3 mm <sup>2</sup>	0.5 mm <sup>2</sup>	0.75 mm <sup>2</sup>	1.25 mm <sup>2</sup>
	Solid wire	0.5 mm dia.	0.8 mm dia.	1.0 mm dia.	
	Tensile strength	10 N	20 N	30 N	40 N
Length of exposed wire		10 ±1 mm			





## 22 mm pushbutton switch

A22 comes in a wide variety of shapes and colours and is installable in 22-dia. or 25-dia. panel cutouts. The switch unit can easily be mounted. A22 is mounted using either open-type (fork-type) or closed-type (round-type) crimp terminals.

- Finger-protection mechanism on switch unit provided as standard feature
- Increased wiring efficiency with three-row mounting of switch blocks
- IP65 oil-resistant (non-lighted models), IP65 (lighted models)
- Lighted and non-lighted, flat, projection and half- and full-guard versions
- EN60947-5-1, UL and cUL approved



### Ordering information

#### Pushbutton

illumination	Colour	Flat type	Projection type	Full-guard type	Half-guard type	Square / projection type	Square / full-guard type	Round / mushroom type (30-dia. head)	Round / mushroom type (40-dia. head)
Non-lighted	Red	<b>A22-FR</b>	<b>A22-TR</b>	<b>A22-GR</b>	A22-HR	A22-CR	A22-DR	<b>A22-SR</b>	<b>A22-MR</b>
	Green	<b>A22-FG</b>	<b>A22-TG</b>	<b>A22-TG</b>	A22-HG	A22-CG	A22-DG	A22-SG	A22-MG
	Yellow	<b>A22-FY</b>	<b>A22-TY</b>	<b>A22-GY</b>	A22-HY	A22-CY	A22-DY	A22-SY	A22-MY
	White	<b>A22-FW</b>	<b>A22-TW</b>	<b>A22-GW</b>	A22-HW	A22-CW	A22-DW	A22-SW	A22-MW
	Blue	<b>A22-FA</b>	<b>A22-TA</b>	<b>A22-GA</b>	A22-HA	A22-CA	A22-DA	A22-SA	A22-MA
Lighted	Red		<b>A22L-TR</b>	<b>A22L-GR</b>	A22L-HR	A22L-CR	A22L-DR		
	Green		<b>A22L-TG</b>	A22L-GG	A22L-HG	A22L-CG	A22L-DG		
	Yellow		<b>A22L-TY</b>	<b>A22L-GY</b>	A22L-HY	A22L-CY	A22L-DY		
	White		<b>A22L-TW</b>	<b>A22L-GW</b>	A22L-HW	A22L-CW	A22L-DW		
	Blue		<b>A22L-TA</b>	<b>A22L-GA</b>	A22L-HA	A22L-CA	A22L-DA		
Buttons size in mm		29.7 dia. x 12D	29.7 dia. x 19D	29.7 dia. x 19D	29.7 dia. x 12/18.5D	29.8 mm <sup>2</sup> x 18D	29.8 mm <sup>2</sup> x 18D	30 dia. x 32D	40 dia. x 32D

**Bold** = preferred stock item

#### Switches

Switch operation	Contacts	Non-lighted models	Lighted models			
			With voltage reduction unit		With voltage reduction unit 110 VAC 220 VAC	
Momentary	SPST-NO	<b>A22-10M</b>	<b>A22L-10M</b>	A22L-10M-T1	A22L-10M-T2	
	SPST-NC	<b>A22-01M</b>	A22L-01M	A22L-01M-T1	A22L-01M-T2	
	SPST-NO+SPST-NC	<b>A22-11M</b>	<b>A22L-11M</b>	A22L-11M-T1	A22L-11M-T2	
	DPST-NO	A22-20M	A22L-20M	A22L-20M-T1	A22L-20M-T2	
	DPST-NC	A22-02M	A22L-02M	<b>A22L-02M-T1</b>	A22L-02M-T2	
Alternate	SPST-NO	A22-10A	A22L-10A	<b>A22L-10A-T1</b>	A22L-10A-T2	
	SPST-NC	A22-01A	A22L-01A	A22L-01A-T1	A22L-01A-T2	
	SPST-NO+SPST-NC	<b>A22-11A</b>	A22L-11A	A22L-11A-T1	A22L-11A-T2	
	DPST-NO	A22-20A	A22L-20A	A22L-20A-T1	A22L-20A-T2	
	DPST-NC	A22-02A	A22L-02A	A22L-02A-T1	A22L-02A-T2	

#### Switch blocks

	Standard load	Model
Switch blocks	SPST-NO	<b>A22-10</b>
	SPST-NC	<b>A22-01</b>
	DPST-NO	<b>A22-20</b>
	DPST-NC	<b>A22-02</b>

**Bold** = preferred stock item

#### Lamp - LED

AC / DC	LED light	Operating voltage			
		6 V	12 V	24 V	24 V superbright
DC	Red	A22-6DR			
	Green	A22-6DG			
	Yellow <sup>*1</sup>	A22-6DY			
	Blue	A22-6DA			
AC	Red	A22-6AR			
	Green	A22-6AG			
	Yellow <sup>*1</sup>	A22-6AY			
	Blue	A22-6AA			
AC and DC	Red		A22-12AR	<b>A22-24AR</b>	A22-24ASR
	Green		A22-12AG	<b>A22-24AG</b>	A22-24ASG
	Yellow <sup>*1</sup>		A22-12AY	<b>A22-24AY</b>	A22-24ASY
	Blue		A22-12AA	<b>A22-24AA</b>	A22-24ASA

<sup>\*1</sup> Used when the pushbutton colour is yellow or white

#### Lamp - incandescent lamp

Operating voltage		
5 VAC / VDC	12 VAC / VDC	24 VAC / VDC
A22-5	A22-12	<b>A22-24</b>

**Bold** = preferred stock item

## Accessories

				Remarks	Model
Lamp sockets	Direct lighting			Used when changing the lighting method (LED only)	A22-TN
	Voltage-reduction lighting		220 VAC		A22-T2
Mounting latches	For momentary models			Order mounting latches only when mounting switch blocks or lamp sockets are purchased individually	A22-3200
Legend plate frames	Large size	With snap-in legend plate, without text, black		Snap-in legend plate is acrylic	A22Z-3333
		Without snap-in legend plate			A22Z-3330
Sealing caps	For projection models			Used to prevent dust or water from entering the operation unit (pushbutton, etc.), color: opaque, material: silicon	A22Z-3600T
Three-throw spacer				Used when mounting three non-lighted switches	A22Z-3003
Control boxes (enclosures)	Exclusively for A22		One hole	Do not use DPST-NO or DPST-NC switches, material: polycarbonate resin	A22Z-B101
			Two holes		A22Z-B102
			Three holes		A22Z-B103
Snap-in legend plates	Standard size	Without text	White	Attached to the standard-size legend plate frame, material: acrylic	A22Z-3443W
			Transparent		A22Z-3443C
		White text on black background	ON		A22Z-3443B-5
			OFF		A22Z-3443B-6
			DOWN		A22Z-3443B-8
	Large size	Without text	POWER ON	A22Z-3443B-9	
			White	Attached to the large-size legend plate frame, material: acrylic	A22Z-3453W
Transparent	A22Z-3453C				
For emergency stop switch	60-dia. round plate with black letters on a yellow background	“EMERGENCY STOP” is engraved on the plate. Used as an emergency stop switch legend plate		A22Z-3466-1	
	90-dia. round plate with black letters on a yellow background			A22Z-3476-1	
Lamp extractor				Rubber tool used to easily replace lamps	A22Z-3901
Tightening wrench				Tool used to tighten nuts from the back of the panel	A22Z-3905

**Bold** = preferred stock item

## Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515
—	EN60947-5-1	—

## Contact ratings (standard load)

Rated carry current (A)	Rated voltage	Rated current (A)			
		AC15 (inductive load)	AC12 (resistive load)	DC13 (inductive load)	DC12 (resistive load)
10	24 VAC	10	10		
	110 VAC	5	10		
	220 VAC	3	6		
	380 VAC	2	3		
	440 VAC	1	2		
	24 VDC			1,5	10
	110 VDC			0,5	2
	220 VDC			0,2	0,6
	380 VDC			0,1	0,2

## Contacts (microload)

Rated applicable load	Minimum applicable load
50 mA at 5 VDC (resistive load)	1 mA at 5 VDC

## LED indicators without voltage reduction unit

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC $\pm$ 5%
6 VAC	60 mA (20 mA)	6 VAC / VDC $\pm$ 5%
12 VAC / VDC	30 mA (10 mA)	12 VAC / VDC $\pm$ 5%
24 VAC / VDC	15 mA (10 mA)	24 VAC / VDC $\pm$ 5%

## Super-bright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC / VDC	15 mA	24 VAC / VDC $\pm$ 5%

## Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC / VDC	200 mA	5 VAC / VDC
14 VAC / VDC	80 mA	12 VAC / VDC
28 VAC / VDC	40 mA	24 VAC / VDC
130 VAC / VDC	20 mA	100 VAC / VDC

## Voltage-reduction lighting

Rated voltage	Operating voltage	Applicable lamp (BA8S/13 $\square$ gold)
110 VAC	95 to 115 VAC	LED Lamp (A22-24A $\square$ )
220 VAC	190 to 230 VAC	

		Pushbutton switches		Emergency stop switches		Knob-type selector switches		Key-type selector switch
		Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted	Lighted	Non-lighted
Allowable operating frequency	Mechanical	Momentary operation: 60 operations / minute max.		30 operations/minute max.		Manual release: 30 operations / minute max., automatic release: 30 operations / minute max.		
	Electrical	30 operations / minute max.				30 operations/minute max.		
Durability (number of operations min.)	Mechanical	Momentary operation: 5,000,000		Momentary operation: 300,000		500,000	100,000	500,000
	Electrical	500,000		300,000		500,000	100,000	500,000
Ambient temperature	Operating	-20 °C to 70 °C	-20 °C to 55 °C	-20 °C to 70 °C	-20 °C to 55 °C	-20 °C to 70 °C	-20 °C to 55 °C	-20 °C to 70 °C
	Storage	-40 °C to 70 °C	-40 °C to 70 °C	-40 °C to 70 °C	-40 °C to 70 °C	-40 °C to 70 °C	-40 °C to 70 °C	-40 °C to 70 °C
Degree of protection		IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)	IP65	IP65 (oil-resistant)
Size in mm (in-panel only)		34Hx34Wx54.7D, 34Hx34Wx72.7D for DPST switches						



## Indicators with a mounting aperture of 16 mm

The M16 series of nut-mounted indicators comes in rectangular, square and round versions. Due to its modular construction, assembly is quick and easy. M16 comes in a wide variety of control and signal devices with a wide range of switching capacities, from general load to micro load.

- LED, incandescent and neon lamp
- Snap-in switch unit
- Short mounting depth, less than 28.5 mm below panel
- High reliability, IP65
- UL, CSA and VDE approved, conforms to EN60947-5-1



## Ordering information

### Pushbutton

Type	Display colour	IP40			IP65 oil-resistant		
		Rectangular	Square	Round	Rectangular	Square	Round
LED Incandescent lamp	Red	<b>A16L-JR</b>	<b>A16L-AR</b>	<b>A16L-TR</b>	<b>A165L-JR</b>	<b>A165L-AR</b>	<b>A165L-TR</b>
	Yellow	<b>A16L-JY</b>	<b>A16L-AY</b>	<b>A16L-TY</b>	<b>A165L-JY</b>	<b>A165L-AY</b>	<b>A165L-TY</b>
	Pure yellow	<b>A16L-JPY</b>	<b>A16L-APY</b>	<b>A16L-TPY</b>	<b>A165L-JPY</b>	<b>A165L-APY</b>	<b>A165L-TPY</b>
	White	<b>A16L-JW</b>	<b>A16L-AW</b>	<b>A16L-TW</b>	<b>A165L-JW</b>	<b>A165L-AW</b>	<b>A165L-TW</b>
LED Incandescent lamp	Blue	<b>A16L-JA</b>	<b>A16L-AA</b>	<b>A16L-TA</b>	<b>A165L-JA</b>	<b>A165L-AA</b>	<b>A165L-TA</b>
	Green	<b>A16L-JGY</b>	<b>A16L-AGY</b>	<b>A16L-TGY</b>	<b>A165L-JGY</b>	<b>A165L-AGY</b>	<b>A165L-TGY</b>
	Green	<b>A16L-JG</b>	<b>A16L-AG</b>	<b>A16L-TG</b>	<b>A165L-JG</b>	<b>A165L-AG</b>	<b>A165L-TG</b>

**Bold** = preferred stock item

### Lamp

Type	Colour	Operating voltage		
		5 VDC	12 VDC	24 VDC
LED	Red	A16-5DSR	A16-12DSR	<b>A16-24DSR</b>
	Yellow	A16-5DSY	A16-12DSY	<b>A16-24DSY</b>
	Green	A16-5DSG	A16-12DSG	<b>A16-24DSG</b>
	White	A16-5DSW	A16-12DSW	<b>A16-24DSW</b>
	Blue	<b>A16-5DA</b>	A16-12DA	<b>A16-24DA</b>
Type		5 VAC / VDC	12 VAC / VDC	24 VAC / VDC
Incandescent lamp		A16-5	<b>A16-12</b>	<b>A16-24</b>

### Case

Classification		Model
IP40	Rectangular	<b>A16-CJM</b>
	Square	<b>A16-CAM</b>
	Round	<b>A16-CTM</b>
IP65 oil-resistant	Rectangular	<b>A165-CJM</b>
	Square	<b>A165-CAM</b>
	Round	<b>A165-CTM</b>

### Socket

Classification	Model	
Solder terminals	<b>M16-0</b>	
PCB terminals	M16-0P	
Screw-less clamp	M16-S	
Solder terminals	Voltage-reduction lighting	100 V M16-T1
Screw-less clamp		100 V M16-T1-S
		200 V M16-T2-S

## Specifications

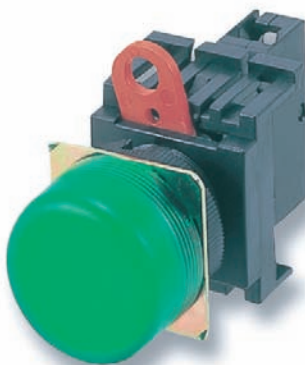
Allowable operating frequency	Mechanical	Momentary operation: 120 operations / minute max., alternate operation: 60 operations / minute max.
	Electrical	20 operations / minute max.
Durability	Mechanical	Momentary operation: 2,000,000 operations min., alternate operation: 200,000 operations min.
	Electrical	100,000 operations min.
Degree of contamination	3 (IEC947-5-1)	
Ambient temperature	Operating: -10 °C to 55 °C (with no icing or condensation) Storage: -25 °C to 65 °C (with no icing or condensation)	
Weight	Approx. 10 g (in the case of a lighted DPDT switch with solder terminals)	
Size in mm	Round / square: 18Hx18Wx28.5D rectangular: 18Hx24Wx28.5D	

Agency	Standards	File number
UL, cUL	UL508	E41515

### Ratings

Superbright LED			
Rated voltage	Rated current	Operating voltage	Built-in limiting resistance
5 VDC	30 mA (15 mA)	5 VDC ±5%	33 Ω (68 Ω)
12 VDC	15 mA	12 VDC ±5%	270 Ω (560 Ω)
24 VDC	10 mA	24 VDC ±5%	1,600 Ω (2,000 Ω)

Incandescent lamp		
Rated voltage	Rated current	Operating voltage
6 VAC / VDC	60 mA	5 VAC / VDC
14 VAC / VDC	40 mA	12 VAC / VDC



## Nut-mounted, 22 mm indicator, with high-visibility, illuminated buttons

The M22 series of indicators comes in 22 or 25 mm-diameter round versions. They can easily be mounted and removal of the socket unit is also easy. The finger-protection mechanism on the lamp is provided as a standard feature. M22 indicators can be equipped with an LED or incandescent lamp.

- Available in 5 colours
- Super-bright LEDs for all versions
- Lamp sockets with or without transformers
- UL and cUL approved



### Ordering information

#### Display

Appearance	IP65 oil-resistant	
	Colour of display	Model
Round / flat	Red	M22-FR
	Green	M22-FG
	Yellow	M22-FY
	White	M22-FW
	Blue	M22-FA
Square / projection	Red	M22-CR
	Green	M22-CG
	Yellow	M22-CY
	White	M22-CW
	Blue	M22-CA

#### Socket unit

Voltage-reduction circuits	
Without voltage reduction unit	With voltage reduction unit (220 VAC)
M22-00	M22-00-T2

#### Lamp

AC / DC	LED light	Operating voltage			
		6 V	12 V	24 V	24 V superbright
AC	Red	A22-6DR			
	Green	A22-6DG			
	Yellow	A22-6DY			
	Blue	A22-6DA			
DC	Red	A22-6AR			
	Green	A22-6AG			
	Yellow	A22-6AY			
	Blue	A22-6AA			
AC and DC	Red		A22-12AR	<b>A22-24AR</b>	A22-24ASR
	Green		A22-12AG	<b>A22-24AG</b>	A22-24ASG
	Yellow		A22-12AY	<b>A22-24AY</b>	A22-24ASY
	Blue		A22-12AA	<b>A22-24AA</b>	A22-24ASA

Incandescent lamp	6 VAC / VDC	12 VAC / VDC	24 VAC / VDC	100 VAC / VDC
	A22-5	A22-12	A22-24	A22-H1

**Bold** = preferred stock item

### Accessories

M22 uses the same accessories as A22. Please refer to the relevant information in the corresponding section for the A22.

### Specifications

Recognized organization	Standards	File number
UL, cUL	UL508	E41515

#### LED lamp

Rated voltage	Rated current	Operating voltage
6 VDC	60 mA (20 mA)	6 VDC ±5%
6 VAC	60 mA (20 mA)	6 VAC ±5%
12 VAC / VDC	30 mA (10 mA)	12 VAC / VDC ±5%
24 VAC / VDC	15 mA (10 mA)	24 VAC / VDC ±5%

#### Incandescent lamp

Rated voltage	Rated current	Operating voltage
6 VAC / VDC	200 mA	5 V
14 VAC / VDC	80 mA	12 V
28 VAC / VDC	40 mA	24 V
130 VAC / VDC	20 mA	100 V

#### Superbright LED indicator

Rated voltage	Rated current	Operating voltage
24 VAC / VDC	15 mA	24 VAC / VDC ±5%

#### Voltage-reduction lighting

Rated voltage	Rated current	Operating voltage
110 VAC	95 to 115 VAC	LED lamp (A22-24□)
220 VAC	190 to 230 VAC	

Ambient temperature	Operating: -20 °C to 55 °C, storage: -40 °C to 70 °C
Degree of protection	IP65
Electric shock protection class	Class II
PTI (tracking characteristic)	175
Degree of contamination	3 (IEC947-5-1)
Size in mm	Button: 29.7 dia.x16D, switch: 34Hx34Wx54.7D

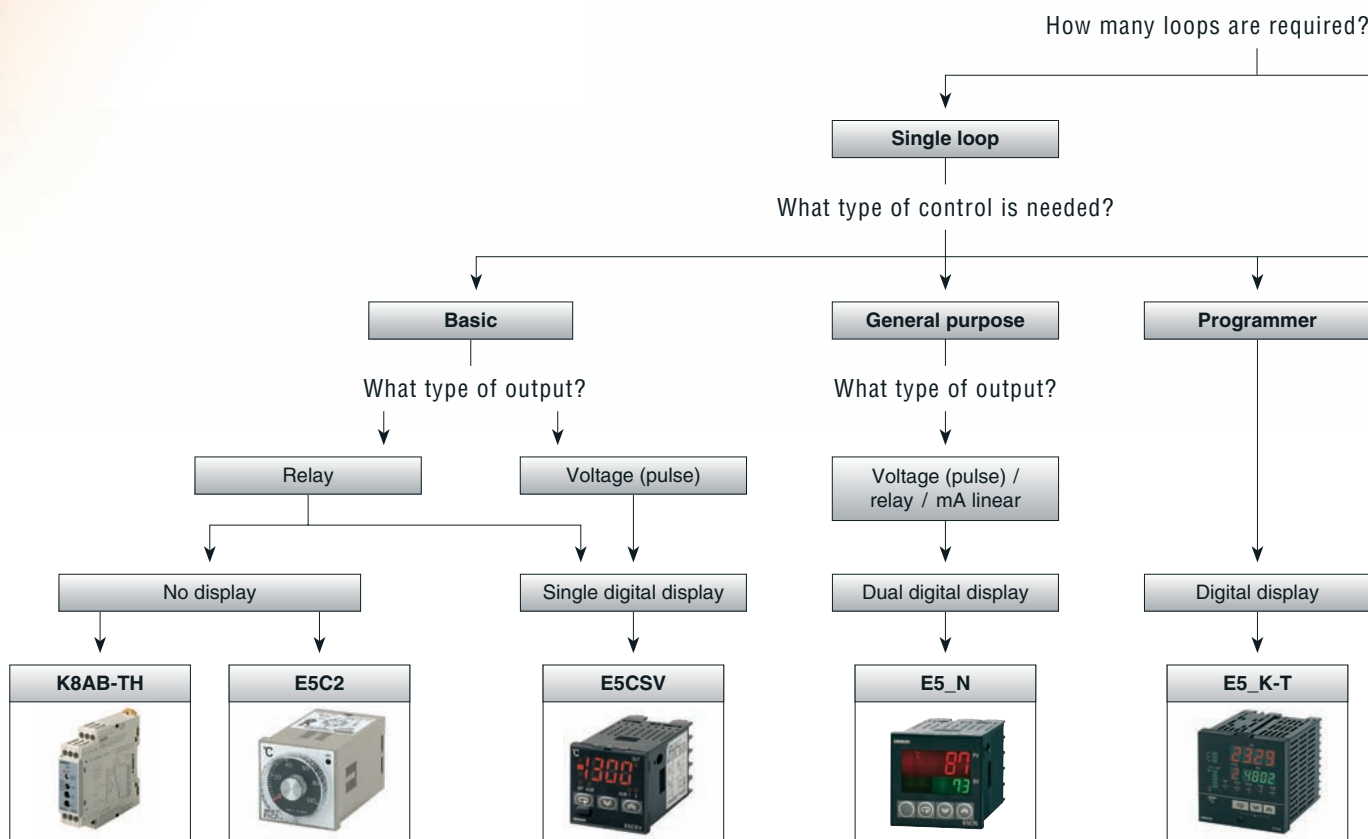
# Temperature controllers

## Temperature uniformity made easy

With E5ZN temperature controllers, all temperatures are equal

Omron's E5ZN temperature controllers feature GTC, the innovative new gradient temperature control technology. GTC provides perfectly-controlled 2D temperature profiles over any size sheet and eliminates all irregularities in sheet-processing temperature to provide faster throughput and high, consistent quality and yield. E5ZN types are available with inputs for thermocouple or PRT signals and with voltage, transistor or analogue outputs.

Up to five E5ZN controllers can be connected together to apply GTC to up to 10 heating elements and a DeviceNet communications unit is available to provide centralised control. E5ZN – the perfect solution for 2D processing temperature control.



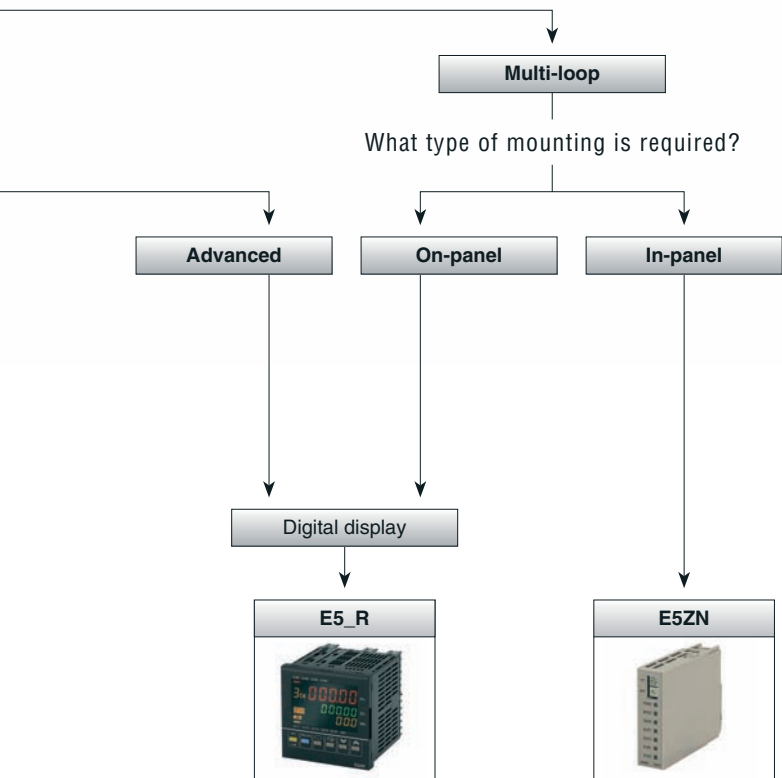


# The E5\_N series – evolution in temperature control

Now available in a choice of dimensions!

Omron's best-selling E5CN temperature controller is now joined by the upgraded versions of the E5AN and E5EN, offering the same superb features. The E5\_N series includes a bright LCD display that gives a clear read-out, even under a wide viewing angle and harsh lighting conditions. They feature a colour change display with process values in three colours for easy status recognition, and an 11-segment display that makes text easy to understand.

The unique 2-PID provides optimum control performance. Plus, the E5\_N series is easy to set up and operate. It has customisable menus and parameter protection, as well as PC software tools for parameter cloning, setting and tuning. Trust Omron to set the pace in temperature control evolution!










## Table of contents

Selection table		222
Basic temperature controller	K8AB-TH	224
	E5C2	225
	E5CSV	226
General purpose controller	E5□N	227
	E5ZN	229
Advanced controller	E5□K / E5□K-T	230
	E5□R	231
Auxiliaries	PRT1-SCU11	233



# Selection table

Category		Alarm controller	Analogue temperature controller	Compact digital temperature controller	Digital temperature controller			
Selection criteria								
	Model	K8AB-TH	E5C2	E5CSV	E5AN	E5EN	E5CN	E5GN
	Type	Basic			General purpose			
	Panel	In-panel type	In- & on-panel type		On-panel type			
	Loops		Single loop					
Control mode	Size	22.5 mm wide	1/16 DIN	1/16 DIN	1/4 DIN	1/8 DIN	1/16 DIN	1/32 DIN
	ON / OFF	■	■	■	■	■	■	■
	PID		■ *1					
	2-PID *2			■	■	■	■	■
	Operation *3		H	H / C	H & C	H & C	H & C	H & C
Features	Position proportional *4							
	Accuracy	±2%		±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
	Auto-tuning			■	■	■	■	■
	Self-tuning			■	■	■	■	■
	Transfer output							
	Remote input							
	Number of alarms	1		2	3	3	3	1
	Heater burnout				□	□	□*5	□
	IP rating front panel	IP20	IP40	IP65	IP66	IP66	IP66	IP66
Supply voltage	Display	Rotary switch	SV dial	Single 3.5 digit	Dual 4 digit colour change	Dual 4 digit colour change	Dual 4 digit colour change	Dual 4 digit
	110 / 220 VAC	■ 100 to 240	■	■ 100 to 240	■	■	■	■
	24 VAC / VDC	■		□	□	□	□	□
Comms *6	RS-232				□	□		
	RS-485				□	□	□	□
	Event IP	■			□	□	□	
	QLP port				■	■	■	■
	DeviceNet							
Control output	Relay	■	■	■	■	■	■	■
	SSR							
	Voltage (pulse)		■	■	■	■	■	■
	Linear voltage							
	Linear current				■	■	■	
Input type - linear	mA				□	□	□	□
	mV				■	■	■	■
	V				■	■	■	
Input type - thermocouple	K	■	■	■	■	■	■	■
	J	■	■	■	■	■	■	■
	T	■	■	■	■	■	■	■
	E	■	■		■	■	■	■
	L		■	■	■	■	■	■
	U		■	■	■	■	■	■
	N		■	■	■	■	■	■
	R	■	■	■	■	■	■	■
	S	■	■		■	■	■	■
	B	■	■		■	■	■	■
	W							
	PLII	■						
Input type - RTD	Pt100	■	■	■	■	■	■	■
	JPt100			■	■	■	■	■
	THE		■	□				
Page		224	225	226	227			

\*1 P only

\*2 2-PID is OMRON's unique high-performance PID control

\*3 H = heat, H / C = heat or cool, H & C = heat and cool

\*4 Position proportional = valve control (relay up & down)

\*5 Heater alarm = heater burnout & SSR failure detection

\*6 PROFIBUS-DP communication option via gateway for E5\_N, E5\_R, E5ZN, ask your local OMRON representative.

\*7 Fuzzy PID available

## Temperature controllers

[illegible]

Standard

☐ Available

☐ No / not available



## Affordable and compact temperature alarm unit

This temperature monitoring relay was designed specially for monitoring abnormal temperatures to prevent excessive temperature increase and to protect equipment. K8AB-TH provides temperature monitoring in slim design with a width of just 22.5 mm.

- Simple function settings using DIP switch
- Selectable alarm latch and SV setting protection
- Multi-input support for thermocouple or Pt100 sensor input
- Changeover relay: fail-safe selectable
- Alarm status identification with LED



### Ordering information

Input type	Temperature setting range	Setting unit	Supply voltage	Size in mm (HxWxD)	Model
Thermocouple / Pt100	0 to 399 °C / F	1 °C / F	100 to 240 VAC	90x22.5x100	K8AB-TH11S 100-240
			24 VAC / VDC		K8AB-TH11S 24
Thermocouple	0 to 1,800 °C	10 °C / F *1	100 to 240 VAC		K8AB-TH12S 100-240
	0 to 3,200 °F		24 VAC / VDC		K8AB-TH12S 24

\*1 Setting range depending on sensor type selected

### Specifications

		100 to 240 VAC 50 / 60 Hz	24 VAC 50 / 60 Hz or 24 VDC
Allowable voltage range		85% to 110% of power supply voltage	
Power consumption		5 VA max.	2 W max. (24 VDC), 4 VA max. (24 VAC)
Sensor inputs	K8AB-TH11S	Thermocouple: K, J, T, E; platinum-resistance thermometer: Pt100	
	K8AB-TH12S	Thermocouple: K, J, T, E, B, R, S, PLII	
Output relay		One SPDT relay (3 A at 250 VAC, resistive load)	
External inputs (for latch setting)	Contact input	ON: 1 kΩ 2 max., OFF: 100 kΩ 2 min.	
	Non-contact input	ON residual voltage: 1.5 V max., OFF leakage current: 0.1 mA max.	
		Leakage current: approx. 10 mA	
Setting method		Rotary switch setting (set of three switches)	
Indicators		Power (PWR): green LED, relay output (ALM): red LED	
Other functions		Alarm mode (upper limit / lower limit), output normally ON / OFF selection, output latch, setting protection, temperature unit °C / °F	
Ambient operating temperature		-10 °C to 55 °C (with no condensation or icing); for 3-year guarantee: -10 °C to 50 °C	
Storage temperature		-25 °C to 65 °C (with no condensation or icing)	
Setting accuracy		±2% of full scale	
Hysteresis width		2 °C	
Output relay	Resistive load	3 A at 250 VAC (cosφ = 1), 3 A at 30 VDC (L / R = 0 ms)	
	Inductive load	1 A at 250 VAC (cosφ = 0.4), 1 A at 30 VDC (L / R = 7 ms)	
	Minimum load	10 mA at 5 VDC	
	Maximum contact voltage	250 VAC	
	Maximum contact current	3 A AC	
	Maximum switching capacity	1,500 VA	
	Mechanical life	10,000,000 operations	
	Electrical life	Make: 50,000 times, break: 30,000 times	
Sampling cycle		500 ms	
Weight		130 g	
Degree of protection		IP20	
Memory protection		Non-volatile memory (number or writes: 200,000)	
Safety standards	Approved standards	EN 61010-1	
	Application standards	EN 61326 and EN 61010-1 (pollution level 2, overvoltage category II)	
Crimp terminals		Two solid wires of 2.5 mm <sup>2</sup> or two ferrules of 1.5 mm <sup>2</sup> with insulation sleeves can be tightened together	
Case color		Munsell 5Y8/1 (ivory)	
Case material		ABS resin (self-extinguishing resin)	
Mounting		Mounted to DIN-rail or with M4 screws	
Size in mm		90Hx22.5Wx100D	



## Easy-to-use, basic temperature controller with analogue dial setting

OMRON's basic ON / OFF or PD controller features an analogue setting dial. This compact, low-cost controller has a setting accuracy of 2% of full scale. It incorporates a plug-in socket allowing for DIN-rail or flush mounting.

- Compact, cost-effective controller
- Control mode: ON / OFF or PD
- Control output: relay
- Power supply: 100 - 120 / 200 - 240 VAC
- Thermocouple K: 0 to 1200°C, L: 0 to 400°C, Pt100: -50 to 200°C



### Ordering information

Setting method	Indication method	Control mode	Output	Model				Voltage
				Thermocouple		Platinum resistance thermometer Pt100	Thermistor THE	
				K (CA) chromel vs. alumel	L (IC) iron vs. constantan			
Analogue setting	No indication	ON / OFF	Relay	E5C2-R20K	E5C2-R20L-D	E5C2-R20P-D	E5C2-R20G	100/110/120 VAC
		P	Relay	E5C2-R40K	E5C2-R40L-D	E5C2-R40P-D		200/220/240 VAC

Input ranges	Thermocouple <sup>*1</sup>		Platinum resistance thermometer	Thermistor <sup>*2</sup>
	K (CA) chromel vs. alumel	L (IC) iron vs. constantan	Pt100	THE
°C	0 to 200 (5), 0 to 300 (10), 0 to 400 (10), <b>0 to 600 (20)</b> , 0 to 800 (20), 0 to 1,000 (25), <b>0 to 1,200 (25)</b>	<b>0 to 200 (5)</b> , <b>0 to 300 (10)</b> , 0 to 400 (10), <b>5 to 450 (10)</b>	-50 to 50 (2), -20 to 80 (2), 0 to 50 (1), <b>0 to 100 (2)</b> , <b>0 to 200 (5)</b> , <b>0 to 300 (10)</b> , 0 to 400 (10)	-50 to 50 (2) (6 kΩ at 0 °C), 0 to 100 (2) (6 kΩ at 0 °C), 50 to 150 (2) (30 kΩ at 0 °C)
°F	32 to 392 (10), 32 to 572 (20), 32 to 752 (20), 32 to 1,112 (40), 32 to 1,472 (50), 32 to 1,832 (50), 32 to 2,192 (50)	32 to 392 (10), 32 to 572 (20), 32 to 752 (20)	32 to 212 (5), 32 to 392 (10)	

<sup>\*1</sup> Values in ( ) are the minimum unit.

<sup>\*2</sup> Values in ( ) are the thermistor resistive value.

<sup>\*3</sup> Preferred stock items are R20. Types + 200-240 AC

**Bold** = preferred stock item <sup>\*3</sup>

### Accessories

Functions	Model
Front connecting socket with finger protection	P2CF-08-E
Back connecting socket (for flush mounting)	P3G-08
Finger protection cover (for P3G-08)	Y92A-48G
Protective front cover (IP66)	Y92A-48B

### Specifications

Thermocouple input type	K, L (with sensor break detection)
RTD input type	Pt100, THE
Control mode	ON / OFF or P control
Setting method	Analogue setting
Output	Relay, SPDT, 3 A at 250 VAC
Life expectancy	Electrical: 100,000 operations min.
Setting accuracy	±2% FS max.
Hysteresis	Approx. 0.5% FS (fixed)
Proportional band	3% FS (fixed)
Reset range	5 ±1% FS min.
Control period	20 s
IP Rating front panel	IP40 (IP66 cover available)
IP rating terminals	IP00
Ambient temperature	-10 °C to 55 °C
Size in mm	48Hx48Wx96D



## Easy setting using DIP switch and simple functions within DIN 48x48 mm

This multi-range 1/16 DIN controller with alarm function offers field-selectable PID control or ON / OFF control. The large, single display shows process value, direction of deviation from set point, output and alarm status.

- All setting field configurable with switches
- Multi-input (thermocouple / Pt100)
- Clearly visible 3.5-digit display with character height of 13.5 mm
- Control output: relay, voltage (for driving SSR)
- ON / OFF or 2-PID control with auto-tuning and self-tuning



### Ordering information

Size in mm	Power supply voltage	Number of alarm points	Control output	TC/Pt universal input case color: black
1/16 DIN 48Hx48Wx78D	100 to 240 VAC	1	Relay	<b>E5CSV-R1T-500 AC100-240</b>
			Voltage (for driving SSR)	<b>E5CSV-Q1T-500 AC100-240</b>
	24 VAC / VDC	1	Relay	E5CSV-R1TD-500 AC/DC24
			Voltage (for driving SSR)	E5CSV-Q1TD-500 AC/DC24

**Note:** Other models are available on request.

**Bold** = preferred stock item

### Specifications

Supply voltage		100 to 240 VAC, 50 / 60 Hz or 24 VAC / VDC (depending on model)
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		5 VA
Sensor input		Multi-input (thermocouple / platinum resistance thermometer): K, J, L, T, U, N, R, Pt100, JPt100
Control output	Relay output	SPST-NO, 250 VAC, 3A (resistive load)
	Voltage output (for driving SSR)	12 VDC, 21 mA (with short-circuit protection circuit)
Control method		ON / OFF or 2-PID (with auto-tune and self-tune)
Alarm output		SPST-NO, 250 VAC, 1 A (resistive load)
Setting method		Digital setting using front panel keys (functionality set-up with DIP switch)
Indication		7-segment digital display (character height: 13.5 mm) and deviation indicators
Ambient temperature		-10 °C to 55 °C (with no condensation or icing)
Setting / indication accuracy		±0.5% of indication value or ±1 °C, whichever is greater ±1 digit max.
Hysteresis (for ON / OFF control)		0.2% FS (0.1% FS for multi-input (thermocouple / platinum resistance thermometer) models)
Proportional band (P)		1 to 999 °C (automatic adjustment using AT / ST)
Integral time (I)		0 to 1,999 s (automatic adjustment using AT / ST)
Derivative time (D)		0 to 1,999 s (automatic adjustment using AT / ST)
Control period		2 / 20 s
Sampling period		500 ms
Electrical life expectancy		100,000 operations min. (relay output models)
Weight		Approx. 120 g (controller only)
Degree of protection		Front panel: equivalent to IP66; rear case: IP20; terminals: IP00
Memory protection		EEPROM (non-volatile memory) (number of writes: 1,000,000)
Size in mm		48Hx48Wx78D



## Compact and intelligent general-purpose controllers

The E5□N general-purpose line of temperature controllers is available in 4 standard DIN formats. They all feature a high-intensity dual LCD display with a wide viewing angle. Except for the E5GN, the series features 3-colour PV change for easy status recognition.

- Control mode: ON / OFF or 2-PID
- Control output: relay, hybrid relay, voltage (SSR) or linear current
- Power supply: 100 / 240 VAC or 24 VDC / VAC
- Easy PC connection for parameter cloning, setting and tuning
- Easy set-up and operation



### Ordering information

Type	Input	Output	Fixed option	Alarms	48x24 mm model		Voltage	
					Thermocouple	Pt100, JPt100		
On-panel		relay		1	E5GN-R1TC	E5GN-R1P	AC100-240	or DC/AC 24
		voltage (pulse)			E5GN-Q1TC	E5GN-Q1P	AC100-240	or DC/AC 24
		relay		0	E5GN-R03TC-FLK	E5GN-R03P-FLK	AC100-240	or DC/AC 24
		voltage (pulse)			E5GN-Q03TC-FLK	E5GN-Q03P-FLK	AC100-240	or DC/AC 24

Type	Input	Output	Fixed option	Alarms	48x48 mm model		Voltage	
On-panel	temperature (TC / Pt / mV)	relay		2	E5CN-R2MT-500		AC100-240	or DC/AC 24
		voltage (pulse)			E5CN-Q2MT-500		AC100-240	or DC/AC 24
		linear current			E5CN-C2MT-500		AC100-240	or DC/AC 24
		hybrid relay			E5CN-Y2MT-500		AC100-240	
	analogue (mA / V)	relay			E5CN-R2ML-500		AC100-240	or DC/AC 24
		voltage (pulse)			E5CN-Q2ML-500		AC100-240	or DC/AC 24
		linear current			E5CN-C2ML-500		AC100-240	or DC/AC 24
		hybrid relay			E5CN-Y2ML-500		AC100-240	
In-panel	temperature (TC / Pt / mV)	relay		2	E5CN-R2TU		AC100-240	or DC/AC 24
		voltage (pulse)			E5CN-Q2TU		AC100-240	or DC/AC 24

Type	Input	Output	Fixed option	Alarms	48x96 mm model		96x96 mm model	Voltage	
On-panel	temperature (TC / Pt / mV)	linear current		3	E5EN-C3MT-500	E5AN-C3MT-500		AC100-240	or DC/AC 24
			hybrid relay	3	E5EN-C3YMT-500	E5AN-C3YMT-500		AC100-240	
			voltage (pulse)		E5EN-C3QMT-500	E5AN-C3QMT-500		AC100-240	
		voltage (pulse)		3	E5EN-Q3MT-500	E5AN-Q3MT-500		AC100-240	or DC/AC 24
			hybrid relay		E5EN-Q3YMT-500	E5AN-Q3YMT-500		AC100-240	
			voltage (pulse)	3	E5EN-Q3QMT-500	E5AN-Q3QMT-500		AC100-240	
			heater alarm		E5EN-Q3HMT-500	E5AN-Q3HMT-500		AC100-240	or DC/AC 24
			3-phase HA		E5EN-Q3HHMT-500	E5AN-Q3HHMT-500		AC100-240	
			power supply		E5EN-Q3PMT-500			AC100-240	
		relay		3	E5EN-R3MT-500	E5AN-R3MT-500		AC100-240	or DC/AC 24
			voltage (pulse)		E5EN-R3QMT-500	E5AN-R3QMT-500		AC100-240	
			heater alarm		E5EN-R3HMT-500	E5AN-R3HMT-500		AC100-240	or DC/AC 24
			3-phase HA		E5EN-R3HHMT-500	E5AN-R3HHMT-500		AC100-240	
			power supply		E5EN-R3PMT-500			AC100-240	
	analogue (mA / V)	linear current		3	E5EN-C3ML-500			AC100-240	
		voltage (pulse)		3	E5EN-Q3ML-500			AC100-240	
			hybrid relay		E5EN-Q3YML-500			AC100-240	
		relay	heater alarm		E5EN-Q3HML-500	E5AN-Q3HML-500		AC100-240	
				3	E5EN-R3ML-500			AC100-240	
			heater alarm		E5EN-R3HML-500	E5AN-R3HML-500		AC100-240	

**Note:**

- Output relay: 3 A / 250 VAC, electrical life: 100,000 operations
- Output voltage (pulse): 12 V, 21 mA
- Hybrid relay (long life relay) electrical life 1,000,000 operations
- Linear current: 0(4) - 20 mA
- Heater alarm = heater burnout + SSR short detection
- Voltage: specify the power supply specifications (voltage) when ordering

**Bold** = preferred stock item



**Accessories****E5CN option boards**

(do not fit in E5CN-U types; one slot available in each instrument)


Model	Option			
E53-CN03N	RS-485	heater alarm		
E53-CN03N	RS-485			
E53-CN03N		heater alarm	event input	
E53-CN03N			event input	
E53-CN03N	RS-485	3-phase HA		
E53-CN03N	RS-485			voltage (pulse)
E53-CN03N		heater alarm		voltage (pulse)
E53-CN03N			event input	power supply 12 VDC / 20 mA
E53-CN03N		heater alarm		power supply 12 VDC / 20 mA

**E5AN / -EN option boards**

(one slot available in each instrument)

Model	Option
E53-EN01	RS-232 communications (Compoway-F / Modbus)
E53-EN03	RS-485 communications (Compoway-F / Modbus)
E53-AKB	event input

**E5\_N series optional tools**

Model	Option
E58-CIFQ1	USB PC based configuration cable
	
CX-Thermo	PC based configuration and tuning software
ThermoMini	PC based parameter cloning software (free)
P2CF-08-E	Standard 8 pin socket for E5CN-□□□U type

**Specifications**

Heater alarm	yes, optional; 1 + 3-phase option
Thermocouple input type	K, J, T, E, L, U, N, R, S, B
RTD input type	Pt100, JPt100
Linear input type	mV, mA (optional), V (not for -GN)
Control mode	ON / OFF, 2-PID, heat and / or cool
Accuracy	±0.5% of indicated value
Auto-tuning	yes
Self-tuning	yes
RS-232	-AN / -EN: optional
RS-485	optional
Event input	optional (not for -GN)
QLP port (USB connection PC)	yes (not for -GN)
Ambient temperature	-10 °C to 55 °C
IP Rating front panel	IP66
Sampling period	500 ms for -GN, 250 ms for -CN, -EN, -AN



## In-panel, DIN-rail mounted modular multi-loop temperature controllers

This modular temperature controller consists of 22.5 mm wide modules with 2 channels per module. Via RS-485 one can build up to a maximum of 32 control loops. The modularity of E5ZN enables easy exchange and replacement of the individual modules.

- Output: SSR, transistor, current, transfer outputs and event in- and outputs
- Alarms and load-fail detection, LED indicators for status
- Control mode: ON / OFF and 2-PID
- Easy connection to PLC and HMI or PC
- Configuration by separate setting unit (E5ZN-SDL) and tool software



### Ordering information

Functions		Control output	Auxiliary output	Input type *1	Model
Heating or heat / cool control *2 Event input: 1 point per unit	Heater burnout alarm *3	Voltage (pulse) output	Transistor output: 2 pts (sinking)	Thermocouple	E5ZN-2QNH03TC-FLKDC24
				Platinum resistance thermometer	E5ZN-2QNH03P-FLKDC24
			Transistor output: 2 pts (sourcing)	Thermocouple	E5ZN-2QPH03TC-FLKDC24
				Platinum resistance thermometer	E5ZN-2QPH03P-FLKDC24
		Transistor output	Transistor output: 2 pts (sinking)	Thermocouple	<b>E5ZN-2TNH03TC-FLKDC24</b>
				Platinum resistance thermometer	<b>E5ZN-2TNH03P-FLKDC24</b>
	Transfer output *4		Transistor output: 2 pts (sourcing)	Thermocouple	<b>E5ZN-2TPH03TC-FLKDC24</b>
				Platinum resistance thermometer	<b>E5ZN-2TPH03P-FLKDC24</b>
			Transistor output: 2 pts (sinking)	Thermocouple	E5ZN-2CNF03TC-FLKDC24
				Platinum resistance thermometer	E5ZN-2CNF03P-FLKDC24
		Transistor output: 2 pts (sourcing)	Thermocouple	<b>E5ZN-2CPF03TC-FLKDC24</b>	
			Platinum resistance thermometer	<b>E5ZN-2CPF03P-FLKDC24</b>	

<sup>\*1</sup> Thermocouple models provide analogue input and input for infrared temperature sensors (ES1B).

**Bold** = preferred stock item

<sup>\*2</sup> When using heating and cooling control functionality, the auxiliary output will be either heating control output or cooling control output.

<sup>\*3</sup> When using the heater burnout alarm, purchase a current transformer (CT) separately.

<sup>\*4</sup> When connecting the load of the controlled system, heat control output or cool control output can be allocated to the control output or auxiliary output. When connecting a recording device or digital panel meter, transfer output (volt) can be allocated to control output or auxiliary output 3 or 4 of analogue output models.

**Note:** Terminal units are required for wiring. Purchase separately.

### Accessories

#### Terminal unit (includes bus system without backplane)

no. of terminals	Functions	Model
24	Master socket, equipped with terminals for power supply, communications and display unit	<b>E5ZN-SCT24S-500</b>
18	Extension socket	<b>E5ZN-SCT18S-500</b>

#### Current transformer

Diameter	Model
5.8 dia.	<b>E54-CT1</b>
12.0 dia.	E54-CT3

#### Setting display unit

Power Supply	Model
24 VDC	<b>E5ZN-SDL</b>

#### Sockets for E5ZN-SDL

Type	Model
Front-connecting socket (with finger protection)	<b>P2CF-11-E</b>
Back-connecting socket (for control panel mounting)	<b>P3GA-11</b>
Terminal cover for finger protection	<b>Y92A-48G</b>

#### DeviceNet gateway

Functions	Model
Connects up to 16 E5ZN modules to DeviceNet (fits into master socket), 24 VDC supply voltage	<b>E5ZN-DRT</b>

**Bold** = preferred stock item

### Specifications

Heater burnout	yes
Thermocouple input type	K, J, T, E, L, U, N, R, S, B
RTD input type	Pt100, JPt100
Linear input type	mA, 0-50 mV
Control mode	2-PID or ON / OFF Control
Accuracy	0.5% FS
Auto-tuning	yes
RS-485	yes
Event input	yes
DeviceNet	optional
Ambient temperature	-10 °C to 55 °C
Sampling period	500 ms
Size in mm	130Hx22.5Wx112D



## Advanced compact digital process controllers

The E5□K series of advanced controllers provides standard models and models with programmer functionality. The modular structure of the series makes it very versatile. A number of tuning functions are provided, including auto-tuning, self-tuning and fuzzy self-tuning.

- 96Hx48Wx100D / 53Hx53Wx100D / 96Hx96Wx100D mm
- Control mode: ON / OFF or PID
- Control output: relay, SSR, voltage or current
- Universal inputs (Pt100 / thermocouple / volt / milliampere)
- Supported by ThermoTools PC Software



## Ordering information

Specification	Alarms	Standard model	Programmer model 48x48 mm	Voltage
Base unit	1	E5CK-AA1	E5CK-TAA1	AC100-240 or DC/AC 24
Base unit with terminal cover		<b>E5CK-AA1-500</b>	<b>E5CK-TAA1-500</b>	
Specification	Alarms	Standard model	Programmer model 48x96 mm	Voltage
Standard model	2	E5EK-AA2	E5EK-TAA2	AC100-240 or DC/AC 24
Standard model with terminal cover		<b>E5EK-AA2-500</b>	<b>E5EK-TAA2-500</b>	
Position-proportional model		E5EK-PRR2	E5EK-TPRR2	
Position-proportional model with terminal cover		<b>E5EK-PRR2-500</b>	<b>E5EK-TPRR2-500</b>	
Standard mode with terminal cover and DeviceNet		E5EK-AA2-DRT-500		AC100-240
Specification	Alarms	Standard model	Programmer model 96x96 mm	Voltage
Standard model	2	E5AK-AA2	E5AK-TAA2	AC100-240 or DC/AC 24
Standard model with terminal cover		<b>E5AK-AA2-500</b>	<b>E5AK-TAA2-500</b>	
Position-proportional model		E5AK-PRR2	E5AK-TPRR2	
Position-proportional model with terminal cover		<b>E5AK-PRR2-500</b>	<b>E5AK-TPRR2-500</b>	

**Note:** A single output unit and option unit can be mounted to each E5CK base unit.

## Option Units

Model	Name	Model	Specification
E5CK	Output units	<b>E53-R4R4</b>	Relay / relay
		<b>E53-Q4R4</b>	Pulse (NPN) / relay
		<b>E53-Q4HR4</b>	Pulse (PNP) / relay
		<b>E53-C4R4</b>	Linear (4 to 20 mA) / relay
		<b>E53-C4DR4</b>	Linear (0 to 20 mA) / relay
		<b>E53-V44R4</b>	Linear (0 to 10 V) / relay
		<b>E53-Q4Q4</b>	Pulse (NPN) / pulse (NPN)
		<b>E53-Q4HQ4H</b>	Pulse (PNP) / pulse (PNP)
	Option units	<b>E53-CK01</b>	RS-232C
		<b>E53-CK03</b>	RS-485
		<b>E53-CKB</b>	Event input: 1 point
		<b>E53-CKF</b>	Transfer output (4 to 20 mA)

Model	Name	Model	Specification
E5AK E5EK	Output units	<b>E53-R</b>	Relay
		<b>E53-S</b>	SSR
		<b>E53-Q</b>	Pulse (NPN) 12 VDC
		<b>E53-Q3</b>	Pulse (NPN) 24 VDC
		<b>E53-Q4</b>	Pulse (PNP) 24 VDC
		<b>E53-C3</b>	Linear (4 to 20 mA)
		<b>E53-C3D</b>	Linear (0 to 20 mA)
		<b>E53-V34</b>	Linear (0 to 10 V)
		<b>E53-V35</b>	Linear (0 to 5 V)
	Option units	<b>E53-AKB</b>	Event input
		E53-EN01	Communication (RS-232C)
		E53-EN02	Communication (RS-422)
		E53-EN03	Communication (RS-485)
		<b>E53-AKF</b>	Transfer output

**Bold** = preferred stock item

## Specifications

Heater burnout	Optional, CK: loop burnout
Thermocouple input type	K, J, T, E, L, U, N, R, S, B, W, PLII
RTD input type	Pt100, JPt100
Linear input type	mA, 0 to 50 mV
Control mode	2-PID or ON / OFF control
Accuracy	0.3% FS, 1 digit max.
Self-tuning	yes
Auto-tuning	yes
RS-485	optional
Event input	optional
Ambient temperature	-10 °C to 55 °C
IP rating front panel	IP66
Sampling period	Temperature input: 250 ms Linear input: 100 ms



## Digital process controllers with high speed and precision, multiple I/O

The E5\_R series provides you with high-accuracy inputs (0.01°C for Pt100) and a 50ms sample and control cycle for all four loops. Its unique disturbance overshoot reduction adjustment ensures solid, robust control.

- 96Hx48Wx110D / 96Hx96Wx110D mm
- Control mode: ON / OFF or 2-PID
- Control output: voltage (puls), linear (mA) and relay valve positioning
- Power supply: 100 - 240 VAC or 24 VAC / VDC
- Supported by CX-Thermo PC software



### Ordering information

Functions	Loops	Input		Output		Comms	48x96 mm model	Voltage		
		Analogue	Event	Control	Alarm					
standard	1	1	2	2	QC+Q	4R	-	E5ER-Q4B	AC100-240	or DC/AC 24
standard	1	1	2	2	QC+Q	4R	RS-485	E5ER-Q43B-FLK	AC100-240	
standard	1	1	2	4	QC+Q+C+C	4R	RS-485	E5ER-QC43B-FLK	AC100-240	or DC/AC 24
standard	1	1	6	2	QC+Q	2T	RS-485	E5ER-QT3DB-FLK	AC100-240	
standard	max 2	2	4	2	QC+Q	2T	RS-485	E5ER-QT3DW-FLK	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	4R	-	E5ER-C4B	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	4R	RS-485	E5ER-C43B-FLK	AC100-240	
standard	1	1	6	2	C+C	2T	RS-485	E5ER-CT3DB-FLK	AC100-240	
standard	max 2	2	4	2	C+C	2T	RS-485	E5ER-CT3DW-FLK	AC100-240	or DC/AC 24
valve	1	1 + pot	4	2	R+R	2T	-	E5ER-PRTDF	AC100-240	or DC/AC 24
valve	1	1 + pot	-	4	R+R+QC+Q	4R	RS-485	E5ER-PRQ43F-FLK	AC100-240	or DC/AC 24
standard	1	1	2	2	QC+Q	2T	DeviceNet	E5ER-QTB-DRT	AC100-240	or DC/AC 24
standard	max 2	2	-	2	QC+Q	2T	DeviceNet	E5ER-QTW-DRT	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	2T	DeviceNet	E5ER-CTB-DRT	AC100-240	or DC/AC 24
standard	max 2	2	-	2	C+C	2T	DeviceNet	E5ER-CTW-DRT	AC100-240	or DC/AC 24
valve	1	1 + pot	-	2	R+R	2T	DeviceNet	E5ER-PRTF-DRT	AC100-240	or DC/AC 24
Functions	Loops	Input		Output		Comms	96x96 mm Model	Voltage		
		Analogue	Event	Control	Alarm					
standard	1	1	2	2	QC+Q	4R	-	E5AR-Q4B	AC100-240	or DC/AC 24
standard	1	1	2	2	QC+Q	4R	RS-485	E5AR-Q43B-FLK	AC100-240	
standard	1	1	6	2	QC+Q	4R	RS-485	E5AR-Q43DB-FLK	AC100-240	
standard	1	1	6	4	QC+Q+C+C	4R	RS-485	E5AR-QC43DB-FLK	AC100-240	or DC/AC 24
standard	max 2	2	4	2	QC+Q	4R	RS-485	E5AR-Q43DW-FLK	AC100-240	
standard	max 2	2	4	4	QC+Q+QC+Q	4R	RS-485	E5AR-QQ43DW-FLK	AC100-240	or DC/AC 24
standard	max 4	4	4	4	QC+Q+QC+Q	4R	RS-485	E5AR-QQ43DWW-FLK	AC100-240	
standard	1	1	2	2	C+C	4R	-	E5AR-C4B	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	4R	RS-485	E5AR-C43B-FLK	AC100-240	
standard	1	1	6	2	C+C	4R	RS-485	E5AR-C43DB-FLK	AC100-240	
standard	max 2	2	4	2	C+C	4R	RS-485	E5AR-C43DW-FLK	AC100-240	
standard	max 4	4	4	4	C+C+C+C	4R	RS-485	E5AR-CC43DWW-FLK	AC100-240	or DC/AC 24
valve	1	1 + pot	4	2	R+R	4R	-	E5AR-PR4DF	AC100-240	or DC/AC 24
valve	1	1 + pot	4	4	R+R+QC+Q	4R	RS-485	E5AR-PRQ43DF-FLK	AC100-240	or DC/AC 24
standard	1	1	2	2	QC+Q	4R	DeviceNet	E5AR-Q4B-DRT	AC100-240	or DC/AC 24
standard	1	1	2	4	QC+Q+C+C	4R	DeviceNet	E5AR-QC4B-DRT	AC100-240	or DC/AC 24
standard	max 2	2	-	4	QC+Q+QC+Q	4R	DeviceNet	E5AR-QQ4W-DRT	AC100-240	or DC/AC 24
standard	1	1	2	2	C+C	4R	DeviceNet	E5AR-C4B-DRT	AC100-240	or DC/AC 24
standard	max 4	4	-	4	C+C+C+C	4R	DeviceNet	E5AR-CC4WW-DRT	AC100-240	or DC/AC 24
valve	1	1 + pot	-	2	R+R	4R	DeviceNet	E5AR-PR4F-DRT	AC100-240	or DC/AC 24
valve	1	1 + pot	-	4	R+R+QC+Q	4R	DeviceNet	E5AR-PRQ4F-DRT	AC100-240	or DC/AC 24

**Note:** - Voltage: specify the power supply specifications (voltage) when ordering.  
 - standard = heat and / or cool PID control, valve = valve positioning (relay up / down) (PRR)  
 - max 2 = 2 loops heat and / or cool or 1 loop cascade, ratio or remote SP  
 - max 4 = 4 loops heat and / or cool  
 - 1, 2 or 4 = number of analogue universal input 1 + pot = 1 universal and 1 slide wire feedback from valve  
 - QC = voltage (pulse) or current (switch), Q = voltage (pulse), C = current, 4R = 4 two pole relay, 2T = two transistor output NPN

**Bold** = preferred stock item

Terminal cover for E5AR	<b>E53-COV14</b>
Terminal cover for E5ER	<b>E53-COV15</b>

**Specifications**

Thermocouple input type	K, J, T, E, L, U, N, R, S, B, W
RTD input type	Pt100
Linear input type	mA, V
Control mode	2-PID or ON / OFF control
Accuracy	±0.1% FS
Auto-tuning	yes
RS-485	optional
Event input	optional
Ambient temperature	-10 °C to 55 °C
IP rating front panel	IP66
Sampling period	50 ms
Size in mm	E5ER: 96Hx48Wx110D E5AR: 96Hx96Wx110D



## OMRON's intelligent PROFIBUS-DP and Compoway/F gateway

This gateway supports all Compoway/F equipped products, including temperature controllers, digital panel indicators, etc. It can also be used for connecting MCW151-E and E5\_K series.

- Cost-effectively integrates basic instruments into a PROFIBUS-DP network
- Requires no complex protocol conversion writing
- Has function blocks for drag-and-drop configuration
- Connects up to 15 instruments to a single PROFIBUS point



### Ordering information

Name	Model
PROFIBUS remote terminal serial communications unit	PRT1-SCU11

### Specifications

Storage temperature	-20 °C to +75 °C
Ambient temperature	0 °C to 55 °C
Ambient humidity	10 to 90% (non-condensing)
EMC compliance	EN 50081-2, EN 61131-2
Power supply	+24 VDC (+10% / -15%) Current consumption 80 mA (typical)
Weight	125 g (typical)
Communication interface	RS-485 based PROFIBUS-DP RS-422A Host link RS-485 CompoWay/F RS-232C Peripheral Port supporting connection to thermotools
Size in mm	90Hx40Wx65D

# ES1B



## Achieve low-cost measurements with an infrared thermosensor

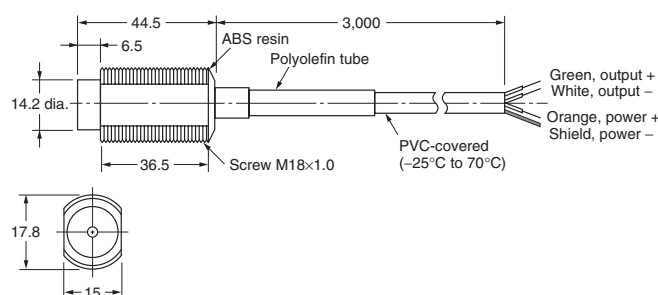
This infrared thermosensor provides an accurate, stable and cost-effective way to measure the temperature of objects. It behaves just like a standard K-type thermocouple, which enables it to operate with any temperature controller or alarm unit.

- Cost-effective infrared thermosensor
- Contactless, meaning no deterioration, unlike thermocouples
- 4 temperature ranges available: 10-70°C, 60-120°C, 115-165°C and 140-260°C
- Response speed 300 ms

### Ordering information

Appearance and sensing characteristics	Specification	Model
	10 to 70 °C	ES1B 10-70C
	60 to 120 °C	ES1B 115-165C
	155 to 165 °C	ES1B 140-260C
	140 to 260 °C	ES1B 60-120C

### Dimensions (unit: mm)



### Specifications

Item	ES1B
Power supply voltage	12 / 24 VDC
Current consumption	20 mA max.
Accuracy	±5 °C: ±2% PV or ±2 °C, whichever is larger ±10 °C: ±4% PV or ±4 °C, whichever is larger ±30 °C: ±6% PV or ±6 °C, whichever is larger ±40 °C: ±8% PV or ±8 °C, whichever is larger
Reproducibility	±1% PV or ±1 °C, whichever is larger
Temperature drift	0.4 °C / °C max.
Receiver element	Thermopile
Response speed	Approximately 300 ms at response rate of 63%
Operating temperature	-25 °C to 70 °C (with no icing or condensation)
Allowable ambient humidity	35% to 85%
Degree of protection	IP65
Size in mm	head: 17.8 dia. x 44.5 (screw M18 x 1.0), cable 3,000



# Power supplies

## With the S8VS Micro size IS everything!

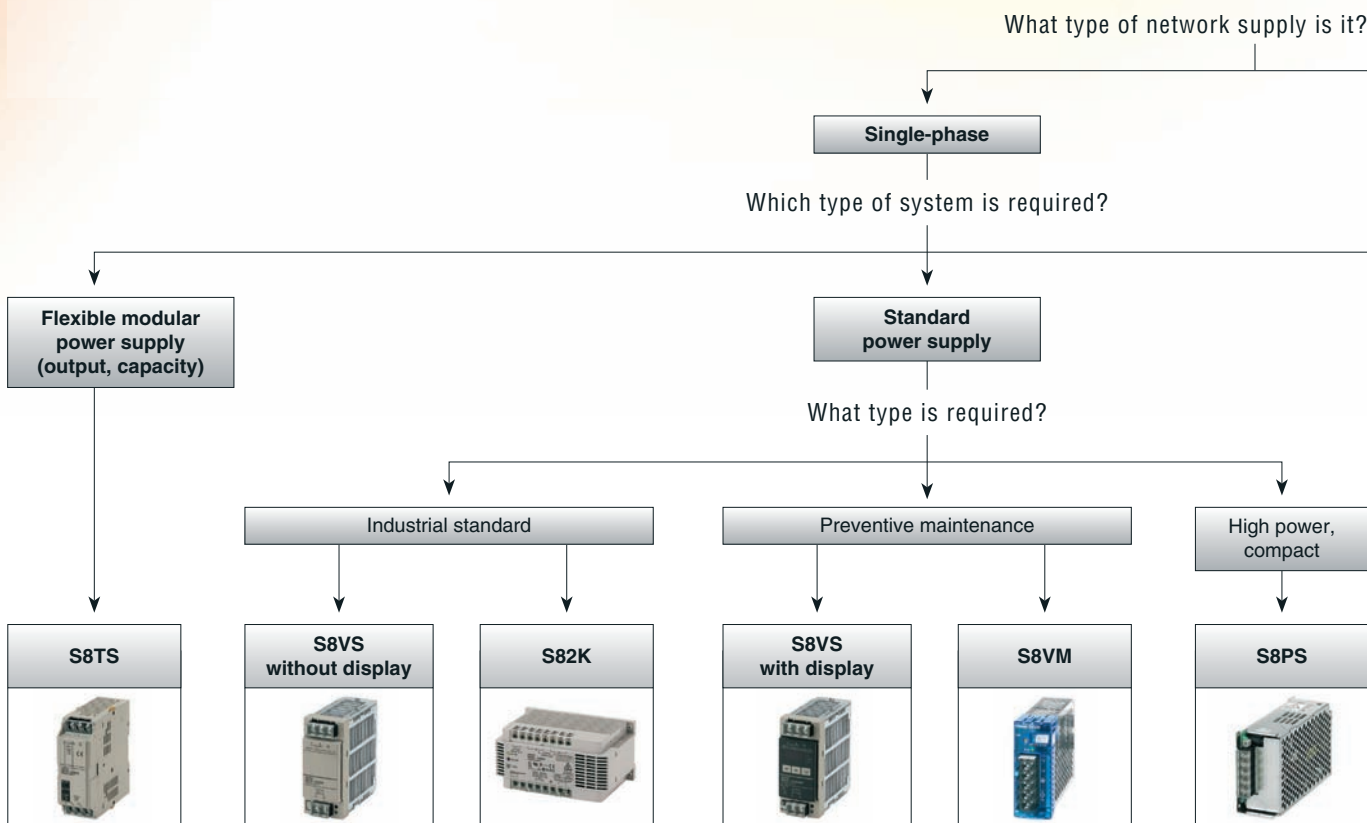
### Powerful performance in compact design

At just 22.5 mm wide Omron's S8VS Micro series is one of smallest power supplies around, but it delivers more power per cm<sup>3</sup> than almost any similar product in its class!

It provides 100% performance (no derating) right up to its maximum operating temperature. It offers flexible mounting (DIN-rail and horizontal or vertical panel-mounting) for convenient installation. And it is available in 15 W and 30 W models, each of which offers an output voltage choice of 5VDC, 12VDC and 24VDC. A powerful yet cost-effective solution for reducing cabinet space!

#### Features at a glance:

- Compact size
- No derating
- Easy DIN-rail mounting
- Full range to choose from



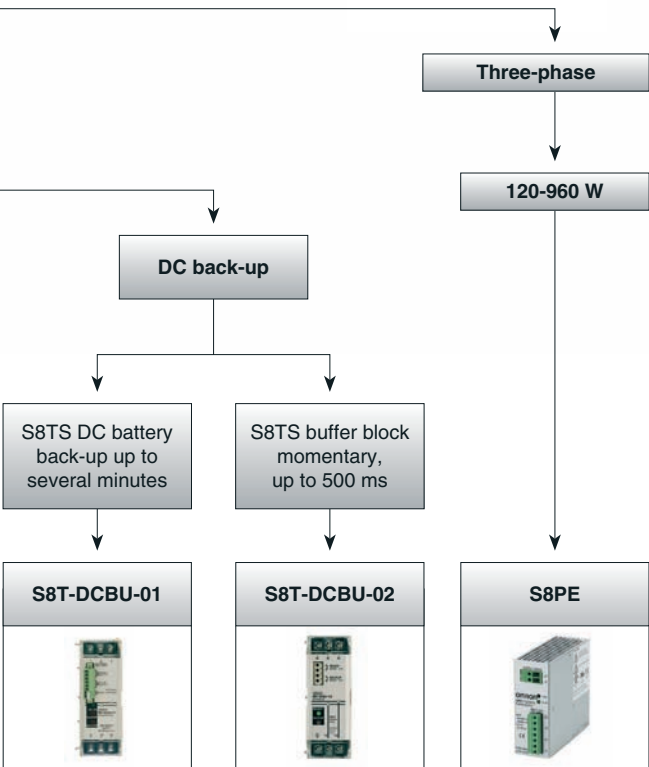
# S8VM power supplies

## The power supplies that alert you!

This new single-phase industrial switch mode power supply series features an undervoltage alarm that gives a warning in case of failure. The new S8VM series provide not only a clear indication that a DC output voltage drop has occurred, but also indicates the likely cause – allowing for fast, effective corrective action. The power supplies come in a broad 5 to 24 V voltage range, with output powers between 15 and 150 W. Extensions up to 1500 W will be launched in 2006.

### Features at a glance





- Timely, efficient on-site troubleshooting for optimum quality management
- New ultra-compact housing supports cabinet downsizing
- Early-warning system
- Easy installation
- Broad product range of DC output voltages from 5 V up to 24 V and in powers from 15 W to 150 W





## Table of contents

Selection table		236
Single-phase	S8VS	238
	S8VM	239
	S8TS	240
	S8T-DCBU-01/-02	241
	S82K	242
Three-phase	S8PE	243

# Selection table

Category		Industrial standard	With status monitor					Modular		Back-up	
Selection criteria											
	Model	S8VS	S8VS-Bx / -Ax	S8VM				S8TS			
	Phases	Single-phase									
	Rated voltage	100 to 240 VAC									
	Voltage	24 V	24 V	5 V	12 V	15 V	24 V	5 V	12 V	24 V	24 V
Power [W]	3 W										
	7.5 W										
	10 W										
	15 W			■ 3 A	■ 1.3 A	■ 1 A	■ 0.65 A				
	25 W							■ 5 A			
	30 W			■ 6 A	■ 2.5 A	■ 2 A	■ 1.3 A		■ 2.5 A		
	50 W			■ 10 A	■ 4.3 A	■ 3.5 A	■ 2.2 A				
	60 W	■ 2.5 A	■ 2.5 A						■ 5 A	■ 2.5 A	■ 2.5 A
	90 W	■ 3.75 A	■ 3.75 A						■ 7.5 A		
	100 W			■ 20 A	■ 8.5 A	■ 7 A	■ 4.5 A				
	120 W	■ 5 A	■ 5 A						■ 10 A	■ 5 A	
	150 W			■ 27 A	■ 12.5 A	■ 10 A	■ 6.5 A				
	180 W	■ 7.5 A	■ 7.5 A							■ 7.5 A	
	240 W	■ 10 A	■ 10 A							■ 10 A	
	300 W										
	480 W										
600 W											
960 W											
Features	Conforms to EN61000-3-2 A14	■ with PFC	■ with PFC	■ with PFC	■ with PFC	■ with PFC	■ with PFC	■ with PFC	■ with PFC	■ with PFC	
	DC back-up							□	□	□	
	Capacitor back-up	□	□							□	■
	Undervoltage alarm	■	■				■	■	■	■	
	Overvoltage protection	■	■	■	■	■	■	■	■	■	■
	Overload protection	■	■	■	■	■	■	■	■	■	■
	DIN-rail mounting	■	■	■	■	■	■	■	■	■	■
	Screw mounting (with bracket)			■	■	■	■				
	EMI Class B			■	■	■	■	■	■	■	■
	UL Class 2	■ only 60 W	■ only 60 W					■	■	■	■
	N+1 redundancy							■	■	■	
	Parallel operation							■	■	■	■
	Series operation	■	■	■	■	■	■	■	■		
	Page	238		239			240				

Category		Industrial standard				High power
Selection criteria						
	Model	S82K				S8PE
	Phases	Single-phase				3-phase
	Rated voltage	100 / 200 VAC or 100 to 240 VAC				400 - 480 VAC or 200 - 230 VAC
Power [W]	Voltage	5 V	12 V	15 V	24 V	24 V
	3 W	■ 0.6 A	■ 0.25 A	■ 0.2 A	■ 0.13 A	
	7.5 W	■ 1.5 A	■ 0.6 A	■ 0.5 A	■ 0.3 A	
	10 W					
	15 W	■ 2.5 A	■ 1.2 A		■ 0.6 A	
	25 W					
	30 W	■ 5 A	■ 2.5 A		■ 1.3 A	
	50 W				■ 2.1 A	
	60 W					
	90 W				■ 3.75 A	
	100 W				■ 4.2 A	
	120 W					■ 5 A
	150 W					
	180 W					
	240 W					■ 10 A
	300 W					
	480 W					■ 20 A
	600 W					
	960 W					■ 40 A
Features	Conforms to EN61000-3-2 A14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	■
	DC back-up					
	Capacitor back-up				<input type="checkbox"/>	<input type="checkbox"/>
	Undervoltage alarm	■	■	■	<input type="checkbox"/>	
	Overvoltage protection					■ except 40 A
	Overload protection	■	■	■	■	■
	DIN-rail mounting	■	■	■	■	■ except 40 A
	Screw mounting (with bracket)	■	■	■	■	■ only 40 A
	EMI Class B	■	■	■		
	UL Class 2	■	■	■	■ except dual output	
	N+1 redundancy					
	Parallel operation				■ only 100 W	■
	Series operation				■ only 90 / 100 W	■
Page		242				243

■ Standard

☐ Available

☐ No / not available



## Compact power supply with diagnostics and output monitor function

S8VS contributes to higher productivity and preventative maintenance of your equipment or machine due to its unique diagnostics feature. Where production stop is critical, such as in the automotive and semiconductor industry, the S8VS with display is ideal (60 to 240 W at 24 VDC).

- Provides a replacement indication (maintenance forecast monitor)
- Provides operation time measurement (total run-time monitor)
- Display shows output values: voltage, current or peak current
- Non-display models available from 15 to 240 W at 5, 12 and 24 VDC
- UL Class 2 (15 - 60 W) and UL Class I div. 2 (15, 30 W); SEMI-F47-0200



### Ordering information

Power	Output voltage	Output current	Diagnostics function	Diagnostic alarm output	Size in mm (HxWxD)	Type	
15 W	5 VDC	2 A (10 W)	Undervoltage alarm indicator	no	85x22.5x96.4	S8VS-01505	
	12 VDC	1.2 A		no		S8VS-01512	
	24 VDC	0.65 A		no		S8VS-01524	
30 W	5 VDC	4 A (20 W)		no		S8VS-03005	
	12 VDC	2.5 A		no		S8VS-03012	
	24 VDC	1.3 A		no		S8VS-03024	
60 W	24 VDC	2.5 A	no	no	95x40x108.3	S8VS-06024	
90 W	24 VDC	3.75 A		no	115x50x121.3	S8VS-09024	
120 W	24 VDC	5 A		no		S8VS-12024	
180 W	24 VDC	7.5 A		no	115x75x125.3	S8VS-18024	
240 W	24 VDC	10 A		no	115x100x125.3	S8VS-24024	
60 W	24 VDC	2.5 A	Maintenance *1	no	95x40x108.3	S8VS-06024A	
			Total run-time	no		S8VS-06024B	
						Alarm output sinking (NPN)	Alarm output sourcing (PNP)
90 W	24 VDC	3.75 A	Maintenance *1	yes	115x50x121.3	S8VS-09024A	S8VS-09024AP
			Total run-time			S8VS-09024B	S8VS-09024BP
120 W	24 VDC	5 A	Maintenance *1			S8VS-12024A	S8VS-12024AP
			Total run-time			S8VS-12024B	S8VS-12024BP
180 W	24 VDC	7.5 A	Maintenance *1		115x75x125.3	S8VS-18024A	S8VS-18024AP
			Total run-time			S8VS-18024B	S8VS-18024BP
240 W	24 VDC	10 A	Maintenance *1		115x100x125.3	S8VS-24024A	S8VS-24024AP
			Total run-time			S8VS-24024B	S8VS-24024BP

\*1 Maintenance indicates maintenance forecast monitor

**Bold** = preferred stock item

### Specifications

Specification		15 W	30 W	60 W	90 W	120 W	180 W	240 W
Efficiency		77% min. (24 V)	80% min. (24 V)	78% min.	80% min.	80% min.	80% min.	80% min.
Power factor						0.95 min.	0.95 min.	0.95 min.
Input voltage		100 to 240 VAC (85 to 264 VAC), single-phase						
Output voltage	Voltage adjustment	±10% to ±15% (with V. ADJ) min.						
	Ripple	2% p-p max. (at rated input / output voltage)						
	Input variation	0.5% max. (at 85 to 264 VAC input, 100% load)						
	Temperature influence	0.05% / °C max.						
Overload protection		105% to 160% of rated load current, voltage drop, automatic reset						
Overvoltage protection		yes	yes	yes	yes	yes	yes	yes
Input current	100 V	0.45 A m Ax.	0.9 A m Ax.	1.7 A m Ax.	2.3 A m Ax.	1.9 A m Ax.	2.7 A m Ax.	3.8 A m Ax.
	200 V	0.25 A m Ax.	0.6 A m Ax.	1.0 A m Ax.	1.4 A m Ax.	1.1 A m Ax	1.6 A m Ax.	2.0 A m Ax.
	230 V	0.19 A (5 V: 0.14 A)	0.37 A (5 V: 0.27 A)	0.7 A typ.	0.9 A typ.	0.6 A typ.	0.9 A typ.	1.2 A typ.
Output indicator		yes (green)	yes (green)	yes (green)	yes (green)	yes (green)	yes (green)	yes (green)
Weight		160 g	180 g	330 g	490 g	550 g	850 g	1,150 g
Operating temperature		-10 °C to 60 °C	-10 °C to 60 °C *1	-10 °C to 60 °C, derating beyond 40 °C, no icing or condensation				
Series operation		yes (24 V only)	yes	yes	yes	yes	yes	yes

\*1 For 30 W model 24 V: no derating, 12 & 5 V: derating beyond 50 °C.





## General-purpose, slim power supply with DC output status monitor

The S8VM is available in a slim housing from 15 to 150 W at 5, 12, 15 and 24 VDC in various configurations. S8VM gives a warning when abnormalities occur, such as input power failure, overload and under-voltage, by watching the DC output behaviour to help you to quickly determine the cause of failure.

- Indicates abnormalities on the load side (undervoltage alarm)
- Indicates input power failure (undervoltage alarm)
- Consistent height in the family for easy cabinet design
- 300 to 1,500 W models to be released soon (see S8PS / S82J until then)
- EMI Class B, UL Class 1 division 2, SEMI-F47-0200 (pending)



### Ordering information

Power ratings	Output voltage	Output current	Size in mm (HxWxD)	Open-frame type	Covered type					
				DIN-rail mounting <sup>*1</sup>	Front-mounting			DIN-rail mounting		
				Standard type	Standard type	Undervoltage alarm type		Standard type	Undervoltage alarm type	
						Sinking (NPN)	Sourcing (PNP)		Sinking (NPN)	Sourcing (PNP)
15 W	5 V	3 A	84.5x35.1x94.4	S8VM-01505D	S8VM-01505C			S8VM-01505CD		
	12 V	1.3 A		S8VM-01512D	S8VM-01512C			S8VM-01512CD		
	15 V	1 A		S8VM-01515D	S8VM-01515C			S8VM-01515CD		
	24 V	0.65 A		S8VM-01524D	S8VM-01524C	S8VM-01524A <sup>*2</sup>		S8VM-01524CD	S8VM-01524AD <sup>*2</sup>	
30 W	5 V	6 A	84.5x35.1x109.4	S8VM-03005D	S8VM-03005C			S8VM-03005CD		
	12 V	2.5 A		S8VM-03012D	S8VM-03012C			S8VM-03012CD		
	15 V	2 A		S8VM-03015D	S8VM-03015C			S8VM-03015CD		
	24 V	1.3 A		S8VM-03024D	S8VM-03024C	S8VM-03024A <sup>*2</sup>		S8VM-03024CD	S8VM-03024AD <sup>*2</sup>	
50 W	5 V	10 A	84.5x35.1x124.5	S8VM-05005D	S8VM-05005C			S8VM-05005CD		
	12 V	4.3 A		S8VM-05012D	S8VM-05012C			S8VM-05012CD		
	15 V	3.5 A		S8VM-05015D	S8VM-05015C			S8VM-05015CD		
	24 V	2.2 A		S8VM-05024D	S8VM-05024C	S8VM-05024A	S8VM-05024P	S8VM-05024CD	S8VM-05024AD	S8VM-05024PD
100 W	5 V	20 A	84.5x36.6x164.5	S8VM-10005D	S8VM-10005C			S8VM-10005CD		
	12 V	8.5 A		S8VM-10012D	S8VM-10012C			S8VM-10012CD		
	15 V	7 A		S8VM-10015D	S8VM-10015C			S8VM-10015CD		
	24 V	4.5 A		S8VM-10024D	S8VM-10024C	S8VM-10024A	S8VM-10024P	S8VM-10024CD	S8VM-10024AD	S8VM-10024PD
150 W	5 V	27 A (135 W)	84.5x45.6x164.5	S8VM-15005D	S8VM-15005C			S8VM-15005CD		
	12 V	12.5 A		S8VM-15012D	S8VM-15012C			S8VM-15012CD		
	15 V	10 A		S8VM-15015D	S8VM-15015C			S8VM-15015CD		
	24 V	6.5 A		S8VM-15024D	S8VM-15024C	S8VM-15024A	S8VM-15024P	S8VM-15024CD	S8VM-15024AD	S8VM-15024PD

<sup>\*1</sup> For open-frame type with front-mounting, remove the 'D' from the ordering number..

<sup>\*2</sup> No output built-in.

**Bold** = preferred stock item

**Note:** The indicated sizes are for DIN-rail mounting covered types. Other types will have slightly different dimensions.

### Specifications

		15 W	30 W	50 W	100 W	150 W
Efficiency	5 V models	75% min.	75% min.	80% min.	81% min.	81% min.
	12 V models	78% min.	79% min.	79% min.	81% min.	81% min.
	15 V models	78% min.	79% min.	79% min.	81% min.	81% min.
	24 V models	80% min.	81% min.	80% min.	82% min.	83% min.
Input voltage		100 to 240 VAC, (85 to 264 VAC), single phase				
Output	Voltage adjustment	±20% with V. ADJ min. (S8VM-□□□24□□ / P□: -10% to 20%)				
	Ripple	5 V models	3.2% (p-p) max.	3.2% (p-p) max.		
		12 V models	1.5% (p-p) max.	1.5% (p-p) max.		
		15 V models	1.2% (p-p) max.	1.2% (p-p) max.		
		24 V models	1.0% (p-p) max.	0.75% (p-p) max.		
	Input variation	0.4% max.				
	Temperature influence	0.02% / °C max.				
Overload protection		105% to 160% of rated load current, voltage drop, automatic reset				
Overvoltage protection		yes				
Output indicator		yes (green)				
Weight		180 g max.	220 g max.	290 g max.	460 g max.	530 g max.
Series operation		yes				
Remote sensing function		no	no	no	yes	yes





## Industrial-use, modular power supply for multiple configurations

The S8TS is an expandable power supply; standard units can easily be snapped together in parallel to provide you with ultimate flexibility.

Expandable up to 4 units, it can deliver a total power of 240 W at 24 VDC or a multi-output configuration.

- Improves system reliability by building up N+1 redundancy
- Standard unit; 60 W at 24 VDC, 30 W at 12 VDC and 25 W at 5 VDC
- Battery back-up unit protects against power outage (see accessories)
- Buffer unit protects against power glitches and outage (see accessories)
- EMI class B, UL class 2, UL class 1 division 2



### Ordering information

Basic block					
Output voltage	Output current	Screw terminal type		Connector terminal type <sup>*1</sup>	
		With bus line connectors <sup>*2</sup>	Without bus line connectors <sup>*3</sup>	With bus line connectors <sup>*2</sup>	Without bus line connectors <sup>*3</sup>
24 V	2.5 A	<b>S8TS-06024-E1</b> <sup>*4</sup>	S8TS-06024	S8TS-06024F-E1	S8TS-06024F
12 V	2.5 A	<b>S8TS-03012-E1</b>	S8TS-03012	S8TS-03012F-E1	S8TS-03012F
5 V	5 A		<b>S8TS-02505</b>		S8TS-02505F

<sup>\*1</sup> Attached connectors: 2ESDPLM-05P (for output terminal) and 3ESDPLM-03P (for input terminal) made by DINKLE ENTERPRISE. **Bold** = preferred stock item

<sup>\*2</sup> One S8T-BUS01 connector and one S8T-BUS02 connector are included as accessories.

<sup>\*3</sup> Bus line connectors can be ordered separately if necessary.

<sup>\*4</sup> Conforms to EMI class B with DC minus terminal ground.

### Accessories

Bus line connector		
Type	Number of connectors	Model number
AC line + DC line bus (For parallel operation)	1 connector	<b>S8T-BUS01</b>
	10 connectors <sup>*1</sup>	<b>S8T-BUS11</b>
AC line bus (For series operation or isolated operation)	1 connector	<b>S8T-BUS02</b>
	10 connectors <sup>*2</sup>	S8T-BUS12

<sup>\*1</sup> One package contains 10 S8T-BUS01 connectors.

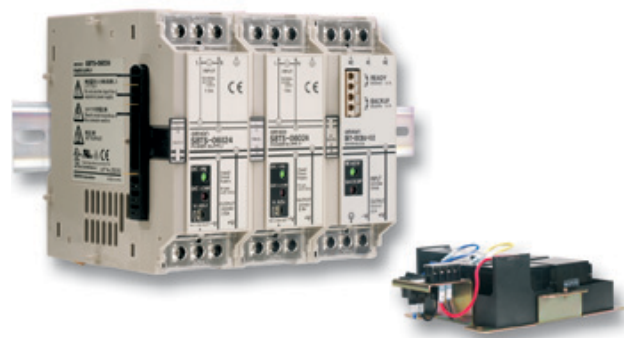
**Bold** = preferred stock item

<sup>\*2</sup> One package contains 10 S8T-BUS02 connectors.

### Specifications

		5 V models	24 / 12 V models	
		Single operation	Single operation	Parallel operation
Efficiency		62% min.	24 V models: 75%, 12 V models: 70% min.	
Power factor		0.8 min.	24 V models: 0.9 min., 12 V models: 0.8 min.	
Input voltage		100 to 240 VAC, (85 to 264 VAC), single-phase		
Output voltage	Voltage adjustment	5 V ±10% min.	24 V models: 22 to 28 V, 12 V models: 12 V ±10% min.	
	Ripple	2% (p-p) max.	2% (p-p) max.	2% (p-p) max.
	Input variation	0.5% max.		
	Temperature influence	0.05% / °C max. (with rated input, 10% to 100% load)		
Overcurrent protection		105% to 125% of rated load current, inverted L drop, automatic reset		
Overvoltage protection		yes	yes	yes
Output indicator		yes (green)	yes (green)	yes (green)
Weight		450 g max.	450 g max.	450 g max.
Series operation		yes	yes	yes
Parallel operation		no	yes	yes
Size in mm		120Hx43Wx120D		

S8T-DCBU-01



The S8T-DCBU-01 battery backup block supplies 24 VDC for a fixed period of time during AC input outages to considerably improve system reliability.



Ordering information

Product	Input voltage	Output voltage	Output current			Model number
DC back-up block	24 to 28 VDC	24 V	3.7 A / 8 A			S8T-DCBU-01
Battery holder						S82Y-TS01
Product	Input voltage	Output voltage	Output current	Type		Model number
Basic block (use together with the DC back-up block)	100 to 240 VAC	24 V	2.5 A	Screw terminal type	With bus line connectors	S8TS-06024-E1
					Without bus line connectors	S8TS-06024
				Connector terminal type	With bus line connectors	S8TS-06024F-E1
					Without bus line connectors	S8TS-06024F
Product	Back-up time	Overcurrent protection operating point selector				Model number
Battery	8 min. / 3.7 A	5.7 A (typ.)				LC-R122R2PG
	4 min. / 8.0 A	5.7 A (typ.)	11.7 A (typ.)			LC-R123R4PG

**Note:** The S8TS DC back-up block is for S8TS power supplies only. **Bold** = preferred stock item

Specifications

	Size in mm
<b>S8TS-DCBU-01</b>	120Hx43Wx130D
<b>Battery holder</b>	82Hx185.7Wx222.25D

S8T-DCBU-02



Prevents equipment stoppage, data loss and other problems resulting from momentary power failures. One S8TS-DCBU-02 buffer block provides a back-up time of 500 ms at an output current of 2.5 A. Can be wired to the 24 VDC output from any switch mode power supply.



Ordering information

Input voltage	Output voltage (during back-up operation)	Output current	Model number
24 VDC (24 to 28 VDC)	22.5 V	2.5 A	<b>S8T-DCBU-02</b>

Accessories

Type	Number of connectors	Model number
DC bus line connector (for use with S8TS only)	1 connector	S8T-BUS03
	10 connectors	S8T-BUS13

Specifications

	Size in mm
<b>S8TS-DCBU-02</b>	120Hx43Wx120D



## All-purpose, industrial use power supply

The S82K has set an industrial standard in power supply history. Available from 3 to 100 W at 5, 12, 15 and 24 VDC.

- Indicates abnormalities on the load side (undervoltage alarm)
- Parallel operation (100 W models)
- $\pm 12$  and  $\pm 15$  VDC output with 7.5 W available
- UL Class 2 (90 W), EMI class B



### Ordering information

Power ratings	Output voltage	Output current	Function configuration			Size in mm (HxWxD)	Models	
			Output	Undervoltage alarm indicator	Undervoltage alarm output			
3 W	5 V	0.6 A	Single output	yes	no	75x37.5x65	S82K-00305	
	12 V	0.25 A					S82K-00312	
	15 V	0.2 A					S82K-00315	
	24 V	0.13 A					S82K-00324	
7.5 W	5 V	1.5 A	Single output	yes	no	75x45x91	S82K-00705	
	12 V	0.6 A					S82K-00712	
	15 V	0.5 A					S82K-00715	
	24 V	0.3 A					S82K-00724	
	+V12 / -V12	0.3 A / 0.2 A	Dual output				S82K-00727	
	+V15 / -V15	0.2 A / 0.2 A					S82K-00728	
	15 W	5 V	2.5 A				Single output	yes
12 V		1.2 A	S82K-01512					
24 V		0.6 A	S82K-01524					
30 W	5 V	5.0 A (25 W)	Single output	yes	no	75x90x91	S82K-03005	
	12 V	2.5 A					S82K-03012	
	24 V	1.3 A					S82K-03024	
50 W	24 V	2.1 A	Single output	yes	no	75x145x91	S82K-05024	
90 W	24 V	3.75 A					yes	S82K-09024
100 W		4.2 A <sup>*2</sup>						S82K-09024-500 <sup>*1</sup>
								S82K-10024

<sup>\*1</sup> Conforms to EMI class B with DC minus terminal ground

<sup>\*2</sup> The output current during parallel operation is 3.78 A.

**Note:** Complies to EN61000-3-2 A14 for all models

**Bold** = preferred stock item

#### Models with PFC

S82K-P09024

S82K-P10024

### Specifications

Specification		Models without PFC								Models with PFC	
		Single output		Dual output	Single output					Single output	
		3 W	7.5 W	7.5 W	15 W	30 W	50 W	90 W	100 W	90 W	100 W
Efficiency		60% to 80% (varies depending on specification)									
Power factor	100 V										0.95 min.
	200 V									0.7 min.	0.95 min.
Input voltage		100 to 240 VAC, single-phase									
Output voltage	Voltage adjustment	±10% (V. ADJ)		not applicable	±10% (V.ADJ), -10% to 15% for S82K-030012 / -03024 / -05024						
	Ripple	2% (p-p max.)									
	Input variation	0.5% max.									
	Temperature influence	0.5% / °C max.									
Overload protection		105% to 160% of rated load current, inverted L drop, automatic reset *1									
Input current max.	100 V	0.15 A	0.25 A		0.45 A	0.9 A	1.3 A	2.5 A	2.5 A		
	200 V				0.25 A	0.6 A	0.8 A	1.5 A	1.0 A		
Output indicator		Yes (green)									
Weight		150 g	260 g		260 g	380 g	400 g	600 g	1,000 g		
Operating temperature		-10 °C to 60 °C with derating from 50 °C, 100 W models: -10 °C to 50 °C, 90 W model derating from 30 °C									
Series operation								yes	yes	yes	yes
Parallel operation									yes		yes

<sup>\*1</sup> For 7.5 W Dual output 105% to 250% and for 90 W models 101% to 111%



Slim, 3-phase input power supply

S8PE provides all you need for control panel design. From 5 to 40 A available.

- 3-phase input (340 - 576 VAC)
- 5, 10, 20 and 40 A; 24 VDC output
- 50 mm wide with 240 W model
- UL60950 (CSA22.2-60950), UL508 listing (CSA22.2-14) and CE
- Conforms to EN61000-3-2



Ordering information

Power ratings	Output voltage	Output current	Size in mm (HxWxD)	With front-mounting bracket	With DIN-rail mounting bracket
120 W	24 V	5 A	125x50x140		<b>S8PE-F12024CD</b>
240 W	24 V	10 A	170x50x140		<b>S8PE-F24024CD</b>
480 W	24 V	20 A	133x256x80		<b>S8PE-F48024CD</b>
960 W	24 V	40 A	275x246x80	<b>S8PE-F96024C</b>	

**Bold** = preferred stock item

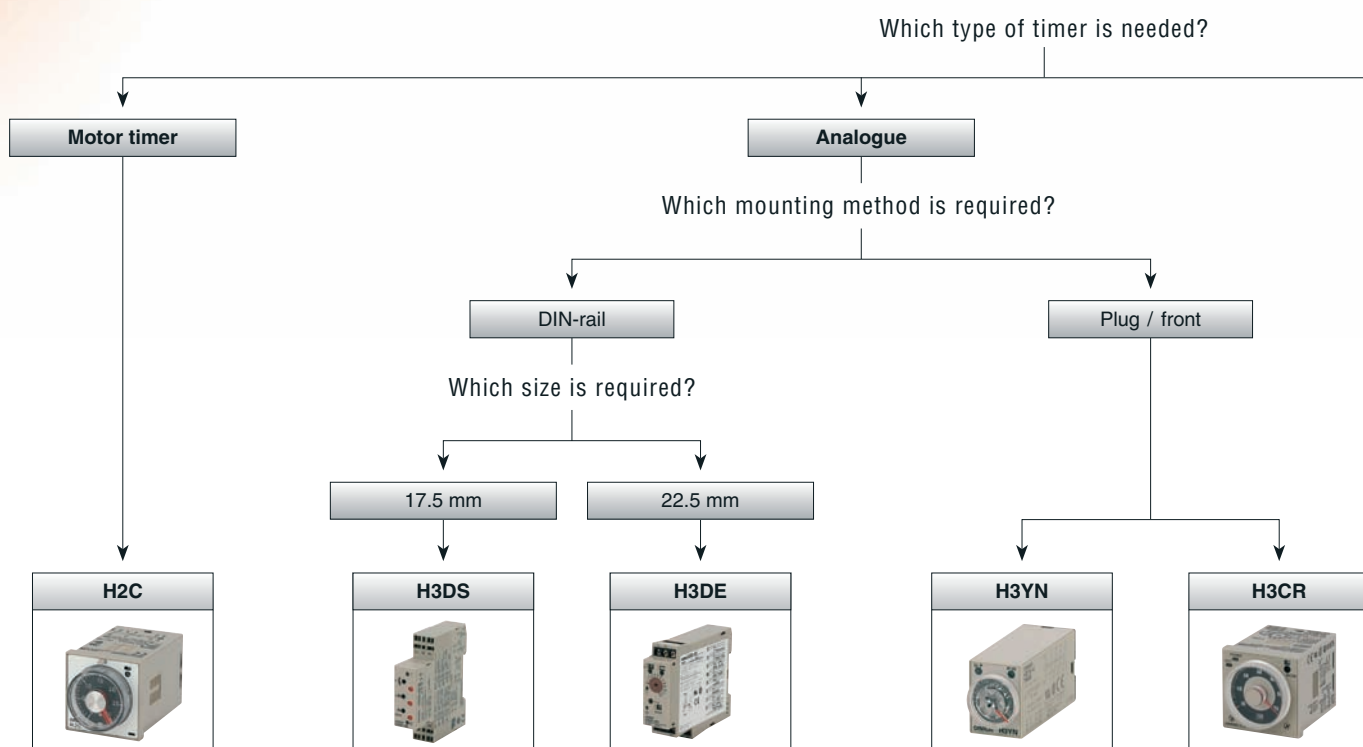
Specifications

		5 A	10 A	20 A	40 A
Efficiency	V <sub>in</sub> = 400 VAC	85 %	88 %	87 %	90 %
	V <sub>in</sub> = 480 VAC	84 %	88 %	87 %	90 %
Voltage range		340 to 766 VAC, 3-phase			
Output voltage	Voltage adjustment	22.5 to 26.4 VDC min.			
	Ripple	200 mV max.			
	Input variation	±0.5% max.			
	Temperature influence	±0.01% / °C			
Overload protection		yes			
Overvoltage protection		yes			
Output indicator		yes (green)	yes (green)	yes (green)	yes (green)
Weight		750 g	1.0 kg	2.65 kg	4.75 kg
Series operation		yes (for 2 units)			
Parallel operation		yes (for 2 units)			

# Timers

With over 70 years experience in timers, Omron knows exactly how to satisfy every timer function need. Our range includes motor timers, electronic timers, standard and digital timers, all available in a wide variety of housing and mounting methods to suit any customer requirement.

- An extensive range of motor timers, electronic timers and digital timers
- A wide range of timer function modes
- Conformance to all safety standards
- A wide range of housing varieties to suit every application
- Timer range from 0.001 seconds to 9999 hours
- Relay outputs, contact and transistor outputs



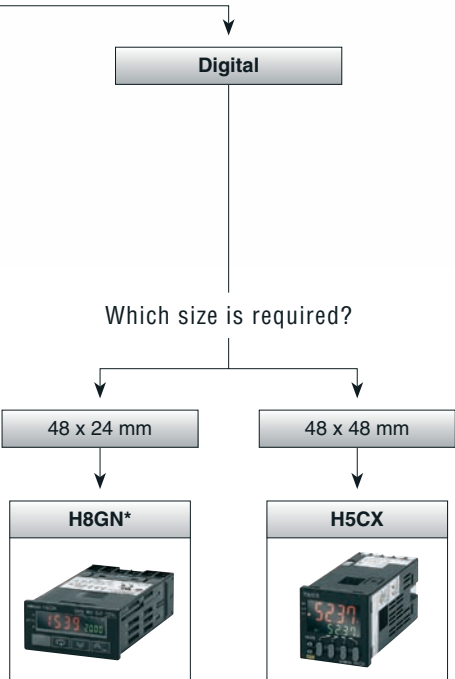


# H5CX series – designed to your specifications

The H5CX series is a complete range of digital timers offering multiple time ranges and covering basically all timing functions, including real twin-timer function, memory function, an intuitive way of programming, and a two-colour, back-lit negative transmissive LCD display.

Every model features a crystal-clear display for excellent visibility in all lighting conditions, dust- and water-proof front casing (IP66) that guarantees top performance under adverse conditions, and extensive functionality in its class.

In addition, each unit in this series has the same “look and feel” with its uniform display design, the same front-panel rocker-keys for easy set-up and operation, and the same intuitive way of programming.














\*Please see page XX in the counter section






## Table of contents

Selection table		246
Analogue solid state timers	H3DS	248
	H3DE	249
	H3YN	250
	H3CR	251
Digital timers	H5CX	252
Motor timers	H2C	253



# Selection table

Category		Analogue solid state timer										
Selection criteria												
	Model	H3DS-M	H3DS-S	H3DS-A	H3DS-F	H3DS-G	H3DS-X	H3DE-M	H3DE-S	H3DE-F	H3DE-G	H3DE-H
	Mounting	DIN-rail										
	Size	17.5 mm						22.5 mm				
	Type	Multi-functional			Twin timer	Star-delta	Two-wired	Multi-functional		Twin timer	Star-delta	Power OFF-delay
Contact configuration	Time limit	■	■	■	■	■	■	■	■	■	■	■
	Instantaneous							■	■			
	Programmable contacts							■	■			
	14 pins											
	11 pins											
	8 pins											
	Screw terminals	■	■	■	■	■	■	■	■	■	■	■
	Screw-less clamp terminals	□	□	□	□	□	□					
	Screw-less clamp sockets											
Inputs	Voltage input	□	□	□				□	□			
Outputs	Transistor											
	Relay	■	■	■	■	■		■	■	■	■	■
	SCR						■					
	Relay output type	SPDT	■	■	■	■		□	■	■	■ (2X)	■
		SPST-NO				■ (2X)						
		DPDT						□	■			
		4PDT										
Features	Time range	Total time range	0.1 s to 120 h	1 s to 120 h	2 s to 120 h	0.1 s to 120 h	1 s to 120 h	0.1 s to 120 h	0.1 s to 120 h	0.1 s to 120 h	1 s to 120 h	0.1 s to 120 h
		Number of sub ranges	7	7	7	6	2	7	8	8	2	2 (model dependent)
	Supply voltage		24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 24 to 48 VDC	24 to 230 VAC or 12 VDC	24 to 230 VAC / DC or 12 VDC	24 to 230 VAC / DC	24 to 230 VAC / DC	100 to 120 VAC, 200 to 230 VAC, 24 VAC / DC, 48 VAC / DC
	Number of operating modes		8	4	1	2	1	1	8	4	1	1
Functions	ON-delay		■	■				■	■	■		
	Flicker OFF start		■			■		■		■		
	Flicker ON start		■	■		■		■	■	■		
	Signal ON- / OFF-delay		■					■				
	Signal OFF-delay		■					■				■
	Interval (signal or power start)		■	■				■	■			
	One-shot output (ON-delay)		■	■				■	■			
	ON-delay (fixed)				■						■	
	Independent ON / OFF time											
	Star-delta					■						
Re- marks	Transistor						■					
Page		248	249									

Category		Analogue solid state timer					Digital timer		Motor timer
Selection criteria									
	Model	H3YN	H3CR-A	H3CR-F	H3CR-G	H3CR-H	H5CX	H8GN	H2C
	Mounting	Socket / on panel							
	Size	21.5 mm	1/16 DIN					1/32 DIN	1/16 DIN
Contact configuration	Type	Miniature	Multi-functional	Twin timer	Star-delta	Power OFF-delay	Multi-functional	Preset counter / timer	Motor timer
	Time limit	■	■	■	■	■	■	■	■
	Instantaneous		■		■	■			■
	Programmable contacts						■	■	
	14 pins	■							
	11 pins		□	□	□	□	□		□
	8 pins	■	□	□	□	□	□		□
	Screw terminals						□	■	□
	Screw-less clamp terminals								
Inputs	Screw-less clamp sockets	□							
	Voltage input		□						
Outputs	Transistor		□				□		
	Relay	■	□	■	■	■	□	■	■
	SCR								
	Relay output type								
	SPDT		□			□	□	■	■
Features	SPST-NO				■ (2X)				
	DPDT	□	□	■		□			
	4PDT	□							
	Time range								
	Total time range	0.1 s to 10 h (model dependent)	0.05 s to 300 h, 0.1 s to 600 h (model dependent)	0.05 s to 30 h or 1.2 s to 300 h (model dependent)	0.5 s to 120 s	0.05 s to 12 s, 1.2 s to 12 min	0.001 s to 9999 h (configurable)	0.000 s to 9999 h (configurable)	0.2 s to 30 h
	Number of sub ranges	2	9	14	4	4	10	9	15
Functions	Supply voltage	24, 100 to 120, 200 to 230 VAC, 12, 23, 48, 100 to 110, 125 VDC	100 to 240 VAC, 100 to 125 VDC, 24 to 48 VAC, 12 to 48 VDC	100 to 240 VAC, 12 VDC, 24 VAC / DC, 48 to 125 VDC	100 to 120 VAC, 200 to 240 VAC	100 to 120 VAC, 200 to 240 VAC, 24 VAC / DC, 48 VDC, 100 to 125 VDC	100 to 240 VAC, 24 VAC, 12 to 24 VDC	24 VDC	24, 48, 100, 110, 115, 120, 200, 220, 240 VAC
	Number of operating modes	4	6 (model dependent)		2	1	12	6	2
	ON-delay	■	□				■	■	■
	Flicker OFF start	■	□	■			■	■	
	Flicker ON start	■	□	■			■		
Re-remarks	Signal ON- / OFF-delay		□				■		
	Signal OFF-delay		□				■	■	■
	Interval (signal or power start)	■	□				■	■	
	One-shot output (ON-delay)		□				■		
	ON-delay (fixed)						■		
	Independent ON / OFF time						■	■	
Re-remarks	Star-delta				■				
	Transistor		□				■		
Page		250	251				252	261	253

■ Standard

□ Available

□ No / not available



## DIN-rail mounted, standard 17.5 mm width solid state timer range

This broad range of timers includes many functionalities and has a wide AC / DC power supply range. Models with screwless clamp connection available.

- 17.5 mm width, modular 45 mm
- DIN-rail mounting
- 24 - 48 VDC and 24 - 230 VAC
- 0.1 s to 120 h, 7 ranges



### Ordering information

Type	Supply voltage	Control output	Time setting range	Operating modes	Model	
					Screw terminal type	Screw-less clamp type
Multi-functional timer	24 to 230 VAC (50 / 60 Hz) / 24 to 48 VDC	SPDT	0.1 s - 120 h	ON-delay, flicker OFF start, flicker ON start, signal ON / OFF-delay, signal OFF-delay, interval, signal ON / OFF-delay, one-shot	<b>H3DS-ML</b>	<b>H3DS-MLC</b>
Standard timer				ON-delay, flicker ON start, interval, one-shot	<b>H3DS-SL</b>	H3DS-SLC
Single function timer				ON-delay	<b>H3DS-AL</b>	<b>H3DS-ALC</b>
Twin timer		Relay SPDT	0.1 s - 12 h	Flicker OFF start, flicker ON start	<b>H3DS-FL</b>	H3DS-FLC
Star-delta timer		2x Relay SPST-NO	1 s - 120 s	Star-delta	<b>H3DS-GL</b>	H3DS-GLC
Two-wired timer	24 to 230 VAC / VDC (50 / 60 Hz)	SCR output	0.1 s - 120 h	ON-delay	<b>H3DS-XL</b>	H3DS-XLC

**Bold** = preferred stock item

### Specifications

Terminal block	Screw terminal type: clamps two 2.5 mm <sup>2</sup> max. bar terminals without sleeves Screw-less clamp type: clamps two 1.5 mm <sup>2</sup> max. bar terminals without sleeves
Mounting method	DIN-rail mounting
Operating voltage range	85% to 110% of rated supply voltage
Power reset	Minimum power-off time: 0.1 s, 0.5 s for H3DS-G
Reset voltage	2.4 VAC / VDC max., 1.0 VAC / VDC max. for H3DS-X
Voltage input	Max. permissible capacitance between input lines (terminals B1 and A2): 2,000 pF
	Load connectable in parallel with inputs (terminals B1 and A1)
	H-level: 20.4 to 253 VAC / 20.4 to 52.8 VDC
	L-level: 0 to 2.4 VAC / VDC
Control output	Contact output: 5 A at 250 VAC with resistive load ( $\cos\phi = 1$ )
	5 A at 30 VDC with resistive load ( $\cos\phi = 1$ )
Ambient temperature	Operating: -10 °C to 55 °C (with no icing)
	Storage: -25 °C to 65 °C (with no icing)
Accuracy of operating time	±1% max. of FS (±1% ±10 ms max. at 1.2 s range)
Setting error	±10% ±50 ms max. of FS
Influence of voltage	±0.7% max. of FS (±0.7% ±10 ms max. at 1.2 s range)
Influence of temperature	±5% max. of FS (±5% ±10 ms max. at 1.2 s range)
Life expectancy (not H3DS-X)	Mechanical: 10 million operations min. (under no load at 1,800 operations / h)
	Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 360 operations / h)
Size in mm	80Hx17.5Wx73D



## DIN-rail mounted, standard 22.5 mm width solid state timer range

The H3DE series of timers provides a wide AC / DC power supply and time range to reduce the number of items.

- 79Hx22.5Wx100D mm
- DIN-rail mounting
- 24 - 230 VAC / VDC (except -H)
- Wide time setting range: 0.10 s - 120 h (except -H and -G), 8 ranges



### Ordering information

Type	Supply voltage	Control output	Time setting range	Operating modes	Model
Multi-functional standard timers	12 VDC	DPDT	0.1 s - 120 h	ON-delay, flicker OFF start, flicker ON start, signal ON / OFF-delay, signal OFF-delay, interval, signal ON / OFF-delay, one-shot	<b>H3DE-M2 DC12</b> <sup>*1</sup>
	24 to 230 VAC / VDC	SPDT			<b>H3DE-M1 AC/DC24-230</b>
		DPDT			<b>H3DE-M2 AC/DC24-230</b> <sup>*1</sup>
		SPDT		ON-delay, flicker ON start, interval, one-shot	<b>H3DE-S1 AC/DC24-230</b>
		DPDT			<b>H3DE-S2 AC/DC24-230</b> <sup>*1</sup>
Twin timer		SPDT	0.1 s - 12 h	Flicker OFF start, flicker ON start	<b>H3DE-F AC/DC24-230</b>
Star-delta timer		2x SPDT	1 - 20 m	Star-delta	<b>H3DE-G AC/DC24-230</b>
Power OFF-delay timer	24 VAC / VDC	SPDT	1 - 120 s	Signal OFF-delay	<b>H3DE-H AC/DC24 L</b>
			0.1 - 12 s		<b>H3DE-H AC/DC24 S</b>
	48 VAC / VDC		1 - 120 s		H3DE-H AC/DC48 L
			0.1 - 12 s		H3DE-H AC/DC48 S
	100 to 120 VAC		1 - 120 s		<b>H3DE-H AC100-120 L</b>
			0.1 - 12 s		<b>H3DE-H AC100-120 S</b>
	200 to 230 VAC		1 - 120 s		<b>H3DE-H AC200-230 L</b>
			0.1 - 12 s		<b>H3DE-H AC200-230 S</b>

<sup>\*1</sup> One output can be set to instantaneous.

**Bold** = preferred stock item

### Specifications

Terminal block	Clamps two 2.5 mm <sup>2</sup> max. bar terminals without sleeves
Mounting method	DIN-rail mounting
Operating voltage range	85% to 110% of rated supply voltage
Power reset	Minimum power-off time: H3DE-M/S, H3DE-F: 0.1 s, H3DE-G: 0.5 s
Reset voltage	2.4 VAC / VDC max. (not for H3DE-H)
Voltage input (H3DE-M / -S)	Max. permissible capacitance between input lines (terminals B1 and A2): 2,000 pF Load connectable in parallel with inputs (terminals B1 and A2) H-level: 20.4 to 253 VAC / VDC, L-level: 0 to 2.4 VAC / VDC
Control output	Contact output: 5 A at 250 VAC with resistive load ( $\cos\phi=1$ ), 5 A at 30 VDC with resistive load ( $\cos\phi=1$ )
Ambient temperature	Operating: -10 °C to 55 °C (with no icing), storage: -25 °C to 65 °C (with no icing)
Accuracy of operating time	±1% max. of FS (±1% ±10 ms max. at 1.2 s range)
Setting error	±10% ±0.05 s max. of FS
Signal input time	50 ms min.
Influence of voltage	±0.5% max. of FS
Influence of temperature	±2% max. of FS
Contact material	AGNi+gold plating
Life expectancy	Mechanical: 10 million operations min. (under no load at 1,800 operations / h) Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 360 operations / h)
Degree of protection	IP30 (terminal block: IP20)
Size in mm	79Hx22.5Wx100D



## Miniature timer with multiple time ranges and multiple operating modes

H3YN features 4 multi-operating modes: ON-delay, interval, flicker ON start and flicker OFF start.

- 28Hx21.5Wx52.6D mm
- Plug-in
- All supply voltages available
- 0.1 s to 10 h
- DPDT (5 A) or 4PDT (3 A)



### Ordering information

Supply voltage	Functions	Time-limit contact	Short-time range model (0.1 s to 10 min)	Long-time range model (0.1 min to 10 h)
12 VDC	ON-delay Interval Flicker ON Flicker OFF	DPDT	<b>H3YN-2 12DC</b>	<b>H3YN-21 12DC</b>
24 VAC			<b>H3YN-2 24AC</b>	<b>H3YN-21 24AC</b>
24 VDC			<b>H3YN-2 24DC</b>	<b>H3YN-21 24DC</b>
100 - 120 VAC			<b>H3YN-2 100-120AC</b>	<b>H3YN-21 100-120AC</b>
200 - 230 VAC			<b>H3YN-2 200-230AC</b>	<b>H3YN-21 200-230AC</b>
12 VDC		4PDT	<b>H3YN-4 12DC</b>	<b>H3YN-41 12DC</b>
24 VAC			<b>H3YN-4 24AC</b>	<b>H3YN-41 24AC</b>
24 VDC			<b>H3YN-4 24DC</b>	<b>H3YN-41 24DC</b>
100 - 120 VAC			<b>H3YN-4 100-120AC</b>	<b>H3YN-41 100-120AC</b>
200 - 230 VAC			<b>H3YN-4 200-230AC</b>	<b>H3YN-41 200-230AC</b>

**Bold** = preferred stock item

### Accessories

#### Connecting socket

Timer	DIN-rail mounting / front-connecting socket	Back-connecting socket
		PCB terminal
H3YN-2 / -21	PYF08A, PYF08A-N, PYF08A-E	<b>PY08-02</b>
H3YN-4 / -41	PYF14A, PYF14A-N, PYF14A-E	<b>PY14-02</b>

#### Hold-down clips

Applicable socket	Model
PYF08A, PYF08A-N, PYF08A-E, PYF14A, PYF14A-N, PYF14A-E	<b>Y92H-3 (pair)</b>
PY08, PY08-02, PY14-02	Y92H-4

**Bold** = preferred stock item

### Specifications

Item	H3YN-2 / -4	H3YN-21 / -41
Time ranges	0.1 s to 10 min (1 s, 10 s, 1 min, or 10 min max. selectable)	0.1 min to 10 h (1 min, 10 min, 1 h, or 10 h max. selectable)
Rated supply voltage	24, 100 to 120, 200 to 230 VAC (50 / 60 Hz) 12, 24, 48, 100 to 110, 125 VDC	
Pin type	Plug-in	
Operating mode	ON-delay, interval, flicker OFF start, or flicker ON start (selectable with DIP switch)	
Operating voltage range	85% to 110% of rated supply voltage (12 VDC: 90% to 110% of rated supply voltage)	
Reset voltage	10% min. of rated supply voltage	
Control outputs	DPDT: 5 A at 250 VAC, resistive load ( $\cos\phi = 1$ ), 4PDT: 3 A at 250 VAC, resistive load ( $\cos\phi = 1$ )	
Accuracy of operating time	$\pm 1\%$ FS max. (1 s range: $\pm 1\% \pm 10$ ms max.)	
Setting error	$\pm 10\% \pm 50$ ms FS max.	
Reset time	Min. power-opening time: 0.1 s max. (including halfway reset)	
Influence of voltage	$\pm 2\%$ FS max.	
Influence of temperature	$\pm 2\%$ FS max.	
Ambient temperature	Operating: $-10$ °C to $50$ °C (with no icing), storage: $-25$ °C to $65$ °C (with no icing)	
Degree of protection	IP40	
Size in mm	28Hx21.5Wx52.6D	



## DIN 48x48 mm multi-functional timer series

This elaborate range of solid state timers provides you with a multi-functional timer, twin timer, star-delta timer and a power OFF-delay timer.

- 48x48 mm front-panel / plug-in
- High- / low-voltage models (except -H and -G)
- 0.05 s to 300 h (except -H and -G)
- DPDT, 5 A at 250 VAC
- Transistor 100 mA at 30 VDC



### Ordering information

Output	Number of pins	Supply voltage	Time range	Operating mode	Model
Relay DPDT	11	100 to 240 VAC / 100 to 125 VDC	0.05 s to 300 h	ON-delay, flicker OFF start, flicker ON start, signal ON / OFF-delay, signal OFF-delay, interval	<b>H3CR-A 100-240AC/100-125DC</b>
Transistor		24 to 48 VAC / 12 to 48 VDC	0.05 s to 300 h		<b>H3CR-A 24-48AC/12-48DC</b> H3CR-AS 24-48AC/12-48DC
Relay DPDT	8	100 to 240 VAC / 100 to 125 VDC	0.05 s to 300 h	ON-delay, flicker ON start, interval, one-shot	<b>H3CR-A8 100-240AC/100-125DC</b>
Transistor		24 to 48 VAC / 12 to 48 VDC	0.05 s to 300 h		<b>H3CR-A8 24-48AC/12-48DC</b> H3CR-A8S 24-48AC/12-48DC
Relay SPDT		100 to 240 VAC / 100 to 125 VDC			<b>H3CR-A8E 100-240AC/100-125DC</b>
		24 to 48 VAC / 12 to 48 VDC			<b>H3CR-A8E 24-48AC/DC</b>
Relay DPDT	11	100 to 240 VAC	0.05 s to 30 h	Flicker OFF start	<b>H3CR-F 100-240AC</b> H3CR-F 24AC/DC
	8	100 to 240 VAC			<b>H3CR-F8 100-240AC</b> H3CR-F8 24AC/DC
	11	100 to 240 VAC	0.05 s to 30 h		<b>H3CR-FN 100-240AC</b> H3CR-FN 24AC/DC
	8	100 to 240 VAC			<b>H3CR-F8N 100-240AC</b> H3CR-F8N 24AC/DC
		24 VAC / VDC			H3CR-G8EL 100-120AC
		100 to 120 VAC			H3CR-G8EL 200-240AC
		200 to 240 VAC			
		24 VAC / VDC			
Time-limit contact and instantaneous contact		100 to 120 VAC			
DPDT	8	100 to 120 VAC	0.05 to 12 s	Signal OFF-delay	<b>H3CR-H8LS 100-120AC</b> H3CR-H8LS 200-240AC
		200 to 240 VAC			<b>H3CR-H8LS 24AC/DC</b>
		24 VAC / VDC			<b>H3CR-H8LM 100-120AC</b> H3CR-H8LM 200-240AC
		100 to 120 VAC	0.05 to 12 m		<b>H3CR-H8LM 100-120AC</b> H3CR-H8LM 200-240AC
		200 to 240 VAC			<b>H3CR-H8LM 200-240AC</b> H3CR-H8LM 24AC/DC
		24 VAC / VDC			<b>H3CR-H8LM 24AC/DC</b>

**Bold** = preferred stock item

### Accessories

Name / specifications		Model
Flush-mounting adapter		<b>Y92F-30</b>
Protective cover		<b>Y92A-48B</b>
Front connecting socket	8-pin, finger-safe type, DIN-rail	<b>P2CF-08-E</b>
11-pin, finger-safe type		<b>P2CF-11-E</b>
Back connecting socket	8-pin	<b>P3G-08</b>
	11-pin	<b>P3GA-11</b>

Name / specifications		Model
Time setting ring	Setting a specific time	<b>Y92S-27</b>
	Limiting the setting range	<b>Y92S-28</b>
Panel cover	Light grey (5Y7/1)	<b>Y92P-48GL</b>
	Black (N1.5)	<b>Y92P-48GB</b>

**Bold** = preferred stock item

### Specifications

<b>Accuracy of operating time</b>		±0.2% FS max. (±0.2% ±10 ms max. in a range of 1.2 s)
<b>Influence of voltage</b>		±0.2% FS max. (±0.2% ±10 ms max. in a range of 1.2 s)
<b>Influence of temperature</b>		±1% FS max. (±1% ±10 ms max. in a range of 1.2 s)
<b>Ambient temperature</b>		Operating: -10 °C to 55 °C (with no icing), storage: -25 °C to 65 °C (with no icing)
<b>Life expectancy</b>	<b>Mechanical:</b>	20,000,000 operations min. (under no load at 1,800 operations / h)
	<b>Electrical:</b>	100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations / h)
<b>Size in mm</b>		48Hx48Wx66.6D (H3CR-A, -F), 48Hx48Wx78D (H3CR-G, -H)

<b>Setting error</b>	±5% FS ±50 ms
<b>Degree of protection</b>	IP40 (panel surface)
<b>Weight</b>	Approx. 90 g





## The most complete digital standard timer on the market

H5CX offers you the most complete series of products on the market today. Based on extensive customer research, these new timers have been designed with added-value features that users both need and appreciate.

- 48Hx48Wx64D to 100 mm
- Two-colour display value, red or green
- Front-mounting/plug-in
- 0.001 s to 9999 h, 10 ranges
- Input NPN, PNP and contact



### Ordering information

Output type	Supply voltage	Functions	External connection	Size in mm (HxWxD)	Socket depth (mm)	Model
Contact output	100 to 240 VAC	A: Signal ON-delay	Screw terminals	48x48x100	0	<b>H5CX-A</b>
	12 to 24 VDC / 24 VAC	A-1: Signal ON-delay 2		48x48x64		<b>H5CX-AD</b>
Transistor output	100 to 240 VAC	A-2: Power ON-delay 1		48x48x100		<b>H5CX-AS</b>
	12 to 24 VDC / 24 VAC	A-3: Power ON-delay 2		48x48x64		<b>H5CX-ASD</b>
Contact output	100 to 240 VAC	b: Repeat cycle 1	11-pin socket	48x48x72.5	14.4	<b>H5CX-A11</b>
	12 to 24 VDC / 24 VAC	b-1: Repeat cycle 2		48x48x63.7		<b>H5CX-A11D</b>
Transistor output	100 to 240 VAC	d: Signal OFF-delay		48x48x72.5		<b>H5CX-A11S</b>
	12 to 24 VDC / 24 VAC	E: Interval		48x48x63.7		<b>H5CX-A11SD</b>
Contact output	100 to 240 VAC	F: Cumulative	8-pin socket	48x48x63.7	14.3	<b>H5CX-L8</b>
	12 to 24 VDC / 24 VAC	Z: ON / OFF-duty adjustable flicker				<b>H5CX-L8D</b>
Transistor output	100 to 240 VAC	toff: Twin timer OFF start				<b>H5CX-L8S</b>
	12 to 24 VDC / 24 VAC	ton: Twin timer ON start				<b>H5CX-L8SD</b>

**Bold** = preferred stock item

### Accessories

Name	Model
Flush-mounting adapter	<b>Y92F-30</b>
Waterproof packing	Y92S-29
Front-connecting socket	8-pin, finger safe type
11-pin, finger safe type	<b>P2CF-08-E</b>
Back-connecting socket	8-pin
11-pin	<b>P2CF-11-E</b>
Hard cover	<b>P3G-08</b>
Soft cover	<b>P3GA-11</b>
	<b>Y92A-48</b>
	Y92A-48F1

**Bold** = preferred stock item

### Specifications

Item	H5CX-A□	H5CX-A11□	H5CX-L8□
Display	7-segment, negative transmissive LCD		
	Present value: 11.5 mm-high characters		
	red or green (programmable)	red	
	Set value: 6-mm-high characters, green		
Digits	4 digits		
Total time range	0.001 s to 9,999 h (configurable)		
Timer mode	Elapsed time (Up), remaining time (Down) (selectable)		
Input signals	Signal, reset, gate		Signal, reset
Key protection	Yes		
Memory backup	EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.		
Ambient temperature	Operating: -10 °C to 55 °C (no icing or condensation), side-by-side mounting: -10 °C to 50 °C		
Case color	Black (N1.5)		



## DIN-sized (48x48 mm) motor timer with variable time ranges

This motor timer series provides you with many features, such as ON-delay, time indicator, moving pointer and synchronous motor. Moreover, the LED indicator shows the time operation, time range and the rated voltage.

- DIN-sized 48x48 mm
- Front-panel / plug-in / DIN-rail
- All supply voltages available
- 0.2 s to 30 h
- SPDT, 6A at 250 VAC



### Ordering information

Operation / resetting system	Internal connection	Terminal	Time-limit contact	Instantaneous contact	Time range code	Model
Time-limit operation / electric resetting	Separate motor and clutch connection	11-pin socket	SPDT	SPDT	1.25 s - 30 h in 5 ranges	H2C-RSA 110AC
						H2C-RSA 220AC
						H2C-RSA 24AC
					0.2 s - 6 h in 5 ranges	H2C-RSB 110AC
						H2C-RSB 220AC
						H2C-RSB 24AC
					0.5 s - 12 h in 5 ranges	H2C-RSC 110AC
						H2C-RSC 220AC
						H2C-RSC 24AC
Time-limit operation / self-resetting	Separate motor and clutch connection	11-pin socket	SPDT	SPDT	1.25 s - 30 h in 5 ranges	H2C-SA 110AC
						H2C-SA 220AC
						H2C-SA 24AC
					0.2 s - 6 h in 5 ranges	H2C-SB 110AC
						H2C-SB 220AC
						H2C-SB 24AC
					0.5 s - 12 h in 5 ranges	H2C-SC 110AC
						H2C-SC 220AC
						H2C-SC 24AC

**Note:** Other voltages available on request

**Bold** = preferred stock item

### Accessories

Name / specifications	Model	Name / specifications	Model
DIN-rail mounting / front-connecting socket	8-pin, finger safe type	Hold-down clip (pair)	For PL08 and PL11 sockets
	11-pin, finger safe type		For PF085A socket
Back-connecting socket	8-pin, screw terminal	Flush mounting adapter	<b>Y92F-30</b>
	11-pin		Time setting ring
			Y92A-Y1

**Bold** = preferred stock item

### Specifications

<b>Operating voltage range</b>	85% to 110% of rated supply voltage	<b>Setting error</b>	±2% FS max.
<b>Reset voltage</b>	10% max. of rated supply voltage	<b>Reset time</b>	0.5 s max.
<b>Reset time</b>	Min. power-opening time: 0.5 s, min. pulse width: 0.5 s	<b>Influence of voltage</b>	±1% FS max.
<b>Control outputs</b>	6 A at 250 VAC, resistive load (cosφ = 1)	<b>Influence of temperature</b>	±2% FS max.
<b>Mounting method</b>	Flush mounting (except for H2C-F / -FR models), surface-mounting, DIN-rail mounting	<b>Ambient temperature</b>	Operating: -10 °C to 50 °C
<b>Life expectancy</b>	Mechanical: 10,000,000 operations min. Electrical: 500,000 operations min.	<b>Case color</b>	Light grey (Munsell 5Y7/1)
<b>Motor life expectancy</b>	20,000 h	<b>Degree of protection</b>	IP40 (panel surface)
<b>Accuracy of operating time</b>	±0.5% FS max. (±1% max. at 0.2 to 6 s for the time range code B or at 0.5 to 12 s for the time range code C)	<b>Size in mm</b>	48Hx48Wx77.5D

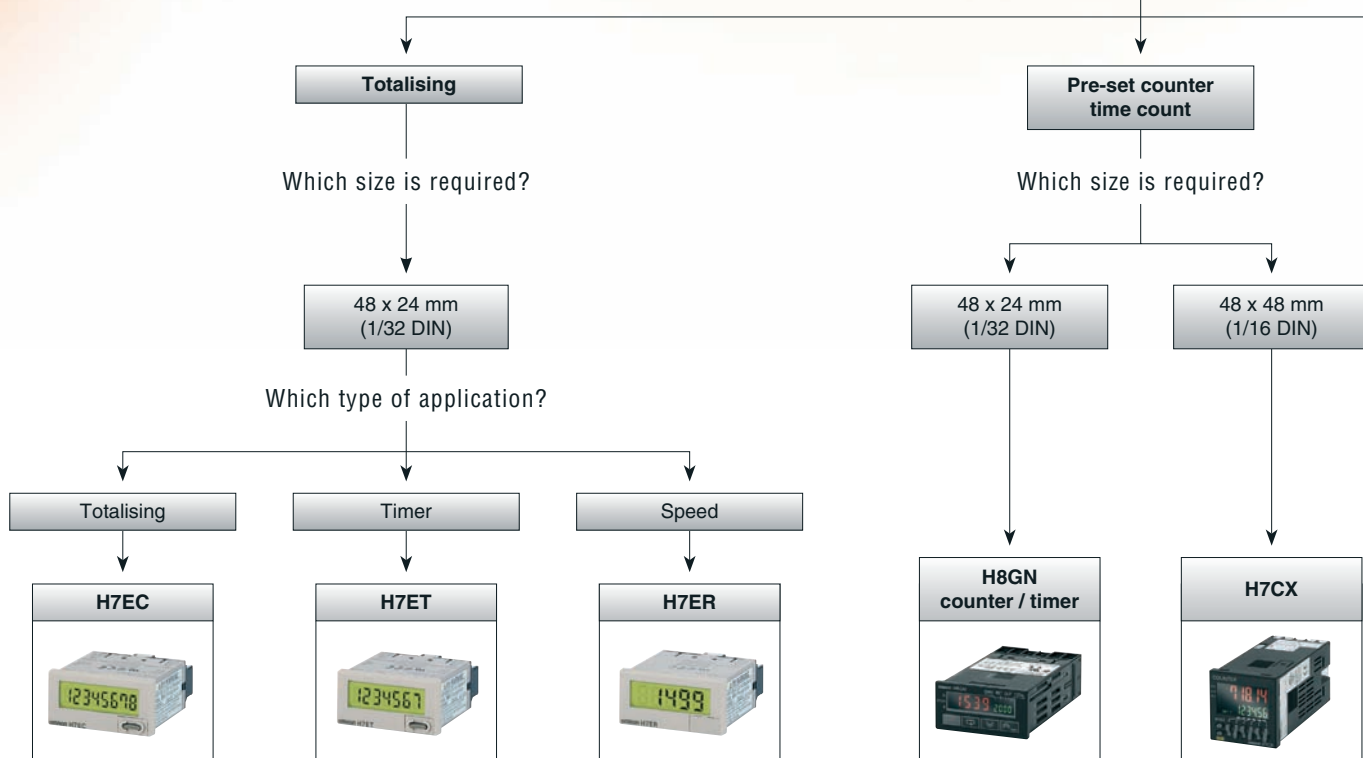
# Counters

With over three decades in the counter market, Omron can provide a solution to every measurement process requirement, including total counting, timing, pre-set counting and specific cam positioning applications.

- Full range of battery-powered counters for total-, timing- and speed counting
- Pre-set version has highly visible colour-change feature
- Relay output and transistor output for pre-set counters
- Models available with communication capability
- Conform to all relevant safety standards
- LCD negative transmission back-lit display in most models



What is the type of counting application?



# H7CX series – multi-functional pre-set counter

The H7CX series offers the ultimate in versatility and intuitive programming. With a display choice of up to six digits the H7CX offers many added-value features, making it ideal for multiple uses.

Every model features a crystal-clear display for excellent visibility in all lighting conditions, dust- and water-proof front casing (IP66) that guarantees top performance under adverse conditions, and extensive functionality in its class. In addition, each unit in this series has the same “look and feel” with its uniform display design, the same front-panel rocker-keys for easy set-up and operation, and the same intuitive way of programming.

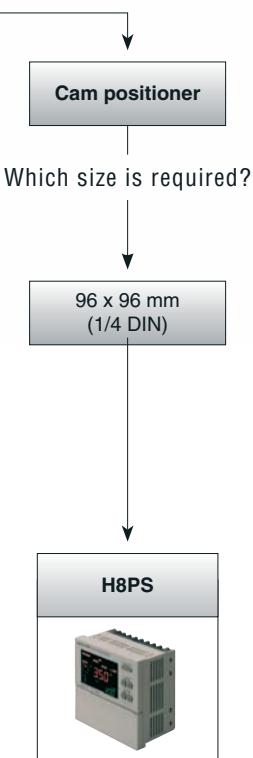








Table of contents		
Selection table		256
Totalisers	H7EC	258
	H7ET	259
	H7ER	260
Pre-set counters	H8GN	261
	H7CX	262
Cam positioners	H8PS	263

# Selection table

Category		Self-powered total	Self-powered timer	Self-powered tachometer
Selection criteria				
	Model	H7EC	H7ET	H7ER
	Display	LCD		
	Size	1/32 DIN		
Outputs	Control outputs			
	2 stage			
	Total	■	■	
	Time		■	
	Preset			
	Batch			
	Dual			
Inputs	Tachometer	■		■
	Control inputs	No-voltage, PNP / NPN, DC-voltage, AC / DC multi-voltage	No-voltage, PNP / NPN, DC-voltage, AC / DC multi-voltage	No-voltage, PNP / NPN
Features	Dual operation			
	Number of digits	8	7	4 or 5
	NPN / PNP switch	■	■	■
	Back-lit	□	□	□
	External reset	■	■	
	Manual reset	■	■	
	Number of banks			
	Built-in sensor power supply			
Terminals	IP rating	IP66	IP66	IP66
	Screw terminals	■	■	■
	PCB terminals			
	11-pin socket			
Supply voltage	100 to 240 VAC			
	12 to 24 VDC			
	24 VDC	□	□	□
	Comms			
Functions	Up	■	■	
	Down			
	Up / down			
	Reversible			
	Speed	0 to 30 Hz or 0 to 1 kHz		1 or 10 kHz
	Counting range	0 to 99999999	0.0 h to 999999.9 h <--> 0.0 h to 3999 d 23.9 h or 0 s to 999 h 59 min 59 s <--> 0.0 min to 9999 h 59.9 min	1000 s <sup>-1</sup> or 1000 min <sup>-1</sup> ; 1000 s <sup>-1</sup> or 1000 min <sup>-1</sup> <--> 10000 min <sup>-1</sup>
Colour	Beige	■	■	■
	Black	■	■	■
	Page	258	259	260



Counter type		Pre-set counter / timer	Pre-set counter	Cam positioner
Selection criteria				
	Model	H8GN	H7CX	H8PS
	Display	LCD negative transmissive		LCD
Outputs	Size	1/32 DIN	1/16 DIN	1/4 DIN
	Control outputs	1 relay (SPDT)	1 relay (SPDT), transistor	NPN or PNP, cam outputs (8 lines), run out, tachometer
	5 stage	■	□	
	Total	■	□	
	Time	■		
	Preset	■	□	
	Batch	■	□	
Inputs	Dual	■	□	
	Tachometer		□	
Features	Control inputs	No-voltage	No-voltage, PNP / NPN	Encoder
	Dual operation	■	■	□
	Number of digits	PV: 4, SV: 4	PV: 4, SV: 4 or PV: 6, SV: 6	7
	NPN / PNP switch		■	
	Back-lit		■	
	External reset	■	■	
	Manual reset	■	■	
	Number of banks	4		
Terminals	Built-in sensor power supply		■	
	IP rating	IP66	IP66	IP50
	Screw terminals	■	■	■
Supply voltage	PCB terminals			■
	11-pin socket		□	
	100 to 240 VAC		■	
Functions	12 to 24 VDC		■	
	24 VDC	■		■
	Comms	□		
Colour	Up	■	■	
	Down	■	■	
	Up / down		■	
	Reversible	■	■	
	Speed	0 to 30 Hz or 0 to 5 kHz	0 to 30 Hz or 0 to 5 kHz	
	Counting range	-1999 to 9999	-999 to 9999 or -99999 to 999999	
Page	Beige			■
	Black	■	■	
Page		261	262	263

■ Standard

□ Available

□ No / not available





## Self-powered LCD totaliser

The H7E series is available with large display with 8.6 mm character height. It includes models with backlight for improved visibility in dimly lit places. The H7E family includes total counters, time counters, tachometers and PCB-mounted counters.

- 24Hx48Wx48.5D mm
- 8 digits, 8.6 mm character height
- Black or light-grey housing
- Dual input speed: 30 Hz <-> 1 kHz
- Short body: all models have a depth of 48.5 mm



## Ordering information

Count input	Max. counting speed	Display	Model	
			Light grey body	Black body
No-voltage	30 Hz <-> 1 kHz (switchable)	7-segment LCD	<b>H7EC-N</b>	<b>H7EC-N-B</b>
PNP / NPN universal DC voltage input	30 Hz <-> 1 kHz (switchable)	7-segment LCD	<b>H7EC-NV</b>	<b>H7EC-NV-B</b>
		7-segment LCD with backlight	<b>H7EC-NV-H</b>	<b>H7EC-NV-BH</b>
AC / DC multi-voltage input	20 Hz	7-segment LCD	<b>H7EC-NFV</b>	<b>H7EC-NFV-B</b>

**Bold** = preferred stock item

## Specifications

Item	H7EC-NV-□ / H7EC-NV-□H	H7EC-NFV-□	H7EC-N-□
Operating mode	Up type		
Mounting method	Flush mounting		
External connections	Screw terminals, optional wire-wrap terminals		
Number of digits	8		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm)		
Max. counting speed	30 Hz / 1 kHz	20 Hz	30 Hz / 1 kHz
Case color	Light grey or black (-B models)		
Attachment	Waterproof packing, flush mounting bracket		
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (only for backlight) No-backlight model: not required (powered by built-in battery)	Not required (powered by built-in battery)	
Count input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (input impedance: approx. 4.7 kΩ)	High (logic) level: 24 to 240 VAC / VDC, 50 / 60 Hz Low (logic) level: 0 to 2.4 VAC / VDC, 50 / 60 Hz	No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Reset input		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.	
Minimum signal width	20 Hz: 25 ms, 30 Hz: 16.7 ms, 1 KHz: 0.5 ms		
Reset system	External reset and manual reset: minimum signal width of 20 ms		
Ambient temperature	Operating: -10 °C to 55 °C (with no condensation or icing), storage: -25 °C to 65 °C (with no condensation or icing)		
Degree of protection	Front-panel: IP66, NEMA4, terminal block: IP20		
Battery life (reference)	7 years min. with continuous input at 25 °C (lithium battery)		
Size in mm	24Hx48Wx48.5D		



## Self-powered time counter

The H7E series is available with large display with 8.6 mm character height. It includes models with backlight for improved visibility in dimly lit places. The H7E family includes total counters, time counters, tachometers and PCB-mounted counters.

- 24Hx48Wx48.5D mm
- 7 digits, 8.6 mm character height
- Black or light-grey housing
- Dual time range 999999.9h <-> 3999d23.9h or 999h59m59s <-> 9999h59.9m



## Ordering information

Timer input	Display	Time range			
		999999.9h <-> 3999d23.9h (switchable)		999999.9h <-> 3999d23.9h (switchable)	
		Light grey body	Black body	Light grey body	Black body
No-voltage input	7-segment LCD	<b>H7ET-N</b>	<b>H7ET-N-B</b>	<b>H7ET-N1</b>	<b>H7ET-N1-B</b>
PNP / NPN universal	7-segment LCD	<b>H7ET-NV</b>	<b>H7ET-NV-B</b>	<b>H7ET-NV1</b>	<b>H7ET-NV1-B</b>
DC voltage input	7-segment LCD with backlight	<b>H7ET-NV-H</b>	<b>H7ET-NV-BH</b>	<b>H7ET-NV1-H</b>	<b>H7ET-NV1-BH</b>
AC / DC multi-voltage input	7-segment LCD	<b>H7ET-NFV</b>	<b>H7ET-NFV-B</b>	<b>H7ET-NFV1</b>	<b>H7ET-NFV1-B</b>

**Bold** = preferred stock item

## Specifications

Item	H7ET-NV□-□ / H7ET-NV□-□H	H7ET-NFV□-□	H7ET-N□-□
Operating mode	Accumulating		
Mounting method	Flush mounting		
External connections	Screw terminals		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm)		
Number of digits	7		
Case color	Light grey or black (-B models)		
Attachment	Waterproof packing, flush mounting bracket, time unit labels		
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (for backlight) No-backlight model: not required (powered by built-in battery)	Not required (powered by built-in battery)	
Timer input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input impedance: approx. 4.7 kΩ)	High (logic) level: 24 to 240 VAC / VDC, 50 / 60 Hz Low (logic) level: 0 to 2.4 VAC / VDC, 50 / 60 Hz	No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Reset input		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.	
Minimum pulse width	1 s		
Reset system	External reset and manual reset: minimum signal width of 20 ms		
Ambient temperature	Operating: -10 °C to 55 °C (with no condensation or icing), storage: -25 °C to 65 °C (with no condensation or icing)		
Time accuracy	±100 ppm (25 °C)		
Degree of protection	Front-panel: IP66, NEMA4 with waterproof packing, terminal block: IP20		
Battery life (reference)	10 years min. with continuous input at 25 °C (lithium battery)		
Size in mm	24Hx48Wx48.5D		



## Self-powered tachometer

The H7E series is available with large display with 8.6 mm character height. It includes models with backlight for improved visibility in dimly lit places. The H7E family includes total counters, time counters, tachometers and PCB-mounted counters.

- 24Hx48Wx48.5D mm
- 5 digits, 8.6 mm character height
- Black or light-grey housing
- Dual revolution display



## Ordering information

Count input	Display	Max. revolutions displayed (applicable encoder resolution)			
		1,000 s <sup>-1</sup> (1 pulse / rev.) 1,000 min <sup>-1</sup> (60 pulse / rev.)		1,000.0 s <sup>-1</sup> (10 pulse / rev) 1,000.0 min <sup>-1</sup> (600 pulse / rev) <-> 10,000 min <sup>-1</sup> (60 pulse / rev) (switchable)	
		Light grey body	Black body	Light grey body	Black body
No-voltage input	7-segment LCD	<b>H7ER-N</b>	H7ER-N-B		
PNP / NPN universal	7-segment LCD	<b>H7ER-NV</b>	H7ER-NV-B	<b>H7ER-NV1</b>	H7ER-NV1-B
DC voltage input	7-segment LCD with backlight	H7ER-NV-H	H7ER-NV-BH	H7ER-NV1-H	H7ER-NV1-BH

**Bold** = preferred stock item

## Specifications

Item	H7ER-NV1-□ / H7ER-NV1-□H	H7ER-NV-□ H7ER-NV-□H	H7ER-N-□
Operating mode	Up type		
Mounting method	Flush mounting		
External connections	Screw terminals, wire-wrap terminals		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm)		
Number of digits	5	4	
Max. revolutions displayed	1,000.0 s <sup>-1</sup> (when encoder resolution of 10 pulse / rev is used) 1,000.0 min <sup>-1</sup> (when encoder resolution of 600 pulse / rev is used) <-> 10,000 min <sup>-1</sup> (when encoder resolution of 60 pulse / rev is used) (switchable with switch)	1,000 s <sup>-1</sup> (when encoder resolution of 1 pulse / rev is used) 1,000 min <sup>-1</sup> (when encoder resolution of 60 pulse / rev is used)	
Attachment	Waterproof packing, flush mounting bracket, revolution unit labels		
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (for backlight lit) No-backlight model: not required (powered by built-in battery)		Not required (powered by built-in battery)
Count input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input impedance: approx. 4.7 kΩ)		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Max. counting speed	10 kHz	1 kHz	
Minimum signal width	10 kHz: 0.05 ms, 1 kHz: 0.5 ms		
Ambient temperature	Operating: -10 °C to 55 °C (with no condensation or icing), storage: -25 °C to 65 °C (with no condensation or icing)		
Degree of protection	Front-panel: IP66, NEMA4 with waterproof packing, terminal block: IP20		
Battery life (reference)	7 years min. with continuous input at 25 °C (lithium battery)		
Size in mm	24Hx48Wx48.5D		



## World's smallest compact preset counter / timer

The H8GN is a 1/32 DIN timer and counter in one. It is simple to switch between the timer and counter functions. During operation it is also possible to switch the display to monitor the totalising count value in 8 digits. Many sophisticated functions come standard with H8GN.

- 24Hx48Wx83D mm
- 8-digit display, 4 value and 4 set value
- Front mounting
- 0.001 s to 9999 h (configurable)
- 24 VDC



## Ordering information

Functions		Supply voltage	Output	Communications	
Counter	Timer			No communications	RS-485
Counter: up / down / reversible, 4 digits, N, F, C or K output modes Total counter: 8 digits	A: ON-delay B: Flicker D: Signal OFF-delay E: Interval F: Accumulative Z: ON / OFF-duty adjustable flicker	24 VDC	Contact output (SPDT)	<b>H8GN-AD</b>	<b>H8GN-AD-FLK</b>

**Bold** = preferred stock item

## Specifications

Rated supply voltage		24 VDC
Operating voltage range		85% to 110% of rated supply voltage
Power consumption		1.5 W max. (for max. DC load) (inrush current: 15 A max.)
Mounting method		Flush-mounting
External connections		Screw terminals (M3 screws)
Terminal screw tightening torque		0.5 Nm max.
Attachment		Waterproof packing, flush-mounting bracket
Display		7-segment, negative transmissive LCD; time display (h, min, s); CMW, OUT, RST, TOTAL Present value (red, 7 mm high characters); set value (green, 3.4 mm high characters)
Digits		PV: 4 digits, SV: 4 digits, when total count value is displayed: 8 digits (zeros suppressed)
Memory backup		EEPROM (non-volatile memory) (number of writes: 100,000 times)
Counter	Maximum counting speed	30 Hz or 5 kHz
	Counting range	-999 to 9,999
	Input modes	Increment, decrement, individual, quadrature inputs
Timer	Timer modes	Elapsed time (up), remaining time (down)
Inputs	Input signals	For counter: CP1, CP2, and reset For timer: start, gate, and reset
	Input method	No-voltage input (contact short-circuit and open input) Short-circuit (ON) impedance: 1 kΩ max. (approx. 2 mA runoff current at 0 Ω) Short-circuit (ON) residual voltage: 2 VDC max. Open (OFF) impedance: 100 kΩ min. Applied voltage: 30 VDC max.
	Start, reset, gate	Minimum input signal width: 1 or 20 ms (selectable)
	Power reset	Minimum power-opening time: 0.5 s
Control output		SPDT contact output: 3 A at 250 VAC / 30 VDC, resistive load (cosφ= 1)
Minimum applied load		10 mA at 5 VDC (failure level: P, reference value)
Reset system		External, manual, and power supply resets (for timer in A, B, D, E, or Z modes)
Sensor waiting time		260 ms max. (inputs cannot be received during sensor wait time if control outputs are turned OFF)
Timer function	Accuracy of operating time and setting error (including temperature and voltage effects)	Signal start: ±0.03% ±30 ms max. Power-ON start: ±0.03% ±50 ms max.
Ambient temperature	Operating storage	-10 °C to 55 °C (with no icing or condensation)
		-25 °C to 65 °C (with no icing or condensation)
Case color		Rear section: grey smoke; front section: N1.5 (black)
Degree of protection		Panel surface: IP66 and NEMA Type 4X (indoors); rear case: IP20, terminal block: IP20
Size in mm		24Hx48Wx83D



## The most complete digital standard timer on the market

H7CX offers you the most complete series of products on the market today. Based on extensive customer research, these new counters have been designed with added-value features that users both need and appreciate.

- 48Hx48Wx64D to 100 mm
- Two-colour display value, red or green
- Front-mounting / plug-in
- 6-digit model -99999 to 999999, set value -99999 to 999999
- Input contact, NPN or PNP



### Ordering information

Type	External connection	Sensor power supply	Supply voltage	Output type	Digits	Size in mm (HxWxD)	Model
1-stage counter	Screw terminal	12 VDC	100 to 240 VAC	Contact and transistor output	6	48x48x100	H7CX-AU
1-stage counter with total counter			12 to 24 VDC / 24 VAC	Transistor output (2x)			H7CX-AUD1
2-stage counter			100 to 240 VAC				H7CX-AUSD1
1-stage counter with batch counter			12 to 24 VDC / 24 VAC	Contact output (2x)			H7CX-AW
Dual counter (addition/subtraction)							H7CX-AWD1
Tachometer							
1-stage counter	11-pin socket	12 VDC	100 to 240 VAC	Contact output		48x48x72.5	H7CX-A11
1-stage counter with total counter			12 to 24 VDC / 24 VAC	Transistor output			H7CX-A11D1
			100 to 240 VAC				H7CX-A11S
			12 to 24 VDC / 24 VAC				H7CX-A11SD1
	Screw terminal		100 to 240 VAC	Contact output		48x48x100	H7CX-A
			100 to 240 VAC	Transistor output			H7CX-AS

**Bold** = preferred stock item

### Accessories

Name	Model
Flush-mounting adapter	<b>Y92F-30</b>
Waterproof packing	Y92S-29
DIN-rail mounting / front-connecting socket	<b>11-pin, finger safe type</b>
Back-connecting socket	<b>11-pin</b>
	<b>Finger safe terminal cover for P3GA-11</b>
Hard cover	<b>Y92A-48G</b>
Soft cover	<b>Y92A-48</b>
	Y92A-48F1

**Bold** = preferred stock item

### Specifications

Display	7-segment, negative transmissive LCD
Digits	6-digits: -99,999 to 999,999, SV range: 0 to 9,999
Max. counting speed	30 Hz or 5 kHz (selectable, ON / OFF ratio 1:1)
Input modes	Increment, decrement, command, individual, and quadrature
Control output	Contact output: 3 A at 250 VAC / 30 VDC, resistive load ( $\cos\phi = 1$ ) Minimum applied load: 10 mA at 5 VDC Transistor output: NPN open collector, 100 mA at 30 VDC Residual voltage: 1.5 VDC max. (approx. 1V) Leakage current: 0.1 mA max.
	NEMA B300 Pilot Duty, 1/4 HP 3 A resistive load at 120 VAC, 1/3 HP 3 A resistive load at 240 VAC
Key protection	Yes
Decimal point adjustment	Yes (rightmost 3 digits)
Sensor waiting time	250 ms max.
Memory backup	EEPROM (overwrites: 100,000 times min.) stores data 10 years min.
Ambient temperature	Operating: -10 to 55 °C (-10 to 50 °C when mounted side by side)
Case color	Black (N1.5), light grey (Munsell 5Y7/1, produced upon request)
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load)
Degree of protection	Panel surface: IP66, NEMA 4 (indoors)



## Compact, easy-to-use cam positioner

The H8PS provides high-speed operation at 1,600 r/min and high-precision settings to 0.5° ensuring widespread application. H8PS features a highly visible display with back-lit negative transmissive LCD. Advance angle compensation function compensates for output delays.

- 96Hx96Wx65D mm
- Front-panel/DIN-rail
- 24 VDC
- 8-, 16- and 32-outputs
- NPN / PNP 100 mA at 30 VDC



## Ordering information

Number of outputs	Mounting method	Output configuration	Bank function	Size in mm (HxWxD)	Model
8-outputs	Flush-mounting	NPN transistor output	No	96x96x67.5	<b>H8PS-8B</b>
		PNP transistor output			<b>H8PS-8BP</b>
	Surface-mounting / DIN-rail mounting	NPN transistor output		96x96x60.6	H8PS-8BF
		PNP transistor output			<b>H8PS-8BFP</b>
16-outputs	Flush-mounting	NPN transistor output	Yes	96x96x67.5	<b>H8PS-16B</b>
		PNP transistor output			<b>H8PS-16BP</b>
	Surface-mounting / DIN-rail mounting	NPN transistor output		96x96x60.6	<b>H8PS-16BF</b>
		PNP transistor output			<b>H8PS-16BFP</b>
32-outputs	Flush-mounting	NPN transistor output		96x96x67.5	<b>H8PS-32B</b>
		PNP transistor output			<b>H8PS-32BP</b>
	Surface-mounting / DIN-rail mounting	NPN transistor output		96x96x60.6	<b>H8PS-32BF</b>
		PNP transistor output			<b>H8PS-32BFP</b>

**Bold** = preferred stock item

## Accessories

Type	Resolution	Cable length	Model
Economy	256	2 m	<b>E6CP-AG5C-C 256 2M</b>
Standard	256	1 m	E6C3-AG5C-C 256 1M
		2 m	E6C3-AG5C-C 256 2M
	360		<b>E6C3-AG5C-C 360 2M</b>
Rigid	720		E6C3-AG5C-C 720 2M
	256	2 m	E6F-AG5C-C 256 2M
	360		E6F-AG5C-C 360 2M
	720		E6F-AG5C-C 720 2M

**Bold** = preferred stock item

Name	Specification	Model
Discrete wire output cable	2 m	<b>Y92S-41-200</b>
Connector-type output cable	2 m	E5ZE-CBL200
Support software	CD-ROM	<b>H8PS-SOFT-V1</b>
USB cable	A miniB, 2 m	<b>Y92S-40</b>
Parallel input adapter	Two units can operate in parallel	<b>Y92C-30</b>
Protective cover		<b>Y92A-96B</b>
Watertight cover		<b>Y92A-96N</b>
DIN-rail mounting base		<b>Y92F-91</b>

## Encoder accessories

Name	Specification	Model
Shaft coupling for the E6CP	Axis: 6 mm dia.	<b>E69-C06B</b>
Shaft coupling for the E6C3	Axis: 8 mm dia.	<b>E69-C08B</b>
Shaft coupling for the E6F	Axis: 10 mm dia.	<b>E69-C10B</b>
Extension cable	5 m (same for E6CP, E6C3, and E6F)	<b>E69-DF5</b>

**Bold** = preferred stock item

## Specifications

Rated supply voltage			24 VDC
Inputs	Encoder input		8-output models: none; 16-/32-output models: bank inputs 1/2/4, origin input, start input
	External inputs		8-output models: none; 16-/32-output models: bank inputs 1/2/4, origin input, start input
		Input signals	No voltage inputs: ON impedance: 1 kΩ max. (leakage current: approx. 2 mA at 0 Ω) ON residual voltage: 2 V max., OFF impedance: 100 kΩ min., applied voltage: 30 VDC max. Minimum input signal width: 20 ms
Number of banks			8 banks (for 16-/32-output models only)
Display method			7-segment, negative transmissive LCD (main display: 11 mm (red), sub-display: 5.5 mm (green))
Memory backup method			EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.
Ambient operating temperature			-10 °C to 55 °C (with no icing or condensation)
Storage temperature			-25 °C to 65 °C (with no icing or condensation)
Ambient humidity			25% to 85%
Degree of protection			Panel surface: IP40, rear case: IP20
Case color			Light grey (Munsell 5Y7/1)



# Programmable relays

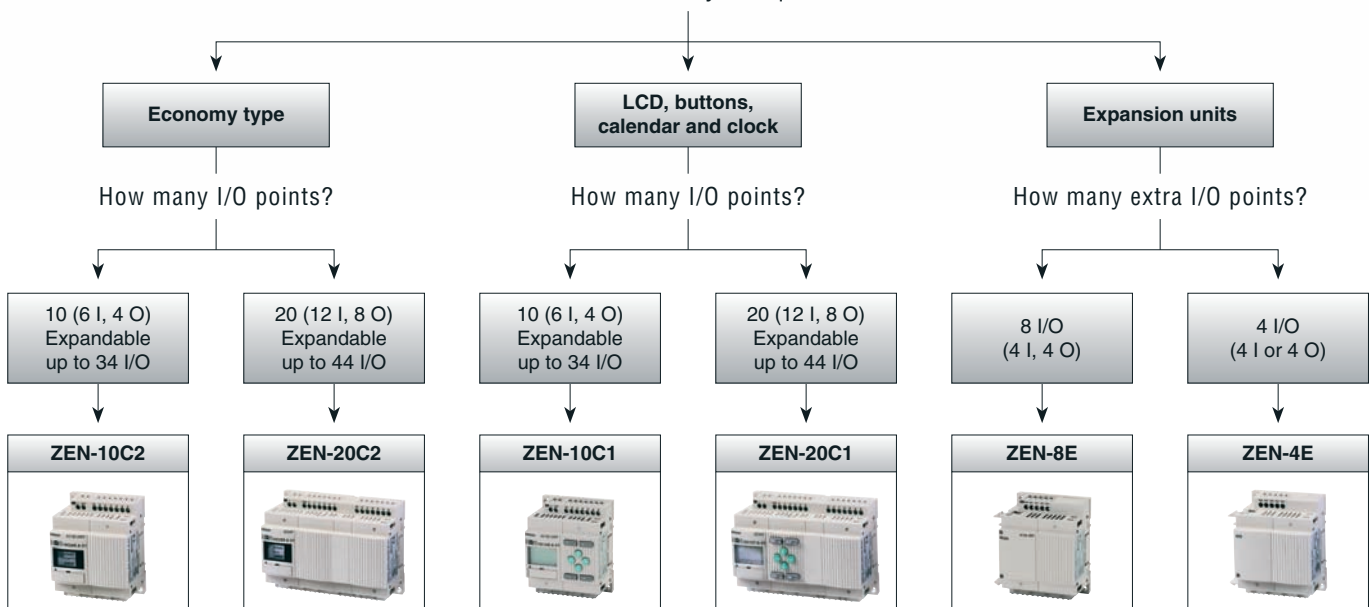
## ZEN – the logical automatic tools for small-scale flexible control



The ZEN is a modular, expandable, programmable relay that is designed to provide flexible, automatic control for small-scale machines and facilities. The ZEN combines all the functionality of timers, counters and relays to control multiple input and output signals, while being easy to install and program. It enables any daily routine that involves switching and control to be easily automated, which saves time and effort. And it is the perfect solution for building automation applications where multiple timer control is very important.

- 10 I/O models with 6 inputs and 4 outputs, expandable up to 34 I/Os
- 20 I/O models with 12 inputs and 8 outputs, expandable up to 44 I/Os
- With LCD screen, including calendar and clock function or LED indicator
- DC power supply units have analogue input
- Expansion units for 10 & 20 I/O versions with relay output or transistor



What functionality is required?





Category		CPU units											
Selection criteria													
	Model	ZEN-10C1A R-A-V1	ZEN-10C2A R-A-V1	ZEN-10C1D R-D-V1	ZEN-10C2D R-D-V1	ZEN-10C1D T-D-V1	ZEN-10C2D T-D-V1	ZEN-20C1A R-A-V1	ZEN-20C2A R-A-V1	ZEN-20C1D R-D-V1	ZEN-20C2D R-D-V1	ZEN-20C1D T-D-V1	ZEN-20C2D T-D-V1
	Type	LCD	LED	LCD	LED	LCD	LED	LCD	LED	LCD	LED	LCD	LED
	Number of I/O points	10 expandable up to 34 I/O						20 expandable up to 44 I/O					
	Inputs	6		6		6		12		12		12	
	Inputs / power supply	100 to 240 VAC		24 VDC		24 VDC		100 to 240 VAC		24 VDC		24 VDC	
	Outputs	4		4		4		8		8		8	
Features		Relays		Relays		Transistors		Relays		Relays		Transistors	
	LCD, buttons, calendar and clock	■		■		■		■		■		■	
	Analogue input (PNP)			■	■	■	■			■	■	■	■
	Timers	16											
	Holding timers	8											
	Counters	16											
	Weekly timers	16		16		16		16		16		16	
	Calendar timers	16		16		16		16		16		16	
	Displays	16		16		16		16		16		16	
	Work bits	16											
	Holding bits	16											
Analogue comparators (PNP)				4						4			
Comparators	16												
	Page	267											

Accessories and options	EEPROM (for data security and copying)	ZEN-ME01	Enables programs and parameter settings to be saved or copied to another ZEN
	Battery (keeps time, date and bit values for 10 years at 25 °C)	ZEN-BAT01	10 year min. battery life (at 25 °C)
	Connecting cable for the programming software, RS-232C cable, 9-way 'D' connector for PC	ZEN-CIF01	2 m RS-232C (9-pin D-sub connector)
	Support software for Windows	ZEN-SOFT01-V3	Runs on Windows 95, 98, 2000, ME, XP, or NT 4.0
	PS unit 24 VDC, 1.3 A (30 W)	ZEN-PA03024	ZEN power supply unit
	ZEN kit - with LCD display AC version	ZEN-KIT01-EV3	Set containing CPU unit (ZEN-10C1AR-A-V1), support software connecting cable, ZEN support software and manual
	ZEN kit - with LCD Display DC version	ZEN-KIT02-EV3	Set containing CPU unit (ZEN-10C1DR-D-V1), support software connecting cable, ZEN support software and manual

■ Standard

□ Available

□ No / not available

Category		Expansion I/O units					
Selection criteria							
	Model	ZEN-8EAR	ZEN-8EDR	ZEN-8EDT	ZEN-4EA	ZEN-4ED	ZEN-4ER
	Type						
	Number of I/O points	8			4		
	Inputs	4	4	4	4	4	
	Inputs / power supply	100 to 240 VAC	24 VDC	24 VDC	100 to 240 VAC	24 VDC	24 VDC
	Outputs	4	4	4			4
Features		Relays	Relays	Transistors			Relays
	LCD, buttons, calendar and clock						
	Analogue input (PNP)						
	Timers						
	Holding timers						
	Counters						
	Weekly timers						
	Calendar timers						
	Displays						
	Work bits						
	Holding bits						
	Analogue comparators (PNP)						
	Comparators						
Page		267					



## Flexible automation

Within OMRON's ZEN range there are up to 44 I/O to control. Our basic unit is either a 10 I/O or a 20 I/O version. These basic units are available with a realtime clock, an LCD screen and buttons, or with LED indication and no buttons. Each CPU can be handle up to 3 expansion units

- 10 I/O models with 6 inputs and 4 outputs, expandable up to 34 I/O
- 20 I/O models with 12 inputs and 8 outputs, expandable up to 44 I/O
- With LCD screen, including calendar & clock function or LED indicator
- DC power supply units have analogue input
- Expansion units for 10 & 20 I/O versions with relay output or transistor

## Ordering information

Name	Number of I/O points	Inputs	Inputs / power supply	Outputs	Type	LCD, buttons, calendar and clock	Ana-logue input	Timers, counters, weekly timers, calendar timers, displays, work bits, holding bits, comparators	Analogue comparators	Holding timers	Size in mm (HxWxD)	Model number
CPU units	10 Expandable up to 34 I/O	6	100 to 240 VAC	4 Relays	LCD	yes		16	4	8	90x70x56	<b>ZEN-10C1AR-A-V1</b>
					LED							<b>ZEN-10C2AR-A-V1</b>
		6	24 VDC	4 Relays	LCD	yes	yes					<b>ZEN-10C1DR-D-V1</b>
					LED		yes					<b>ZEN-10C2DR-D-V1</b>
		6	24 VDC	4 Transistors	LCD	yes	yes					<b>ZEN-10C1DT-D-V1</b>
					LED		yes					<b>ZEN-10C2DT-D-V1</b>
	20 Expandable up to 44 I/O	12	100 to 240 VAC	8 Relays	LCD	yes					90x122.5x56	<b>ZEN-20C1AR-A-V1</b>
					LED							<b>ZEN-20C2AR-A-V1</b>
		12	24 VDC	8 Relays	LCD	yes	yes					<b>ZEN-20C1DR-D-V1</b>
					LED		yes					<b>ZEN-20C2DR-D-V1</b>
		12	24 VDC	8 Transistors	LCD	yes	yes					<b>ZEN-20C1DT-D-V1</b>
					LED		yes					<b>ZEN-20C2DT-D-V1</b>
Expansion I/O units	8	4	100 to 240 VAC	4 Relays							90x70x56	<b>ZEN-8EAR</b>
		4	24 VDC	4 Relays								<b>ZEN-8EDR</b>
		4	24 VDC	4 Transistors								<b>ZEN-8EDT</b>
	4	4	100 to 240 VAC									<b>ZEN-4EA</b>
		4	24 VDC									<b>ZEN-4ED</b>
				4 Relays								<b>ZEN-4ER</b>

**Bold** = preferred stock item

## Accessories and options

EEPROM (for data security and copying)	<b>ZEN-ME01</b>
Battery (keeps time, date and bit values for 10 years at 25 °C)	<b>ZEN-BAT01</b>
For the programming software, RS-232C cable, 9-way 'D' connector for PC	<b>ZEN-CIF01</b>
Support software for Windows	<b>ZEN-SOFT01-V3</b>
PS unit 24 VDC, 1.3 A (30 W)	<b>ZEN-PA03024</b>
ZEN kit - CPU unit ZEN-10C1AR-A-V1, support software and RS-232C cable	<b>ZEN-KIT01-EV3</b>
ZEN kit - CPU unit ZEN-10C1DR-D-V1, support software and RS-232C cable	<b>ZEN-KIT02-EV3</b>

**Bold** = preferred stock item

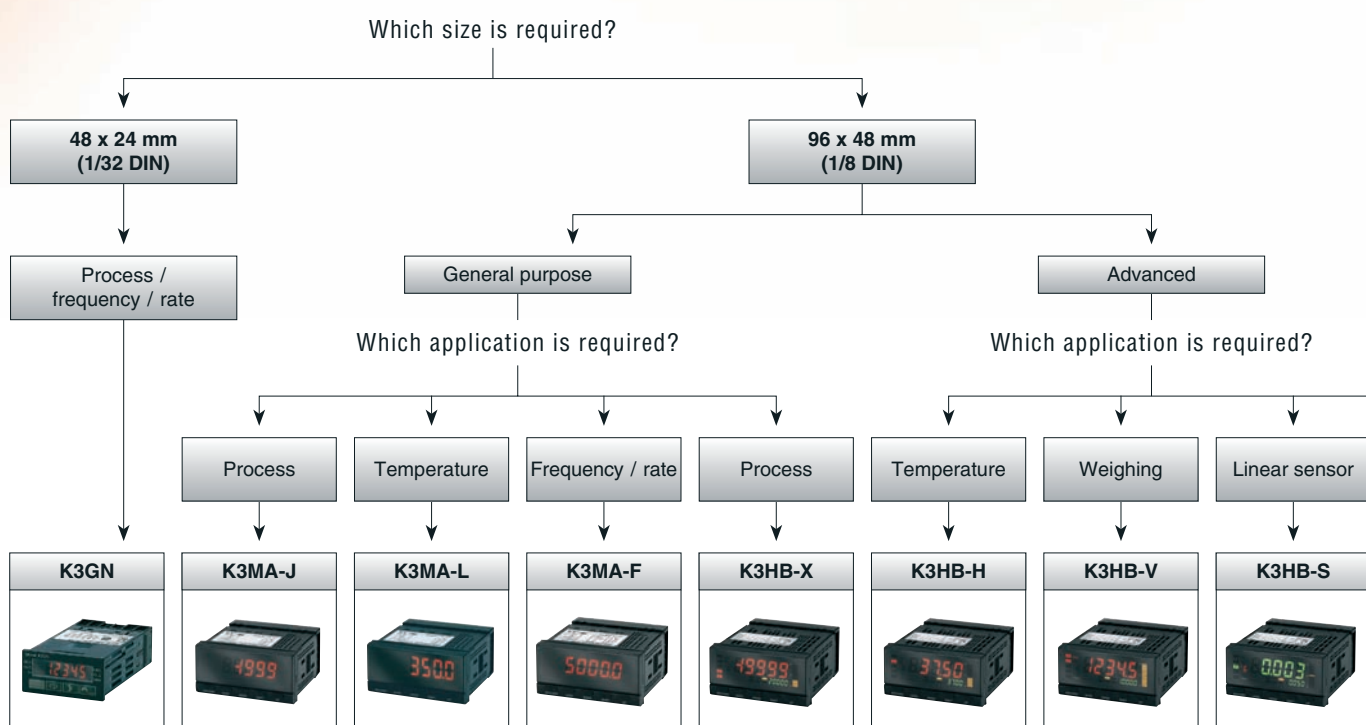
## Specifications

Item	Specification	
	ZEN-□□C□AR-A-V1	ZEN-□□C□DR-D-V1
Power supply voltage	100 to 240 VAC	24 VDC
Rated power supply voltage	85 to 264 VAC	20.4 to 26.4 VDC
Power consumption	30 W max. (with 3 expansion units connected)	6.5 W max. (with 3 expansion units connected)
Ambient temperature	LCD-type CPU unit (operation panel and calendar / clock function): 0 °C to 55 °C LED-type CPU unit (no operation panel or calendar / clock function): -25 °C to 55 °C	
Ambient storage temperature	LCD-type CPU unit: -20 °C to 75 °C, LED-type CPU unit: -40 °C to 75 °C	
Control method	Stored program control	
I/O control method	Cyclic scan	
Programming language	Ladder diagram	
Program capacity	96 lines (3 input conditions and 1 output per line)	
LCD display	12 characters x 4 lines, with backlight (LCD-type CPU unit only)	
Operation keys	8 (4 cursor keys and 4 operation keys) (LCD-type CPU unit only)	
Super-capacitor holding time	2 days min. (25 °C)	
Battery life (ZEN-BAT01)	10 years min. (25 °C)	
Time function (RTC)	ZEN□□C1□□-□□-□ only, accuracy: 1 to 2 min / month (at 25 °C)	

# Digital panel indicators

Omron's digital panel indicator series accepts a wide range of input signals (process, temperature, pulse/impulse, weight, etc.), that can be displayed in any required value. The series also includes a green / red colour change display feature, which clearly visualises the status of a process.

- Multiple inputs, including process, temperature, frequency and many more!
- Highly visible display provides a clear, highly stable read-out of values
- Large, front-panel keys for unambiguous, user-friendly programming
- Dust-proof and waterproof front case that complies with NEMA4X (IP66 equivalent) standards
- Wide range of models with communication capability including DeviceNet



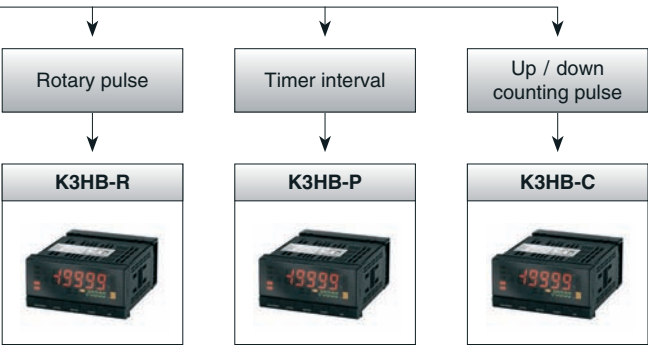


# K3HB – Omron's new panel indicator

The K3HB indicators provide a bar-graph position indication, which is unique in 1/8 DIN horizontal housing panel indicators. The sampling speed of this range has been increased to 50 times per second, or 2,000 times per second for the linear sensor indicator version.

Furthermore, users can specify DeviceNet communications, with the option of a DeviceNet output module delivering high-speed data communication with PLCs, without the need for special programming.

The full range of K3HB analogue input panel indicators includes a process indicator (K3HB-X), a temperature indicator (K3HB-H), a weighing indicator (K3HB-V) and a linear sensor indicator (K3HB-S). These indicators provide convenient, high performance solutions in a broad spectrum of applications in the process industry, as well as in machinery applications such as binding, soldering, semiconductor manufacture, moulding and mixing machines. The K3HB indicators are modular in design, which enables users to select exactly the functionality they require.








## Table of contents

Selection table		270
1/32 DIN multi-function	K3GN	272
1/8 DIN standard indicators	K3MA-J, -L, -F	273
1/8 DIN advanced indicators - analogue input	K3HB-X, -H, -V, -S	274
1/8 DIN advanced indicators - digital input	K3HB-R, -P, -C	276



# Selection table

Panel indicator type		Multifunctional digital panel indicator	Process indicator	Temperature indicator	Frequency / rate indicator	Process indicator
Selection criteria						
	Model	K3GN	K3MA-J	K3MA-L	K3MA-F	K3HB-X
	Size	1/32 DIN	1/8 DIN			
Features	Colour change display	■	■	■	■	■
	Number of digits	5	5	4	5	5
	Leading zero suppression	■	■	■	■	■
	Forced zero function	■	■	■	■	■
	Min. / max. hold function	■	■	■	■	■
	Average processing	■	■	■	■	■
	User selectable inputs	■	■	■	■	■
	Start-up compensating time	■			■	
	Key protection	■	■	■	■	■
	Decimal point position setting	■	■	■	■	■
	Accuracy	±0.1% of full scale	±0.1% of full scale	±0.1% of full scale	±0.1% of full scale	±0.1% of full scale (DC voltage & DC current), ±0.5% of full scale (AC voltage & AC current)
	Input range	0 to 20 mA, 4 to 20 mA or 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V or 0 to 30 Hz or 0 to 5 kHz	0 to 20 mA, 4 to 20 mA or 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V	Pt100, JPt100 or thermocouple K, J, T, E, L, U, N, R, S, B	0 to 30 Hz or 0 to 5 kHz	0.000 to 10.000 A, 0.0000 to 19.999 mA, -199.99 to 199.99 mA, 4.000 to 20.000 mA, 0.0 to 400.0 V, 0.0000
	Sample rate	4 Hz	4 Hz	0 to 30 Hz or 0 to 5 kHz	0 to 30 Hz or 0 to 5 kHz	50 Hz
	Features	Remote / local processing, parameter initialisation, programmable output configuration, process value hold	Teaching, comparative output pattern selection, parameter initialisation, programmable output configuration, process value hold	Programmable output configuration, process value hold	Teaching, comparative output pattern selection, programmable output configuration, process value hold	Scaling, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output
Front protection	Sensor power supply				■	□
	IP rating	IP66	IP66	IP66	IP66	IP66
	Supply voltage	24 VDC	24 VAC / VDC or 100 to 240 VAC	24 VAC / VDC or 100 to 240 VAC	24 VAC / VDC or 100 to 240 VAC	100 to 240 VAC or 24 VAC / VDC
Inputs	NPN	■		■	■	□
	PNP	■		■	■	□
	Temperature					
	Contact				■	
	Voltage pulse				■	
	Load cell					
	DC voltage	■	■	■		□
	DC current	■	■			□
	AC voltage					□
Outputs	AC current					□
	Relay	■	■	■	■	□
	NPN	■				□
	PNP	■				□
	Linear					□
	BCD					
	Comms	■				□
	Page	272	273			274

# Digital panel indicators

Temperature indicator	Weighing indicator	Linear sensor indicator	Rotary pulse indicator	Time interval indicator	Up / down counting pulse indicator
					
K3HB-H	K3HB-V	K3HB-S	K3HB-R	K3HB-P	K3HB-C
1/8 DIN					
■	■	■	■	■	■
5	5	5	5	5	5
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
Thermocouple: $\pm 0.3\%$ of full scale, Pt-100: $\pm 0.2\%$ of full scale	$\pm 0.1\%$ of full scale	One input: $\pm 0.1\%$ of full scale, two inputs: $\pm 0.2\%$ of full scale	$\pm 0.006\%$ rgd $\pm 1$ digit $\pm 0.02\%$ rgd $\pm 1$ digit	$\pm 0.08\%$ rgd $\pm 1$ digit	
Pt100, thermocouple K, J, T, E, L, U, N, R, S, B, W	0.00 to 199.99 mV, 0.000 to 19.999 mV, 100.00 mV, 199.99 mV	0 to 20 mA, 4 to 20 mA, 0 to 5 V, -5 to 5 V, -10 to 10 V	No voltage contact: 30 Hz, voltage pulse: 50 kHz, open collector: 50 kHz	No voltage contact: 30 Hz, voltage pulse: 50 kHz, open collector: 50 kHz	No voltage contact: 30 Hz, voltage pulse: 50 kHz, open collector: 50 kHz
50 Hz	50 Hz	2000 Hz	50 Hz	50 Hz	50 Hz
Scaling, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	Scaling, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	Scaling, 2-input calculation, teaching, averaging, output hysteresis, output OFF-delay, output test, bank selection, reset, comparative output	Scaling, measurement operation selection, averaging, previous average value comparison, output hysteresis, output OFF-delay, output test, teaching, display value selection, display colour selection, key protection, bank selection, display refresh period, maximum / minimum hold, reset	Scaling, measurement operation selection, output hysteresis, output OFF-delay, output test, teaching, display value selection, display colour selection, key protection, bank selection, display refresh period, maximum / minimum hold, reset	Scaling, measurement operation selection, output hysteresis, output OFF-delay, output test, display value selection, display colour selection, key protection, bank selection, display refresh period, maximum / minimum hold, reset
□	□	□	□	□	□
IP66	IP66	IP66	IP66	IP66	IP66
100 to 240 VAC or 24 VAC / VDC	100 to 240 VAC or 24 VAC / VDC	100 to 240 VAC or 24 VAC / VDC	100 to 240 VAC or 24 VAC / VDC	100 to 240 VAC or 24 VAC / VDC	100 to 240 VAC or 24 VAC / VDC
□	□	□	■	■	■
□	□	□	■	■	■
■					
			■	■	■
	■				
		■			
		■			
□	□	□	□	□	□
□	□	□	□	□	□
□	□	□	□	□	□
□	□	□	□	□	□
□	□	□	□	□	□
□	□	□	□	□	□
274			276		

■ Standard

□ Available

□ No / not available



## Compact and intelligent digital panel meter

The K3GN is able to cover a wide variety of applications with its 3 main functions: process meter, RPM processor/tachometer and digital data display for PC / PLC. Configuration is easy and the design is advanced and compact.

- Process indicator DC voltage / current
- RPM process / tachometer
- Digital data display for PC / PLC
- Very compact 1/32 DIN housing: 24Hx48Wx83D mm
- 5-digit display with programmable display colour, in red or green



## Ordering information

Input type	Supply voltage	Output	Model	
			No communications	RS-485
DC voltage / current, NPN	24 VDC	Dual relays (SPST-NO)	<b>K3GN-NDC 24 DC</b>	<b>K3GN-NDC-FLK 24 DC</b>
		Three NPN open collector	<b>K3GN-NDT1 24 DC</b>	K3GN-NDT1-FLK 24 DC
DC voltage / current, PNP		Dual relays (SPST-NO)	<b>K3GN-PDC 24 DC</b>	<b>K3GN-PDC-FLK 24 DC</b>
		Three PNP open collector	<b>K3GN-PDT2 24 DC</b>	K3GN-PDT2-FLK 24 DC

**Bold** = preferred stock item

## Specifications

Supply voltage	24 VDC
Operating voltage range	85% to 110% of the rated supply voltage
Power consumption	2.5 W max. (at max. DC load with all indicators lit)
Ambient temperature	Operating: -10 °C to 55 °C (with no condensation or icing) Storage: -25 °C to 65 °C (with no condensation or icing)
Display refresh period	Sampling period (sampling times multiplied by number of averaging times if average processing is selected)
Max. displayed digits	5 digits (-19999 to 99999)
Display	7-segment digital display, character height: 7.0 mm
Polarity display	"-" is displayed automatically with a negative input signal
Zero display	Leading zeros are not displayed
Scaling function	Programmable with front-panel key inputs (range of display: -19999 to 99999). The decimal point position can be set as desired.
External controls	HOLD: (measurement value held) ZERO: (forced-zero)
Hysteresis setting	Programmable with front-panel key inputs (0001 to 9999)
Other functions	Programmable colour display Selectable output operating action Teaching set values Average processing (simple average) Lockout configuration Communications writing control (communications output models only)
Output	Relays: 2 SPST-NO Transistors: 3 NPN open collector 3 PNP open collector  Combinations: Communications output (RS-485) + relay outputs Communications output (RS-485) + transistor outputs Communications output (RS-485) + transistor outputs (3 PNP open collector)
Communications	Communications function: RS-485
Delay in comparative outputs (transistor outputs)	750 ms max.
Degree of protection	Front-panel: NEMA4X for indoor use (equivalent to IP66) Rear case: IEC standard IP20 Terminals: IEC standard IP20
Memory protection	Non-volatile memory (EEPROM) (possible to rewrite 100,000 times)
Size in mm	24Hx48Wx80D



## Highly visible LCD display with 2-colour (red and green) LEDs

The K3MA series comes with a process meter, a frequency / rate meter and a temperature meter of either 100 to 240 VAC or 24 VAC / VDC. All are equipped with the same quality display and have the same short depth of 80 mm.

- DIN-size of 48Hx96W mm
- Highly visible, negative transmissive backlit LCD display
- 14.2 mm high characters
- 5 digits (-19,999 to 99,999), K3MA-L: 4 digits
- Front-panel IP66



## Ordering information

Indicator	Input type & ranges	Supply voltage	Output	Model
Process meter	DC voltage: 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V DC current: 0 to 20 mA, 4 to 20 mA	100 to 240 VAC	2 relay contact outputs (SPST-NO)	<b>K3MA-J-A2 100-240VAC</b>
		24 VAC / VDC	2 relay contact outputs (SPST-NO)	<b>K3MA-J-A2 24VAC/VDC</b>
Temperature meter	Platinum-resistance thermometer: Pt100, JPt100 or thermocouple K, J, T, E, L, U, N, R, S, B	100 to 240 VAC	1 relay contact output (SPDT)	<b>K3MA-L-C 100-240VAC</b>
		24 VAC / VDC	1 relay contact output (SPDT)	<b>K3MA-L-C 24VAC/VDC</b>
Frequency / rate meter	Rotary pulse: no voltage: 0.05 to 30.00 Hz; open collector: 0.1 to 5000.0 Hz	100 to 240 VAC	2 relay contact outputs (SPST-NO)	<b>K3MA-F-A2 100-240VAC</b>
		24 VAC / VDC	2 relay contact outputs (SPST-NO)	<b>K3MA-F-A2 24VAC/VDC</b>

**Bold** = preferred stock item

## Accessories

Name	Model
Splash-proof soft cover	<b>K32-49SC</b>
Hard cover	<b>K32-49HC</b>

**Bold** = preferred stock item

## Specifications

Item	100-240 VAC models	24 VAC / VDC models
Supply voltage	100 to 240 VAC	24 VAC (50 / 60 Hz), 24 VDC
Operating voltage range	85% to 110% of the rated supply voltage	
Power consumption (under maximum load)	6 VA max.	4.5 VA max. (24 VAC) 4.5 W max. (24 VDC)
Ambient temperature	Operating: -10 °C to 55 °C (with no condensation or icing) Storage: -25 °C to 65 °C (with no condensation or icing)	
Weight	Approx. 200 g	
Display	7-segment digital display, character height: 14.2 mm	
Polarity display	"- " is displayed automatically with a negative input signal	
Zero display	Leading zeros are not displayed	
Hold function	Max. hold (maximum value), min. hold (minimum value)	
Hysteresis setting	Programmable with front-panel key inputs (0001 to 9,999)	
Delay in comparative outputs	1 s max.	
Degree of protection	Front-panel: NEMA4X for indoor use (equivalent to IP66) Rear case: IEC standard IP20 Terminals: IEC standard IP00 + finger protection (VDE 0106 / 100)	
Memory protection	Non-volatile memory (EEPROM) (possible to rewrite 100,000 times)	
Size in mm	48Hx96Wx80D	



## Process, temperature, weighing and linear sensor indicators

These indicators with analogue input feature a clear and easy-to-use colour change display. All models are equipped with an IP66 housing. K3HB series is high-speed, with a sample rate of 50 Hz, and even 2,000 Hz for K3HB-S

- Position meter indication for easy monitoring
- Optional DeviceNet, RS-232C, RS-485
- Double display, with 5 digits, in two colours
- Dimensions: 48Hx96Wx100D mm



### Ordering information

Type of indicator	Input sensor type and range	Supply voltage	Base unit model
Process indicator K3HB-X	AC current input, from 0.000 to 10.000 A, 0.0000 to 19.999 mA	100 - 240 VAC	<b>K3HB-XAA 100-240VAC</b>
		24 VAC / VDC	<b>K3HB-XAA 24VAC/VDC</b>
	DC current input, from $\pm 199.99$ mA, to 4.000 to 20.000 mA	100 - 240 VAC	<b>K3HB-XAD 100-240VAC</b>
		24 VAC / VDC	<b>K3HB-XAD 24VAC/VDC</b>
	AC voltage input, from 0.0 to 400.0 V to 0.0000 to 1.999 V	100 - 240 VAC	<b>K3HB-XVA 100-240VAC</b>
		24 VAC / VDC	<b>K3HB-XVA 24VAC/VDC</b>
	DC voltage input, from $\pm 199.99$ V to 1.0000 to 5.0000 V	100 - 240 VAC	<b>K3HB-XVD 100-240VAC</b>
		24 VAC / VDC	<b>K3HB-XVD 24VAC/VDC</b>
Temperature indicator K3HB-H	Temperature input Pt100, thermocouple K, J, T, E, L, U, N, R, S, B, W	100 - 240 VAC	<b>K3HB-HTA 100-240VAC</b>
		24 VAC / VDC	<b>K3HB-HTA 24VAC/VDC</b>
Weighing indicator K3HB-V	Load cell input (DC low voltage input), 0.00 to 199.99 mV, 0.000 to 19.999 mV, 100.00 mV, 199.999 mV	100 - 240 VAC	<b>K3HB-VLC 100-240 VAC</b>
		24 VAC / VDC	<b>K3HB-VLC 24VAC/VDC</b>
Linear sensor indicator K3HB-S	DC process input, 0 to 5 V, 1 to 5 V, -5 to 5 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA	24 VAC / VDC	<b>K3HB-SSD AC/DC24</b>
		100 - 240 VAC	<b>K3HB-SSD AC100-240</b>

**Bold** = preferred stock item

### Option boards

#### Sensor power supply / output boards

Slot	Output	Sensor power supply	Communications	Model	Applicable indicator types
B	Relay	PASS: SPDT		<b>K33-CPA</b> <sup>*1</sup>	K3HB-X, -H, -S
	Linear current	DC0(4) - 20 mA		<b>K33-L1 A</b> <sup>*2</sup>	K3HB-X, -H, -S
	Linear voltage	DC0(1) - 5 V, 0 to 10 V		<b>K33-L2A</b> <sup>*2</sup>	K3HB-X, -H, -S
				<b>K33-A</b> <sup>*2</sup>	K3HB-X, -H, -S
			RS-232C	<b>K33-FLK1 A</b> <sup>*2</sup>	K3HB-X, -H, -S
			RS-485	<b>K33-FLK3A</b> <sup>*2</sup>	K3HB-X, -H, -S
	Relay	PASS: SPDT		<b>K33-CPB</b> <sup>*1</sup>	K3HB-V
	Linear current	DC0(4) - 20 mA		<b>K33-L1B</b> <sup>*2</sup>	K3HB-V
	Linear voltage	DC0(1) - 5 V, 0 to 10 V		<b>K33-L2B</b> <sup>*2</sup>	K3HB-V
				<b>K33-B</b> <sup>*2</sup>	K3HB-V
			RS-232C	<b>K33-FLK1B</b> <sup>*2</sup>	K3HB-V
			RS-485	<b>K33-FLK3B</b> <sup>*2</sup>	K3HB-V

#### Relay / transistor output boards

Slot	Output	Communications	Model
C	Relay		H / L: SPDT each
			HH / H / LL / L: SPST-NO each
	Transistor		NPN open collector: HH / H / PASS / L / LL
			PNP open collector: HH / H / PASS / L / LL
		DeviceNet	

#### Event input boards

Slot	Input type	Number of points	Communications	Model
D	NPN open collector	5	M3 terminal blocks	<b>K35-1</b>
		8	10-pin MIL connector	<b>K35-2</b>
	PNP open collector	5	M3 terminal blocks	<b>K35-3</b>
		8	10-pin MIL connector	<b>K35-4</b>

<sup>\*1</sup> CPA / CPB can be combined with relay outputs only.

<sup>\*2</sup> Only one of the following can be used by each digital indicator: RS-232C / RS-485 communications, a linear output, or DeviceNet communications.

K3HB has got three slots for option boards: slot B, slot C and slot D.

**Bold** = preferred stock item

## Accessories

Special cable (for event inputs with 8-pin connector)

**K32-DICN**

**Bold** = preferred stock item

## Specifications

Power supply voltage			100 to 240 VAC (50 / 60 Hz), 24 VAC / VDC, DeviceNet power supply: 24 VDC
Allowable power supply voltage range			85% to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC
Power consumption			100 to 240 V: 18 VA max. (max. load), 24 VAC / DC: 11 VA / 7 W max. (max. load)
Display method			Negative LCD (backlit LED) display 7-segment digital display (character height: PV: 14.2 mm (green / red); SV: 4.9 mm (green))
Ambient operating temperature			-10 °C to 55 °C (with no icing or condensation)
Display range			-19,999 to 99,999
Weight			Approx. 300 g (base unit only)
Degree of protection		Front-panel	Conforms to NEMA 4X for indoor use (equivalent to IP66)
		Rear case	IP20
		Terminals	IP00 + finger protection (VDE0106 / 100)
Memory protection			EEPROM (non-volatile memory), number of rewrites: 100,000
Event input ratings		Contact	ON: 1 kΩ max., OFF: 100 kΩ min.
		No-contact	ON residual voltage: 2 V max., OFF leakage current: 0.1 mA max., load current: 4 mA max. Maximum applied voltage: 30 VDC max.
Output ratings	Transistor output	Maximum load voltage	24 VDC
		Maximum load current	50 mA
		Leakage current	100 μA max.
	Contact output (resistive load)	Rated load	5 A at 250 VAC, 5 A at 30 VDC
		Rated through current	5 A
		Mechanical life expectancy	5,000,000 operations
		Electrical life expectancy	100,000 operations
	Linear output	Allowable load impedance	500 Ω max. (mA); 5 kΩ min. (V)
		Resolution	Approx. 10,000
		Output error	±0.5% FS
Size in mm			48Hx96Wx100D





## Rotary pulse, timer interval and up- / down-counting pulse indicators

These indicators with analogue input feature a clear and easy-to-use colour change display. All models are equipped with an IP66 housing. K3HB-R and -C are high-speed, with a sample rate up to 50 kHz.

- Position meter indication for easy monitoring
- Optional DeviceNet, RS-232C, RS-485
- Double display, with 5 digits, in two colours
- Dimensions: 48Hx96Wx100D mm



### Ordering information

Type of indicator	Input ranges	Supply voltage	Input sensor	Base unit model
Rotary pulse indicator K3HB-R	No voltage contact: 30 Hz max. Voltage pulse: 50 kHz max. Open collector: 50 kHz max.	100 - 240 VAC	NPN input / voltage pulse	<b>K3HB-RNB 100-240VAC</b>
		24 VAC / VDC		<b>K3HB-RNB 24VAC/VDC</b>
		100 - 240 VAC	PNP input	<b>K3HB-RPB 100-240VAC</b>
		24 VAC / VDC		<b>K3HB-RPB 24VAC/VDC</b>
		100 - 240 VAC		<b>K3HB-PNB 100-240VAC</b>
		100 - 240 VAC		<b>K3HB-PPB 100-240VAC</b>
Timer interval indicator K3HB-P		24 VAC / VDC		<b>K3HB-PPB 24VAC/VDC</b>
		100 - 240 VAC		<b>K3HB-CNB 100-240VAC</b>
Up / down counting pulse indicator K3HB-C		24 VAC / VDC		<b>K3HB-CNB 24VAC/VDC</b>
		24 VAC / VDC		<b>K3HB-CPB 24VAC/VDC</b>

**Bold** = preferred stock item

### Option boards

#### Sensor power supply / output boards

Slot	Output	Sensor power supply	Communications	Model
B	Relay	PASS: SPDT		<b>K33-CPA</b> *1
	Linear current	DC0(4) - 20 mA		<b>K33-L1 A</b> *2
	Linear voltage	DC0(1) - 5 V, 0 to 10 V		<b>K33-L2A</b> *2
				<b>K33-A</b> *2
			RS-232C	<b>K33-FLK1 A</b> *2
			RS-485	<b>K33-FLK3A</b> *2

#### Relay / transistor output boards

Slot	Output	Communications	Model
C	Relay		<b>K34-C1</b>
			<b>K34-C2</b>
	Transistor		<b>K34-T1</b>
			<b>K34-T2</b>
	BCD + transistor	DeviceNet	<b>K34-DRT</b> *2
			<b>K34-BCD</b>

**Bold** = preferred stock item

#### Event input boards

Slot	Input type	Number of points	Communications	Model
D	NPN open collector	5	M3 terminal blocks	<b>K35-1</b>
		8	10-pin MIL connector	<b>K35-2</b>
	PNP open collector	5	M3 terminal blocks	<b>K35-3</b>
		8	10-pin MIL connector	<b>K35-4</b>

\*1 CPA can be combined with relay outputs only.

\*2 Only one of the following can be used by each digital indicator: RS-232C / RS-485 communications, a linear output, or DeviceNet communications.

**Bold** = preferred stock item

K3HB has got three slots for option boards: slot B, slot C and slot D.

### Accessories

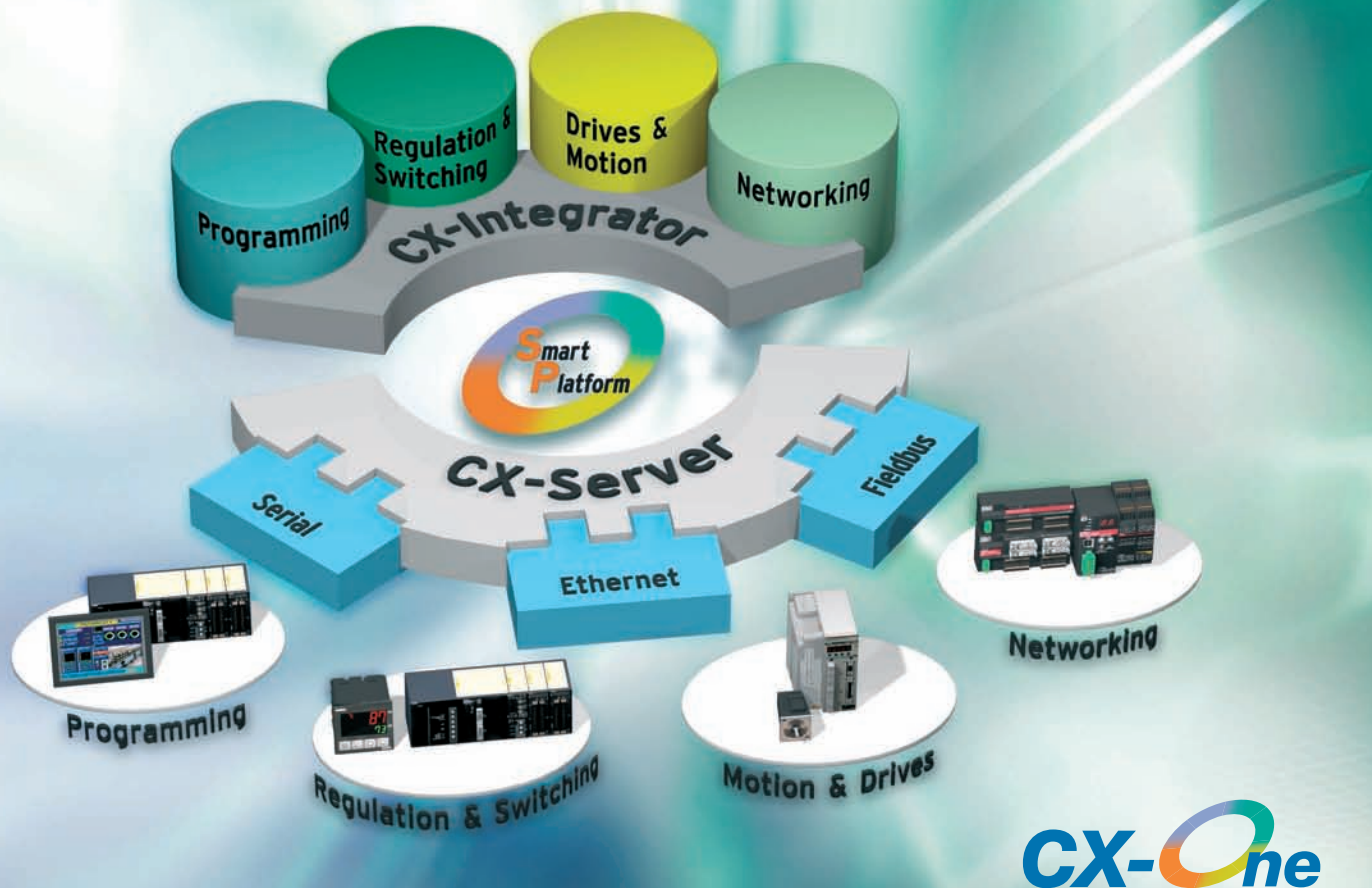
Special cable (for event inputs with 8-pin connector)	<b>K32-DICN</b>
Special BCD output cable	<b>K32-BCD</b>

**Bold** = preferred stock item

## Specifications

Power supply voltage			100 to 240 VAC (50 / 60 Hz), 24 VAC / VDC, DeviceNet power supply: 24 VDC
Allowable power supply voltage range			85% to 110% of the rated power supply voltage, DeviceNet power supply: 11 to 25 VDC
Power consumption			100 to 240 V: 18 VA max. (max. load), 24 VAC / DC: 11 VA / 7 W max. (max. load)
Display method			Negative LCD (backlit LED) display 7-segment digital display (character height: PV: 14.2 mm (green / red); SV: 4.9 mm (green))
Ambient operating temperature			-10 °C to 55 °C (with no icing or condensation)
Display range			-19,999 to 99,999
Weight			Approx. 300 g (base unit only)
Degree of protection		Front-panel	Conforms to NEMA 4X for indoor use (equivalent to IP66)
		Rear case	IP20
		Terminals	IP00 + finger protection (VDE0106 / 100)
Memory protection			EEPROM (non-volatile memory), number of rewrites: 100,000
Event input ratings		Contact	ON: 1 kΩ max., OFF: 100 kΩ min.
		No-contact	ON residual voltage: 2 V max., OFF leakage current: 0.1 mA max., load current: 4 mA max. Maximum applied voltage: 30 VDC max.
Output ratings	Transistor output	Maximum load voltage	24 VDC
		Maximum load current	50 mA
		Leakage current	100 μA max.
	Contact output (resistive load)	Rated load	5 A at 250 VAC, 5 A at 30 VDC
		Rated through current	5 A
		Mechanical life expectancy	5,000,000 operations
		Electrical life expectancy	100,000 operations
	Linear output	Allowable load impedance	500 Ω max. (mA); 5 kΩ min. (V)
		Resolution	Approx. 10,000
		Output error	±0.5% FS
Size in mm			48Hx96Wx100D

# Programmable logical controllers (PLC)



## CX-One – one software for all your automation needs

### Architecture

CX-One is based on applications software such as CX-Programmer, CX-Designer and applications as the network manager CX-Integrator and CX-Server acting as middleware between networks and applications software. The benefit of such architecture is that users don't have to bother about networks or device drivers while developing their applications. CX-Server supports all Omron networks as well as open fieldbuses.

The latest version of CX-One adds extra key functionality, adds multi-language user interface and supports more devices than previously.

The CX-Integrator – the graphical interface and system configuration tool – the heart of CX-One – now supports Italian, Spanish, French, German and Chinese language in addition to English and Japanese making it easier for engineers to operate the software.

### Programming

- CX-Programmer (PLC programming)
- CX-Simulator (PLC simulation)
- CX-Designer (HMI programming)

### Motion & Drives

- CX-Motion – for motion controllers with analogue output
- CX-Position – for PTP controllers with pulse output
- CX-Motion – NCF for PTP with motion bus MLII
- CX-Motion – MCH advanced motion with motion link MLII
- CX-Drive – for inverters and servodrives

### Regulation and Switching

- CX-Process for PLC process units
- CX-Thermotools for stand-alone temperature controllers

### Networks

- CX-Integrator (DeviceNet + Ethernet + Controllerlink)
- CX-Profibus – all profibus modules



## CP1H – the all-in-one PLC

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

### Flexible I/O possibilities

With 4 high-speed encoder inputs up to 1 MHz (single phase) and 4 pulse outputs up to 1 MHz (line driver), CP1H CPUs are ideal for positioning and speed control. Their optional 4 analogue inputs and 2 analogue outputs plus advanced PID control with auto-tuning also make them ideal for continuous control applications.

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

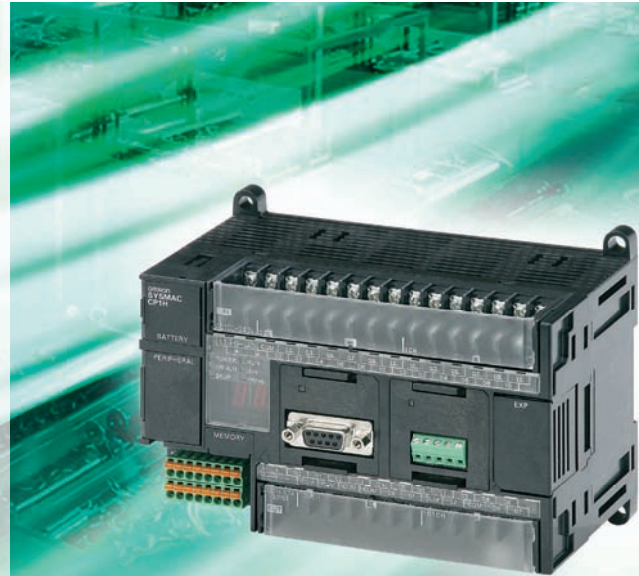
Equipped with a USB interface as standard for programming and monitoring, the new CPUs allows up to two serial ports to be plugged in for communication with HMI or field devices. And, of course, they provide 'Smart Platform' communication routing over multiple network layers.

### One architecture

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

### Features at a glance





- 4 high-speed encoder inputs and 4 fast pulse outputs
- AC or DC supply, 24 digital inputs and 16 digital outputs (transistor or relay)
- CJ1M-compatible instruction set and execution speed
- Expandable with intelligent CJ1 I/O and communication units
- Analogue I/O built-in (optional), RS232C and RS-422A/485 serial ports (plug-in option boards)





## Table of contents

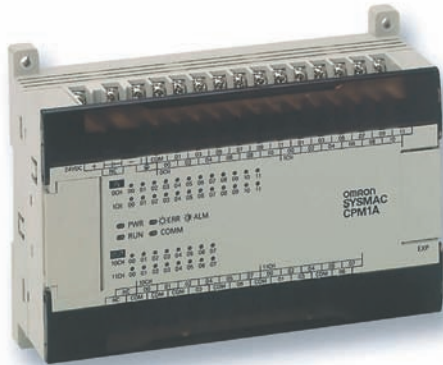
<b>Compact PLC</b>	CPM1A CPU units	282
	CPM2A CPU units	283
	CPM2C CPU units	284
	CP1H CPU units	285
	CPM1A expansion units	286
	CPM2C expansion units	287
<b>Modular PLC</b>	CJ1 CPU units	288
	CJ1 power supplies, expansions	289
	CJ1 digital I/O units	290
	CJ1 analog I/O and control units	291
	CJ1 position control units	293
	CJ1 communication units	294
<b>Rack PLC</b>	CS1 CPU units	295
	CS1 power supplies, backplanes	296
	CS1 digital I/O units	297
	CS1 analog and process I/O units	298
	CS1 position / motion control units	300
	CS1 communication units	301

# Selection table

Compact PLC series						
						
Model		CPM1A	CPM2A	CPM2C	CP1H	
Built-in	Digital I/O	10 - 40	20 - 60	10 - 32	40	
	Interrupt inputs	2 - 4	2 - 4	2 - 4	8	
	Counter inputs	1 (5 kHz)	1 (20 kHz) + 2 to 4 (2 kHz)			4 (100 kHz)
	Pulse outputs	1 (2 kHz)	2 (10 kHz)			2 (100 kHz) + 2 (30 kHz)
CPU features / option boards		Built-in AC or DC power supply 2 analog settings	Built-in AC or DC power supply 2 analog settings Removable terminal blocks Standard 2nd serial port	DC power supply 2nd serial port via converter unit	Built-in AC or DC power supply 4 analog in / 2 analog out (XA model) 2 serial communication board plug-ins 1 simple analog input 1 analog setting Removable terminal blocks USB programming port	
Max. digital I/O points		10 - 100	80 - 120	106 - 192	320	
Execution time (bit instruction)		0.72 - 1.72 μs	0.26 - 0.64 μs			0.1 μs
Program memory		2 kWords	4 kWords			20 kSteps
Data memory		1 kWords	2 kWords			32 kWords
CompactFlash memory		n.a.				
Analog I/O		Up to 6 inputs and 3 outputs 8-bit, 12-bit resolution U, I, TC, Pt100		Up to 4 x (2 in + 1 out) 12-bit resolution U, I, TC, Pt100	Up to approx. 30 inputs / outputs (8, 13, 14-bit resolution U, I, TC, PT100)	
Special function units		n.a.			Temperature control Protocol macro RFID sensor unit	
Industrial networks		Serial communications			Ethernet (100 BASE-Tx) Controller link Serial communications	
Fieldbus master		n.a.		CompoBus/S	DeviceNet CAN PROFIBUS-DP CompoBus/S	
Fieldbus I/O link		DeviceNet CompoBusS PROFIBUS-DP		DeviceNet CompoBus/S	DeviceNet PROFIBUS-DP CAN	
Page		282	283	284	285	

		Modular PLC series		Rack PLC series	
					
Model		CJ1M	CJ1G/H	CS1G/H	CS1D
Built-in	Digital I/O	16	n.a.		
	Interrupt inputs	4	n.a.		
	Counter inputs	2 (100 kHz)	n.a.		
	Pulse outputs	2 (100 kHz)	n.a.		
CPU features / option boards		Choice of models with and without built-in I/O Ethernet CPU (3 models)	Loop control CPU (4 models)	2 serial ports Loop control board	Loop control board  Duplex CPU, Power supply and communications
Max. digital I/O points		160 - 640	960 - 2560	960 - 5120	960 - 5,120
Execution time (bit instruction)		0.1 µs	0.04/0.02 µs	0.04/0.02 µs	0.04/0.02 µs
Program memory		5 - 20 kSteps	10 - 250 kSteps	10 - 250 kSteps	10 - 250 kSteps
Data memory		32 kWords	64 - 448 kWords	64 - 448 kWords	64 - 448 kWords
CompactFlash memory		Up to 64 MB		Up to 64 MB	
Analog I/O		Up to 20 x 8 points 12 bit resolution U, I 15 bit resolution TC, Pt100, Pt1000 inputs	Up to 36 x 8 points 13-bit resolution U, I 15-bit resolution TC, Pt100, PT1000 inputs	Up to 80 x 8 points, 13 bit resolution or 80 x 4 points, 16 bit resolution U, I, TC, Pt100, process I/O	Up to 75 x 8 points, 13 bit resolution or 75 x 4 points, 16 bit resolution U, I, TC, Pt100, process I/O
Special function units		Temperature control High-speed counters (500 kHz) SSI encoder input Position control Protocol macro RFID sensor unit		Temperature control SSI encoder input High-speed counters (500 kHz) Position control Motion control Process control Protocol macro RFID sensor unit	
Industrial networks		Ethernet (100 BASE-Tx) Controller link Serial communications		Ethernet (100 BASE-Tx) Controller link Serial communications	
Fieldbus master		DeviceNet CAN PROFIBUS-DP CompoBus/S		DeviceNet PROFIBUS-DP CAN / CANopen CompoBus/S	
Fieldbus I/O link		DeviceNet PROFIBUS-DP CAN		DeviceNet PROFIBUS-DP CAN / CANopen	
Page		288		295	



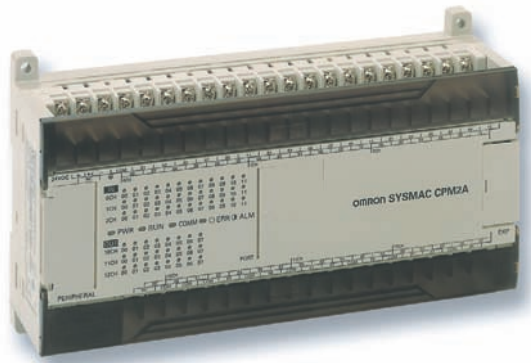


## CPUs with 10 to 40 I/O built-in

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

### Ordering information

Input points	Output points	Program capacity	Data memory capacity	Logic execution speed	Expandability	Size in mm (HxWxD)	Power supply	Output method	Built-in functions	Model
6 points	4 points	2 kWords	1 kWords	0.72 µs to 1.72 µs	Not possible	90x66x70	85 to 264 VAC	Relay	1 Encoder input (5 kHz)	CPM1A-10CDR-A-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-10CDT-A-V1
								Transistor (source type)		CPM1A-10CDT1-A-V1
						90x66x50	20.4 to 26.4 VDC	Relay	1 Encoder input (5 kHz)	CPM1A-10CDR-D-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-10CDT-D-V1
								Transistor (source type)		CPM1A-10CDT1-D-V1
12 points	8 points	2 kWords	1 kWords	0.72 µs to 1.72 µs	Not possible	90x86x70	85 to 264 VAC	Relay	1 Encoder input (5 kHz)	CPM1A-20CDR-A-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-20CDT-A-V1
								Transistor (source type)		CPM1A-20CDT1-A-V1
						90x86x50	20.4 to 26.4 VDC	Relay	1 Encoder input (5 kHz)	CPM1A-20CDR-D-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-20CDT-D-V1
								Transistor (source type)		CPM1A-20CDT1-D-V1
18 points	12 points	2 kWords	1 kWords	0.72 µs to 1.72 µs	Up to 3 expansions	90x130x70	85 to 264 VAC	Relay	1 Encoder input (5 kHz)	CPM1A-30CDR-A-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-30CDT-A-V1
								Transistor (source type)		CPM1A-30CDT1-A-V1
						90x130x50	20.4 to 26.4 VDC	Relay	1 Encoder input (5 kHz)	CPM1A-30CDR-D-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-30CDT-D-V1
								Transistor (source type)		CPM1A-30CDT1-D-V1
24 points	16 points	2 kWords	1 kWords	0.72 µs to 1.72 µs	Up to 3 expansions	90x150x70	85 to 264 VAC	Relay	1 Encoder input (5 kHz)	CPM1A-40CDR-A-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-40CDT-A-V1
								Transistor (source type)		CPM1A-40CDT1-A-V1
						90x150x50	20.4 to 26.4 VDC	Relay	1 Encoder input (5 kHz)	CPM1A-40CDR-D-V1
								Transistor (sink type)	1 Encoder input (5 kHz) 1 Pulse output (2 kHz)	CPM1A-40CDT-D-V1
								Transistor (source type)		CPM1A-40CDT1-D-V1



## CPUs with 20 to 60 I/O built-in

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

### Ordering information

Input points	Output points	Program capacity	Data memory capacity	Logic execution speed	Expandability	Size in mm (HxWxD)	Power supply	Output method	Built-in functions	Model
12 points	8 points	4 kWords	2 kWords	0.26 µs to 0.64 µs	Up to 3 expansions <sup>*1</sup>	90x130x90	85 to 264 VAC	Relay	1 Encoder input (20 kHz)	CPM2A-20CDR-A
						90x130x55	20.4 to 26.4 VDC	Relay	1 Encoder input (20 kHz)	CPM2A-20CDR-D
								Transistor (sink type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-20CDT-D
								Transistor output (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-20CDT1-D
18 points	12 points	4 kWords	2 kWords	0.26 µs to 0.64 µs	Up to 3 expansions <sup>*1</sup>	90x130x90	85 to 264 VAC	Relay	1 Encoder input (20 kHz)	CPM2A-30CDR-A
						90x130x55	20.4 to 26.4 VDC	Relay	1 Encoder input (20 kHz)	CPM2A-30CDR-D
								Transistor (sink type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-30CDT-D
								Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-30CDT1-D
24 points	16 points	4 kWords	2 kWords	0.26 µs to 0.64 µs	Up to 3 expansions <sup>*1</sup>	90x150x90	85 to 264 VAC	Relay	1 Encoder input (20 kHz)	CPM2A-40CDR-A
						90x150x55	20.4 to 26.4 VDC	Relay	1 Encoder input (20 kHz)	CPM2A-40CDR-D
								Transistor (sink type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-40CDT-D
								Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-40CDT1-D
36 points	24 points	4 kWords	2 kWords	0.26 µs to 0.64 µs	Up to 3 expansions <sup>*1</sup>	90x195x90	85 to 264 VAC	Relay	1 Encoder input (20 kHz)	CPM2A-60CDR-A
						90x195x55	20.4 to 26.4 VDC	Relay	1 Encoder input (20 kHz)	CPM2A-60CDR-D
								Transistor (sink type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-60CDT-D
								Transistor (source type)	1 Encoder input (20 kHz) 2 Pulse output (10 kHz)	CPM2A-60CDT1-D

<sup>\*1</sup> Consult operation manual for details.



## Compact CPUs with 10 to 32 I/O built-in

An extensive range of models assures efficient machine control in an ultracompact package. CPU units are available with relay or transistor output, terminal block or various connector options, and an optional real-time clock function.

### Ordering information

Input points	Output points	Program capacity	Data memory capacity	Logic execution speed	Size in mm (HxWxD)	I/O Connectors	Output method	Built-in functions	Real time clock	Model
6 points	4 points	4 kWords	2 kWords	0.64 µs	90x33x65	2 Terminal blocks	Relay	1 Encoder input (20 kHz)	-	CPM2C-10CDR-D
									Yes	CPM2C-10C1DR-D
						2 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz)	-	CPM2C-10CDT1C-D
								2 Pulse output (10 kHz)	Yes	CPM2C-10C1DT1C-D
						2 MIL (20 pt)	Transistor (source type)	1 Encoder input (20 kHz)	-	CPM2C-10CDT1M-D
								2 Pulse output (10 kHz)	Yes	CPM2C-10C1DT1M-D
12 points	8 points	4 kWords	2 kWords	0.64 µs	90x33x65	2 Terminal blocks	Relay	1 Encoder input (20 kHz)	-	CPM2C-20CDR-D
									Yes	CPM2C-20C1DR-D
						2 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz)	-	CPM2C-20CDT1C-D
								2 Pulse output (10 kHz)	Yes	CPM2C-20C1DT1C-D
						2 MIL (20 pt)	Transistor (source type)	1 Encoder input (20 kHz)	-	CPM2C-20CDT1M-D
								2 Pulse output (10 kHz)	Yes	CPM2C-20C1DT1M-D
16 points	16 points	4 kWords	2 kWords	0.64 µs	90x33x65	2 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz)	-	CPM2C-32CDT1C-D
								2 Pulse output (10 kHz)	-	
						2 MIL (20 pt)	Transistor (source type)	1 Encoder input (20 kHz)	-	CPM2C-32CDT1M-D
								2 Pulse output (10 kHz)	-	
6 points	4 points	4 kWords	2 kWords	0.64 µs	90x40x65	1 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz)	Yes	CPM2C-S110C-DRT
								2 Pulse output (10 kHz)		
6 points	4 points	4 kWords	2 kWords	0.64 µs	90x40x65	1 Fujitsu (24 pt)	Transistor (source type)	Programmable Slave with DeviceNet slave and CompoBus/S Master		
6 points	4 points	4 kWords	2 kWords	0.64 µs	90x40x65	1 Fujitsu (24 pt)	Transistor (source type)	1 Encoder input (20 kHz)	Yes	CPM2C-S110C
								2 Pulse output (10 kHz)		
								CompoBus/S Master		

**Note:** All CPU's are available only with DC supply voltage (CPM2C-PA201 can be used as power supply).

CPU's with sourcing transistor outputs are also available with sinking transistor outputs.

MIL = connector according to MIL-C-83503 (compatible with DIN 41651 / IEC 60603-1).



## Powerful compact PLC with 40 I/O built-in

The CP1H is the advanced high speed all-in-one compact PLC. It combines all the strong points from the CPM2A and CJ1 series PLCs. Built-in functions like Digital I/O, High-speed counters, Pulse outputs, and analog Input / Outputs offer huge flexibility. Integrated communication gateway functions make CP1H the first compact PLC in OMRON's Smart Platform concept. All OMRON devices connected to CP1H by Ethernet, DeviceNet, MECHATROLINK-II or Serial link can be configured, programmed and monitored through a single connection, using the CX-One software suite.



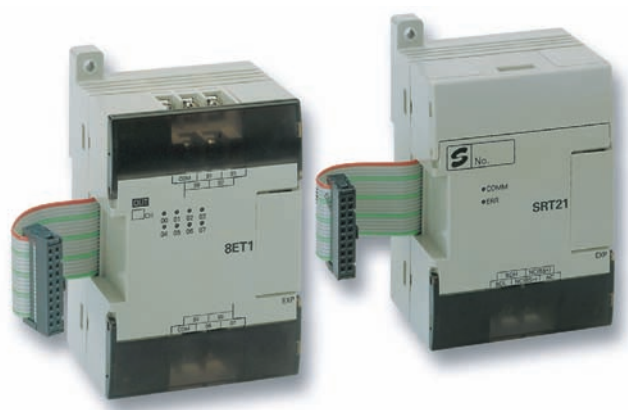
### Ordering information

Input points	Output points	Expandable up to (digital I/O)*1	Program capacity	Data memory capacity	Logic execution speed	Power supply	Output method	Built-in functions	Model
24 points	16 points	320 points	20 kSteps	32 kWords	100 ns	85 to 264 VAC	Relay	4 Encoder inputs (100 kHz) 8 Interrupts / counters	CP1H-X40DR-A
						20.4 to 26.4 VDC	Transistor (sink type)	4 Encoder input (100 kHz) 4 Pulse output (2 x 100 kHz + 2 x 30 kHz) 8 Interrupts / counters	CP1H-X40DT-D
							Transistor (source type)		CP1H-X40DT1-D
24 points	16 points	320 points	20 kSteps	32 kWords	100 ns	85 to 264 VAC	Relay	4 Encoder inputs (100 kHz) 8 Interrupts / counters	4 Analog in 2 Analog out (res: 1/12000) CP1H-XA40DR-A
						20.4 to 26.4 VDC	Transistor (sink type)	4 Encoder input (100 kHz) 4 Pulse output (2 x 100 kHz + 2 x 30 kHz) 8 Interrupts / counters	CP1H-XA40DT-D
							Transistor (source type)		CP1H-XA40DT1-D

\*1 CP1H CPU series can be expanded with CPM1A expansion units and CJ1 Special I/O units.

### CP1H option modules

Type	Remarks	Model
RS-232C option board	Plug-in board (D-Sub, 9 pins, female)	CP1W-CIF01
RS-422A/485 option board	Plug-in board (Terminal block)	CP1W-CIF11
Memory cassette	512 kWords (upload/download program)	CP1W-ME05M
Expansion I/O connecting cable	80 cm cable to connect CPM1A I/O	CP1W-CN811
CJ1 expansion unit adapter	Unit to connect CJ1 Special I/O units	CP1W-EXT01



## Expand the capacity of your compact PLC

A wide variety of expansion units such as Digital I/O, Analog I/O and Remote I/O are available to create the control system you need for your application. These CPM1A expansion units can be used for CPM1A and also for CPM2A and CP1H PLC series.

### Ordering information

Unit	Size in mm (HxWxD)	Output type	Inputs	Outputs	Model
Expansion I/O units	90x66x50	-	8	-	CPM1A-8ED
		Relay	-	8	CPM1A-8ER
		Transistor (sinking)			CPM1A-8ET
		Transistor (sourcing)			CPM1A-8ET1
	90x86x50	Relay	12	8	CPM1A-20EDR1
		Transistor (sinking)			CPM1A-20EDT
		Transistor (sourcing)			CPM1A-20EDT1
	90x150x50	Relay	24	16	CPM1A-40EDR
		Transistor (sinking)			CPM1A-40EDT
		Transistor (sourcing)			CPM1A-40EDT1
Analog I/O units	90x66x50	Analog (resolution 1/256)	2	1	CPM1A-MAD01
	90x86x50	Analog (resolution 1/6000)	2	1	CPM1A-MAD11
	90x86x50	Analog (resolution 1/6000)	4	-	CPM1A-AD041
	90x86x50	Analog (resolution 1/6000)	-	4	CPM1A-DA041
Temperature sensor units	90x86x50	Thermocouple input	2	-	CPM1A-TS001
		Thermocouple input	4	-	CPM1A-TS002
		Platinum resistance input	2	-	CPM1A-TS101
		Platinum resistance input	4	-	CPM1A-TS102
		Platinum resistance input and voltage / current output	2	1	CPM1A-TS101-DA
DeviceNet I/O link unit	90x66x50	-	I/O link of 32 input bits and 32 output bits		CPM1A-DRT21
PROFIBUS-DP I/O link unit	90x66x50	-	I/O link of 16 input bits and 16 output bits		CPM1A-PRT21
CompoBus/S I/O link unit	90x66x50	-	I/O link of 8 input bits and 8 output bits		CPM1A-SRT21



## Expand the capacity of your CPM2C PLC

Expansion I/O units with 8 to 32 I/O points make it possible to configure a control system with a maximum of 192 I/O points

### Ordering information

Unit	Output type	I/O Connectors	Inputs	Outputs	Model
Expansion I/O units	-	1 Fujitsu (24 pt) 1 MIL (20 pt)	8	-	CPM2C-8EDC CPM2C-8EDM
	-	1 Fujitsu (24 pt) 1 MIL (20 pt)	16	-	CPM2C-16EDC CPM2C-16EDM
	Relay	1 Terminal block	-	8	CPM2C-8ER
	Transistor output (source type)	1 Fujitsu (24 pt) 1 MIL (20 pt)	-	-	CPM2C-8ET1C CPM2C-8ET1M
	Transistor output (source type)	1 Fujitsu (24 pt) 1 MIL (20 pt)	-	16	CPM2C-16ET1C CPM2C-16ET1M
	Relay	2 Terminal blocks	6	4	CPM2C-10EDR
	Relay	2 Terminal blocks	12	8	CPM2C-20EDR
	Transistor output (source type)	2 Fujitsu (24 pt) 2 MIL (20 pt)	16	8	CPM2C-24EDT1C CPM2C-24EDT1M
	Transistor output (source type)	2 Fujitsu (24 pt) 2 MIL (20 pt)	16	16	CPM2C-32EDT1C CPM2C-32EDT1M
Analog I/O units	Analog (resolution 1/6000)	2 Terminal blocks	2	1	CPM2C-MAD11
Temperature sensor units	Thermocouple input	1 Terminal block	2	-	CPM2C-TS001
	Platinum resistance input	1 Terminal block	2	-	CPM2C-TS101
CompoBus/S I/O link unit	-	1 Terminal block	I/O link of 8 input bits and 8 output bits		CPM2C-SRT21
RS232C and RS422 adapter units	-	1 D-sub 9-pin	RS232C	-	CPM2C-CIF01-V1
	-	1 Terminal block and 1 D-sub 9-pin	RS232C and RS422	-	CPM2C-CIF11

**Note:** Expansion I/O units with sourcing transistor outputs are also available with sinking transistor outputs.  
MIL = connector according to MIL-C-83503 (compatible with DIN 41651 / IEC 60603-1).





## Fast and powerful CPUs for any task

OMRON's CS1-series CPUs are available in two processor speeds, each in various memory capacities. Besides the basic CPU models, versions are available for dual-redundant operation, supporting I/O hot-swapping. All CPUs have one dedicated board slot with a direct CPU-bus connection, in which a serial communication board or a loop control board can be mounted. All CPU Units support IEC61131-3 Structured text and ladder language.

OMRON's extensive function block library helps to reduce your programming effort, while you can create your own function blocks to suit your specific needs.

## Ordering information

Max. digital I/O points	Program capacity	Data memory capacity	Logic execution speed	Max. I/O Units	Width	5 V current consumption	Built-in functions	Model
2,560	250 kSteps	448 kWords	20 ns	40	62 mm	990 mA		CJ1H-CPU67H
2,560	120 kSteps	256 kWords	20 ns	40	62 mm	990 mA		CJ1H-CPU66H
2,560	60 kSteps	128 kWords	20 ns	40	62 mm	990 mA		CJ1H-CPU65H
1,280	60 kSteps	128 kWords	40 ns	40	69 mm	1,060 mA	Loop control engine (300 blocks)	CJ1G-CPU45P
					62 mm	910 mA		CJ1G-CPU45H
1,280	30 kSteps	64 kWords	40 ns	40	69 mm	1,060 mA	Loop control engine (300 blocks)	CJ1G-CPU44P
					62 mm	910 mA		CJ1G-CPU44H
960	20 kSteps	64 kWords	40 ns	30	69 mm	1,060 mA	Loop control engine (300 blocks)	CJ1G-CPU43P
					62 mm	910 mA		CJ1G-CPU43H
960	10 kSteps	64 kWords	40 ns	30	69 mm	1,060 mA	Loop control engine (50 blocks)	CJ1G-CPU42P
					62 mm	910 mA		CJ1G-CPU42H
640	30 kSteps	32 kWords	100 ns	20	49 mm	640 mA	2 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 4 interrupt / counter inputs	CJ1M-CPU23
320	10 kSteps	32 kWords	100 ns	10	49 mm	640 mA	2 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 4 interrupt / counter inputs	CJ1M-CPU22
160	5 kSteps	32 kWords	100 ns	10	49 mm	640 mA	2 Encoder inputs (100 kHz) 2 Pulse outputs (100 kHz) 4 interrupt / counter inputs	CJ1M-CPU21
640	20 kSteps	32 kWords	100 ns	19	62 mm	950 mA	100 base-Tx Ethernet port	CJ1G-CPU13-ETN
				20	31 mm	580 mA		CJ1G-CPU13
320	10 kSteps	32 kWords	100 ns	9	62 mm	950 mA	100 base-Tx Ethernet port	CJ1G-CPU12-ETN
				10	31 mm	580 mA		CJ1G-CPU12
160	5 kSteps	32 kWords	100 ns	9	62 mm	950 mA	100 base-Tx Ethernet port	CJ1G-CPU11-ETN
				10	31 mm	580 mA		CJ1G-CPU11

**Note:** - MIL = connector according to MIL-C-83503 (compatible with DIN 41651 / IEC 60603-1).  
- Models with sinking outputs (NPN type) are available as well.

## Accessories

		Model
CompactFlash memory card, 30 MB, for all models (not required for operation)	Industrial grade	HMC-EF372
CompactFlash memory card, 64 MB, for all models (not required for operation)	Industrial grade	HMC-EF672
CompactFlash PC-Card adapter		HMC-AP001
I/O terminal block (40 x M3 screw) for CJ1M-CPU2x	MIL (40 pt)	XW2D-40G6
Servo unit terminal block for 1 axis		XW2B-20J6-8A
Servo unit terminal block for 2 axes		XW2B-40J6-9A
Connection cable between I/O terminal block and CJ1M-CPU2x (□□□ = length in cm)	MIL (40 pt)	XW2Z-□□□K
SMARTSTEP cable for CJ1M CPU2x, cable length: 1 m		XW2Z-100J-A26
W-series servo cable for CJ1M CPU2x, cable length: 1 m		XW2Z-100J-A27
CX-One, integrated software for programming and configuration of all OMRON control system components		CX-ONE-AL□□C-E
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port (length: 2.0 m)		CS1W-CN226
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port (length: 6.0 m)		CS1W-CN626
USB to serial conversion cable		CS1W-CIF31



Power and flexibility

CJ1 systems can operate on 24 VDC power supply, or on 100 - 240 VAC mains. For small-scale systems with mainly digital I/O a low-cost small-capacity power supply can be used. For systems with many analog I/Os and control/communication units, it may be necessary to use a larger power supply Unit.

Depending on the CPU type, up to 3 expansions can be connected to the CPU 'rack', giving a total capacity of 40 I/O units. The total length of the expansion cables of one system may be up to 12 m.

Ordering information

Power supply

Input range	Power consumption	Output capacity 5 VDC	Output capacity 24 VDC	Max. output power	Features	Width	Model
21.6 to 26.4 VDC	35 W max.	2.0 A	0.4 A	16.6 W	No galvanic isolation	27 mm	CJ1W-PD022
19.2 to 28.8 VDC	50 W max.	5.0 A	0.8 A	25 W		60 mm	CJ1W-PD025
85 to 264 VAC 47 to 63 Hz	50 VA max.	2.8 A	0.4 A	14 W		45 mm	CJ1W-PA202
	100 VA max.	5.0 A	0.8 A	25 W	Run output (SPST relay) Maintenance status display	80 mm	CJ1W-PA205R CJ1W-PA205C

I/O expansion

Type	Description	Width, Length	Model
I/O control unit	Required unit on CPU 'rack' to connect I/O expansions	20 mm	CJ1W-IC101
I/O interface unit	Start unit for each I/O expansion 'rack'. Requires a power supply unit.	31 mm	CJ1W-II101
I/O expansion cable	Connects CJ1W-IC101 or -II101 to the next expansion rack's -II101	0.3 m	CS1W-CN313
		0.7 m	CS1W-CN713
		2.0 m	CS1W-CN223
		3.0 m	CS1W-CN323
		5.0 m	CS1W-CN523
		10 m	CS1W-CN133
		12 m	CS1W-CN133-B2



## 8 to 64 points per unit - input, output or mixed

Digital I/O units serve as the PLC's interface to achieve fast, reliable sequence control. A full range of units, from high-speed DC inputs to relay outputs, let you adapt CJ1 to your needs.

CJ1 units are available with various I/O densities and connection technologies. Up to 16 I/O points can be wired to units with detachable M3 screw terminals or screwless clamp terminals. High-density 32- and 64-point I/O units are equipped with standard 40-pin 'flatcable'-connectors. Prefabricated cables and wiring terminals are available for easy interfacing to high-density I/O units.



### Ordering information

Type	Points	Type	Rated voltage	Rated current	Width	I/O bus current consumption	Remarks	Connection type <sup>*1</sup>	Model
input	8	AC in	240 VAC	7 mA	31 mm	80 mA		M3	CJ1W-IA201
input	8	DC in	24 VDC	10 mA	31 mm	80 mA		M3	CJ1W-ID201
input	16	DC in	24 VDC	7 mA	31 mm	80 mA		M3 Screwless	CJ1W-ID211 CJ1W-ID211(SL)
input	16	DC in	24 VDC	7 mA	31 mm	80 mA	Inputs start interrupt tasks in PLC program	M3	CJ1W-INT01
input	16	DC in	24 VDC	7 mA	31 mm	80 mA	Latches pulses down to 50 ms pulse width	M3	CJ1W-IDP01
input	32	DC in	24 VDC	4.1 mA	20 mm	90 mA		1 x MIL <sup>*1</sup> (40 pt)	CJ1W-ID232
input	64	DC in	24 VDC	4.1 mA	31 mm	90 mA		2 x MIL <sup>*1</sup> (40 pt)	CJ1W-ID262
output	8	Triac out	250 VAC	0.6 mA	31 mm	220 mA		M3	CJ1W-OA201
output	8	Relay out	250 VAC	2 mA	31 mm	80 mA		M3 Screwless	CJ1W-OC201 CJ1W-OC201(SL)
output	16	Relay out	250 VAC	2 mA	31 mm	110 mA		M3 Screwless	CJ1W-OC211 CJ1W-OC211(SL)
output	8	DC out (source) <sup>*2</sup>	24 VDC	2 mA	31 mm	110 mA	With short-circuit protection, alarm	M3	CJ1W-OD202
output	8	DC out (source) <sup>*2</sup>	24 VDC	0.5 mA	31 mm	100 mA	With short-circuit protection, alarm	M3	CJ1W-OD204
output	16	DC out (source) <sup>*2</sup>	24 VDC	0.5 mA	31 mm	100 mA	With short-circuit protection, alarm	M3 Screwless	CJ1W-OC212 CJ1W-OC212(SL)
output	32	DC out (source) <sup>*2</sup>	24 VDC	0.3 mA	20 mm	150 mA	With short-circuit protection, alarm	1 x MIL <sup>*1</sup> (40 pt)	CJ1W-OD232
output	64	DC out (source) <sup>*2</sup>	24 VDC	0.3 mA	31 mm	170 mA		2 x MIL <sup>*1</sup> (40 pt)	CJ1W-OD262
In + out	16+16	DC in/out (source) <sup>*2</sup>	24 VDC	0.5 mA	31 mm	130 mA		2 x MIL (20 pt)	CJ1W-OD232
In + out	32+32	DC in/out (sink)	24 VDC	0.3 mA	31 mm	140 mA		2 x MIL <sup>*1</sup> (40 pt)	CJ1W-OD263
In + out	32+32	DC in/out (TLL)	5 VDC	35 mA	31 mm	190 mA		2 x MIL <sup>*1</sup> (40 pt)	CJ1W-OD563

<sup>\*1</sup> MIL = connector according to MIL-C-83503 (compatible with DIN 41651 / IEC 60603-1).

<sup>\*2</sup> Models with sinking outputs (NPN type) are available as well.

### Accessories

	Model
Replacement 18-point screwless terminal blocks for I/O Units, pack of 5 pcs.	Screwless CJ-WM01-18P-5
I/O terminal block (40 x M3 screw) for XW2Z-□□□K	MIL (40pt) XW2D-40G6
Connection cable between I/O terminal block and I/O unit (□□□ = length in cm)	MIL (40pt) XW2Z-□□□K



## From basic analog I/O to advanced temperature control

CJ1 offers a wide choice of analog input units, fit for any application, from low-speed, multi-channel temperature measurement to high-speed, high-accuracy data acquisition. Analog outputs can be used for accurate control or external indication.

Advanced units with built-in scaling, filtering and alarm functions reduce the need for complex PLC programming. High-accuracy process I/O units support an extensive range of sensors, for fast and accurate data acquisition. Temperature control units relieve the PLC CPU of PID calculations and alarm monitoring. These functions are handled autonomously by the unit, offering control performance and autotuning functions similar to stand-alone temperature controllers.

### Ordering information

Points	Type	Ranges	Resolution	Accuracy *1	Conversion time	Width	I/O bus current consumption	Remarks	Connection type	Model
4	Analog input	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	V: 0.2% of PV I: 0.4% of PV	250 µs/point	31 mm	420 mA	Offset / gain adjustment, peak hold, moving average, alarms	M3 Screwless	CJ1W-AD041-V1 CJ1W-AD041-V1 (SL)
8	Analog input	1 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	V: 0.2% of PV I: 0.4% of PV	250 µs/point	31 mm	420 mA	Offset / gain adjustment, peak hold, moving average, alarms	M3 Screwless	CJ1W-AD081-V1 CJ1W-AD081-V1 (SL)
2	Analog output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% of PV I: 0.5% of PV	1 ms/point	31 mm	120 mA	Offset / gain adjustment, output hold	M3 Screwless	CJ1W-DA021 CJ1W-DA021 (SL)
4	Analog output	1 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% of PV I: 0.5% of PV	1 ms/point	31 mm	120 mA	Offset / gain adjustment, output hold	M3 Screwless	CJ1W-DA041 CJ1W-DA041 (SL)
8	Voltage output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V	1/8,000	0.3% of PV	250 µs/point	31 mm	140 mA	Offset / gain adjustment, output hold	M3 Screwless	CJ1W-DA08V CJ1W-DA08V (SL)
8	Current output	4 to 20 mA	1/8,000	0.5% of PV	250 µs/point	31 mm	140 mA	Offset / gain adjustment, output hold	M3 Screwless	CJ1W-DA08C CJ1W-DA08C (SL)
4 + 2	Analog in + output	1 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/8,000	in: 0.2% of PV out: 0.3% of PV	1 ms/point	31 mm	580 mA	Offset / gain adjustment, scaling, peak hold, moving average, alarms, output hold	M3 Screwless	CJ1W-MAD042 CJ1W-MAD042 (SL)
2	Process input	4 to 20 mA 0 to 20 mA 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 0 to 1.25 V, 1.25 to 1.25 V	1/64,000	0.05% of PV	5 ms/point	31 mm	180 mA	Configurable alarms, maintenance functions, user-defined scaling	M3	CJ1W-PDC15

Points	Type	Ranges	Resolution	Accuracy <sup>*1</sup>	Conversion time	Width	I/O bus current consumption	Remarks	Connection type	Model
2	Thermocouple input	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, -100 to 100 mV	1 / 64,000	0.05% of PV	5 ms/point	31 mm	180 mA	Configurable alarms, maintenance functions	M3	CJ1W-PTS15
2	Resistance thermometer input	Pt50, Pt100, JPt100, Ni508.4	1 / 64,000	0.05% of PV	5 ms/point	31 mm	180 mA	Configurable alarms, maintenance functions	M3	CJ1W-PTS16
4	Thermocouple Input	B, J, K, L, R, S, T	0.1 °C	0.3% of PV	62.5 ms/point	31 mm	250 mA	4 configurable alarm outputs	M3	CJ1W-PTS51
4	Resistance thermometer input	Pt100, JPt100	0.1 °C	0.3% of PV	62.5 ms/point	31 mm	250 mA	4 configurable alarm outputs	M3	CJ1W-PTS52
6	Thermocouple input	K-type (-200 to 1,300 °C) J-Type (-100 to 850 °C)	0.1 °C	0.5% of PV	40 ms/point	31 mm	220 mA	Basic I/O Unit, setup by DIPswitches, adjustable filtering 10/50/60 Hz	M3 Screwless	CJ1W-TS561 CJ1W-TS561 (SL)
6	Resistance thermometer input	Pt100 (-200 to 650 °C) Pt1000 (-200 to 650 °C)	0.1 °C	0.5% of PV	40 ms/point	31 mm	250 mA	Basic I/O Unit, setup by DIPswitches, adjustable filtering 10/50/60 Hz	M3 Screwless	CJ1W-TS562 CJ1W-TS562 (SL)
4	Temperature control loops, Thermocouple	B, J, K, L, R, S, T	0.1 °C	0.3% of PV	500 ms total	31 mm	250 mA	4 control outputs: PNP open collector <sup>*2</sup> , 100 mA max.	M3	CJ1W-TC002
2	Temperature control loops, Thermocouple	B, J, K, L, R, S, T	0.1 °C	0.3% of PV	500 ms total	31 mm	250 mA	2 control outputs: PNP open collector <sup>*2</sup> , 100 mA max., 2 current transformer inputs for heater burnout detection.	M3	CJ1W-TC004
4	Temperature control loops, RTD	Pt100, JPt100	0.1 °C	0.3% of PV	500 ms total	31 mm	250 mA	4 control outputs: PNP open collector <sup>*2</sup> , 100 mA max.	M3	CJ1W-TC102
2	Temperature control loops, RTD	Pt100, JPt100	0.1 °C	0.3% of PV	500 ms total	31 mm	250 mA	2 control outputs: PNP open collector <sup>*2</sup> , 100 mA max., 2 current transformer inputs for heater burnout detection.	M3	CJ1W-TC104

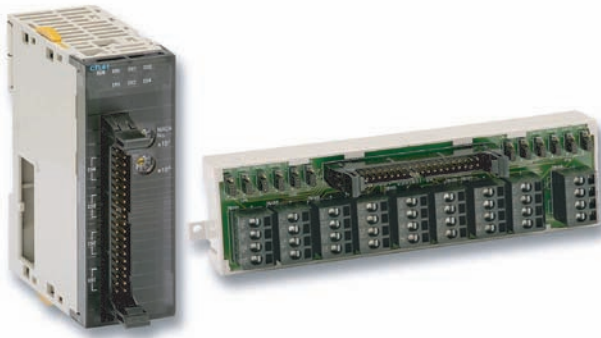
<sup>\*1</sup> Typical value at 25 °C ambient temperature. Consult the operation manual for details.

<sup>\*2</sup> NPN open collector outputs are available as well.

**Note:** all Analog I/O units are designated as special I/O Units, except TS561/TS562, which are basic I/O units

## Accessories

	Connection type	Model
Replacement 18-point screwless terminal blocks for I/O units, pack of 5 pcs.	Screwless	CJ-WM01-18P-5



## Add motion control to any CJ1 PLC

From simple position measurement to multi-axis synchronised motion control, CJ1 offers a full range of units:

- Counter Units gather position information from SSI- or incremental encoders. Actual positions are compared with internally stored target values.
- Position Control Units are used for point-to-point positioning with servo drives or stepper motors. Target data and acceleration/ deceleration curves can be adjusted on-the-fly.
- Position- and Motion Control Units equipped with MECHATROLINK-II interface can control multiple drives through a single high-speed link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.

## Ordering information

Channels /Axes	Type	Signal type	Unit class	Width	I/O bus current consumption	Remarks	Connection type	Model
2	SSI inputs (absolute position data)	Synchronous serial protocol	Special I/O Unit	31 mm	300 mA	Baud rate, encoding type, data length, etc. can be set per channel	M3 screw	CJ1W-CTS21-E
2	500 kHz Counter	24 V, line driver	Special I/O Unit	31 mm	280 mA	2 configurable digital inputs + outputs	1 x Fujitsu (40 pt)	CJ1W-CT021
4	100 kHz Counter	Line driver, 24 V via terminal block	Special I/O Unit	31 mm	320 mA	Target values trigger interrupt to CPU	1 x MIL (40 pt)	CJ1W-CTL41-E
1	Position Control Unit	24 V open collector	Special I/O Unit	31 mm	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CJ1W-NC113
2	Position Control Unit	24 V open collector	Special I/O Unit	31 mm	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CJ1W-NC213
4	Position Control Unit	24 V open collector	Special I/O Unit	31 mm	360 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 x Fujitsu (40 pt)	CJ1W-NC413
1	Position Control Unit	Line driver	Special I/O Unit	31 mm	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CJ1W-NC133
2	Position Control Unit	Line driver	Special I/O Unit	31 mm	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CJ1W-NC233
4	Position Control Unit	Line driver	Special I/O Unit	31 mm	360 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 x Fujitsu (40 pt)	CJ1W-NC433
16	Position Control Unit	MECHA-TROLINK-II	CPU bus Unit	31 mm	360 mA	Position, speed and torque control. Access to all drive parameters	ML-II	CJ1W-NCF71
32	Motion Control Unit	MECHA-TROLINK-II	CPU bus Unit	80 mm	600 mA	Electronic CAM profiles and axis synchronisation. Registration inputs. Access to all drive parameters.	ML-II	CJ1W-MCH71

## Accessories

Description	Connection type	Model
General purpose I/O terminal block (40 x M3 screw)	MIL (40 pt)	XW2D-40G6
Screwless terminal block for connecting 24 V or Line driver encoders to CJ1W-CTL41-E	MIL (40 pt.) to 32 pt. screwless clamp	XW2G-40G7-E
Servo interface block for 2- or 4-Axis position control unit (without communications support)		XW2B-40J6-2B
Servo interface block for 2- or 4-Axis position control unit (with communications support)		XW2B-40J6-4B
General purpose I/O connection cable for I/O units with 40-pt. Fujitsu connector (□□□ = length in cm)	Fujitsu (40 pt.) to MIL (40 pt.)	XW2Z-□□□B
General purpose I/O connection cable for I/O Units with 40-pt. MIL connector (□□□ = length in cm)	2 x MIL (40 pt)	XW2Z-□□□K
Cable connecting CJ1W-NC113 to W Series, cable length: 1.0 m		XW2Z-100J-A14
Cable connecting CJ1W-NC213/413 to W series, cable length: 1.0 m		XW2Z-100J-A15
Cable connecting CJ1W-NC113 to SmartStep, cable length: 1.0 m		XW2Z-100J-A16
Cable connecting CJ1W-NC213/413 to SmartStep, cable length: 1.0 m		XW2Z-100J-A17
Cable connecting CJ1W-NC133 to W series, cable length: 1.0 m		XW2Z-100J-A18
Cable connecting CJ1W-NC233/433 to W series, cable length: 1.0 m		XW2Z-100J-A19
Cable connecting CJ1W-NC133 to SmartStep, cable length: 1.0 m		XW2Z-100J-A20
Cable connecting CJ1W-NC233/433 to SmartStep, cable length: 1.0 m		XW2Z-100J-A21





## Open to any communication

CJ1 provides both standardised open networks interfaces, and cost-efficient high-speed proprietary network links. Datalinks between PLCs, or to higher-level information systems can be made using serial or Ethernet links, or the easy-to-use controller link network.

OMRON supports the 2 major field networks, DeviceNet and PROFIBUS-DP. For high-speed field I/O, OMRON's own CompoBus/S offers an unsurpassed ease of installation. Fully user-configurable serial and CAN-based communication can be used to emulate a variety of application-specific protocols.

## Ordering information

Type	Ports	Protocols	Unit class	Width	I/O bus current consumption	Connection type	Model
Serial	2 x RS-232C	CompoWay-F, Host link, NT link, Modbus, User-defined	CPU bus Unit	31 mm	280 mA	9-pin D-Sub	CJ1W-SCU21-V1
Serial	1 x RS-232C + 1 x RS-422/RS-485	CompoWay-F, Host link, NT link, Modbus, User-defined	CPU bus Unit	31 mm	380 mA	9-pin D-Sub	CJ1W-SCU41-V1
Ethernet	1 x 100 Base-Tx	UDP, TCP/IP, FTP server, SMTP (e-mail), SNMP (time adjust), FINS routing	CPU bus Unit	31 mm	380 mA	RJ45	CJ1W-ETN21
Controller link	2-wire twisted pair	OMRON proprietary	CPU bus Unit	31 mm	350 mA	2-wire screw + GND	CJ1W-CLK21
DeviceNet	1 x CAN	DeviceNet	CPU bus Unit	31 mm	330 mA	5-p detachable	CJ1W-DRM21
PROFIBUS-DP	1 x RS-485 (Master)	DP, DPV1	CPU bus Unit	31 mm	400 mA	9-pin D-Sub	CJ1W-PRM21
PROFIBUS-DP	1 x RS-485 (Slave)	DP	Special I/O Unit	31 mm	400 mA	9-pin D-Sub	CJ1W-PRT21
CAN	1 x CAN	User-defined	CPU bus Unit	31 mm	330 mA	5-p detachable	CJ1W-CORT21
CompoBus/S	2-wire (Master)	OMRON proprietary	Special I/O Unit	20 mm	150 mA	2-wire screw + 2-wire power	CJ1W-SRM21

## Accessories

Description	Connection type	Model
RS-232C to RS-422/RS-485 signal converter. Mounts directly on serial port.	9-pin D-sub to screw clamp terminals	CJ1W-CIF11
Controller link PCI board with support software	PCI, wired CLK	3G8F7-CLK21-EV1
Controller link repeater unit (wire to wire)	Screw - Screw	CS1W-RPT01
Controller link repeater unit (wire to HPCF fiber )	Screw - HPCF connector	CS1W-RPT02
Controller link repeater unit (wire to graded-index glass fiber)	Screw - ST connector	CS1W-RPT03



## Fast and powerful CPUs for any task

OMRON's CS1-series CPUs are available in two processor speeds, each in various memory capacities. Besides the basic CPU models, versions are available for dual-redundant operation, supporting I/O hot-swapping. All CPUs have one dedicated board slot with a direct CPU-bus connection, in which a serial communication board or a loop control board can be mounted. All CPU units support IEC61131-3 structured text and ladder language.

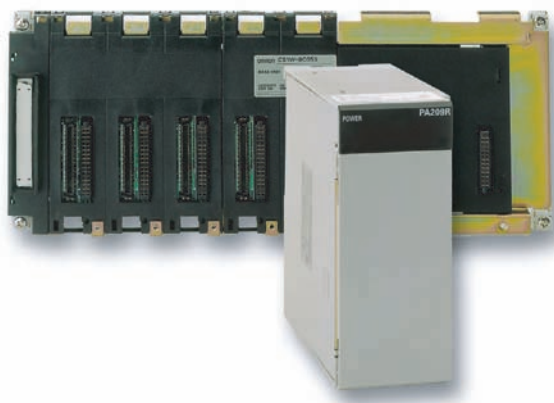
OMRON's extensive function block library helps to reduce your programming effort, while you can create your own function blocks to suit your specific needs.

## Ordering information

Max. Digital I/O points	Program capacity	Data memory capacity	Logic execution speed	Max. I/O Units	I/O bus current consumption (5 V)	Additional functions	Model		
5120	250 kSteps	448 kWords	20 ns	80	820 mA		CS1H-CPU67H		
				71		Supports duplex power supply and I/O hot-swapping	CS1D-CPU67S		
				68		CPU for full dual-redundancy	CS1D-CPU67H		
					1,040 mA	CPU for full dual-redundancy, with loop control board	CS1D-CPU67P		
	120 kSteps	256 kWords		80	820 mA		CS1H-CPU66H		
				80			CS1H-CPU65H		
				71		Supports duplex power supply and I/O hot-swapping	CS1D-CPU65S		
				68		CPU for full dual-redundancy	CS1D-CPU65H		
	60 kSteps	128 kWords			1,040 mA	CPU for full dual-redundancy, with loop control board	CS1D-CPU65P		
				80			CS1H-CPU64H		
				20 kSteps	64 kWords	80	820 mA		CS1H-CPU63H
				60 kSteps					CS1G-CPU45H
1280	30 kSteps	40 ns	40	780 mA				CS1G-CPU44H	
			35				Supports duplex power supply and I/O hot-swapping	CS1D-CPU44S	
			960		20 kSteps	30		CS1G-CPU43H	
10 kSteps							CS1G-CPU42H		
	26						Supports duplex power supply and I/O hot-swapping	CS1D-CPU42S	

## Accessories

Description	I/O bus current consumption (5V)	Data memory capacity
Duplex Unit, required for CS1D-CPU6□H systems	See CS1D-BC052 backplane	CS1D-DPL01
Serial communication option board, 2 x RS-232C	280 mA	CS1W-SCB21-V1
Serial communication option board, 1 x RS-232C + 1 x RS422/RS-485	360 mA	CS1W-SCB41-V1
Loop control option board, 50 control blocks max.	220 mA	CS1W-LCB01
Loop control option board, 300 control blocks max.	220 mA	CS1W-LCB05
Replacement battery set, for all CS1 CPUs		CS1W-BAT01
Industrial grade CompactFlash memory card, 30 MB, for all models (not required for operation)		HMC-EF372
Industrial grade CompactFlash memory card, 64 MB, for all models (not required for operation)		HMC-EF672
CompactFlash PC-Card adapter		HMC-AP001
CX-One, integrated software for programming and configuration of all OMRON control system components		CX-ONE-AL□□C-E
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port (length: 2.0 m)		CS1W-CN226
Connection cable, D-Sub 9-pin PC serial port to PLC peripheral port (length: 6.0 m)		CS1W-CN626
USB to serial conversion cable		CS1W-CIF31



## Expand with up to 7 racks

CS1 systems can operate on 24 VDC power supply, or on 100-240 VAC mains. For small-scale systems with mainly digital I/O a low-cost small-capacity power supply can be used. For systems with many analog I/Os and control / communication units, it may be necessary to use a larger power supply unit.

PLC racks are available in several sizes, from 2 to 10 slots wide. Special backplanes are required for duplex systems. Depending on the CPU type, up to 7 expansions can be connected to the CPU rack, giving a total capacity of 80 I/O units. The total length of the expansion cables of one system may be up to 12 m.

## Ordering information

### Power supplies

Input range	Power consumption	Output capacity 5 VDC	Output capacity 26 VDC	Max. output Power	Extra functions	Model
19.2 to 28.8 V DC	40 W max.	6.6 A	0.62 A	30 W	n.a.	C200HW-PD024
		4.3 A	0.56 A	28 W	Power supply for dual-redundant system	CS1D-PD024
	55 VA max.	5.3 A	1.3 A	40 W	n.a.	C200HW-PD025
					Power supply for dual-redundant system	CD1D-PD025
85 to 264 V AC 50/60 Hz	120 VA max.	4.6 A	0.62 A	30 W	Maintenance status display	C200HW-PA204C
85 to 132 V AC, 170 to 264 V AC, 50/60 Hz					n.a.	C200HW-PA204
					Service output 24 V DC, 0.8 A	C200HW-PA204S
					Run status output (SPST relay)	C200HW-PA204R
	180 VA max.	9.0 A	1.3 A	45 W	Run status output (SPST relay)	C200HW-PA209R
	150 VA max.	7.0 A	1.3 A	35 W	Power supply for dual-redundant system	CS1D-PA207R

## Specifications

Type	Slots	5 V current consumption	Expansion connector	Width	Special functions	Model
CPU backplane	2	110 mA	No	200 mm		CS1W-BC023
CPU backplane	3	110 mA	Yes	260 mm		CS1W-BC033
CPU backplane	5	110 mA	Yes	330 mm		CS1W-BC053
CPU backplane	8	110 mA	Yes	435 mm		CS1W-BC083
CPU backplane	10	110 mA	Yes	505 mm		CS1W-BC103
Expansion backplane	3	230 mA	Yes	260 mm		CS1W-BI033
Expansion backplane	5	230 mA	Yes	330 mm		CS1W-BI053
Expansion backplane	8	230 mA	Yes	435 mm		CS1W-BI083
Expansion backplane	10	230 mA	Yes	505 mm		CS1W-BI103
CPU backplane	5	550 mA (including CS1D-DPL01)	Yes	505 mm	For Duplex CPU + Power supplies	CS1D-BC052
CPU backplane	8	170 mA	Yes	505 mm	For Duplex Power supplies	CS1D-BC082S
Expansion backplane	9	280 mA	Yes	505 mm	For Duplex Power supplies	CS1D-BI092

Type	Description	Length	Model
I/O Expansion cable	Connects CS1 CPU backplane or Expansion backplane to next Expansion backplane.	0.3 m	CS1W-CN313
		0.7 m	CS1W-CN713
		2.0 m	CS1W-CN223
		3.0 m	CS1W-CN323
		5.0 m	CS1W-CN523
		10.0 m	CS1W-CN133
		12.0 m	CS1W-CN133-B2



## Up to 96 I/O points per unit - input, output or mixed

Digital I/O units serve as the PLC's interface to achieve fast, reliable sequence control. A full range of units, from high-speed DC inputs to relay outputs, let you adapt CS1 to your needs.

CS1 units are available with various I/O densities and connection technologies. Up to 16 I/O points can be wired to units with detachable M3 screw terminals directly. High-density 32- and 64- point I/O units are equipped with standard 40-pin connectors. Prefabricated cables and wiring terminals are available for easy interfacing to high-density I/O units.

### Ordering information

Points	Type	Rated voltage	Rated current	I/O bus current consumption (5V)	I/O bus current consumption (26V)	Remarks	Connection type	Model <sup>*1</sup>
16	AC input	240 VAC	10 mA	100 mA			M3	CS1W-IA211
16	DC input	24 VDC	7 mA	100 mA			M3	CS1W-ID211
16	DC input	24 VDC	7 mA	100 mA		Inputs start interrupt tasks in PLC program	M3	CS1W-INT01
16	DC input	24 VDC	7 mA	100 mA		Latches pulses down to 50 µs pulse width	M3	CS1W-IDP01
32	DC input	24 VDC	6 mA	150 mA			1 x 40 pt Fujitsu	CS1W-ID231
64	DC input	24 VDC	6 mA	150 mA			2 x 40 pt Fujitsu	CS1W-ID261
96	DC input	24 VDC	5 mA	200 mA			2 x 56 pt Fujitsu	CS1W-ID291
8	Triac output	250 VAC	1.2 A	max. 230 mA			M3	CS1W-OA201
16	Triac output	250 VAC	0.5 A	max. 200 mA			M3	CS1W-OA211
8	Relay output	250 VAC	2.0 A	100 mA	max. 48 mA		M3	CS1W-OC201
16	Relay output	250 VAC	2.0 A	130 mA	max. 96 mA		M3	CS1W-OC211
16	DC output (source) <sup>*2</sup>	24 VDC	0.5 A	170 mA		With short-circuit protection, alarm	M3	CS1W-OD212
32	DC output (source) <sup>*2</sup>	24 VDC	0.5 A	270 mA		With short-circuit protection, alarm	1 x 40 pt Fujitsu	CS1W-OD232
64	DC output (source) <sup>*2</sup>	24 VDC	0.3 A	390 mA		With short-circuit protection, alarm	2 x 40 pt Fujitsu	CS1W-OD262
96	DC output (source) <sup>*2</sup>	24 VDC	0.1 A	480 mA			2 x 56 pt Fujitsu	CS1W-OD292
16+16	DC in+out (TTL)	5 VDC	35 mA	270 mA			2 x 40 pt Fujitsu	CS1W-MD561
32+32	DC in+out (source) <sup>*2</sup>	24 VDC	0.3 A	270 mA		With short-circuit protection, alarm	2 x 40 pt Fujitsu	CS1W-MD262
48+48	DC in+out (source) <sup>*2</sup>	24 VDC	0.1 A	350 mA			2 x 56 pt Fujitsu	CS1W-MD292

<sup>\*1</sup> C200H I/O units can also be mounted, except on CS1D systems.

<sup>\*2</sup> Models with sinking outputs (NPN type) are available as well.

**Note:** All digital I/O units are designated as basic I/O units



## From basic analog I/O to process control

CS1 offers a wide choice of analog input units, fit for any application, from low-speed, multi-channel temperature measurement to high-speed, high-accuracy data acquisition. Analog outputs can be used for accurate control or external indication.

Advanced units with built-in scaling, filtering and alarm functions reduce the need for complex PLC programming. High-accuracy process I/O units support an extensive range of sensors, for fast and accurate data acquisition. All process and temperature I/O units provide isolation between all individual channels.

## Ordering information

Points	Type	Ranges	Resolution	Accuracy <sup>†1</sup>	Conversion time	I/O bus current consumption (5 V)	I/O bus current consumption (26 V)	Remarks	Connection type	Model
4	Analog input	0 to 5 V,	1/8,000	V: 0.2% of PV	250 µs/point	130 mA	90 mA	Offset / gain adjustment, peak hold, moving average, alarms	M3	CS1W-AD041-V1
8	Analog input	0 to 10 V,		I: 0.4% of PV					M3	CS1W-AD081-V1
18	Analog input	-10 to 10 V, 1 to 5 V, 4 to 20 mA		0.2% of PV					2 x MIL (34p.)	CS1W-AD161
4	Analog output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V, 4 to 20 mA	1/4,000	V: 0.3% of PV I: 0.5% of PV	1 ms/point	130 mA	180 mA	Offset / gain adjustment	M3	CS1W-DA041
8	Voltage output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V		0.3% of PV					M3	CS1W-DA08V
8	Current output	4 to 20 mA		0.5% of PV			250 mA		M3	CS1W-DA08C
4 + 4	Analog in + output	0 to 5 V, 0 to 10 V, -10 to 10 V, 1 to 5 V (4 to 20 mA input)	1/8,000	V in: 0.2% of PV I in: 0.4% of PV out: 0.3% of PV	1 ms/point	200 mA	200 mA	Offset / gain adjustment, scaling, peak hold, moving average, alarms, output hold	M3	CS1W-MAD44
4	Process input	4 to 20 mA, 0 to 20 mA, 0 to 10 V, -10 to 10 V, 0 to 5 V, -5 to 5 V, 1 to 5 V, 1 to 1.25 V, -1.25 to 1.25 V	1/64,000	0.05% of PV	5 ms/point	120 mA	120 mA	Configurable alarms, maintenance functions, user-defined scaling, zero / span adjustment, square root, totaliser.	M3	CS1W-PDC11
8	Process input	-10 to 10 V, 0 to 5 V, 1 to 5 V, 4 to 20 mA	1/16,000	0.3% of PV	62.5 ms/point	180 mA	60 mA	Configurable alarms, zero / span adjustment, square root	M3	CS1W-PDC55
4	Thermocouple input	B, E, J, K, L, N, R, S, T, U, WRe5-26, PLII, -100 to 100 mV	1/64,000	0.05% of PV	5 ms/point	120 mA	80 mA	Configurable alarms (absolute + rate-of-change), peak hold, maintenance functions	M3	CS1W-PTS11
4	Resistance thermometer input	Pt50, Pt100 JPt100, Ni508.4	1/64,000	0.05% of PV	5 ms/point	120 mA	70 mA	Configurable alarms (absolute + rate-of-change), peak hold, maintenance functions	M3	CS1W-PTS12
4	Thermocouple input	B, J, K, L, R, S, T	0.1 °C	0.3% of PV	62.5 ms/point	250 mA	---	4 configurable alarm outputs	M3	CS1W-PTS51
4	Resistance thermometer input	Pt100, JPt100	0.1 °C	0.3% of PV	62.5 ms/point	250 mA	---	4 configurable alarm outputs	M3	CS1W-PTS52
8	Thermocouple input	B, J, K, L, R, S, T	0.1 °C	0.3% of PV	31.2 ms/point	180 mA	60 mA	Configurable alarms per channel	M3	CS1W-PTS55
8	Resistance thermometer input	Pt100, JPt100	0.1 °C	0.3% of PV	31.2 ms/point	180 mA	60 mA	Configurable alarms per channel	M3	CS1W-PTS56
4	2-Wire transmitter input	1 to 5 V, 4 to 20 mA	1/4,096	0.2% of FS	25 ms/point	150 mA	160 mA	Built-in power supply for transmitter, configurable alarms, square root, rate-of-change, etc.	M3	CS1W-PTW01

Points	Type	Ranges	Resolution	Accuracy* <sup>1</sup>	Conversion time	I/O bus current consumption (5 V)	I/O bus current consumption (26 V)	Remarks	Connection type	Model
8	Power transducer input	-1 to 1 mA, 0 to 1 mA	1/4,096	0.2% of FS	25 ms/point	150 mA	80 mA	Inrush current limiter, configurable alarms, averaging, etc.	M3	CS1W-PTR01
8	Power transducer input	-100 to 100 mV, 0 to 100 mV	1/4,096	0.2% of FS	25 ms/point	150 mA	80 mA	Inrush current limiter, configurable alarms, averaging, etc.	M3	CS1W-PTR01
4	Pulse rate input	20000 pps, voltage, open collector, contact	up to 1/32,000	n.a.	25 ms/point			Averaging, totaliser	M3	CS1W-PPS01
4	Isolated control output	1 to 5 V, 4 to 20 mA	1/4,000	I: 0.1% of FS V: 0.2% of FS	25 ms/point	150 mA	160 mA	Output readback, high / low / rate limiting, disconnection alarm, zero / span adjustment	M3	CS1W-PMV01
4	Isolated control output	-10 to 10 V, 0 to 10 V, -5 to 5 V, 0 to 5 V, -1 to 1 V, 0 to 1 V	1/4,000	0.1% of FS	10 ms/point	120 mA	120 mA	High / low / rate limiting, output hold, zero / span adjustment	M3	CS1W-PMV02

\*<sup>1</sup> Typical value at 25 °C ambient temperature. Consult the operation manual for details.

**Note:** All analog I/O units are designated as special I/O units





## Add motion control to any CS1 PLC

From simple position measurement to multi-axis synchronised motion control, CS1 offers a full range of units:

- Counter Units gather position information from SSI- or incremental encoders. Actual positions are compared with internally stored target values.
- Position control units are used for point-to-point positioning with servo drives or stepper motors. Target data and acceleration / deceleration curves can be adjusted on-the-fly.
- Position- and motion control units equipped with MECHATROLINK-II interface can control multiple drives through a single high-speed link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.

## Ordering information

Channels/ Axes	Type	Signal type	Unit class	I/O bus current consumption	Remarks	Connection type	Model
2	SSI inputs (absolute position data)	Synchronous serial protocol	Special I/O unit	320 mA	Baud rate, encoding type, data length, etc. can be set per channel 2 digital outputs, NPN/PNP selectable.	M3 screw	CS1W-CTS21
2	500 kHz	24 V, 12V, line driver	Special I/O unit	360 mA	4 configurable digital inputs +	1 x Fujitsu (40 pt)	CS1W-CT021
4	Counter			450 mA	4 configurable digital outputs Target values trigger interrupt to CPU	2 x Fujitsu (40 pt)	CS1W-CT041
1	Position control unit	24V open collector	Special I/O unit	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CS1W-NC113
2	Position control unit	24V open collector	Special I/O unit	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CS1W-NC213
4	Position control unit	24V open collector	Special I/O unit	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 x Fujitsu (40 pt)	CS1W-NC413
1	Position control unit	Line driver	Special I/O unit	250 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CS1W-NC133
2	Position control unit	Line driver	Special I/O unit	360 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	1 x Fujitsu (40 pt)	CS1W-NC233
4	Position control unit	Line driver	Special I/O unit	360 mA	500 kpps pulse outputs, inputs for origin, limit switches, stop, interrupt	2 x Fujitsu (40 pt)	CS1W-NC433
32	Motion control unit	MECHA- TROLINK-II	CPU bus unit	800 mA	Electronic cam profiles and axis synchronisation. Registration inputs. Access to all drive parameters.	ML-II	CS1W-MCH71

## Accessories

Description	Connection type	Model
General purpose I/O terminal block (40 x M3 screw)	MIL (40 pt)	XW2D-40G6
General purpose I/O connection cable for I/O Units with 40-pt. Fujitsu connector (□□□ = length in cm)	Fujitsu (40 pt.) to MIL (40 pt.)	XW2Z-□□□B
Servo interface block for 2- or 4-Axis position control unit (without communications support)		XW2B-40J6-2B
Servo interface block for 2- or 4-Axis position control unit (with communications support)		XW2B-40J6-4B
Cable connecting CS1W-NC113 to W Series, cable length: 1.0 m		XW2Z-100J-A14
Cable connecting CS1W-NC213/413 to W Series, cable length: 1.0 m		XW2Z-100J-A15
Cable connecting CS1W-NC113 to SmartStep, cable length: 1.0 m		XW2Z-100J-A16
Cable connecting CS1W-NC213/413 to SmartStep, cable length: 1.0 m		XW2Z-100J-A17
Cable connecting CS1W-NC133 to W Series, cable length: 1.0 m		XW2Z-100J-A18
Cable connecting CS1W-NC233/433 to W series, cable length: 1.0 m		XW2Z-100J-A19
Cable connecting CS1W-NC133 to SmartStep, cable length: 1.0 m		XW2Z-100J-A20
Cable connecting CS1W-NC233/433 to SmartStep, cable length: 1.0 m		XW2Z-100J-A21



## Open to any communication, standard or user-defined

CS1 provides both standardised open networks interfaces, and cost-efficient high-speed proprietary network links. Datalinks between PLCs, or to higher-level information systems can be made using Serial or Ethernet links, or the easy-to-use Controller Link network.

OMRON supports the 2 major field networks, DeviceNet and PROFIBUS-DP. For high-speed field I/O, OMRON's own CompoBus/S offers an unsurpassed ease of installation. Fully user-configurable serial and CAN-based communication can be used to emulate a variety of application-specific protocols.

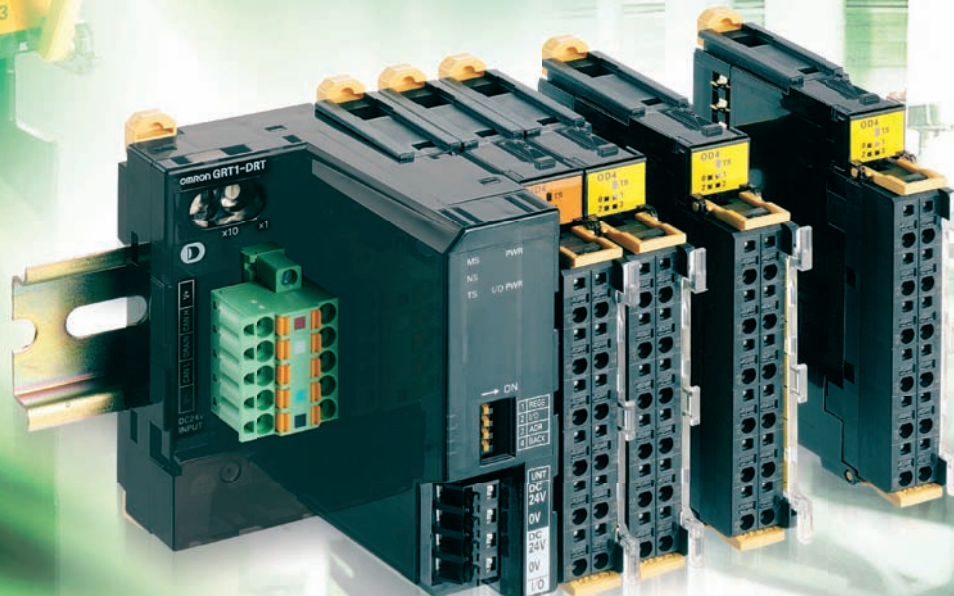
## Ordering information

Type	Ports	Protocols	Unit class	I/O bus current consumption	Remarks	Connection type	Model
Serial	2 x RS-232C	CompoWay-F, Host Link, NT link, Modbus, User-defined	CPU bus unit	290 mA		9-pin D-Sub	CS1W-SCU21-V1
Serial	2 x RS-232C	CompoWay-F, Host Link, NT link, Modbus, User-defined	CPU option board	280 mA		9-pin D-Sub	CS1W-SCB21-V1
Serial	1 x RS-232C + 1 x RS-422/RS-485	CompoWay-F, Host Link, NT link, Modbus, User-defined	CPU option board	360 mA		9-pin D-Sub	CS1W-SCB41-V1
GP-IB	Master / Slave selectable	GP-IB instrument communication	Special I/O unit	260 mA		GP-IB	CS1W-GPI01
Ethernet	1 x 100 Base-Tx	UDP, TCP/IP, FTP server, SMTP (e-mail), SNMP (time adjust), FINS routing	CPU bus unit	400 mA		RJ45	CS1W-ETN21
Controller link	2-wire twisted pair	OMRON proprietary	CPU bus unit	330 mA		2-wire screw + GND	CS1W-CLK21
	Optical HPCF			520 mA		2 x HPCF connector	CS1W-CLK12
	Optical graded-index fiber			650 mA		4 x ST connector	CS1W-CLK52
DeviceNet	1 x CAN	DeviceNet	CPU bus unit	290 mA		5-p detachable	CS1W-DRM21
PROFIBUS-DP	1 x RS-485 (Master)	DP, DPV1	CPU bus unit	400 mA		9-pin D-Sub	CS1W-PRM21
PROFIBUS-DP	1 x RS-485 (Slave)	DP	C200H special I/O unit	250 mA	C200H units cannot be used on CS1D systems	9-pin D-Sub	C200HW-PRT21
CAN	1 x CAN	CANopen, User-defined	C200H special I/O unit	250 mA		5-p detachable	C200HW-CORT21-V1
CompoBus/S	2-wire (Master)	OMRON proprietary	C200H special I/O unit	150 mA		2-wire screw + 2-wire power	C200HW-SRM21-V1

## Accessories

Description	Connection type	Model
RS-232C to RS-422/RS-485 signal converter. Mounts directly on serial port.	9-pin D-sub to screw clamp terminals	CJ1W-CIF11
Controller link PCI board with support software	PCI, wired CLK	3G8F7-CLK21-EV1
Controller link PCI board with support software	PCI, HPCF connectors	3G8F7-CLK12-EV1
Controller link PCI board with support software	PCI, ST connectors	3G8F7-CLK52-EV1
Controller link repeater unit (wire to wire)	Screw - Screw	CS1W-RPT01
Controller link repeater unit (wire to HPCF fiber)	Screw - HPCF connector	CS1W-RPT02
Controller link repeater unit (wire to graded-index glass fiber)	Screw - ST connector	CS1W-RPT03

# Remote I/O



## Smart functions you can rely on

### SmartSlice: Intelligence at I/O level

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

### Maintenance data logging minimises downtime

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

Each unit remembers its last maintenance date: maintenance personnel can check per unit if there

have been any replacements or repairs. A descriptive comment can be entered per node, per unit, even per I/O point. This can help you troubleshoot a machine without having to know PLC-internal tag names or programs. All communication that is required passes through multiple network layers without any special PLC programming to gather or store the data.

### Early-warning system prevents breakdowns

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

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



## Smart design for all-round benefits

These warnings would be useless if you cannot easily find the underlying cause. Therefore, there are several convenient ways to access the information, with little or no PLC programming:

- Directly from the network maintenance view of CX-One
- By using Smart Active Parts on the NS-series HMIs
- By using predefined Function Blocks in the PLC

### Highly compact

More compact than any other modular I/O system – with a height of only 80 mm – SmartSlice takes up very little space in your control cabinet. With a 3-wire input connection there is no need for additional power distribution rails; all your field wiring, including sensor power supply, can be directly connected to the units.

### Reliable 3-piece construction

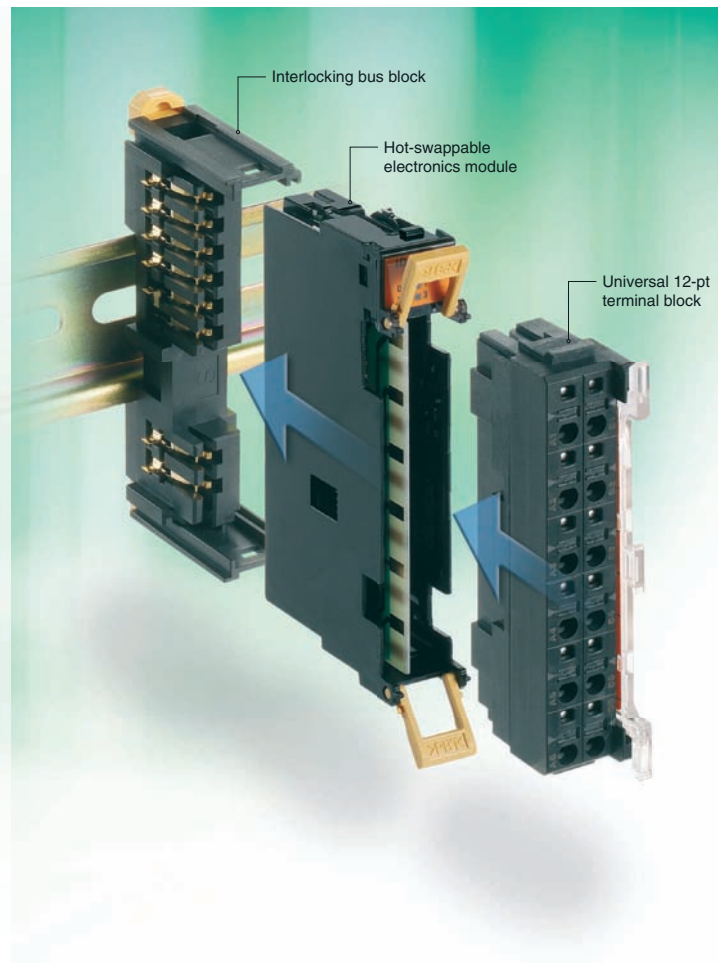
All SmartSlice modules have a 3-piece construction. Interlocking bus blocks build the backplane of the system. The electronics module and removable terminal block plug into the backplane, enabling you to:

- Replace electronic modules while the bus structure and field wiring stay intact. During hot-swapping, all other I/O units continue to operate.
- Detach I/O terminals for pre-wiring, maintenance or testing.

All contact surfaces between the electronics module and connectors are gold-plated for 100% reliable connections.

### Fast backup and restore

With all the intelligence and advanced functions in SmartSlice units, backup and recovery of settings are important to support fast maintenance and repair of your machine. These functions are therefore also toolless in SmartSlice. All I/O unit data can be backed up in the bus interface unit at the flick of a switch. Recovery is even simpler; after hot-swapping a unit, all settings are automatically loaded.



## Table of contents

Remote I/O	SmartSlice I/O system	304
	Compact I/O DRT2	305
	Compact I/O SRT2	306
	Field I/O DRT2/SRT2	307

## The smartest modular I/O system

OMRON's new SmartSlice I/O system is compact, intelligent and easy. When used with OMRON's CS1/CJ1 DeviceNet master units, no configuration tool is required. By using built-in functions such as pre-scaling, totalising, differentiation and alarming in analog I/O units, PLC programming can be minimised. Preventive maintenance data can be accessed using CX-Integrator software, standard PLC function blocks or NS-series Smart Active Parts.

- Most compact in the market (80 mm high)
- Easy set-up, backup and restore functions
- Diagnostics and preventive maintenance data at I/O level
- Detachable terminal blocks allow hot-swapping without re-wiring
- 3-wire connection with 'push-in' technology, no screwdriver required



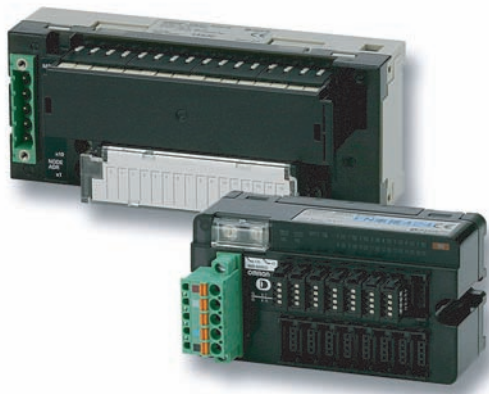
## Ordering information

Model	Specifications	Width	Connection type	Model
DeviceNet interface unit	Supports up to 64 I/O units. Integrated I/O power supply terminals.	58 mm	Open-style DeviceNet connector.	GRT1-DRT
PROFIBUS-DP interface unit	Supports up to 64 I/O units. Integrated I/O power supply terminals.	58 mm	9-pin D-sub PROFIBUS-DP connector.	GRT1-PRT *1
4-point NPN input unit	24 V DC, 7 mA, 3-wire connection (NPN-type signal)	15 mm	Push-in screwless	GRT1-ID4 *1
4-point PNP input unit	24 V DC, 7 mA, 3-wire connection (PNP-type signal)	15 mm	Push-in screwless	GRT1-ID4-1
4-point NPN output unit	24 V DC, 500 mA, 2-wire connection, sinking outputs (NPN-type)	15 mm	Push-in screwless	GRT1-OD4
4-point PNP output unit	24 V DC, 500 mA, 2-wire connection, sourcing outputs (PNP-type)	15 mm	Push-in screwless	GRT1-OD4-1
2-point Relay output unit	240 V AC, 2A, normally-open contacts	15 mm	Push-in screwless	GRT1-ROS2
1-Channel 100 kHz counter unit	A/B/Z encoder input (line driver or 24 V selectable) 1 control input + 2 outputs (NPN-type)	15 mm	Push-in screwless	GRT1-CT1 *1
1-Channel 100 kHz counter unit	A/B/Z encoder input (line driver or 24 V selectable) 1 control input + 2 outputs (PNP-type)	15 mm	Push-in screwless	GRT1-CT1-1 *1
2-Channel thermocouple input unit	Type B, E, J, K, L, R, S, T, U, W, PLII selectable ±0.3% of PV, or ±1.0 °C 250 ms conversion time	15 mm	Push-in screwless	GRT1-TS2T *1
2-Channel Pt100 input unit	Pt100 / JPt100 selectable ±0.3% of PV, or ±1.0 °C 250 ms conversion time	15 mm	Push-in screwless	GRT1-TS2P *1
2-Channel analog input unit, current / voltage	±10 V, 0 - 10 V, 0 - 5 V, 1 - 5 V, 0 - 20 mA, 4 - 20 mA	15 mm	Push-in screwless	GRT1-AD2 *1
2-Channel analog output unit, voltage	±10 V, 0 - 10 V, 0 - 5 V, 1 - 5 V 1/6000 resolution, 2 ms conversion time	15 mm	Push-in screwless	GRT1-DA2V *1
2-Channel analog output unit, current	0-20 mA, 4-20 mA 1/6000 resolution, 2 ms conversion time	15 mm	Push-in screwless	GRT1-DA2C *1
I/O power feed unit, separates power supply between groups of I/O units		15 mm	Push-in screwless	GRT1-PD2
End plate, one unit required per bus interface		19.5 mm		GRT1-END
Turnback unit, right-hand side		19.5 mm		GRT1-TBR
Turnback unit, left-hand side		58 mm		GRT1-TBL
Turnback cable, max. 2 per station		1 mm		GCN1-100

\*1 Available Q2 2006. Specifications may change.

## Software

CX-One, OMRON's integrated software for programming and configuration of all control system components, including PLCs, remote I/O, HMI, drives, temperature controllers and advanced sensors. CX-ONE-AL□□□-E



## Smart DeviceNet I/O

These units feature internal diagnostic and data collection over the network. Power supply status, I/O response times, operation counters and on-time monitor data are continuously recorded and checked against user-defined limits. Hence any deviation is immediately flagged. Smart DeviceNet I/Os are supported by Smart Active Parts, allowing program-less visualisation and monitoring from the NS terminals.

- Compact size IP20 housing
- Expandable digital I/Os
- Built-in diagnostics and preventive maintenance functions
- Detachable I/O terminal blocks
- Analog I/O with data pre-processing and alarm functions

## Ordering information

I/O points	Size in mm (HxWxD)	Current	Name	Remarks	Model
16 input points (PNP)	115x50x49.7	Input current 6.0 mA max./point (for 24 V DC)	Remote I/O terminals with transistors	Can be extended with XWT expansion unit.	DRT2-ID16-1
16 output points (PNP)	115x50x49.7	Output current 0.5 A/point, 4.0 A/common	Remote I/O terminals with transistors	Can be extended with XWT expansion unit.	DRT2-OD16-1
16 output points	125x50x51.8	Load 2 A, 8A / common	Remote I/O terminal with relay outputs	Relay outputs. Can be extended with XWT expansion unit.	DRT2-ROS16
8 input points (PNP)	66x50x49.7	Input current 6.0 mA max./point (for 24 V DC)	Remote I/O terminal expansion units with transistors	Expansion unit for increasing inputs of the basic units	XWT-ID08-1
16 input points (PNP)	94x50x49.7	Input current 6.0 mA max./point (for 24 V DC)	Remote I/O terminal expansion units with transistors	Expansion unit for increasing inputs of the basic units	XWT-ID16-1
8 output points (PNP)	66x50x49.7	Output current 0.5 A/point, 2.0 A/common	Remote I/O terminal expansion units with transistors	Expansion unit for increasing outputs of the basic units	XWT-OD08-1
16 output points (PNP)	94x50x49.7	Output Current 0.5 A/point, 4.0 A/common	Remote I/O terminal expansion units with transistors	Expansion unit for increasing outputs of the basic units	XWT-OD16-1
16 input points (PNP)	180x50x58	Input current 6.0 mA max./point at 24 V DC	Remote I/O terminals with 3-tier terminal blocks and transistors	Wiring locations easy to find (wiring to the same terminal not required). Cannot be expanded with an XWT expansion unit.	DRT2-ID16TA-1
16 output points (PNP)	180x50x58	Output current 0.5 A/point	Remote I/O terminals with 3-tier terminal blocks and transistors	Wiring locations easy to find (wiring to the same terminal not required). Cannot be expanded with an XWT expansion unit.	DRT2-OD16TA-1
8 input points / 8 output points (PNP)	180x50x58	Input current 6.0 mA max./point at 24 V DC. Output Current 0.5 A/point	Remote I/O terminals with 3-tier terminal blocks and transistors	Wiring locations easy to find (wiring to the same terminal not required). Cannot be expanded with an XWT expansion unit.	DRT2-MD16TA-1
16 input points (PNP)	95x50x33.3	Input current 11 mA max./point (for 24 VDC)	Sensor connector terminals with transistors	Uses E-con industry standard sensor connectors.	DRT2-ID16-S
32 input points (PNP)	80x35x60	Input Current 6.0 mA max./point at 24 V DC.	MIL connector terminals with transistors	Connects to relay terminal using MIL cable	DRT2-ID32ML-1
32 output points (PNP)	80x35x60	Output current 0.3 A/point, 4 A/common.	MIL connector terminals with transistors	Connects to relay terminal using MIL cable	DRT2-OD32ML-1
16 input points / 16 output points (PNP)	80x35x60	Input current 6.0 mA max./point at 24 V DC. Output current 0.3 A/point, 2 A/common	MIL connector terminals with transistors	Connects to relay terminal using MIL cable	DRT2-MD32ML-1
4 input points (0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA)	115x50x49.7	Current consumption from communications power supply 90 mA max.	Analog input terminals	Resolution 1/6000 (full scale) Conversion cycle depends on number of active points, 4points: 4ms max.	DRT2-AD04
2 output points (0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA)	115x50x49.7	Current consumption from communications power supply 120 mA max.	Analog output terminals	Conversion time 2 ms/2 points	DRT2-DA02

**Note:** - MIL = connector according to MIL-C-83503 (compatible with DIN 41651 / IEC 60603-1).  
- Models with sinking outputs (NPN type) are available as well.





## Fast and easy over CompoBus/S

OMRON's unique CompoBus/S is the most efficient I/O bus for machine automation. With free topology and up to 500 m bus length in long-distance mode, it can be used as a remote I/O system. In high-speed mode (100 m max.) the guaranteed sub-millisecond cycle time makes it ideal for efficient machine control. Used with the compact CPM2C-S PLC as master, your machine control system will fit in the smallest spaces.

- Compact size in IP20 housing
- Fast cycle time; less than 1 ms per 256 I/O points
- Easy set-up; no software required
- Choice of 4- 8- and 16-point Digital I/O; transistor-, MOSFET- and Relay models
- Analog in- / outputs and customisable modules available

## Ordering information

I/O points	Size in mm (HxWxD)	Current	Name	Remarks	Model
4 input points (PNP)	80x48x50	Input current 6 mA max./point at 24 V DC	Remote I/O terminals with transistors	IP20 protection class, very small size to preserve space.	SRT2-ID04-1
8 input points (PNP)	80x48x50	Input current 6 mA max./point at 24 V DC	Remote I/O terminals with transistors	IP20 protection class, very small size to preserve space	SRT2-ID08-1
16 input points (PNP)	105x48x50	Input current 6 mA max./point at 24 V DC	Remote I/O terminals with transistors	IP20 protection class, very small size to preserve space	SRT2-ID16-1
4 output points (PNP)	80x48x50	Output current 0.3 A/point	Remote I/O terminals with transistors	IP20 protection class, very small size to preserve space	SRT2-OD04-1
8 output points (PNP)	80x48x50	Output current 0.3 A/point	Remote I/O terminals with transistors	IP20 protection class, very small size to preserve space	SRT2-OD08-1
16 output points (PNP)	105x48x50	Output current 0.3 A/point	Remote I/O terminals with transistors	IP20 protection class, very small size to preserve space	SRT2-OD16-1
16 input points (PNP)	180x50x59	Input current 6 mA max. at 24 V DC	Remote I/O terminals with 16 transistor inputs and 3-layer terminal blocks	Easy connection to deliver power to three wire sensors	SRT2-ID16T-1
16 output points (PNP)	180x50x59	Output current 0.5 A/point	Remote I/O terminals with 16 transistor outputs and 3-layer terminal blocks		SRT2-OD16T-1
8 input points / 8 output points (PNP)	180x50x59	Input current 6 mA max. at 24 V DC output current 0.5 A/point	Remote terminals with 8 input and 8 output transistors and 3-layer terminal Block	Easy connection to deliver power to three wire sensors	SRT2-MD16T-1
8 output points	100x50x50	Output current 3A/point	Remote terminals with relay outputs	Relay can be easily replaced	SRT2-ROC08
16 output points	155x50x50	Output current 3A/point	Remote terminals with relay outputs	Relay can be easily replaced	SRT2-ROC16
8 output points	100x50x50	Output current 0,3A/point	Remote terminals with power MOS FETs outputs	Power MOS FETs can be easily replaced	SRT2-ROF08
16 output points	155x50x50	Output current 0,3A/point	Remote terminals with power MOS FETs outputs	Power MOS FETs can be easily replaced	SRT2-ROF16
8 input points (PNP)	100x50x37	Input current 10 mA max./point at 24 V DC	Remote terminals with easy-to-wire connections to 2-wire sensors	Reduces installation time of sensors	SRT2-ID08S
8 output points (PNP)	100x50x37	Output current 0,3A/point	Remote terminals with easy-to-wire connections to 2-wire sensors	Reduces installation time of sensors	SRT2-OD08S
4 input points / 4 output points (PNP)	70x50x37	Input current 6 mA max. at 24 V DC output current 0.5 A/point	Remote terminals with easy-to-wire connections to 2-wire sensors	For sensors with teaching, external diagnostics or bankswitching functions	SRT2-ND08S
4 input points(0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA)	105x50x48	Current consumption from communications power supply 90 mA max.	Analog input terminals	Resolution 1/6000 (full scale) conversion cycle depends on number of active points, 4points: 4ms max.	SRT2-AD04
2 output points (0 to 5 V, 1 to 5 V, 0 to 10 V, -10 to 10 V, 0 to 20 mA, 4 to 20 mA)	105x50x48	Current consumption from communications power supply 170 mA max.	Analog output terminals	Conversion time 2 ms/2 points	SRT2-DA02

**Note:** Models with sinking outputs (NPN type) are available as well.



## IP67 DeviceNet I/O

Rugged I/O units for field mounting. The DRT2 slave units feature internal diagnostic and maintenance data collection, which can be accessed over the network. Power supply status, I/O response times, operation counters and on-time monitor data is available at all times. Maintenance warnings will be generated when limits are exceeded. Using CX-One or NS-series HMI with Smart Active Parts, this allows more efficient system setup, commissioning and troubleshooting.

- IP67 protection, DRT2 versions are also oil- and welding-spatter proof
- Internal circuits powered by DeviceNet; fewer connections means less installation errors.
- Smart Slave functions for diagnostics and preventive maintenance

- Indication of broken wire and short-circuit in I/O signals

- M12 connectors for fast installation.

### Ordering information

I/O points	Size in mm (HxWxD)	Current	Name	Remarks	Model
8 input points (PNP) 1 input / connection.	60x175x37.7	Input current 11.0 mA max./point (for 24 VDC)	Environment-resistive terminals	Waterproof, oil-proof, and spatter-proof construction (IP67). With short-circuit protection and open wire detection.	DRT2-ID08C-1
16 input points (PNP) 2 inputs / connection.	60x175x37.7	Input current 11.0 mA max./point (for 24 VDC)	Environment-resistive terminals	Waterproof, oil-proof, and spatter-proof construction (IP67). With short-circuit protection and open wire detection.	DRT2-HD16C-1
8 output points (PNP)	60x175x43.9	Output current 1.5 A/point, 8.0 A/common	Environment-resistive terminals	Waterproof, oil-proof, and spatter-proof construction (IP67). With short-circuit protection and open wire detection.	DRT2-OD08C-1

**Note:** Models with sinking outputs (NPN type) are available as well.

## Field I/O SRT2



## IP67 CompoBus/S

Rugged I/O units for field mounting. OMRON's unique CompoBus/S is the most efficient I/O bus for machine automation. With free topology and up to 500 m bus length in long-distance mode, it can be used as a remote I/O system. In high-speed mode (100 m max.) the guaranteed sub-millisecond cycle time makes it ideal for efficient machine control. With IP67 slave modules distributed throughout the machine, the need for protective enclosures is minimised.

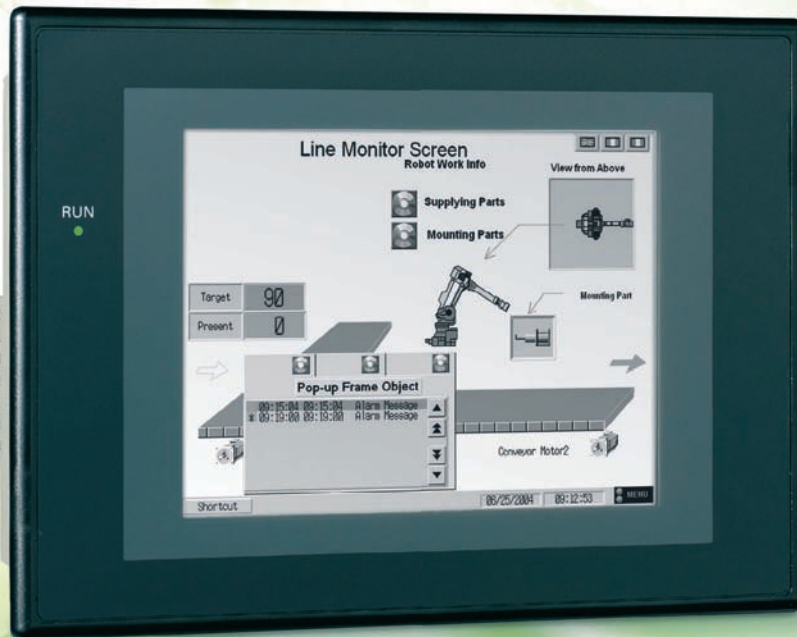
- IP67 protection against dust and water
- Fast cycle time; less than 1 ms for 256 I/O points
- Easy setup; no software required.
- Choice of 4- and 8-point digital I/O
- M12 connectors for easy field wiring

### Ordering information

I/O points	Size in mm (HxWxD)	Current	Name	Remarks	Model
4 input points (PNP)	54x114x45	Input current 6.0 mA max./point (for 24 V DC)	Water-resistant terminals	Small size with easy connection	SRT2-ID04CL-1
8 input points (PNP)	84x160x45	Input current 6.0 mA max./point (for 24 V DC)	Water-resistant terminals	Small size with easy connection	SRT2-ID08CL-1
4 output points (PNP)	54x114x45	Output current 0.5 /point, 2.0 A/common	Water-resistant terminals	Small size with easy connection	SRT2-OD04CL-1
8 output points (PNP)	84x140x45	Output current 0.5 A/point, 2.4 A/common	Water-resistant terminals	Small size with easy connection	SRT2-OD08CL-1

**Note:** Models with sinking outputs (NPN type) are available as well.

# Human machine interface (HMI)



## Less colour, same performance

Following customer demands for more performance without increasing costs for machines Omron introduced the NS5-Monochrome.

The NS5-Monochrome offers the same high quality and the same features as the rest of the NS-series, ranging from 5.7" to 12.1".

This product features a 5.7" STN Monochrome screen, 320 x 240 pixels resolution and a long-life backlight of minimal 50,000 hours, meaning less maintenance costs. It uses the same project data as the colour version of this terminal, which means you can re-use existing applications and download them without any changes in the monochrome version, saving a lot of development time.

We offer you the highest amount of memory (20 MB in all 5.7" screens) in the market, so you can create beautiful applications with many bitmaps and you can re-use applications throughout the complete range.

### Other features of the NS5 Monochrome are:

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

For more info see <http://ns.europe.omron.com>



## Smart Active Parts can make a difference

To be able to satisfy the current needs of customers, Omron has introduced a new way of developing a Human Machine Interface. Therefore our NS-Series allow you to take advantage of "Smart Active Parts". Smart Active Parts are pre-programmed visualisation software modules with embedded communication code that bring 'drag&drop' simplicity to system design. They are available for a wide range of Omron products like Sensors, PLCs, Inverters, Motion Controllers and Temperature Controllers.

### The ease of pre-made software

SAPs allow a complete machine to be configured, commissioned, operated and maintained via the HMI. They allow, for instance, a user to monitor all slaves of a network master on one single screen, read and write parameters of connected inverters without using the inverter console, or view PLC alarms in simple text, all without having to program a single line of communication code. And because you can use SAPs just by dragging & dropping them on to a screen in the development package this saves a lot of development time, and at the same time allows more advanced features to be included that, for instance, reduce down-time or simplify machine set-up.

Written by control experts, the Smart Active Parts are provided in a library in the development package for Omron HMIs CX-Designer, which is incorporated in CX-One.

New Smart Active Parts are freely downloadable from our website:  
**[www.omron-industrial.com](http://www.omron-industrial.com)**



## Table of contents

<b>HMI-NT</b>	NT21S-ST121(B)	310
	NT11-SF121(B)	
	NT2S-SF12..B-E(V2)	
	NT3S-ST12□B-E	
<b>HMI-NS</b>	NS12	312
	NS10	
	NS8	
	NS5-T	
	NS5-S / NSH5-S	
	NS5-M	
	NSJ5	

# Selection table

## Ordering information

### NT series

Name	Specifications			Model
NT21	STN monochrome	Frame color: Beige		NT21-ST121-E
		Frame color: Black		NT21-ST121B-E
NT11	STN monochrome	Ten-key type	Frame color: Beige	NT11S-SF121-EV1
			Frame color: Black	NT11S-SF121B-EV1

### NT-XS series

Name	Specifications			Model
NT2S	STN monochrome	Programmable	6-key type, Frame color: Black	NT2S-SF121B-EV2
				NT2S-SF122B-EV2
		PLC controlled		NT2S-SF123B-EV2
		Programmable	20-key type, Frame color: Black	NT2S-SF125B-E
				NT2S-SF126B-E
		PLC controlled		NT2S-SF127B-E
NT3S	STN monochrome	Programmable	2 x RS-232/CMOS, No RTC, No RS485	NT3S-ST126B-E
			RS-232/CMOS on one port, RS-232/CMOS/485/422 on second port, No RTC	NT3S-ST124B-E
			RS-232/CMOS on one port, RS-232/CMOS/485/422 on second port with RTC	NT3S-ST123B-E
			RS-232/CMOS/485/422 on both ports with RTC	NT3S-ST121B-E

### Software

Name	Specifications	Model
NT-series support software for windows	For NT-series PTs Windows 95, 98, Me, 2000 or NT 4.0	NT-ZJCAT1-EV4S
Printer cable for NT11 series	To print hardcopies of screens	NT-CNT121
NT2S and NT3S support software for windows	For all models of these NT-XS series	NT-XS (free downloadable from our website)

Note: For further information please contact your OMRON representative.

### Accessories





#### NT21 accesories

Product	Specification			Model number
Cables	For screen transfer			XW2Z-S002
	For PLC connection	PT: 9-pin	Cable length: 2 m	XW2Z-200T
		PLC: 9-pin	Cable length: 5 m	XW2Z-500T
		PT: 9-pin PLC: Mini-peripheral	Cable length: 2 m	NT-CN221
Options	Reflection Protective Sheets		Display area only (5 sheets)	NT20M-KBA04
	Chemical-resistive Cover		Silicon cover	NT20S-KBA01
	Battery		For alarm lists/histories	C500-BAT08
	Memory Unit		For screen and system data transfer	NT-MF161
	RS-232C/422A Adapter			NS-AL002
	Connector Kit			XM2S-0911-S003

#### NTXS accesories

Cables	Specification	Model
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 2 m	NT2S-CN212-V1
NT2S-SF121/125 and NT3S	peripheral port CPM series except CPM2C, 5 m	NT2S-CN215-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 2 m	NT2S-CN222-V1
NT2S-SF122/SF123/SF126/SF127	peripheral port CPM series except CPM2C, 5 m	NT2S-CN225-V2
NT2S-SF121/125 and NT3S	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN223-V2
NT2S-SF122/SF123/SF126/SF127	mini-peripheral port CJ1/CS1 and CPM2C series, 2 m	NT2S-CN224-V1

## Specification

					
<b>Model</b>		<b>NT21S-ST121(B)<sup>*1</sup></b>	<b>NT11-SF121(B)<sup>*1</sup></b>	<b>NT2S-SF121□B-E(V2)</b>	<b>NT3S-ST121□B-E</b>
<b>Size in mm (HxWxD)</b>		110x190x58	113x218x38.2	60x108x43	77x140x35
<b>Effective display area</b>		117x63 mm (260x140 dots)	160x64 mm	56x11 mm	98x35 mm (192 x 64 pixels, 4.1 inch)
<b>Type with ethernet</b>		24 VDC +10%/-15%	24 VDC ±15%	24 VDC ±10% (when applicable)	24 VDC ±15%
<b>I/O</b>	<b>Function keys</b>	-	22 keys	6 to 20 keys depending on model	-
	<b>Touch panel</b>	7 vertical x 13 horizontal	---	---	Analog Resistive
<b>Obtained standards</b>		UL, CSA, EC Directives, NEMA equivalent	CE, cULus	CE, cULus	CE, cULus
<b>Display graphics</b>		Straight lines, rectangles, polygons, circles, ovals, sector, bitmaps			Rectangle, rounded rectangle, circle, oval, line, bitmaps
<b>No. of display characters (standard characters)</b>		16 characters x 8 lines	20 characters x 4 lines	16 characters x 2 lines	32 characters x 8 lines
<b>No. of registered screens</b>		3,999 screens max. (depending on screen contents)	250	250	65,000 max. (limited by memory capacity)
<b>Screen data capacity (standard)</b>		512 KB	32 KB	24 KB	120 KB
<b>Expansion memory</b>		---	---	---	---
<b>Memory card interface</b>		NT-MF261 memory unit for screen transfer can be used.	---	---	---
<b>Expansion interface</b>		---	---	---	---
<b>Ethernet</b>		---	---	---	---
<b>Internal memory</b>		Numerical memory table: 2,000 entries max., Character memory table: 2,000 entries max.	-	1 kWords data, 1 kWords retentative memory	1 kWords data, 1 kWords retentative, 64 words system memory
<b>Ladder monitor</b>		---	---	---	---
<b>Programming Console function</b>		Supported	---	---	---
<b>Device monitor</b>		---	---	---	---
<b>Barcode reader connection</b>		Supported	---	---	---
<b>Printer connection</b>		---	Supported	Supported	Supported
<b>Multivendor support</b>		Supports most third party PLCs. <sup>*2</sup>	---	Supports most third party PLCs. <sup>*2</sup>	Supports most third party PLCs. <sup>*2</sup>
<b>Backlight life</b>		50,000 hours average	50,000 hours average	LED, min. 50,000 hours	LED, min. 50,000 hours

<sup>\*1</sup> Model numbers with 'B' have a black frame and without a beige frame.

<sup>\*2</sup> Please contact your local OMRON representative for a list of available drivers.



# Selection table

## Ordering information

Name	Specifications			Model
NS12	TFT, 12", 800 x 600 pixels	Without ethernet	Frame color: Beige	NS12-TS00-V2
			Frame color: Black	NS12-TS00B-V2
		With ethernet	Frame color: Beige	NS12-TS01-V2
			Frame color: Black	NS12-TS01B-V2
NS10	TFT, 10", 640 x 480 pixels	Without ethernet	Frame color: Beige	NS10-TV00-V2
			Frame color: Black	NS10-TV00B-V2
		With ethernet	Frame color: Beige	NS10-TV01-V2
			Frame color: Black	NS10-TV01B-V2
NS8	TFT, 8.4", 640 x 480 pixels	Without ethernet	Frame color: Beige	NS8-TV00-V2
			Frame color: Black	NS8-TV00B-V2
		With ethernet	Frame color: Beige	NS8-TV01-V2
			Frame color: Black	NS8-TV01B-V2
NS5-T	TFT, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-TQ00-V2
			Frame color: Black	NS5-TQ00B-V2
		With ethernet	Frame color: Beige	NS5-TQ01-V2
			Frame color: Black	NS5-TQ01B-V2
NS5-S	STN, 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-SQ00-V2
			Frame color: Black	NS5-SQ00B-V2
		With ethernet	Frame color: Beige	NS5-SQ01-V2
			Frame color: Black	NS5-SQ01B-V2
NS5-M	STN, Monochrome 5.7", 320 x 240 pixels	Without ethernet	Frame color: Beige	NS5-MQ00-V2
			Frame color: Black	NS5-MQ00B-V2
		With ethernet	Frame color: Beige	NS5-MQ01-V2
			Frame color: Black	NS5-MQ01B-V2
NSH5	STN, 5.7", 320 x 240 pixels	Without Ethernet	Frame color: Black	NSH5-SQR00B-V2

## Software

Name	Specifications	Model
NS-series screen design software for windows	For NS-series Windows 95, 98, Me, 2000, XP, NT 4.0 or XP	CX-Designer, included in CX-ONE







Note: For further information please contact your OMRON representative.


## NS series accessories

	Specifications		Model
Cable *1	Screen transfer cable for DOS/V		XW2Z-S002
	USB Host Cable, cable length: 5 m		NS-US52 (5 m)
	USB Host Cable, cable length: 2 m		NS-US22 (2 m)
PT-to-PLC Connecting Cable	PT connection: 9 pins PLC connection: 9 pins	Length: 2 m	XW2Z-200T
		Length: 5 m	XW2Z-500T
Accessories	Video input	Inputs: 4 channels NTSC / PAL	NS-CA001
		Inputs: 2 channels NTSC b/ PAL, 1 channel RGB	NS-CA002
	Special cable for the console		F150-VKP (2 m)
			F150-VKP (5 m)
	Controller link interface unit		NS-CLK21
	RS-422A adapter (50 m)		CJ1W-CIF11
	RS-422A adapter (500 m)		NS-AL002
	Anti-reflection sheets (5 surface sheets)	NS12/10	NS12-KBA04
		NS8	NS7-KBA04
		NS5	NT30-KBA04
	Protective anti-reflection covers (5 pack)	NS12/10	NS12-KBA05
		NS8	NS7-KBA05
		NS5	NT31C-KBA05
	Transparent protective covers (5 pack)	NS12/10	NS12-KBA05N
		NS8	NS7-KBA05N
		NS5	NT31C-KBA05N
	Chemical-resistant cover (1 cover)		NT30-KBA01
	Memory card	15 MB	HMC-EF172
		30 MB	HMC-EF372
		64 MB	HMC-EF672
	Attachment adapter	(NT625C/631/631C series to NS12 series)	NS12-ATT01
		(NT625C/631/631C series to NS12 series)	NS12-ATT01B
		(NT620S/620C/600S series to NS8 series)	NS8-ATT01
		(NT600M/600G/610G/612G series to NS8 series)	NS8-ATT02
	Memory card adapter for pc		HMC-AP001
	Battery		CJ1W-BAT01
	Barcode reader (refer to the catalog for details)		V520-RH21-6

\*1 Be sure to use cables made by OMRON when connecting NS hardware to a printer. No guarantee of proper operation if other cables are used.

## Specification

						
Model	NS12	NS10	NS8	NS5-T	NS5-S / NSH5-S	NS5-M
Type of display	TFT 12 inch colour display	TFT 10 inch colour display	TFT 8 inch colour display	TFT 5.7 inch colour display	STN 5.7 inch colour display	STN 5.7 inch monochrome display
Size in mm (HxWxD mm)	241x215x48.5		177x232x48.5	142x195x54 NSH5 176x223x70.5 (depth excl. emergency button)		
Effective display area	246x184.5 mm (800 x 600 pixels)	215.2x162.4 mm (640 x 480 pixels)	170.9x128.2 (640 x 480 pixels)	117.2x88.4 mm (320 x 240 pixels)		
Display colour	256 colours Image data: 32,768 colours				256 colours Image data: 4,096 colours	16 grey scales
Power supply	24 V DC ±15%					
Touch panel	38 vertical x 50 horizontal	30 vertical x 40 horizontal	24 vertical x 32 horizontal	15 vertical x 20 horizontal		
Obtained standards	UL 1604 C1D2, cUL, EC Directives, NEMA equivalent					
Display graphics	Rectangle, circle, oval, straight line, polyline, polygon, arc					
No. of display characters (standard characters)	100 characters x 37 lines	80 characters x 30 lines				
No. of registered screens	3,999 screens max. (depending on screen contents)					
Screen data capacity (standard)	60 MB			20 MB		
Memory card interface	ATA compact flash card interface, 1 slot					
Internal memory	Bit memory: 32,767 bits, Word memory: 32,767 words, Retentative memory: 8,192 bits and 8,192 words.					
Printer connection	Supported			---	---	
Backlight life	50,000 hours minimum		40,000 hours minimum	75,000 hours minimum		50,000 hours minimum
Multivendor support	Supported for most third-party PLCs. Please contact your local OMRON distributor for more information.					
Video board (composite / RGB)	Supported			---	---	

	
<b>Model</b>	<b>NSJ5</b>
<b>Features</b>	<p>A combination of a fast and powerful CJ1 PLC, a 5.7" NS series touchscreen and open network connections. With the NSJ5 you are able to configure, commission, operate and maintain your complete automation solution. Ideal for applications that require visualisation, control and open network connection with little space. Panelless automation by making use of remote I/O terminals and intelligent devices.</p> <ul style="list-style-type: none"> <li>- 5.7" colour touchscreen, 4096 colours (images), 20 MB screen data memory</li> <li>- 20 k Steps PLC program memory</li> <li>- 32 K Words PLC data memory</li> <li>- DeviceNet or CAN interface</li> <li>- Ethernet interface</li> <li>- Compact Flash card interface</li> </ul>

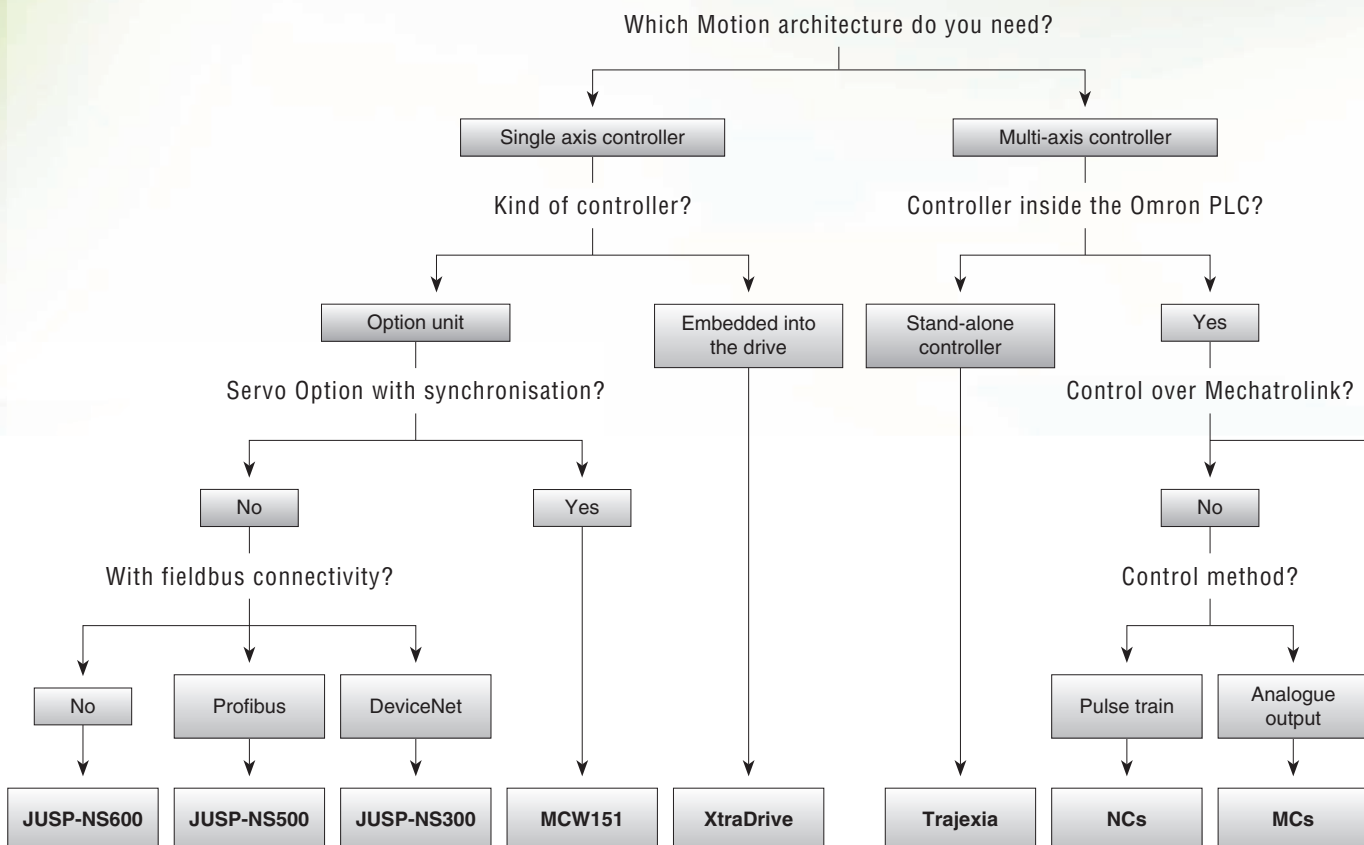
# Motion controllers

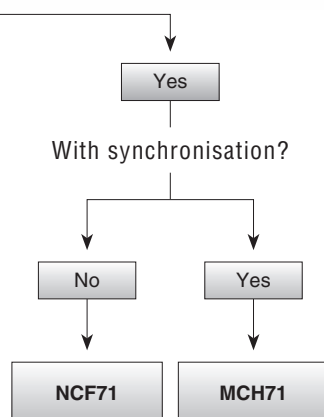
## Trajexia – the advanced motion controller that puts you in control

TrajeXia is the new motion platform that offers you the performance of a dedicated motion system, the ease of use you get from an automation specialist and the peace of mind you have from a global player.

TrajeXia puts you in full control to create the best machines today and tomorrow.

- 16 axes advanced motion coordination over a robust and fast motion link
- Each axis can run complex interpolation moves, e-cams and e-gearboxes
- Advanced debugging tools including trace and oscilloscope functions
- Multi-tasking controller capable of running up to 14 tasks simultaneously
- Open – Ethernet built-in, PROFIBUS-DP and DeviceNet as options














## Table of contents

Selection table			316
Motion controllers	Multi-axes based controllers	TJ1-Trajexia	317
		CJ1W-MCH71	319
		CJ1W-NCF71	320
		CJ1W-NC□	321
	Servo-based controllers	R88A-MCW151	322
		JUSP-NS300	323
		JUSP-NS500	324
		JUSP-NS600	325



Multi-axes motion controllers				
				
Model	Trajexia	CJ1W-MCH71	CJ1W-NCF71	CJ1W-NC□
	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	Point-to-point positioning controller
<b>Axes control method</b>	MECHATROLINK-II motion bus, analogue output and pulse-train	MECHATROLINK-II motion bus	MECHATROLINK-II motion bus	Pulse train output
<b>Number of axes</b>	16 servos + 8 inverters	30 real and 2 virtual axes	16	1, 2, 4
<b>Applicable servo drive</b>	Sigma II	Sigma II	Sigma II	SmartStep, 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.	Point to point applications
<b>Servo control mode</b>	Position, speed and torque	Position, speed and torque	Position, speed and torque	Open loop position with linear interpolation
<b>PLC series</b>	Stand alone motion solution. Ethernet, PROFIBUS-DP and DeviceNet connectivity	CJ1 and CS1 PLCs	CJ1 and CS1 PLCs	CJ1 and CS1 PLCs
<b>Page</b>	317	319	320	321

Servo based motion controllers					
					
Model	R88A-MCW151	XtraDrive	JUSP-NS300	JUSP-NS500	JUSP-NS600
	Advanced motion in a compact package	All in one! Servo drive and motion controller integrated	Position controller over DeviceNet	Position controller over PROFIBUS-DP	Position controller over serial link
<b>Axes control method</b>	Direct connection to servo drive	Integrated into the servo drive	Direct connection to servo drive	Direct connection to servo drive	Direct connection to servo drive
<b>Connectivity</b>	DeviceNet, PROFIBUS, Hostlink	PROFIBUS	DeviceNet	PROFIBUS	RS-485/RS-422
<b>Digital I/O</b>	8 DI, 6 DO, 2 registration inputs, 1 encoder in 1 pulse out + servo I/Os	Servo inputs + expansion available	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>	Advanced motion, e-cam, ELS, phase shift, registration	Advanced motion	Point to point with registration capability	Point to point with registration capability	Point to point with registration capability
<b>Servo control mode</b>	Position, speed and torque. Open loop for additional axis	Position, speed and torque.	Position and speed		
<b>Applicable servo drive</b>	Sigma II	XtraDrive	Sigma II		
<b>Page</b>	322	330	323	324	325

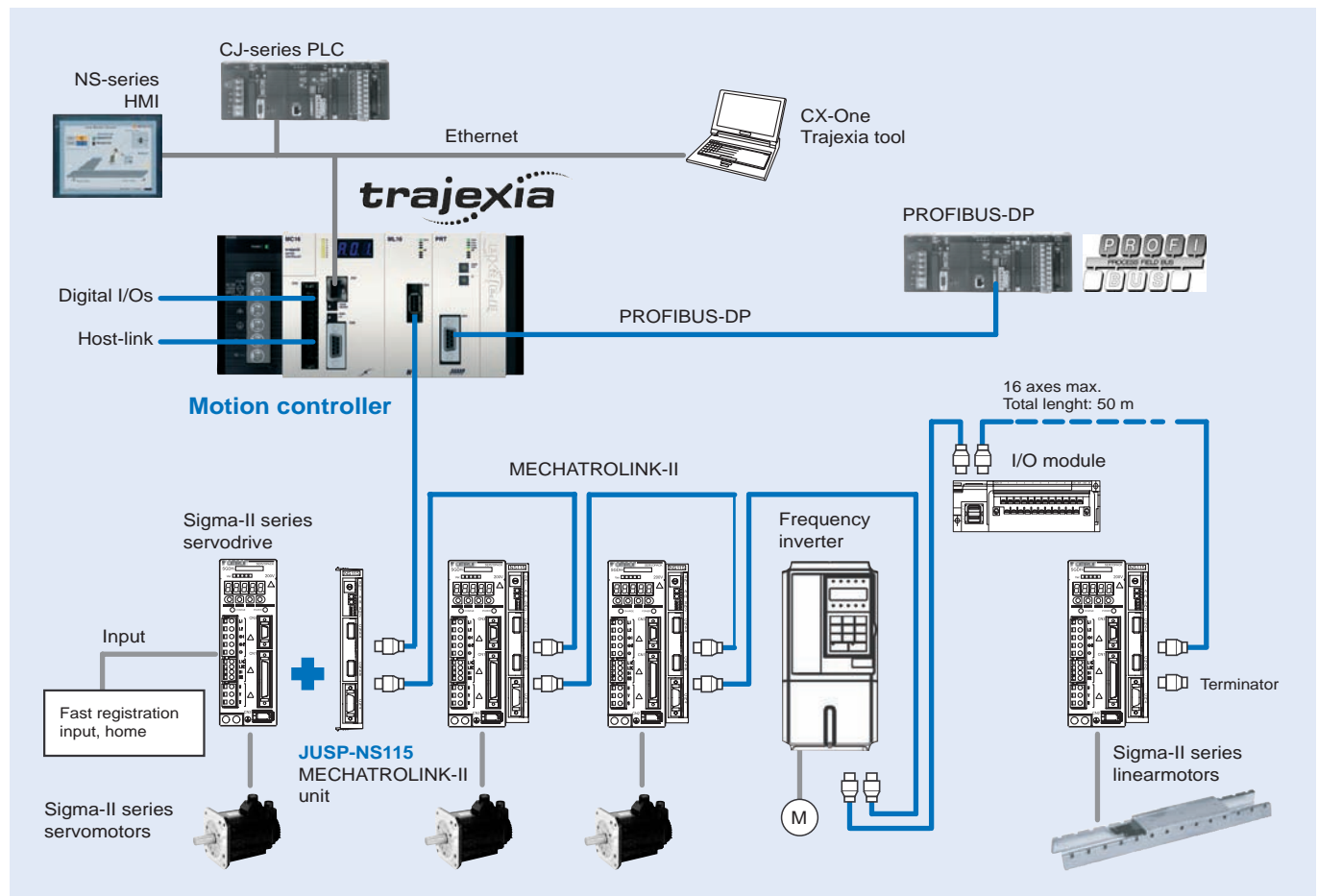


## The advanced motion controller that puts you in control

Trajexia is OMRON's new motion platform that offers you the performance of a dedicated motion system, the ease of use you get from an automation specialist and the peace of mind you have from a global player.

- 16 axes advanced motion coordination over a robust motion link
- Each axis can run complex interpolation moves, eCAMs and eGEAR
- Advanced debugging tools including trace and oscilloscope
- Multi-tasking - capable of running up to 14 tasks simultaneously
- Open - Ethernet built-in, PROFIBUS-DP and DeviceNet as options

## System configuration





## Ordering information

### Trajexia motion controller

Name	Model
Trajexia motion controller unit. Controls up to 16 servos and 8 inverters, Ethernet port build-in.	TJ1-MC16
Power supply for Trajexia controller 100-240 VAC	CJ1W-PA202
Power supply for Trajexia controller 24 VDC	CJ1W-PD022

### Trajexia - axes control modules

Name	Model
Trajexia MECHATROLINK-II master unit (up to 16 axes)	TJ1-ML16
Trajexia flexible axes unit (for 2 axes)	TJ1-FL02

### Trajexia - communication modules

Name	Model
Trajexia PROFIBUS-DP slave unit	TJ1-PRT

### MECHATROLINK-II - related devices

Name	Remarks	Model
Distributed I/O modules	64-point input and 64-point output	JEPMC-IO2310
	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

### I/O Cables

	Remarks	Length m	Model
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

### 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
Trajexia motion perfect and CX-Drive V1.2 or higher	TJ1-Tools

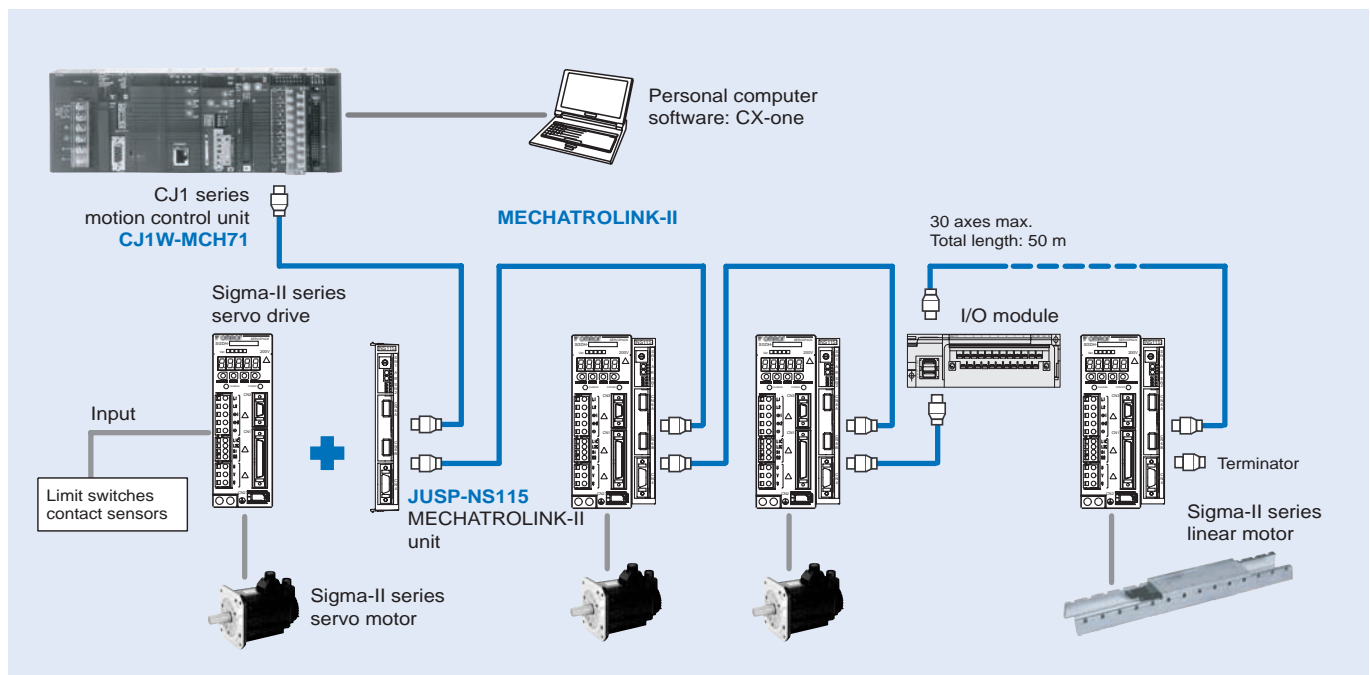


## 30-axes advanced motion controller over MECHATROLINK-II motion bus

The MCH is a compact module that enables the development of advanced applications. It supports 30 real axes and 2 virtual axes. Its advanced motion includes e-cam, ELS and registration.

- Simplified wiring
- Simple basic programming
- One hardware registration per axis
- Real multi-tasking
- Access to complete system from 1 point

### 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
MECHATROLINK cables	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 (For inverter version support contact your OMRON sales office)	SI-T/V7
	For Varispeed F7, G7 inverter (For inverter version support contact your OMRON sales office)	SI-T

Name	Remarks	Model
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

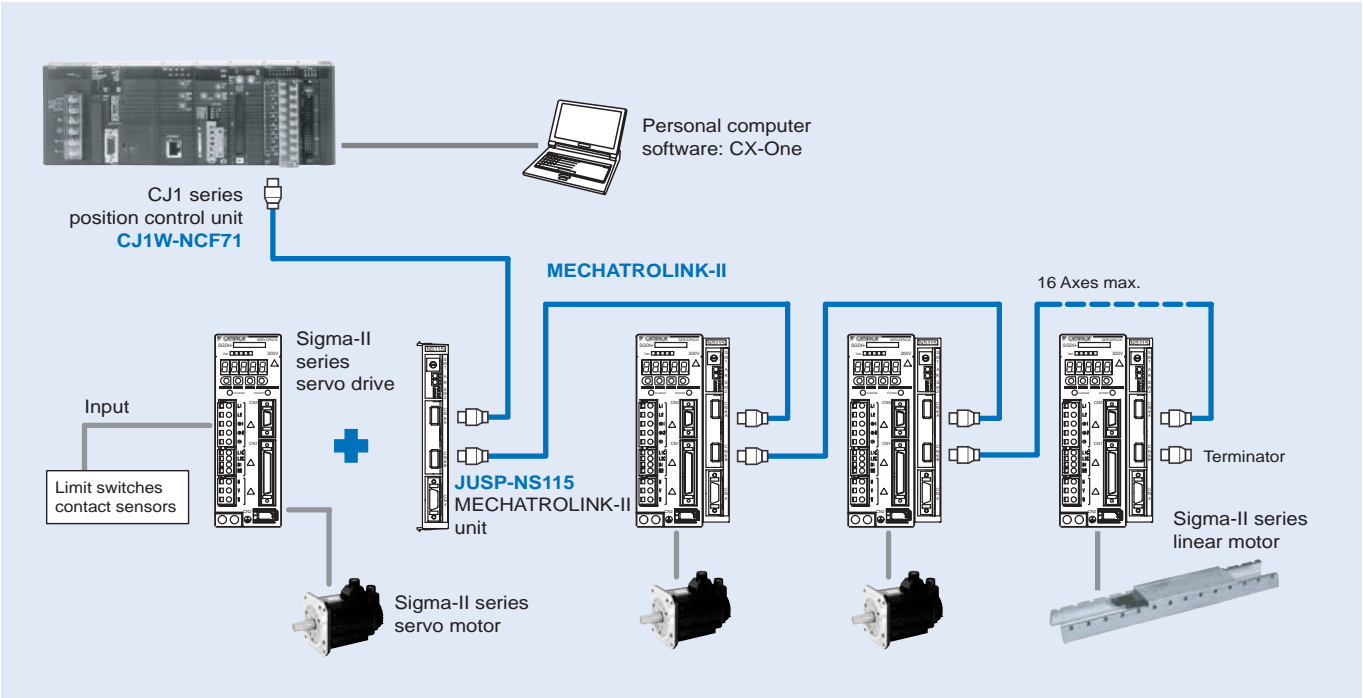


16-axis point-to-point positioning controller over MECHATROLINK-II

NCF is a powerful controller for point-to-point applications. It is based on MECHATROLINK-II motion bus, which reduces programming and development and maintenance costs. Supports PLC open function blocks.

- Simplified wiring. Data routing to all servo drives (MECHATROLINK)
- Integration into OMRON Smart Platform: FBs, SAPs, CX-One
- Servo drives full control and parameter access via MECHATROLINK
- Easy, fast, reliable, optimised for positioning applications
- Advanced PTP: 8-axis (4 dim.+ 4 dim.) interpolator

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. (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

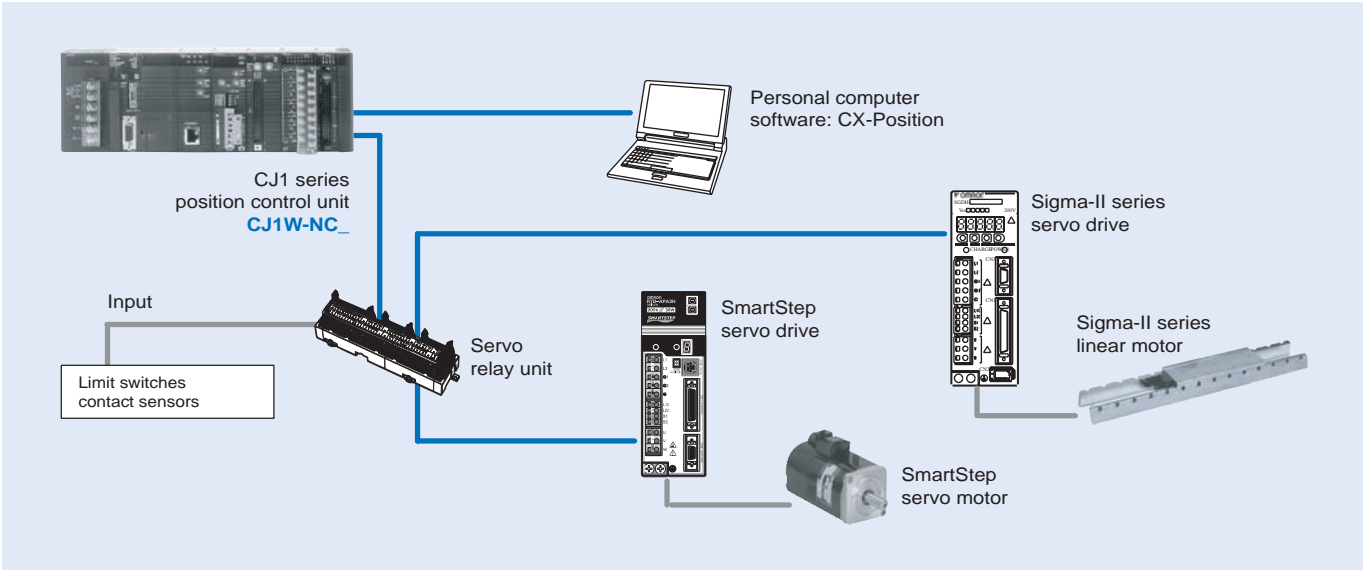


4-axis point-to-point positioning controller with pulse train output

The NC motion controllers support positioning control via pulse-train outputs. Positioning is performed using trapezoidal or S-curve acceleration and deceleration. Ideal for controlling simple positioning in stepper motors and servos with pulse-train input.

- Positioning can be carried out by direct ladder commands
- Positioning using trapezoidal and S curve
- Interrupt feeding function
- Positioning points are saved in internal flash memory
- Origin search and backlash compensation functions

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 version 1.1 or higher	CX-ONE

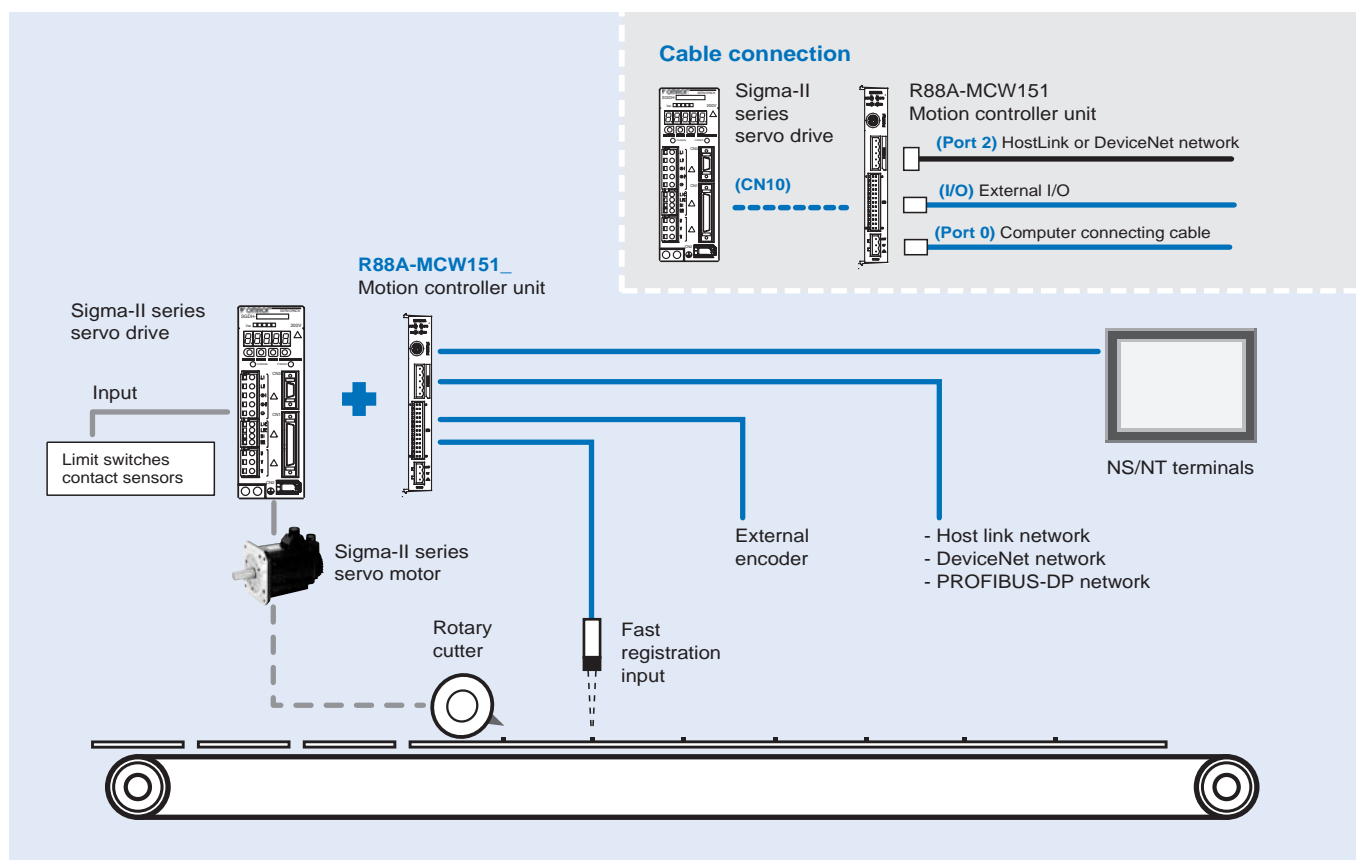


## Motion pure in a compact package

The MCW151 is a powerful servo-based controller. Complex motions such as cams, gears, linked axes and interpolation are made easy with a comprehensive BASIC command set.

- Controls 1 real axis, 1 virtual axis and a configurable third axis
- One pulse-train output to control an additional axis
- User-friendly and intuitive BASIC motion programming
- Multi-tasking programming
- 2 fast-registration inputs

## Ordering information



### 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



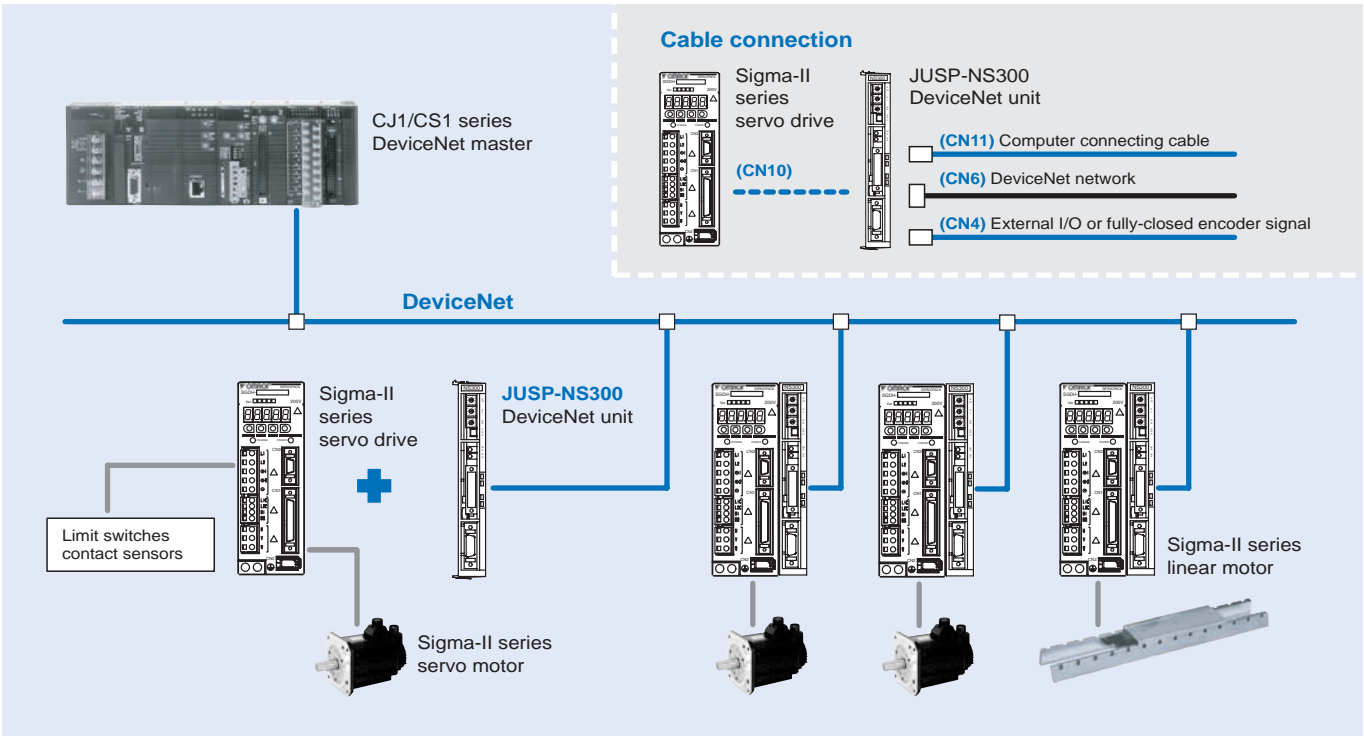


Position controller over DeviceNet

The NS300 is the drive-based solution for simple and reliable positioning using DeviceNet.

- No programming language is necessary
- Up to 63 drives can be connected in a network
- Supports polling I/O and explicit messages
- Parameters are maintained by the PLC
- Various positioning modes (homing, multistep and speed positioning)

Ordering information



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 networks section 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.

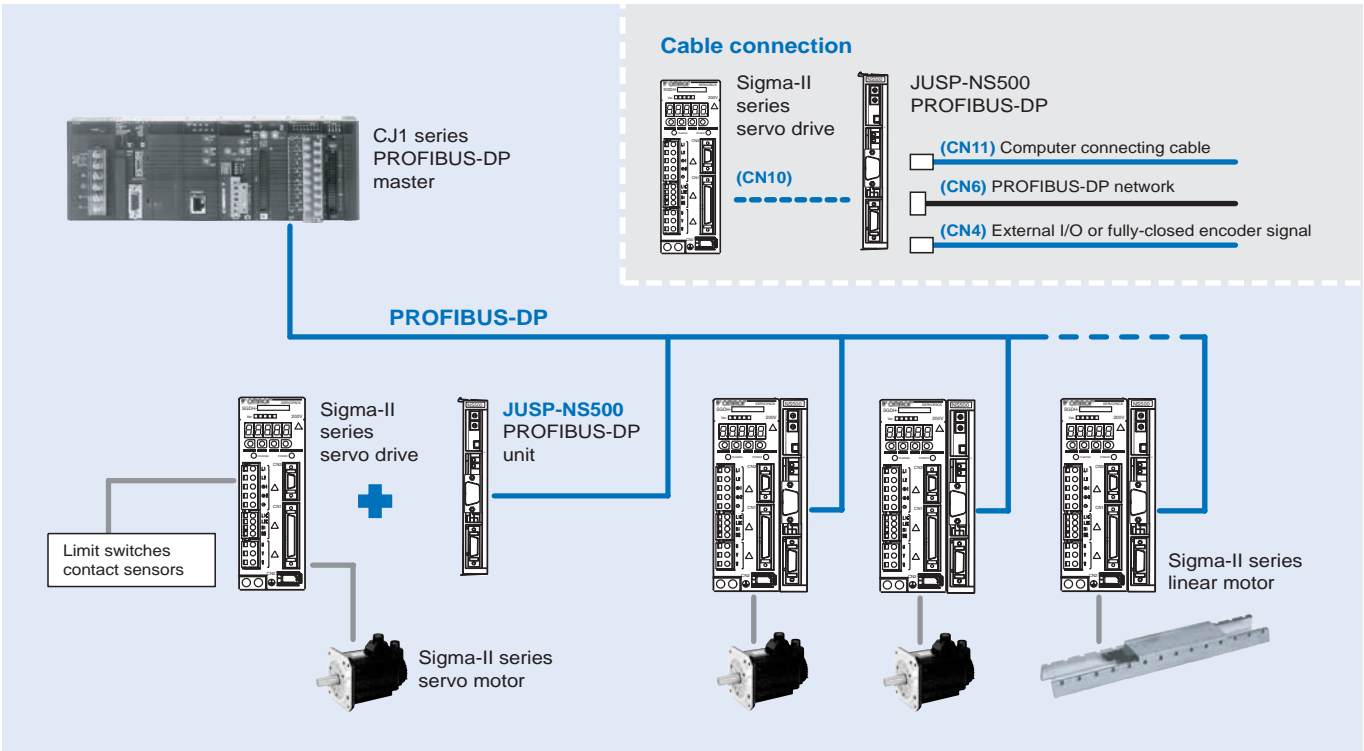


Position controller over PROFIBUS-DP

The NS500 is a flexible and simple distributed control over PROFIBUS-DP. It connects directly to the Sigma-II and has several positioning modes, making it simple to configure.

- No programming language is necessary
- Various positioning modes (homing, multistep and speed positioning)
- Connects directly to Sigma-II drives
- Up to 125 servos can be connected
- Fully closed control loop

Ordering information



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
Conector 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.

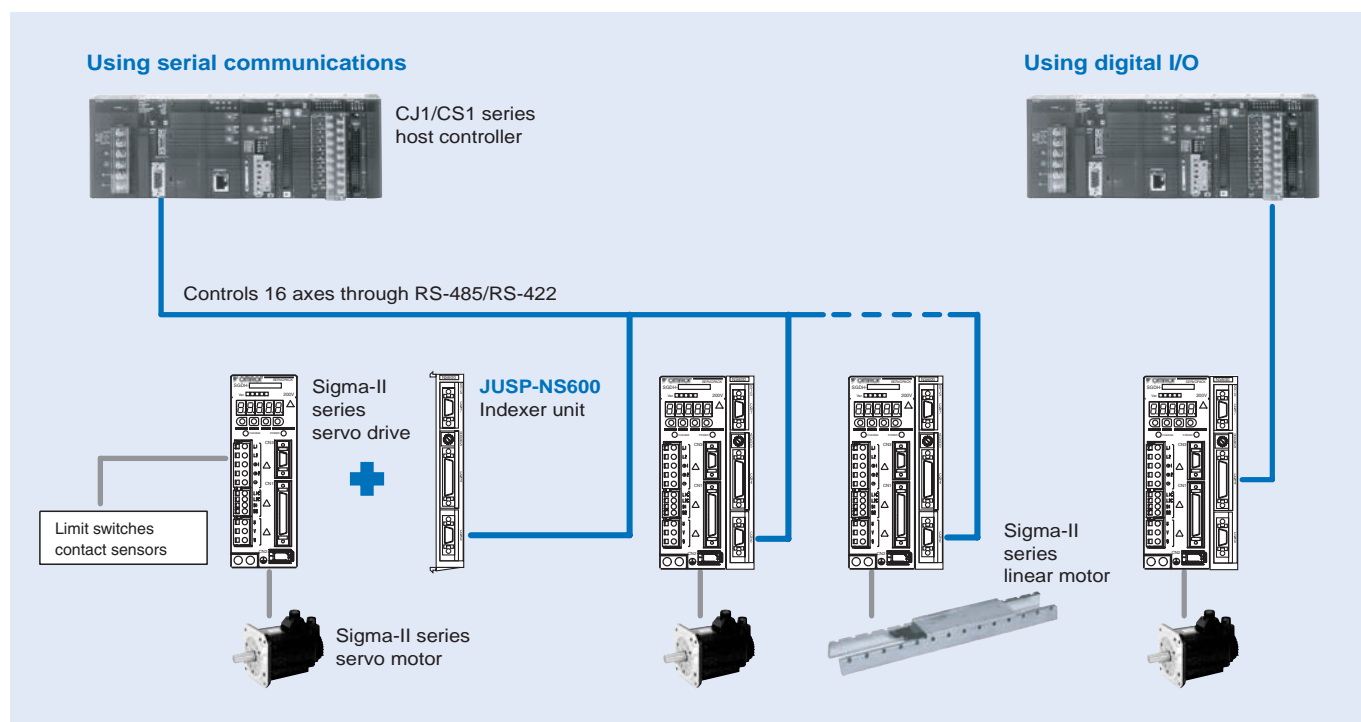


## Position controller over serial link

The NS600 provides flexible and simple distributed control. It connects directly to the Sigma-II and has several positioning modes, making it simple to configure. It supports a standard RS-485/422 and discrete I/O control

- Direct connection to servo drive
- No programming language is necessary
- Discrete I/O positioning control
- Up to 16 servos can be connected via network
- Parameters are maintained by the PLC

## Ordering information



### 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 1m 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.

# Servo systems

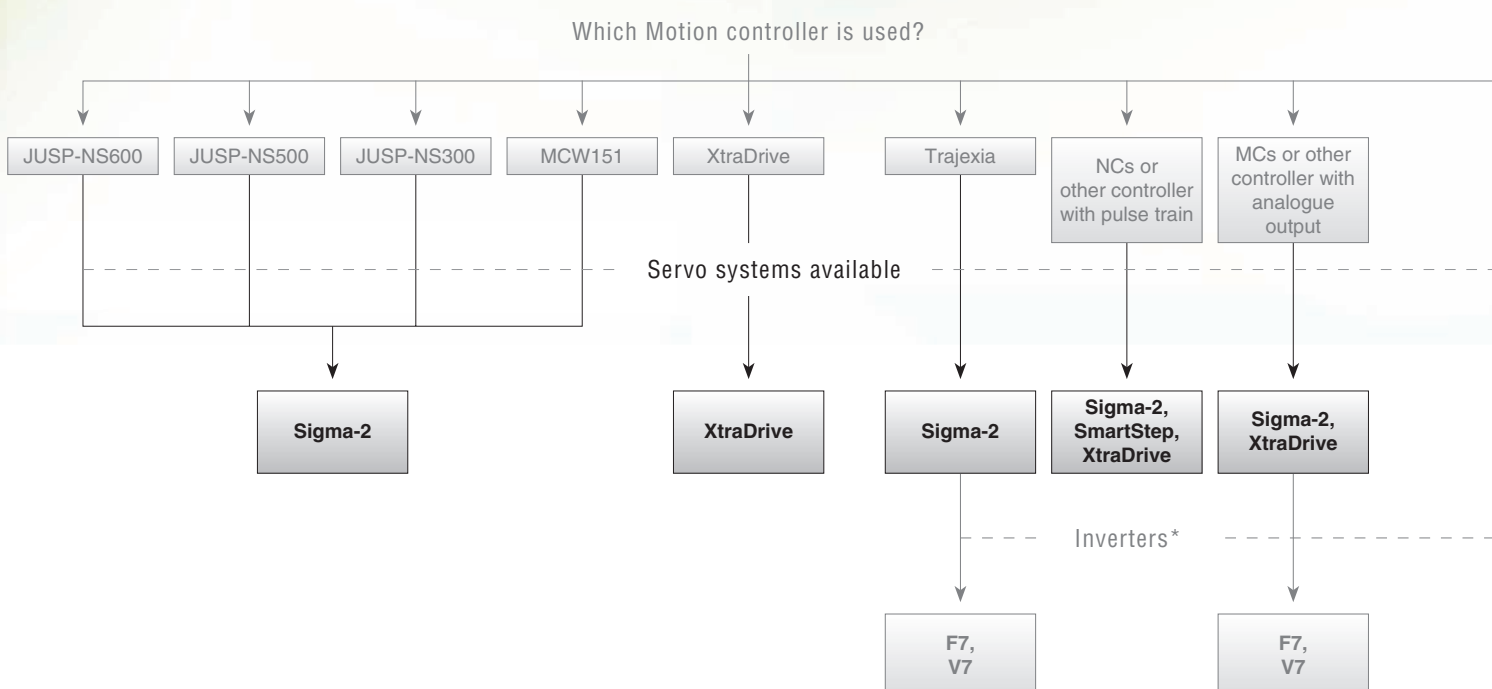
## Designed with ZERO compromise

The Sigma II servo series was designed with ZERO compromise on quality, reliability or performance.

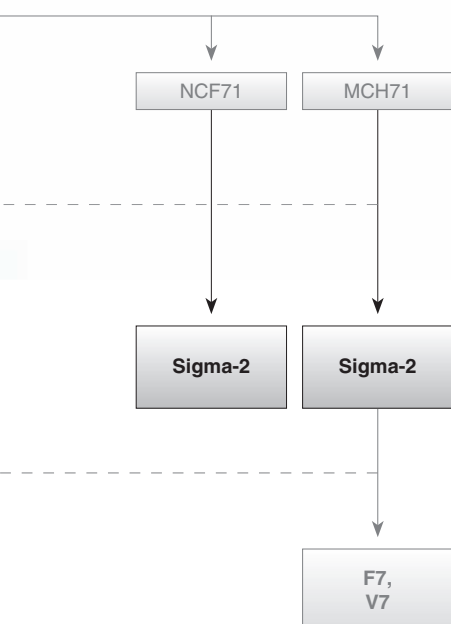
The servo amplifiers are ultra-compact with pulse and analogue inputs as standard, plus an auto-tuning function.

Plug-in option cards offer enhanced functionality such as indexing and complex motions such as cams, gears and linked axes.

- 300% peak current for 3 seconds
- Automatic motor recognition with auto-tuning function
- Analogue and pulse inputs for speed, torque and position control
- Option units for field buses, Mechatrolink II, Sercos and motion controller and indexers
- Trace function allowing oscilloscope functionality













\*See Inverter chapter

## Table of contents

Selection table		328
Servo drive	XtraDrive	330
	Sigma-II servo drive	334
	SmartStep drive	339
Rotary servo motors	Sigma-II rotary motors	342
	SmartStep rotary motors	353
Linear servo motors	Sigma linear motors	357

# Selection table

Servo drives			
			
	<b>XtraDrive</b>	<b>Sigma-II</b>	<b>SmartStep</b>
	All in one! Servo drive and motion controller	Designed with ZERO compromise	Servo capability with stepper simplicity
<b>Ratings 230 V single-phase</b>	30 W to 1,500 W	30 W to 1,500 W	30 W to 800 W
<b>Ratings 400 V single-phase</b>	0.5 kW to 5 kW	0.5 kW to 55 kW	N/A
<b>Motors applicable</b>	Sigma linear motors, rotary Sigma-II and SmartStep motors	Rotary Sigma-II and Sigma linear motors	SmartStep motors
<b>Positioning control</b>	Internal program, pulse train input or via PROFIBUS-DP	Pulse train input or via option unit	Pulse train input
<b>Speed control</b>	Internal program, analogue $\pm 10$ V or via PROFIBUS-DP	Analogue $\pm 10$ V or via option unit	N/A
<b>Torque control</b>	Internal program, analogue $\pm 10$ V or via PROFIBUS-DP	Analogue $\pm 10$ V or via option unit	N/A
<b>Page</b>	330	334	339

Rotary servo motors			
			
	<b>SGMAH</b>	<b>SGMPH</b>	<b>SGMGH</b>
	<b>Sigma-II rotary motors (6 different motor families to cover all application needs)</b>		
	Low-inertia design for high dynamics	Medium inertia design with flat profile	High torque servo motors
<b>Rated speed</b>	3,000 rpm	3,000 rpm	1,500 rpm
<b>Max speed</b>	5,000 rpm	5,000 rpm	3,000 rpm
<b>Rated torque</b>	0.095 Nm to 2.39 Nm	0.318 Nm to 4.77 Nm	2.84 Nm to 95.4 Nm
<b>Sizes</b>	30 to 800 W	100 to 1500 W	0.45 to 15 kW
<b>Drives applicable</b>	Sigma-II and XtraDrive	Sigma-II and XtraDrive	Sigma-II and XtraDrive
<b>Encoder resolution</b>	13 bits-incremental / 16 bits-absolute	13 bits-incremental / 16 bits-absolute	17 bits-incremental and absolute
<b>IP rating</b>	IP55	IP55 (optional IP67)	IP67
<b>Page</b>	342		



## Sigma linear servo motors



	SGLFW	SGLGW	SGLTW
	Iron-core Sigma linear motor, making the difference	Coreless GW linear motor construction results in zero attraction force	Iron-core TW linear motor with magnetic attraction cancellation
<b>Rated force range</b>	25 N to 2250 N	13.5 N to 325 N	300 N to 2,000 N
<b>Peak force range</b>	86 N to 5400N	40 N to 1300 N	600 N to 7500 N
<b>Maximum speed</b>	5 m/sec	5 m/sec	5 m/sec
<b>Design type</b>	Iron-core coil	Coreless coil	Iron-core coil
<b>Magnetic attraction</b>	314 N to 14600 N	zero	zero
<b>Drives applicable</b>	Sigma-II and XtraDrive	Sigma-II and XtraDrive	Sigma-II and XtraDrive
<b>Page</b>	357		

## Rotary servo motors



	SGMSH	SGMUH	SGMBH	SmartStep motors
	Sigma-II rotary motors (6 different motor families to cover all application needs)			SmartStep
	Low-inertia motors for high dynamics	High speed servo motors	High power applications	Ultra compact motor
<b>Rated speed</b>	3,000 rpm	6,000 rpm	1,500 rpm	3,000 rpm
<b>Max speed</b>	5,000 rpm	6,000 rpm	2,000 rpm	4,500 rpm
<b>Rated torque</b>	3.18 Nm to 15.8 Nm	1.59 Nm to 6.3 Nm	140 Nm to 350 Nm	0.095 Nm to 2.39 Nm
<b>Sizes</b>	1 to 5 kW	1 to 5 kW	22 kW to 55 kW	30 to 800 W
<b>Drives applicable</b>	Sigma-II and XtraDrive	Sigma-II and XtraDrive	Sigma-II	SmartStep and XtraDrive
<b>Encoder resolution</b>	17 bits-incremental and absolute	17 bits-incremental	17 bits-incremental and absolute	2000 pulses / revolution
<b>IP rating</b>	IP67	IP67	IP44	IP55
<b>Page</b>	342			353



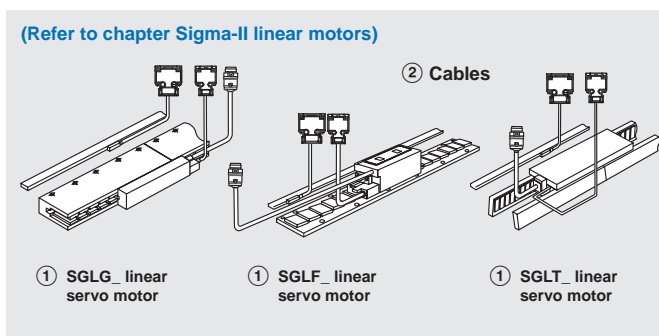
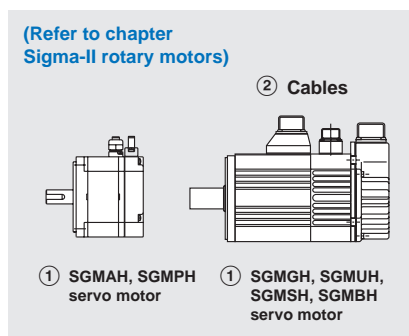
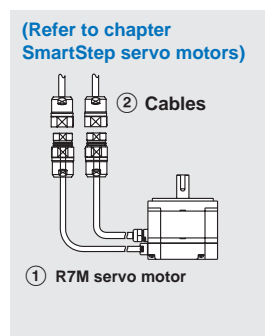
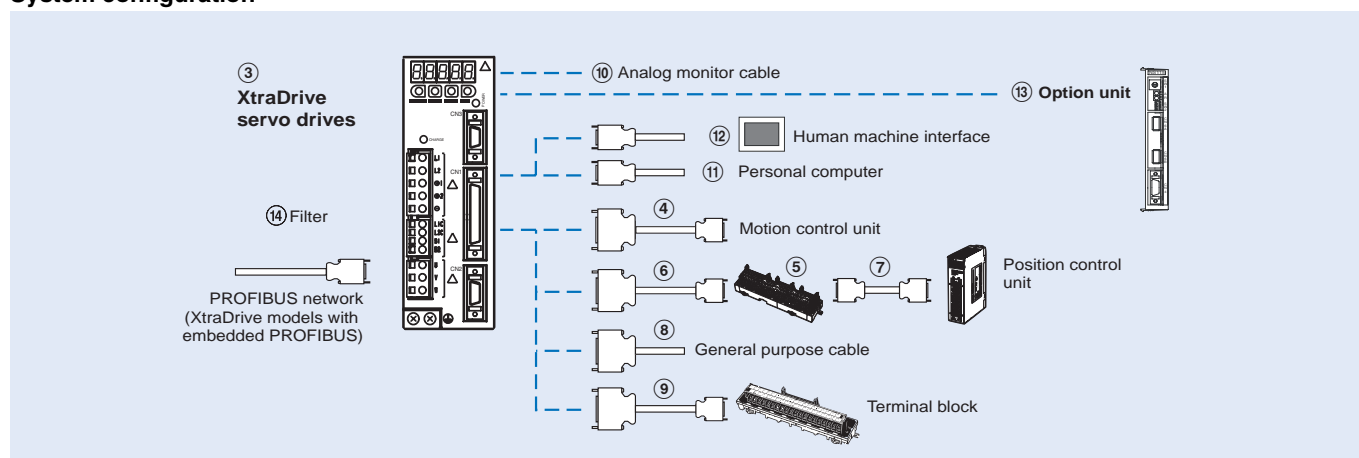
## All-in-one servo drive and motion controller integrated

If your application demands the highest accuracy, the shortest cycle time in the most compact size and the ability to connect to PROFIBUS-DP or CAN, then look no further than XtraDrive. Complex motions such as cams, gears and linked axes are also available.

- Patented non-linear technique for tight control
- Very low tracking error with no overshoot and zero settling time
- The ideal drive for linear-motor control
- Supports various servo-motor encoder types
- PROFIBUS-DP embedded

## Ordering information

### System configuration



**Note:** The symbols ①②③④⑤... show the recommended sequence to select the components for a servo system.

### Servo motors, power & encoder cables

**Note:** ①② Refer to the Servo motors chapter for detailed motor specifications and selection.

### Servo drives

Symbol	Specifications	XtraDrive	XtraDrive-E with electronic CAM	XtraDrive-DP with PROFIBUS	XtraDrive-DP-E with PROFIBUS and electronic CAM	Compatible servo motors ①		
						Sigma-II rotary	SmartStep	Sigma linear motors
③	1 phase 200 VAC	30 W	XD-P3-MN01	XD-P3-MN01-E	-	SGMAH-A3A□	R7M-A03030-□	-
		50 W	XD-P5-MN01	XD-P5-MN01-E	-	SGMAH-A5D□	R7M-A05030-□	SGLGW-30A050□
		100 W	XD-01-MN01	XD-01-MN01-E	XD-01-MSD0	SGMAH-01A□, SGMPH-01A□	R7M-A10030-□, R7M-AP10030-□	SGLGW-30A080□, SGLGW-40A140□
		200 W	XD-02-MN01	XD-02-MN01-E	XD-02-MSD0	SGMAH-02A□, SGMPH-02A□	R7M-A20030-□, R7M-AP20030-□	SGLFW-20A□, SGLFW-35A120□, SGLGW-40A253A□, SGLGW-60A140□
		400 W	XD-04-MN01	XD-04-MN01-E	XD-04-MSD0	SGMAH-04A□, SGMPH-04A□	R7M-A40030-□, R7M-AP40030-□	SGLGW-40A365A□, SGLGW-60A253A□
		750 W	XD-08-MN	XD-08-MN01-E	XD-08-MSD0	SGMAH-08A□, SGMPH-08A□	R7M-A75030-□, R7M-AP75030-□	SGLFW-35A230□, SGLFW-50A200□, SGLGW-60A365A□

Symbol	Specifications		XtraDrive	XtraDrive-E with electronic CAM	XtraDrive-DP with PROFIBUS	XtraDrive-DP-E with PROFIBUS and electronic CAM	Compatible servo motors ①		
							Sigma-II rotary	SmartStep	Sigma linear motors
③	1 Phase 200 VAC	1.5 kW	XD-15-MN	XD-15-MN00-E	-	-	SGMPH-15A□	-	SGLFW-50A380□, SGLFW-1ZA200□, SGLGW-90A200A□
	3 Phase 400 VAC	0.5 kW	XD-05-TN	XD-05-TN00-E	XD-05-TSD0	XD-05-TSD0-E	SGMGH-05D□, SGMAH-03D□, SGMPH-02D□/04D□	-	SGLFW-35D□
		1.0 kW	XD-10-TN	XD-10-TN00-E	XD-10-TSD0	XD-10-TSD0-E	SGMGH-09D□, SGMSH/UH-10D□, SGMAH-07D□, SGMPH-08D□	-	SGLFW-50D200□, SGLTW-35D170□, SGLTW-50D170□
		1.5 kW	XD-15-TN	XD-15-TN00-E	XD-15-TSD0	XD-15-TSD0-E	SGMGH-13D□, SGMSH/UH-15D□, SGMPH-15D□	-	SGLFW-50D380□, SGLFW-1ZD200□
		2.0 kW	XD-20-TN	XD-20-TN00-E	XD-20-TSD0	XD-20-TSD0-E	SGMGH-20D□, SGMSH-20D□	-	SGLTW-35D320□, SGLTW-50D320□
		3.0 kW	XD-30-TN	XD-30-TN00-E	XD-30-TSD0	XD-30-TSD0-E	SGMGH-30D□, SGMSH/UH-30D□	-	SGLFW-1ZD380□, SGLTW-40D400□
		5.0 kW	XD-50-TN	XD-50-TN00-E	-	-	SGMGH-44D□, SGMSH/UH-40D□, SGMSH-50D□	-	SGLTW-40D600□, SGLTW-80D400□

**Note:** SGLGW-□ linear motor combination is made considering the use of standard magnets. Refer to the linear motors chapter for details.

## Control cables (for CN1)

Symbol	Description	Connect to	Len	Model
④	Control cable (1 axis)	Motion control units CS1W-MC221 CS1W-MC421 C200H-MC221	1 m	R88A-CPW001M1
			2 m	R88A-CPW002M1
			3 m	R88A-CPW003M1
			5 m	R88A-CPW005M1
	Control cable (2 axis)	Motion control units CS1W-MC221 CS1W-MC421 C200H-MC221	1 m	R88A-CPW001M2
			2 m	R88A-CPW002M2
			3 m	R88A-CPW003M2
			5 m	R88A-CPW005M2
	Terminal block (4 axes)	Motion control unit C200HW-MC402-E	-	R88A-TC04-E
	Servo drive connecting cable (1 axis)	PLC unit control cables (4 axes)	1 m	R88A-CMUK001J3-E2
	PLC unit control cables (4 axes)		1 m	R88A-CMX001S-E
			1 m	R88A-CMX001J1-E
⑤	Servo relay unit	CS1W-NC1□3, CJ1W-NC1□3, or C200HW-NC113	Position control unit	
		CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3, or C200HW-NC213/413	Position control unit	
		CQM1H-PLB21 CQM1-CPU43	Position control unit	
		CJ1M-CPU22/23	Position control unit	
			Position control unit	
⑥	Cable to servo drive	Servo relay units XW2B-□0J6-□B	1 m	XW2Z-100J-B4
			2 m	XW2Z-200J-B4
⑦	Position control unit connecting cable	C200H-NC112	0.5 m	XW2Z-050J-A1
			1 m	XW2Z-100J-A1
		C200H-NC211	0.5 m	XW2Z-050J-A2
			1 m	XW2Z-100J-A2
		CQM1-CPU43-V1 and CQM1H-PLB21	0.5 m	XW2Z-050J-A3
			1 m	XW2Z-100J-A3
		CS1W-NC113 and C200HW-NC113	0.5 m	XW2Z-050J-A6
			1 m	XW2Z-100J-A6
		CS1W-NC213/413 and C200HW-NC213/413	0.5 m	XW2Z-050J-A7
			1 m	XW2Z-100J-A7
		CS1W-NC133	0.5 m	XW2Z-050J-A10
			1 m	XW2Z-100J-A10
		CS1W-NC233/433	0.5 m	XW2Z-050J-A11
			1 m	XW2Z-100J-A11

Symbol	Description	Connect to	Len	Model
⑦	Position control unit connecting cable	CJ1W-NC113	0.5 m	XW2Z-050J-A14
			1 m	XW2Z-100J-A14
		CJ1W-NC213/413	0.5 m	XW2Z-050J-A15
			1 m	XW2Z-100J-A15
		CJ1W-NC133	0.5 m	XW2Z-050J-A18
			1 m	XW2Z-100J-A18
		CJ1W-NC233/433	0.5 m	XW2Z-050J-A19
			1 m	XW2Z-100J-A19
		CJ1M-CPU22/23	0.5 m	XW2Z-050J-A27
			1 m	XW2Z-100J-A27
⑧	Control cable	For general purpose controllers	1 m	R88A-CPW001S or JZSP-CKI01-1
			2 m	R88A-CPW002S or JZSP-CKI01-2
⑨	Relay terminal block cable	General-purpose controller	1 m	R88A-CTW001N
	Relay terminal block		2 m	R88A-CTW002N
			-	XW2B-50G5

## Cable (for CN5)

Symbol	Name	Model
⑩	Analog monitor cable	R88A-CMW001S or DE9404559

## Options (for CN3)

Symbol	Name	Model
⑪	Computer connecting cable	R88A-CCW002P2 or JZSP-CMS02

## Human machine interface

Symbol	Name	Model
⑫	4.1" HMI monochrome	NT3S-ST126B-E

## Option units (for CN10)

Symbol	Name	Model
⑬	IO card, 8 inputs / 8 outputs	XDIO-08

## Filters

Symbol	Applicable servo drive	Filter model	Rated current	Rated voltage
⑭	XD-P3-M□, XD-P5-M□, XD-01-M□, XD-02-M□	R88A-FIW104-SE	4 A	250 VAC single-phase
	XD-04-M□	R88A-FIW107-SE	7A	
	XD-08-M□	R88A-FIW115-SE	15 A	
	XD-15-M□	R88A-FIW125-SE	25 A	
	XD-05-T□, XD-10-T□, XD-15-T□	R88A-FIW4006-SE	6 A	400 VAC three-phase
	XD-20-T□, XD-30-T□	R88A-FIW4010-SE	10 A	
	XD-50-T□	R88A-FIW4020-SE	20 A	

## Battery backup for absolute encoder

Name	Model
Battery (required for servo motors with absolute encoder)	JZSP-BA01 ER6VC3 (3.6V)

## Connectors

Specification	Model
Control I/O connector (For CN1)	R88A-CNU11C or JZSP-CKI9
XtraDrive 200V connector kit. (For 200V motors SGMAH/PH-□□A□□□D-OY and R7M-A□-D)	Connectors included DE9406973 SPOC-17H-FRON169 SPOC-06K-FSDN169 XD-CN200K-DE
XtraDrive 400V connector kit. (For 400V motors SGMAH/PH-□□D□□□D-OY)	Connectors included DE9406973 SPOC-17H-FRON169 LPRA-06B-FRBN170 XD-CN400K-DE
Sigma-II Drive encoder connector (For CN2)	DE9406973 or R88A-CNU01R
Hypertac encoder connector IP67 (For motors SGMAH/PH-□□□□□□D-OY and R7M-A□-D)	SPOC-17H-FRON169

Specification	Model
Hypertac power connector IP67, 200V. (For 200V motors SGMAH/PH-□□A□□□D-OY and R7M-A□-D)	SPOC-06K-FSDN169
Hypertac power connector IP67, 400V. (For 400V motors SGMAH/PH-□□D□□□D-OY)	LPRA-06B-FRBN170
Military encoder connector IP67 (For motors SGMGH-□, SGMSH-□, SGMUH-□)	MS3108E20-29S
Military power connector IP67 (For 400V motors SGMGH-(05/10/13)D□, SGMSH-(10/15/20)D□, SGMUH-(10/15)D□)	MS3108E18-10S
Military power connector IP67 (For 400V motors SGMGH-(20/30/44)D□, SGMSH-(30/40/50)D□, SGMUH-(30/40)D□)	MS3108E22-22S
Military brake connector IP67 (For 400V servo motors SGMGH-□, SGMSH-□, SGMUH-□)	MS3108E10SL-3S

## Computer software

Specifications	Model
XtraWare	MOTION TOOLS

## Specifications

### Single-phase, 230 V

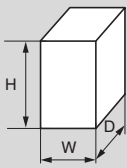
Servo drive type	XD-P3-M□	XD-P5-M□	XD-01-M□	XD-02-M□	XD-04-M□	XD-08-M□	XD-15-M□
Applicable servo motor	SGMAH-□	A3A□	A5A□	01A□	02A□	04A□	08A□
	SGMPH-□	-	-	01A□	02A□	04A□	08A□
	R7M-□	A03030-□	A05030-□	A10030-□	A20030-□	A40030-□	A75030-□
	R7M-□	-	-	AP10030-□	AP20030-□	AP40030-□	AP75030-□
Max. applicable motor capacity	W	30	50	100	200	400	750
Continuous output current	A(rms)	0.44	0.64	0.91	2.1	2.8	5.7
Max. output current	A(rms)	1.3	2.0	2.8	6.5	8.5	13.9
Input power	Main circuit	For single-phase, 200 to 230 VAC +10 to -15%					
Supply	Control circuit	For single-phase, 200 to 230 VAC +10 to -15%					
Control method		Single phase full-wave rectification / IGBT / PWM / sine-wave current drive method					
Feedback		Serial encoder ( incremental / absolute value )					
Usage / storage temperature		0 to +55 °C / -20 to 85 °C					
Usage / storage humidity		90% RH or less (non-condensing)					
Altitude		1000 m or less above sea level					
Vibration / shock resistance		4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>					
Configuration		Base mounted					
Approx. weight	kg	0.8				1.1	1.7

### Three-phase, 400 V

Servo drive type	XD-05-T□	XD-10-T□	XD-15-T□	XD-20-T□	XD-30-T□	XD-50-T□
Applicable servo motor	SGMAH-□	03D□	07D□	-	-	-
	SGMPH-□	02D□, 04D□	08D□	-	-	-
	SGMGH-□	05D□	09D□	13D□	20D□	30D□
	SGMSH-□	-	10D□	15D□	20D□	30D□
	SGMUH-□	-	10D□	15D□	-	30D□
Max. applicable motor capacity	kW	0.45	1.0	1.5	2.0	3.0
Continuous output current	A(rms)	1.9	3.5	5.4	8.4	11.9
Max. output current	A(rms)	5.5	8.5	14	20	28
Input power	Main circuit	For three-phase, 380 to 480 VAC + 10 to -15% (50/60Hz)				
Supply	Control circuit	24VDC+ 15%				
Control method		Three phase full-wave rectification / IGBT / PWM / sine-wave current drive method				
Feedback		Serial encoder (incremental / absolute value)				
Usage / storage temperature		0 to +55 °C / -20 to +85 °C				
Usage / storage humidity		90% RH or less (non-condensing)				
Altitude		1000 m or less above sea level				
Vibration / shock resistance		4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>				
Configuration		Base mounted				
Approx. weight	kg	2.8			3.8	5.5

## Dimensions

### Servo drives

Specifications		Drive model	H	W	D	
1-phase 200 VAC	30 W	XD-P3-M□	160	55	130	
	50 W	XD-P5-M□				
	100 W	XD-01-M□				
	200 W	XD-02-M□				
	400 W	XD-04-M□	160	75	130	
	750 W	XD-08-M□	160	90	180	
	1.5 kW	XD-15-M□	250	110	180	
3-phase 400 VAC	0.5 kW	XD-05-T□	160	110	180	
	1.0 kW	XD-10-T□				
	1.5 kW	XD-15-T□				
	2.0 kW	XD-20-T□	250	110	180	
	3.0 kW	XD-30-T□	250	125	230	
	5.0 kW	XD-50-T□				



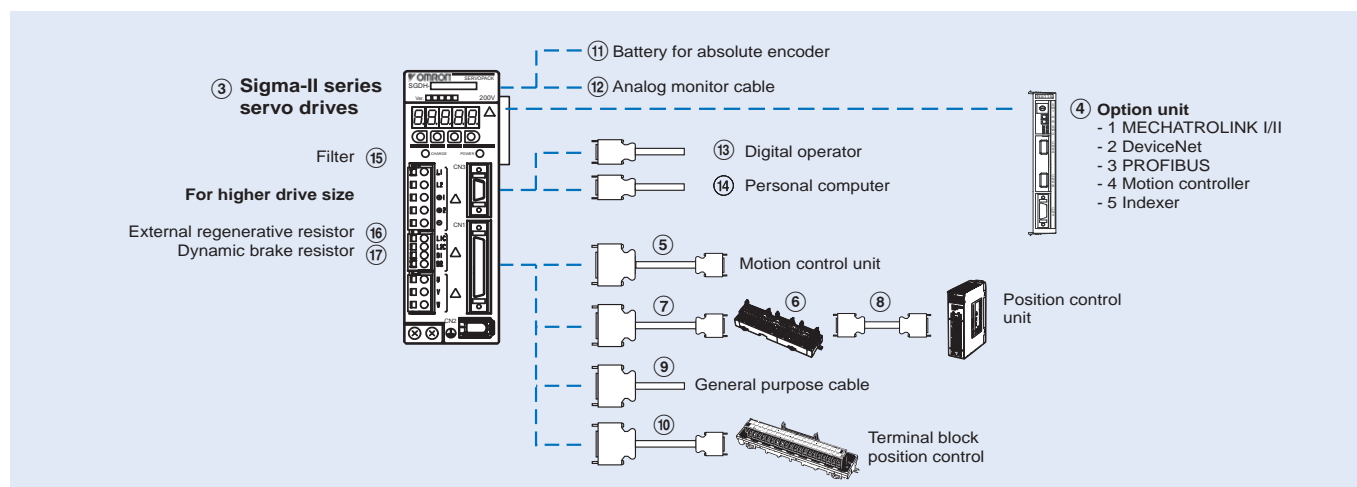


## Designed with ZERO compromise

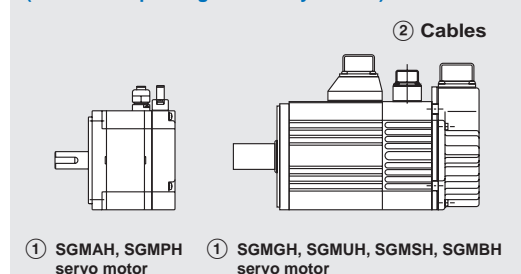
The Sigma II servo series was designed with ZERO compromise on quality, reliability or performance. The servo amplifiers are ultra-compact with pulse and analogue inputs as standard, plus an auto-tuning function. Plug-in option cards offer enhanced functionality such as indexing and complex motions such as cams, gears and linked axes.

- 300% peak current for 3 seconds
- Automatic motor recognition with auto-tuning function
- Analogue and pulse inputs for speed, torque and position control
- Option units for field buses, MECHATROLINK-II, servos and motion controller and indexers
- Trace function allowing oscilloscope function

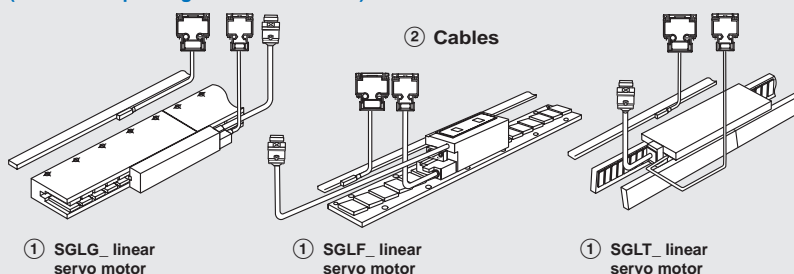
## Ordering information



(Refer to chapter Sigma-II rotary motors)



(Refer to chapter Sigma-II linear motors)



**Note:** The symbols ①②③④⑤... show the recommended sequence to select the components in a Sigma-II servo system

### Servo motors, power & encoder cables

**Note:** ①② Refer to the servo motors chapter for detailed motor specifications and selection

### Servo drives

Symbol	Specifications	Model	Compatible rotary servo motors ①	Compatible linear motors ①
③	1 Phase 200 V AC	30 W	SGDH-A3AE-OY	SGMAH-A3A□
		50 W	SGDH-A5AE-OY	SGMAH-A5D□
		100 W	SGDH-01AE-OY	SGMAH-01A□, SGMPH-01A□
		200 W	SGDH-02AE-OY	SGMAH-02A□, SGMPH-02A□
		400 W	SGDH-04AE-OY	SGMAH-04A□, SGMPH-04A□
		750 W	SGDH-08AE-S-OY	SGMAH-08A□, SGMPH-08A□
		1500 W	SGDH-15AE-S-OY	SGMPH-15A□
				SGLGW-30A050□
				SGLGW-30A080□, SGLGW-40A140□
				SGLFW-20A□, SGLFW-35A120□, SGLGW-40A253A□, SGLGW-60A140□
				SGLGW-40A365A□, SGLGW-60A253A□
				SGLFW-35A230□, SGLFW-50A200□, SGLGW-60A365A□
				SGLFW-50A380□, SGLFW-1ZA200□, SGLGW-90A200A□

Symbol	Specifications	Model	Compatible rotary servo motors ①	Compatible linear motors ①
③	3 Phase 400 V AC	0.5 kW SGDH-05DE-OY	SGMGH-05D□, SGMAH-03D□, SGMPH-02D□/04D□	SGLFW-35D□
		1.0 kW SGDH-10DE-OY	SGMGH-09D□, SGMSH/UH-10D□, SGMAH-07D□, SGMPH-08D□	SGLFW-50D200□, SGLTW-35D170□, SGLTW-50D170□
		1.5 kW SGDH-15DE-OY	SGMGH-13D□, SGMSH/UH-15D□, SGMPH-15D□	SGLFW-50D380□, SGLFW-1ZD200□
		2 kW SGDH-20DE-OY	SGMGH-20D□, SGMSH-20D□	SGLTW-35D320□, SGLTW-50D320□
		3 kW SGDH-30DE-OY	SGMGH-30D□, SGMSH/UH-30D□	SGLFW-1ZD380□, SGLTW-40D400□
		5 kW SGDH-50DE-OY	SGMGH-44D□, SGMSH/UH-40D□, SGMSH-50D□	SGLTW-40D60□, SGLTW-80D400□
		6 kW SGDH-60DE-OY	SGMGH-55D□	-
		7.5 kW SGDH-75DE-OY	SGMGH-75D□	SGLTW-80D600□
		11 kW SGDH-1ADE-OY	SGMGH-1AD□	-
		15 kW SGDH-1EDE-OY	SGMGH-1ED□	-
		22 kW SGDH-2BDE	SGMBH-2BD□	-
		30 kW SGDH-3ZDE	SGMBH-3ZD□	-
		37 kW SGDH-3GDE	SGMBH-3GD□	-
		45 kW SGDH-4EDE	SGMBH-4ED□	-
		55 kW SGDH-5EDE	SGMBH-5ED□	-

## Option units (for CN10)

Symbol	Name	Model
④	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
	MECHATROLINK-I interface unit	JUSP-NS100
	MECHATROLINK-II interface unit	JUSP-NS115
	DeviceNet interface unit with positioning functionality	JUSP-NS300
	PROFIBUS-DP interface unit with positioning functionality	JUSP-NS500
	Indexer unit. versatile point to point positioning	JUSP-NS600

**Note:** ④ Refer to the servo drive option unit chapter for detailed specifications and selection

## Control cables (for CN1)

Symbol	Description	Connect to		Model
⑤	Control cable (1 axis)	Motion control units CS1W-MC221 CS1W-MC421 C200H-MC221	1 m	R88A-CPW001M1
			2 m	R88A-CPW002M1
			3 m	R88A-CPW003M1
			5 m	R88A-CPW005M1
	Control cable (2 axes)	Motion control units CS1W-MC221 CS1W-MC421 C200H-MC221	1 m	R88A-CPW001M2
			2 m	R88A-CPW002M2
			3 m	R88A-CPW003M2
			5 m	R88A-CPW005M2
	Terminal block (4 axes)	Motion control unit C200HW-MC402-E	-	R88A-TC04-E
	Servo drive connecting cable (1 axis)		1 m	R88A-CMUK001J3-E2
PLC unit control cables (4 axes)	1 m		R88A-CMX001S-E	
		1 m	R88A-CMX001J1-E	
⑥	Servo relay unit	CS1W-NC1□3, CJ1W-NC1□3, or C200HW-NC113 position control unit		XW2B-20J6-1B (1 axis)
		CS1W-NC2□3/4□3, CJ1W-NC2□3/4□3, or C200HW-NC213/413 position control unit		XW2B-40J6-2B (2 axes)
		CQM1H-PLB21 CQM1-CPU43		XW2B-20J6-3B (1 axis)
		CJ1M-CPU22/23		XW2B-20J6-8A (1 axis) XW2B-40J6-9A (2 axes)
⑦	Cable to servo drive	Servo relay units XW2B-□0J6-□B	1 m	XW2Z-100J-B4
			2 m	XW2Z-200J-B4
⑧	Position control unit connecting cable	C200H-NC112	0.5 m	XW2Z-050J-A1
			1 m	XW2Z-100J-A1
		C200H-NC211	0.5 m	XW2Z-050J-A2
			1 m	XW2Z-100J-A2
		CQM1-CPU43-V1 and CQM1H-PLB21	0.5 m	XW2Z-050J-A3
			1 m	XW2Z-100J-A3
		CS1W-NC113 and C200HW-NC113	0.5 m	XW2Z-050J-A6
			1 m	XW2Z-100J-A6
		CS1W-NC213/413 and C200HW-NC213/413	0.5 m	XW2Z-050J-A7
			1 m	XW2Z-100J-A7
		CS1W-NC133	0.5 m	XW2Z-050J-A10
			1 m	XW2Z-100J-A10
		CS1W-NC233/433	0.5 m	XW2Z-050J-A11
			1 m	XW2Z-100J-A11

Symbol	Description	Connect to		Model
⑧	Position control unit connecting cable	CJ1W-NC113	0.5 m	XW2Z-050J-A14
			1 m	XW2Z-100J-A14
		CJ1W-NC213/413	0.5 m	XW2Z-050J-A15
			1 m	XW2Z-100J-A15
		CJ1W-NC133	0.5 m	XW2Z-050J-A18
			1 m	XW2Z-100J-A18
		CJ1W-NC233/433	0.5 m	XW2Z-050J-A19
			1 m	XW2Z-100J-A19
CJ1M-CPU22/23	0.5 m	XW2Z-050J-A27		
	1 m	XW2Z-100J-A27		
⑨	Control cable	For general purpose controllers	1 m	R88A-CPW001S
				JZSP-CKI01-1
			2 m	R88A-CPW002S
				JZSP-CKI01-1
⑩	Relay terminal block cable	General purpose controller	1 m	R88A-CTW001N
			2 m	R88A-CTW002N
	Relay terminal block		-	XW2B-50G5

**Battery backup for absolute encoder (for CN8)**

Symbol	Name	Model
⑪	Battery for 30 W to 5 kW drives	JZSP-BA01
	Battery for 6 kW to 15 kW drives	JZSP-BA01-1

**Cable (for CN5)**

Symbol	Name	Model
⑫	Analog monitor cable	R88A-CMW001S or DE9404559

**Options (for CN3)**

Symbol	Name	Model
⑬	Parameter unit with cable	JUSP-OP02A-2 or R88A-PR02W
⑭	Computer connecting cable	R88A-CCW002P2 or JZSP-CMS02

**Filters**

Symbol	Applicable servo drive	Filter model	Rated current	Rated voltage
⑮	SGDH-A3AE-OY, SGDH-A5AE-OY, SGDH-01AE-OY, SGDH-02AE-OY	R88A-FIW104-SE	4 A	250 VAC single-phase
	SGDH-04AE-OY	R88A-FIW107-SE	7A	
	SGDH-08AE-S-OY	R88A-FIW115-SE	15 A	
	SGDH-15AE-S-OY	R88A-FIW125-SE	25 A	
	SGDH-05DE-OY, SGDH-10DE-OY, SGDH-15DE-OY	R88A-FIW4006-SE	6 A	400 VAC three-phase
	SGDH-20DE-OY, SGDH-30DE-OY	R88A-FIW4010-SE	10 A	
	SGDH-50DE-OY	R88A-FIW4020-SE	20 A	
	SGDH-60DE-OY, SGDH-75DE-OY	R88A-FIW4030-SE	30 A	
	SGDH-1ADE-OY, SGDH-1EDE-OY	R88A-FIW4055-SE	55 A	
	SGDH-2BDE, SGDH-3ZDE, SGDH-3GDE	FN258-180-07	180 A	
	SGDH-4EDE, SGDH-5EDE	FN359-250-99	250 A	

**External regenerative resistor**

Symbol	Applicable servo drive	Regenerative resistor unit model	Specifications
⑯	SGDH-60DE-OY to -75DE-OY	JUSP-RA18	18 Ω , 880 W
	SGDH-1ADE-OY to -1EDE-OY	JUSP-RA19	14.25 Ω , 1760 W
	SGDH-2BDE	JUSP-RA12	9 Ω 3600 W
	SGDH-3ZDE	JUSP-RA13	6.7 Ω 3600 W
	SGDH-3GDE	JUSP-RA14	5 Ω 4800 W
	SGDH-4EDE	JUSP-RA15	4 Ω 6000 W
	SGDH-5EDE	JUSP-RA16	3.8 Ω 7200 W

**DB resistor units**

Symbol	Servo drive model	Regenerative resistor unit model	Specifications, star wiring
⑰	SGDH-2BDE, SGDH-3ZDE	JUSP-DB03	180 W, 0.8 Ω
	SGDH-3GDE	JUSP-DB04	180 W, 0.8 Ω
	SGDH-4EDE	JUSP-DB05	180 W, 0.8 Ω
	SGDH-5EDE	JUSP-DB06	300 W, 0.8 Ω

**Connectors**

Specification	Model
Control I/O connector (For CN1)	R88A-CNU11C or JZSP-CKI9
Sigma-II drive encoder connector (For CN2)	JZSP-CMP9-1
Communications connector (For CN3)	R7A-CNA01R

**Computer software**

Specifications	Model
Configuration and monitoring software tool for servo drives and inverters. (CX-Drive version 1.11 or higher)	CX-DRIVE
Complete OMRON software package including CX-Drive (CX-One version 1.1 or higher)	CX-ONE

## Specifications

## Single-phase, 230 V

Servo drive type		SGDH-□	A3AE-OY	A5AE-OY	01AE-OY	02AE-OY	04AE-OY	08AE-S-OY	15AE-S-OY	
Applicable servo motor		SGMAH-□	A3A□	A5A□	01A□	02A□	04A□	08A□	-	
		SGMPH-□	-	-	01A□	02A□	04A□	08A□	15A□	
Basic specifications	Max. applicable motor capacity	W	30	50	100	200	400	750	1500	
	Continuous output current	A(rms)	0.44	0.64	0.91	2.1	2.8	5.7	11.6	
	Max. output current	A(rms)	1.3	2.0	2.8	6.5	8.5	13.9	28	
	Input power	Main circuit	For single-phase, 200 to 230 VAC + 10 to -15%						220 to 230 VAC	
	Supply	Control circuit	For single-phase, 200 to 230 VAC + 10 to -15%						+10 to -15% (50/60 Hz)	
	Control method		Single phase full-wave rectification / IGBT / PWM / sine-wave current drive method							
	Feedback		Serial encoder (incremental / absolute value)							
	Conditions	Usage / storage temperature		0 to +55 °C / -20 to 85 °C						
		Usage / storage humidity		90% RH or less (non-condensing)						
		Altitude		1000 m or less above sea level						
		Vibration / shock resistance		4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>						
	Configuration		Base mounted							
Approx. weight		kg	0.8				1.1	1.7	3.8	

## Three-phase, 400 V (up to 15 kW)

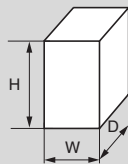
Servo drive type		SGDH-□	05DE-OY	10DE-OY	15DE-OY	20DE-OY	30DE-OY	50DE-OY	60DE-OY	75DE-OY	1ADE-OY	1EDE-OY		
Applicable servo motor		SGMGH-□	05D□	09D□	13D□	20D□	30D□	44D□	55D□	75D□	1AD□	1ED□		
		SGMSH-□	-	10D□	15D□	20D□	30D□	40D□/ 50D□	-	-	-	-		
		SGMUH-□	-	10D□	15D□	-	30D□	40D□	-	-	-	-		
Basic specifications	Max. applicable motor capacity		kW	0.45	1.0	1.5	2.0	3.0	5.0	6.0	7.5	11	15	
	Continuous output current		A(rms)	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.4	28.1	37.2	
	Max. output current		A(rms)	5.5	8.5	14	20	28	40.5	55	65	70	85	
	Input power	Main circuit	For three-phase, 380 to 480 VAC + 10 to -15% (50/60 Hz)											
	Supply	Control circuit	24 VDC + 15%											
	Control method		Three phase full-wave rectification / IGBT / PWM / sine-wave current drive method											
	Feedback		Serial encoder ( incremental / absolute)											
	Conditions	Usage / storage temperature		0 to +55 °C / -20 to +85 °C										
		Usage / storage humidity		90% RH or less (non-condensing)										
		Altitude		1000 m or less above sea level										
		Vibration / shock resistance		4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>										
Configuration		Base mounted												
Approx. weight		kg	2.8			3.8		5.5	15		22			

## Three-phase, 400 V (from 22 kW to 55 kW)

Servo drive type		SGDH-□	2BDE	3ZDE	3GDE	4EDE	5EDE	
Applicable servo motor		SGMBH-□	2BD□A	3ZD□A	3GD□A	4ED□A	5ED□A	
Basic specifications	Max. applicable motor capacity		kW	22	30	37	45	55
	Continuous output current		A(rms)	58	80	100	127	150
	Max. output current		A(rms)	120	170	210	260	310
	Input power	Main circuit	For three-phase, 380 to 480 VAC + 10 to -15% (50/60 Hz)					
	Supply	Control circuit	24 VDC+ 15%					
	Control method		Three phase full-wave rectification / IGBT / PWM / sine-wave current drive method					
	Feedback		Serial encoder (incremental / absolute)					
	Conditions	Usage / storage temperature		0 to +55 °C / -20 to +85 °C				
		Usage / storage humidity		90% RH or less (non-condensing)				
		Altitude		1000 m or less above sea level				
Vibration / shock resistance		4.9 m/s <sup>2</sup> / 19.6 m/s <sup>2</sup>						
Configuration		Base mounted						
Approx. weight		kg	40	60		65		

## Dimensions

## Servo drives

Specifications		Drive model	H	W	D	
1-phase 200 VAC	30 W	SGDH-A3AE-OY	160	55	130	
	50 W	SGDH-A5AE-OY				
	100 W	SGDH-01AE-OY				
	200 W	SGDH-02AE-OY				
	400 W	SGDH-04AE-OY	160	75	130	
	750 W	SGDH-08AE-S-OY	160	90	180	
	1.5 kW	SGDH-15AE-S-OY	250	110	180	
3-phase 400 VAC	0.5 kW	SGDH-05DE-OY	160	110	180	
	1.0 kW	SGDH-10-DE-OY				
	1.5 kW	SGDH-15AE-OY				
	2.0 kW	SGDH-20DE-OY	250	110	180	
	3.0 kW	SGDH-30DE-OY	250	125	230	
	5.0 kW	SGDH-50DE-OY				
	6.0 kW	SGDH-60DE-OY	350	230	235	
	7.5 kW	SGDH-75DE-OY	450	260	285	
	11 kW	SGDH-1ADE-OY				
	15 kW	SGDH-1EDE-OY				
	22 kW	SGDH-2BDE	500	370	348	
	30 kW	SGDH-3ZDE				
	37 kW	SGDH-3GDE	475	500	348	
	45 kW	SGDH-4EDE	475	550	348	
	55 kW	SGDH-5EDE				

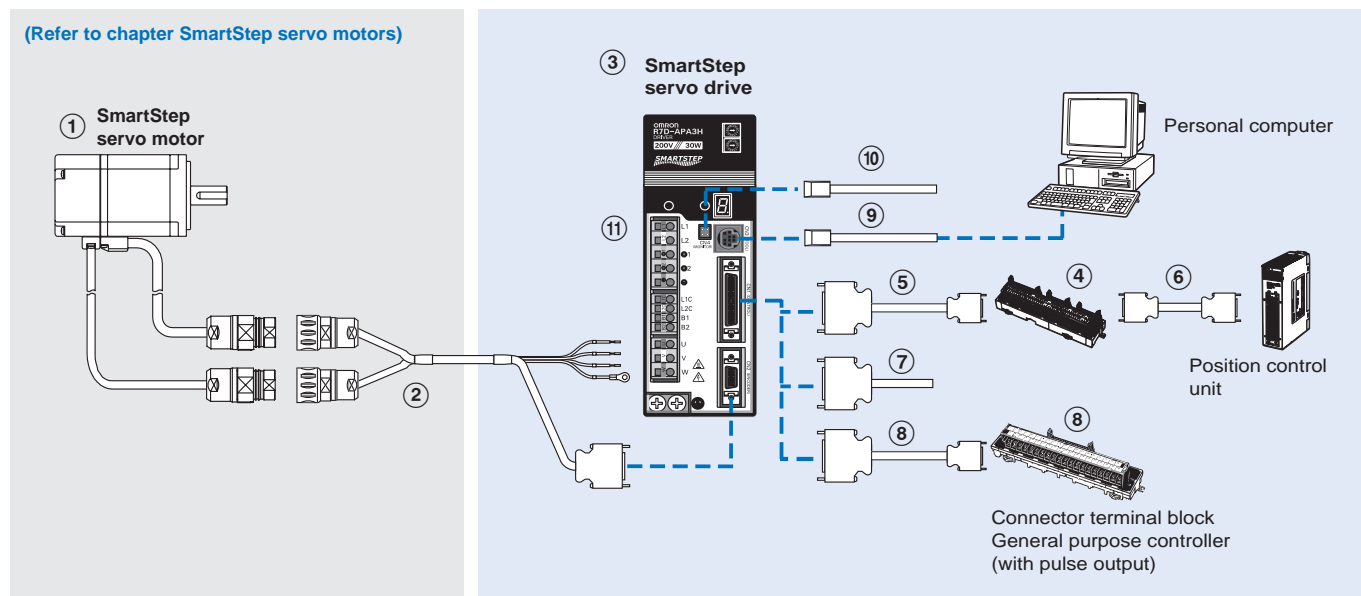


## Servo capability with stepper simplicity

SmartStep is designed and engineered to provide you with an easy way to migrate from steppers to servos in minutes. It accepts pulse-train input, can be configured quickly via simple dip switches and has an online auto-tuning function. Thus, the SmartStep offers all the simplicity and cost-effectiveness of a stepper with the added advantages of the servo drive capability.

- Output range from 30 W to 750 W
- 300% peak current over nominal
- Control via pulse train (speed and position)
- Position resolution of 8,000 steps per revolution
- On-line auto-tuning with 10 levels of rigidity

## Ordering information



**Note:** The symbols ①②③④⑤... show the recommended sequence to select the components in a SmartStep servo system

### Servo motors, power & encoder cables

**Note:** ①② Refer to the SmartStep servo motor chapter for detailed motor specifications and selection

### Servo drives

Symbol	Specifications		SmartStep drive model	Compatible servo motors ①	
				Cylindrical type	Flat type
③	200 VAC	30 W	R7D-APA3H	R7M-A03030-□	-
		50 W	R7D-APA5H	R7M-A05030-□	-
		100 W	R7D-AP01H	R7M-A10030-□	R7M-AP10030-□
		200 W	R7D-AP02H	R7M-A20030-□	R7M-AP20030-□
		400 W	R7D-AP04H	R7M-A40030-□	R7M-AP40030-□
		750 W	R7D-AP08H	R7M-A75030-□	R7M-AP75030-□

### Control cables (For CN1)

Symbol	Name	Compatible units	Model	Available lengths
④	Servo relay unit	Use with position control units (does not support communications functions.) Units: CS1W-NC113/133, CJ1W-NC113/133, C200HW-NC113, and C200H-NC112	XW2B-20J6-1B (1 axis)	---
		Use with position control units (does not support communications functions.) Units: CS1W-NC213/233/413/433, CJ1W-NC213/233/413/433, C200HW-NC213/413, C500-NC113/211, and C200H-NC211	XW2B-40J6-2B (2 axes)	
		Use with position control units (does not support communications functions.) Units: CQM1H-PLB21, and CQM1-CPU43-V1	XW2B-20J6-3B (1 axis)	
		Use with position control units (supports communications functions.) Units: CS1W-NC213/233/413/433, CJ1W-NC213/233/413/433	XW2B-40J6-4A (2 axes)	
		Use with CJ1M-CPU22/23 (does not support communications functions.)	XW2B-20J6-8A (1 axis) XW2B-40J6-9A (2 axes)	
⑤	Cable to servo drive	Does not support communications functions. (for the XW2B-□□J6-□B)	XW2Z-□□□J-B5	1 m or 2 m (The cable length goes in the empty boxes.)
		Supports communications functions. (for the XW2B-□□J6-4B)	XW2Z-□□□J-B7	



Symbol	Name	Compatible units	Model	Available lengths
⑥	Cable to position control unit	CQM1H-PLB21 and CQM1-CPU43-V1 C200H-NC112 C200H-NC211 and C500-NC113/211 CS1W-NC113 and C200HW-NC113 CS1W-NC213/413 and C200HW-NC213/413 CS1W-NC133 CS1W-NC233/433 CJ1W-NC113 CJ1W-NC213/413 CJ1W-NC133 CS1W-NC233/433 CJ1M-CPU22/23	XW2Z-□□□J-A3 XW2Z-□□□J-A4 XW2Z-□□□J-A5 XW2Z-□□□J-A8 XW2Z-□□□J-A9 XW2Z-□□□J-A12 XW2Z-□□□J-A13 XW2Z-□□□J-A16 XW2Z-□□□J-A17 XW2Z-□□□J-A20 XW2Z-□□□J-A21 XW2Z-□□□J-A26	0.5 m or 1 m (The cable length goes in the empty boxes.)
⑦	Control cable	For general-purpose controllers	R88A-CPU□□□S	1 m or 2 m (The cable length goes in the empty boxes.)
⑧	Connector terminal block cable	For general-purpose controllers	R88A-CTU□□□N	---
	Connector terminal block		XW2B-40F5-P	---

## Cable for CN3

Symbol	Name	Model
⑨	Computer monitor cable	R7A-CCA002P2

## Cable for CN4

Symbol	Name	Model
⑩	Analog monitor cable	R88A-CMW001S

## Filters

Symbol	Applicable servo drive	Filter model	Rated current	Rated voltage
⑪	R7D-APA3H, R7D-APA5H, R7D-AP01H, R7D-AP02H	R88A-FIW104-E	4 A	250 VAC
	R7D-AP04H	R88A-FIW107-E	7 A	Single phase
	R7D-AP08H	R88A-FIW115-E	15 A	

## Connectors

Specifications	Model
Control I/O connector (For CN1)	R88A-CNU01C
SmartStep connectors kit	R7A-CNA00K-DE
SmartStep encoder connector (For CN2)	
Hypertac power connectors female	
Hypertac encoder connectors female	

## External regeneration resistor

Specification	Model
220 W, 47 Ω	R88A-RR22047S

## Parameter unit & computer software

Specifications	Model
Parameter copy unit (with cable)	R7A-PR02A
Configuration and monitoring software tool for servo drives and inverters. (CX-Drive version 1.11 or higher)	CX-DRIVE
Complete OMRON software package including CX-Drive (CX-One version 1.1 or higher)	CX-ONE

## Specifications

## General specifications

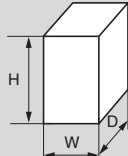
Item	Specification
Ambient operating temperature	0 to 55 °C
Ambient operating humidity	90% max. (with no condensation)
Ambient storage temperature	-20 to 85 °C
Ambient storage humidity	90% max. (with no condensation)
Storage / operating atmosphere	No corrosive gases.
Vibration resistance	10 to 55 Hz in X, Y, and Z directions with 0.1-mm double amplitude or acceleration of 4.9 m/s <sup>2</sup> max., whichever is smaller
Impact resistance	Acceleration 19.6 m/s <sup>2</sup> max., in X, Y, and Z directions, three times
Insulation resistance	Between power line terminals and case: 0.5 MΩ min. (at 500 V DC)
Dielectric strength	Between power line terminals and case: 1,500 VAC for 1 min at 50/60 Hz Between each control signal and case: 500 VAC for 1 min
Protective structure	Built into panel (IP10).
International standards	Approval obtained for UL, cUL, and EN (EMC directive and low-voltage directive)

## Performance specifications

Item	200 VAC input type					
	30 W	50 W	100 W	200 W	400 W	750 W
	R7D-APA3H	R7D-APA5H	R7D-AP01H	R7D-AP02H	R7D-AP04H	R7D-AP08H
Continuous output current (rms)	0.42	0.6	0.89	2.0	2.6	4.4
Momentary maximum output current (rms)	1.3	1.9	2.8	6.0	8.0	13.9
Control power supply	Single-phase 200/230 VAC (170 to 253 V) 50/60 Hz					
Main-circuit power supply	Single-phase 200/230 VAC (170 to 253 V) 50/60 Hz (Three-phase 200/230 VAC can be used with the 750 W model.)					
Control method	All-digital servo					
Speed feedback	2,000 pulses / revolution incremental encoder					
Inverter method	PWM method based on IGBT					
PWM frequency	11.7 kHz					
Weight	0.8	0.8	0.8	0.8	1.1	1.7
Compatible motor voltage	200 V					
Compatible motor capacity	30 W	50 W	100 W	200 W	400 W	750 W
Command pulse response	250 kHz					
Applicable servo motor (R7M-)	A03030	A05030	A10030 AP10030	A20030 AP20030	A40030 AP40030	A75030 AP75030

## Dimensions

## Servo drives

Main dimensions						
Specifications	Drive model		H	W	D	
1-phase 200 VAC	30 W	R7D-APA3H	160	55	130	
	50 W	R7D-APA5H				
	100 W	R7D-AP01H				
	200 W	R7D-AP02H				
	400 W	R7D-AP04H	160	75	130	
	750 W	R7D-AP08H	160	90	180	

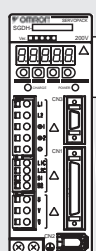


### The ideal servo family for motion control. Fast response, high speed, and high accuracy

- 6 different designs provide a complete range of servo motors to meet the power, speed and performance required for each application.
- Peak torque 300% of nominal during 3 seconds
- Automatic motor recognition by servo drive
- IP67 and shaft oil seal available
- High resolution encoders

### Ordering information

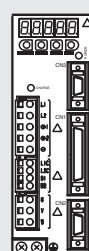
(Refer to servo drive chapter)



Servo drive with option boards for flexible system configuration

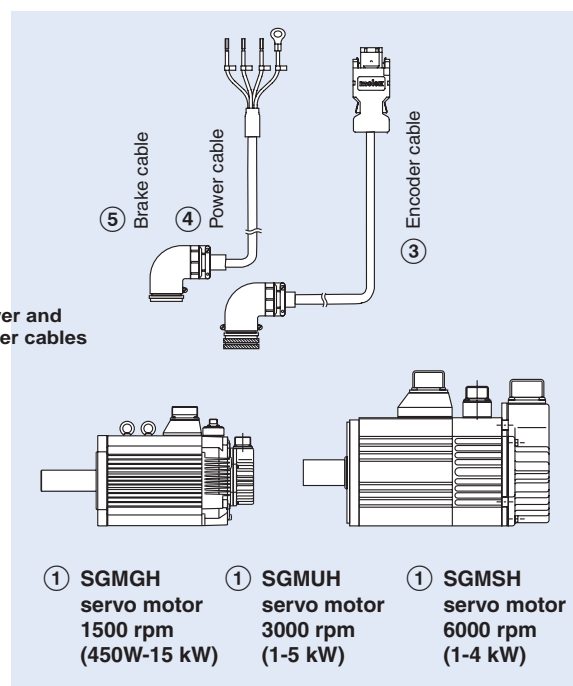
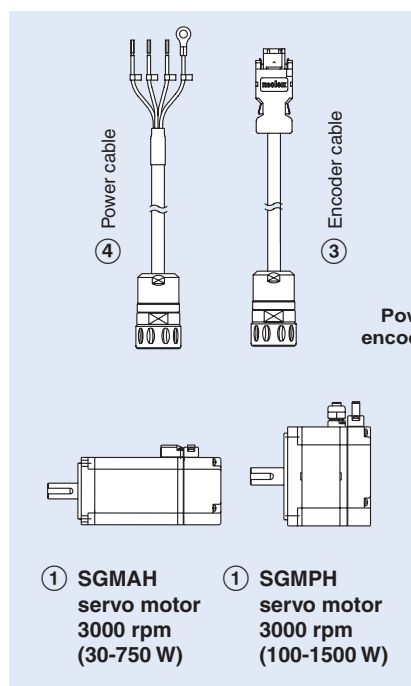
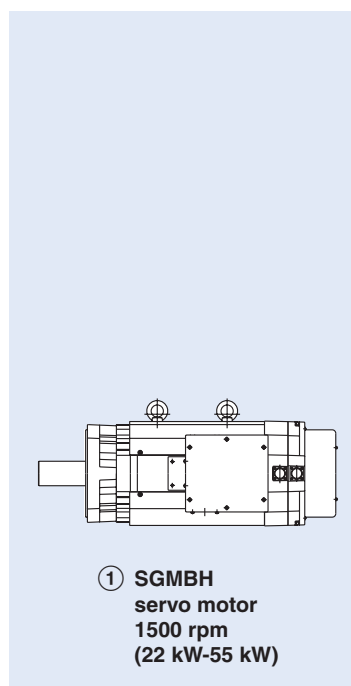
② Sigma-II servo drive

Drive options



Intelligent servo drive

② XtraDrive



**Note:** The symbols ①②③... show the recommended sequence to select the servo motor and cables

#### Servo motor

① A select motor from families SGM AH, SGM PH, SGM GH, SGM UH, SGM SH, SGM BH using motor tables in next pages

#### Servo drive

**Note:** Choosing Sigma-II drive or XtraDrive affects to the encoder cable needed

② Refer to Sigma-II servo drive or XtraDrive chapter for detailed drive specifications and selection of drive accessories

## SGMAH - cylindrical servo motors 3000 r/min (30 - 750 W)


Symbol	Specifications					Servo motor model	Compatible servo drives ②	
	Voltage	Encoder and design		Rated torque	Capacity		Sigma-II	XtraDrive
①	230 V	Incremental encoder (13 bit)  Straight shaft with key & tap	Without brake	0.096 Nm	30 W	SGMAH-A3AAA61D-OY	SGDH-A3AE-OY	XD-P3-MN01
				0.159 Nm	50 W	SGMAH-A5AAA61D-OY	SGDH-A5AE-OY	XD-P5-MN01
				0.318 Nm	100 W	SGMAH-01AAA61D-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMAH-02AAA61D-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMAH-04AAA61D-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMAH-08AAA61D-OY	SGDH-08AE-S-OY	XD-08-MN
		Absolute encoder (16 bit) Straight shaft with key & tap	Without brake	0.096 Nm	30 W	SGMAH-A3AAA6CD-OY	SGDH-A3AE-OY	XD-P3-MN01
				0.159 Nm	50 W	SGMAH-A5AAA6CD-OY	SGDH-A5AE-OY	XD-P5-MN01
				0.318 Nm	100 W	SGMAH-01AAA6CD-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMAH-02AAA6CD-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMAH-04AAA6CD-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMAH-08AAA6CD-OY	SGDH-08AE-S-OY	XD-08-MN
		Absolute encoder (16 bit) Straight shaft with key	Without brake	0.096 Nm	30 W	SGMAH-A3A1A61D-OY	SGDH-A3AE-OY	XD-P3-MN01
				0.159 Nm	50 W	SGMAH-A5A1A61D-OY	SGDH-A5AE-OY	XD-P5-MN01
				0.318 Nm	100 W	SGMAH-01A1A61D-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMAH-02A1A61D-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMAH-04A1A61D-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMAH-08A1A61D-OY	SGDH-08AE-S-OY	XD-08-MN
	400 V	Incremental encoder (13 bit) Straight shaft with key	Without brake	0.096 Nm	30 W	SGMAH-A3A1A6CD-OY	SGDH-A3AE-OY	XD-P3-MN01
				0.159 Nm	50 W	SGMAH-A5A1A6CD-OY	SGDH-A5AE-OY	XD-P5-MN01
				0.318 Nm	100 W	SGMAH-01A1A6CD-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMAH-02A1A6CD-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMAH-04A1A6CD-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMAH-08A1A6CD-OY	SGDH-08AE-S-OY	XD-08-MN
		Absolute encoder (16 bit) Straight shaft with key	Without brake	0.096 Nm	30 W	SGMAH-A3A1A6CD-OY	SGDH-A3AE-OY	XD-P3-MN01
				0.159 Nm	50 W	SGMAH-A5A1A6CD-OY	SGDH-A5AE-OY	XD-P5-MN01
				0.318 Nm	100 W	SGMAH-01A1A6CD-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMAH-02A1A6CD-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMAH-04A1A6CD-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMAH-08A1A6CD-OY	SGDH-08AE-S-OY	XD-08-MN
		Absolute encoder (16 bit) Straight shaft with key	With brake	0.096 Nm	30 W	SGMAH-A3A1A6CD-OY	SGDH-A3AE-OY	XD-P3-MN01
				0.159 Nm	50 W	SGMAH-A5A1A6CD-OY	SGDH-A5AE-OY	XD-P5-MN01
				0.318 Nm	100 W	SGMAH-01A1A6CD-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMAH-02A1A6CD-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMAH-04A1A6CD-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMAH-08A1A6CD-OY	SGDH-08AE-S-OY	XD-08-MN
		Absolute encoder (16 bit) Straight shaft with key	Without brake	0.955 Nm	300 W	SGMAH-03DAA61D-OY	SGDH-05DE-OY	XD-05-TN
				2.07 Nm	650 W	SGMAH-07DAA61D-OY	SGDH-10DE-OY	XD-10-TN
				0.955 Nm	300 W	SGMAH-03DAA6CD-OY	SGDH-05DE-OY	XD-05-TN
				2.07 Nm	650 W	SGMAH-07DAA6CD-OY	SGDH-10DE-OY	XD-10-TN
				0.955 Nm	300 W	SGMAH-03D1A61D-OY	SGDH-05DE-OY	XD-05-TN
				2.07 Nm	650 W	SGMAH-07D1A61D-OY	SGDH-10DE-OY	XD-10-TN
		Absolute encoder (16 bit) Straight shaft with key	With brake	0.955 Nm	300 W	SGMAH-03D1A6CD-OY	SGDH-05DE-OY	XD-05-TN
				2.07 Nm	650 W	SGMAH-07D1A6CD-OY	SGDH-10DE-OY	XD-10-TN

## SGMPH - flat type servo motors 3000 r/min (100 - 1500 W)

Symbol	Specifications					Servo motor model	Compatible servo drives ②	
	Voltage	Encoder and design		Rated torque	Capacity		Sigma-II	XtraDrive
①	230 V	Incremental encoder (13 bit) Straight shaft with key & tap	Without brake	0.318 Nm	100 W	SGMPH-01AAA61D-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMPH-02AAA61D-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMPH-04AAA61D-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMPH-08AAA61D-OY	SGDH-08AE-S-OY	XD-08-MN
				4.77 Nm	1500 W	SGMPH-15AAA61D-OY	SGDH-15AE-S-OY	XD-15-MN
				0.318 Nm	100 W	SGMPH-01AAA6CD-OY	SGDH-01AE-OY	XD-01-MN01
		Absolute encoder (16 bit) Straight shaft with key & tap	Without brake	0.637 Nm	200 W	SGMPH-02AAA6CD-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMPH-04AAA6CD-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMPH-08AAA6CD-OY	SGDH-08AE-S-OY	XD-08-MN
				4.77 Nm	1500 W	SGMPH-15AAA6CD-OY	SGDH-15AE-S-OY	XD-15-MN
			Without brake	0.318 Nm	100 W	SGMPH-01A1A61D-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMPH-02A1A61D-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMPH-04A1A61D-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMPH-08A1A61D-OY	SGDH-08AE-S-OY	XD-08-MN
				4.77 Nm	1500 W	SGMPH-15A1A61D-OY	SGDH-15AE-S-OY	XD-15-MN
		Absolute encoder (16 bit) Straight shaft with key	With brake	0.318 Nm	100 W	SGMPH-01A1A6CD-OY	SGDH-01AE-OY	XD-01-MN01
				0.637 Nm	200 W	SGMPH-02A1A6CD-OY	SGDH-02AE-OY	XD-02-MN01
				1.27 Nm	400 W	SGMPH-04A1A6CD-OY	SGDH-04AE-OY	XD-04-MN01
				2.39 Nm	750 W	SGMPH-08A1A6CD-OY	SGDH-08AE-S-OY	XD-08-MN
				4.77 Nm	1500 W	SGMPH-15A1A6CD-OY	SGDH-15AE-S-OY	XD-15-MN
	400 V	Incremental encoder (13 bit) Straight shaft with key	Without brake	0.637 Nm	200 W	SGMPH-02DAA61D-OY	SGDH-05DE-OY	XD-05-TN
				1.27 Nm	400 W	SGMPH-04DAA61D-OY	SGDH-05DE-OY	XD-05-TN
				2.39 Nm	750 W	SGMPH-08DAA61D-OY	SGDH-10DE-OY	XD-10-TN
				4.77 Nm	1500 W	SGMPH-15DAA61D-OY	SGDH-15DE-OY	XD-15-TN
			With brake	0.637 Nm	200 W	SGMPH-02DAA6CD-OY	SGDH-05DE-OY	XD-05-TN
				1.27 Nm	400 W	SGMPH-04DAA6CD-OY	SGDH-05DE-OY	XD-05-TN
				2.39 Nm	750 W	SGMPH-08DAA6CD-OY	SGDH-10DE-OY	XD-10-TN
				4.77 Nm	1500 W	SGMPH-15DAA6CD-OY	SGDH-15DE-OY	XD-15-TN
		Absolute Encoder (16 bit) Straight shaft with key	Without brake	0.637 Nm	200 W	SGMPH-02D1A61D-OY	SGDH-05DE-OY	XD-05-TN
				1.27 Nm	400 W	SGMPH-04D1A61D-OY	SGDH-05DE-OY	XD-05-TN
				2.39 Nm	750 W	SGMPH-08D1A61D-OY	SGDH-10DE-OY	XD-10-TN
				4.77 Nm	1500 W	SGMPH-15D1A61D-OY	SGDH-15DE-OY	XD-15-TN
			With brake	0.637 Nm	200 W	SGMPH-02D1A6CD-OY	SGDH-05DE-OY	XD-05-TN
				1.27 Nm	400 W	SGMPH-04D1A6CD-OY	SGDH-05DE-OY	XD-05-TN
				2.39 Nm	750 W	SGMPH-08D1A6CD-OY	SGDH-10DE-OY	XD-10-TN
				4.77 Nm	1500 W	SGMPH-15D1A6CD-OY	SGDH-15DE-OY	XD-15-TN

## SGMGH - servo motors 1500 r/min (0.45 - 15 kW)


Symbol	Specifications					Servo motor model	Compatible servo drives ②	
	Voltage	Encoder and design		Rated torque	Capacity		Sigma-II	XtraDrive
①	400 V	Incremental encoder (17 bit) Straight shaft with key & tap	Without brake	2.84 Nm	0.45 kW	SGMGH-05DCA6F-OY	SGDH-05DE-OY	XD-05-TN
				5.39 Nm	0.85 kW	SGMGH-09DCA6F-OY	SGDH-10DE-OY	XD-10-TN
				8.34 Nm	1.3 kW	SGMGH-13DCA6F-OY	SGDH-15DE-OY	XD-15-TN
				11.5 Nm	1.8 kW	SGMGH-20DCA6F-OY	SGDH-20DE-OY	XD-20-TN
				18.6 Nm	2.9 kW	SGMGH-30DCA6F-OY	SGDH-30DE-OY	XD-30-TN
				28.4 Nm	4.4 kW	SGMGH-44DCA6F-OY	SGDH-50DE-OY	XD-50-TN
				35.0 Nm	5.5 kW	SGMGH-55DCA6F-OY	SGDH-60DE-OY	-
				48.0 Nm	7.5 kW	SGMGH-75DCA6F-OY	SGDH-75DE-OY	-
				70.0 Nm	11.5 kW	SGMGH-1ADCA6F-OY	SGDH-1ADE-OY	-
				95.4 Nm	15.0 kW	SGMGH-1EDCA6F-OY	SGDH-1EDE-OY	-
			With brake	2.84 Nm	0.45 kW	SGMGH-05DCA6H-OY	SGDH-05DE-OY	XD-05-TN
				5.39 Nm	0.85 kW	SGMGH-09DCA6H-OY	SGDH-10DE-OY	XD-10-TN
				8.34 Nm	1.3 kW	SGMGH-13DCA6H-OY	SGDH-15DE-OY	XD-15-TN
				11.5 Nm	1.8 kW	SGMGH-20DCA6H-OY	SGDH-20DE-OY	XD-20-TN
				18.6 Nm	2.9 kW	SGMGH-30DCA6H-OY	SGDH-30DE-OY	XD-30-TN
				28.4 Nm	4.4 kW	SGMGH-44DCA6H-OY	SGDH-50DE-OY	XD-50-TN
				35.0 Nm	5.5 kW	SGMGH-55DCA6H-OY	SGDH-60DE-OY	-
				48.0 Nm	7.5 kW	SGMGH-75DCA6H-OY	SGDH-75DE-OY	-
				70.0 Nm	11.5 kW	SGMGH-1ADCA6H-OY	SGDH-1ADE-OY	-
				95.4 Nm	15.0 kW	SGMGH-1EDCA6H-OY	SGDH-1EDE-OY	-
		Absolute encoder (17 bit) Straight shaft with key & tap	Without brake	2.84 Nm	0.45 kW	SGMGH-05D2A6F-OY	SGDH-05DE-OY	XD-05-TN
				5.39 Nm	0.85 kW	SGMGH-09D2A6F-OY	SGDH-10DE-OY	XD-10-TN
				8.34 Nm	1.3 kW	SGMGH-13D2A6F-OY	SGDH-15DE-OY	XD-15-TN
				11.5 Nm	1.8 kW	SGMGH-20D2A6F-OY	SGDH-20DE-OY	XD-20-TN
				18.6 Nm	2.9 kW	SGMGH-30D2A6F-OY	SGDH-30DE-OY	XD-30-TN
				28.4 Nm	4.4 kW	SGMGH-44D2A6F-OY	SGDH-50DE-OY	XD-50-TN
				35.0 Nm	5.5 kW	SGMGH-55D2A6F-OY	SGDH-60DE-OY	-
				48.0 Nm	7.5 kW	SGMGH-75D2A6F-OY	SGDH-75DE-OY	-
				70.0 Nm	11.5 kW	SGMGH-1AD2A6F-OY	SGDH-1ADE-OY	-
				95.4 Nm	15.0 kW	SGMGH-1ED2A6F-OY	SGDH-1EDE-OY	-
			With brake	2.84 Nm	0.45 kW	SGMGH-05D2A6H-OY	SGDH-05DE-OY	XD-05-TN
				5.39 Nm	0.85 kW	SGMGH-09D2A6H-OY	SGDH-10DE-OY	XD-10-TN
				8.34 Nm	1.3 kW	SGMGH-13D2A6H-OY	SGDH-15DE-OY	XD-15-TN
				11.5 Nm	1.8 kW	SGMGH-20D2A6H-OY	SGDH-20DE-OY	XD-20-TN
				18.6 Nm	2.9 kW	SGMGH-30D2A6H-OY	SGDH-30DE-OY	XD-30-TN
				28.4 Nm	4.4 kW	SGMGH-44D2A6H-OY	SGDH-50DE-OY	XD-50-TN
				35.0 Nm	5.5 kW	SGMGH-55D2A6H-OY	SGDH-60DE-OY	-
				48.0 Nm	7.5 kW	SGMGH-75D2A6H-OY	SGDH-75DE-OY	-
				70.0 Nm	11.5 kW	SGMGH-1AD2A6H-OY	SGDH-1ADE-OY	-
				95.4 Nm	15.0 kW	SGMGH-1ED2A6H-OY	SGDH-1EDE-OY	-




## SGMSH - servo motors 3000 r/min (1 - 5 kW)

Symbol	Specifications					Servo motor model	Compatible servo drives ②			
	Voltage	Encoder and design		Rated torque	Capacity		Sigma-II	XtraDrive		
①	400 V	Incremental encoder (17 bit) Straight shaft with key & tap	Without brake	3.18 Nm	1.0 kW	SGMSH-10DCA6F-OY	SGDH-10DE-OY	XD-10-TN		
				4.9 Nm	1.5 kW	SGMSH-15DCA6F-OY	SGDH-15DE-OY	XD-15-TN		
				6.36 Nm	2.0 kW	SGMSH-20DCA6F-OY	SGDH-20DE-OY	XD-20-TN		
				9.8 Nm	3.0 kW	SGMSH-30DCA6F-OY	SGDH-30DE-OY	XD-30-TN		
				12.6 Nm	4.0 kW	SGMSH-40DCA6F-OY	SGDH-50DE-OY	XD-50-TN		
			15.8 Nm	5.0 kW	SGMSH-50DCA6F-OY	SGDH-50DE-OY	XD-50-TN			
			With brake	3.18 Nm	1.0 kW	SGMSH-10DCA6H-OY	SGDH-10DE-OY	XD-10-TN		
				4.9 Nm	1.5 kW	SGMSH-15DCA6H-OY	SGDH-15DE-OY	XD-15-TN		
				6.36 Nm	2.0 kW	SGMSH-20DCA6H-OY	SGDH-20DE-OY	XD-20-TN		
				9.8 Nm	3.0 kW	SGMSH-30DCA6H-OY	SGDH-30DE-OY	XD-30-TN		
				12.6 Nm	4.0 kW	SGMSH-40DCA6H-OY	SGDH-50DE-OY	XD-50-TN		
			15.8 Nm	5.0 kW	SGMSH-50DCA6H-OY	SGDH-50DE-OY	XD-50-TN			
			Absolute encoder (17 bit) Straight shaft with key & tap	Without brake	3.18 Nm	1.0 kW	SGMSH-10D2A6F-OY	SGDH-10DE-OY	XD-10-TN	
					4.9 Nm	1.5 kW	SGMSH-15D2A6F-OY	SGDH-15DE-OY	XD-15-TN	
					6.36 Nm	2.0 kW	SGMSH-20D2A6F-OY	SGDH-20DE-OY	XD-20-TN	
		9.8 Nm			3.0 kW	SGMSH-30D2A6F-OY	SGDH-30DE-OY	XD-30-TN		
		12.6 Nm			4.0 kW	SGMSH-40D2A6F-OY	SGDH-50DE-OY	XD-50-TN		
		15.8 Nm		5.0 kW	SGMSH-50D2A6F-OY	SGDH-50DE-OY	XD-50-TN			
		With brake		3.18 Nm	1.0 kW	SGMSH-10D2A6H-OY	SGDH-10DE-OY	XD-10-TN		
				4.9 Nm	1.5 kW	SGMSH-15D2A6H-OY	SGDH-15DE-OY	XD-15-TN		
				6.36 Nm	2.0 kW	SGMSH-20D2A6H-OY	SGDH-20DE-OY	XD-20-TN		
			9.8 Nm	3.0 kW	SGMSH-30D2A6H-OY	SGDH-30DE-OY	XD-30-TN			


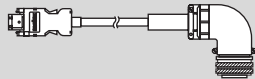
## SGMUH - servo motors 6000 r/min (1 - 4 kW)

Symbol	Specifications				Servo motor model		Compatible servo drives ②	
	Voltage	Encoder and design		Rated torque	Capacity		Sigma-II	XtraDrive
① 	400 V	Incremental encoder (17 bit) Straight shaft with key	Without brake	1.59 Nm	1.0 kW	SGMUH-10DCA61-OY	SGDH-10DE-OY	XD-10-TN
				2.45 Nm	1.5 kW	SGMUH-15DCA61-OY	SGDH-15DE-OY	XD-15-TN
				4.9 Nm	3.0 kW	SGMUH-30DCA61-OY	SGDH-30DE-OY	XD-30-TN
				6.3 Nm	4.0 kW	SGMUH-40DCA61-OY	SGDH-50DE-OY	XD-50-TN
			With brake	1.59 Nm	1.0 kW	SGMUH-10DCA6C-OY	SGDH-10DE-OY	XD-10-TN
				2.45 Nm	1.5 kW	SGMUH-15DCA6C-OY	SGDH-15DE-OY	XD-15-TN
				4.9 Nm	3.0 kW	SGMUH-30DCA6C-OY	SGDH-30DE-OY	XD-30-TN
				6.3 Nm	4.0 kW	SGMUH-40DCA6C-OY	SGDH-50DE-OY	XD-50-TN

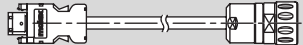
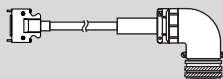
## SGMBH - servo motors 1500 r/min (22 - 55 kW)

Symbol	Specifications				Servo motor model		Compatible drives ②	
	Voltage	Encoder and design		Rated torque	Capacity		Sigma-II	
① 	400 V	Incremental encoder (17 bit) Straight shaft with key & tap	Without brake flange mount	140 Nm	22 kW	SGMBH-2BDCA61	SGDH-2BDE	
				191 Nm	30 kW	SGMBH-3ZDCA61	SGDH-3ZDE	
				236 Nm	37 kW	SGMBH-3GDCA61	SGDH-3GDE	
				286 Nm	45 kW	SGMBH-4EDCA61	SGDH-4EDE	
			Without brake foot mount	236 Nm	37 kW	SGMBH-3GDCAL1	SGDH-3GDE	
				286 Nm	45 kW	SGMBH-4EDCAL1	SGDH-4EDE	
				350 Nm	55 kW	SGMBH-5EDCAL1	SGDH-5EDE	
			With brake flange mount	140 Nm	22 kW	SGMBH-2BDCA6C	SGDH-2BDE	
				191 Nm	30 kW	SGMBH-3ZDCA6C	SGDH-3ZDE	
				236 Nm	37 kW	SGMBH-3GDCA6C	SGDH-3GDE	
				286 Nm	45 kW	SGMBH-4EDCA6C	SGDH-4EDE	
		Absolute encoder (17 bit) Straight shaft with key & tap	Without brake flange mount	140 Nm	22 kW	SGMBH-2BD2A61	SGDH-2BDE	
				191 Nm	30 kW	SGMBH-3ZD2A61	SGDH-3ZDE	
				236 Nm	37 kW	SGMBH-3GD2A61	SGDH-3GDE	
				286 Nm	45 kW	SGMBH-4ED2A61	SGDH-4EDE	
			Without brake foot mount	236 Nm	37 kW	SGMBH-3GD2AL1	SGDH-3GDE	
				286 Nm	45 kW	SGMBH-4ED2AL1	SGDH-4EDE	
				350 Nm	55 kW	SGMBH-5ED2AL1	SGDH-5EDE	
			With brake flange mount	140 Nm	22 kW	SGMBH-2BD2A6C	SGDH-2BDE	
				191 Nm	30 kW	SGMBH-3ZD2A6C	SGDH-3ZDE	
				236 Nm	37 kW	SGMBH-3GD2ALC	SGDH-3GDE	
				286 Nm	45 kW	SGMBH-4ED2ALC	SGDH-4EDE	

## Encoder cables for Sigma-II servo drive







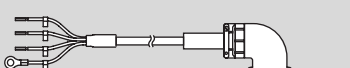
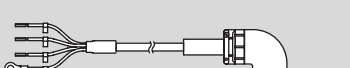
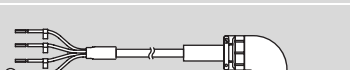
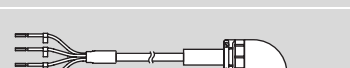


Symbol	Specifications	Model	Appearance
③	Sigma-II encoder cable for SGMAH/PH servo motors SGMAH-□□□□□□□□D-OY SGMPH-□□□□□□□□D-OY	3 m R88A-CRWA003C-DE	
		5 m R88A-CRWA005C-DE	
		10 m R88A-CRWA010C-DE	
		15 m R88A-CRWA015C-DE	
		20 m R88A-CRWA020C-DE	
	Sigma-II encoder cable for SGMGH/SH/UH servo motors SGMGH-□ SGMSH-□ SGMUH-□, SGMBH-□	3 m R88A-CRWB003N-E	
		5 m R88A-CRWB005N-E	
		10 m R88A-CRWB010N-E	
		15 m R88A-CRWB015N-E	
		20 m R88A-CRWB020N-E	

## for XtraDrive servo drive

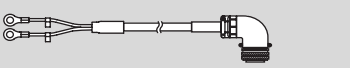
Symbol	Specifications	Model	Appearance
③	XtraDrive encoder cable for Sigma-II (SGMAH/PH) servo motors SGMAH-□□□□□□□□D-OY SGMPH-□□□□□□□□D-OY	3 m XD-CRWA003-DE	
		5 m XD-CRWA005-DE	
		10 m XD-CRWA010-DE	
		15 m XD-CRWA015-DE	
		20 m XD-CRWA020-DE	
	XtraDrive encoder cable for Sigma-II (SGMGH/SH/UH/BH) servo motors SGMGH-□ SGMSH-□ SGMUH-□	3 m XD-CRWB003N-E	
		5 m XD-CRWB005N-E	
		10 m XD-CRWB010N-E	
		15 m XD-CRWB015N-E	
		20 m XD-CRWB020N-E	



## Power cables

Symbol	Specifications	Model	Appearance
④	For 200 V servo motors without brake SGMAH-□□A□□□1D-OY SGMPH-(01/02/04/08)A□□41D-OY	3 m R88A-CAWA003S-DE	
		5 m R88A-CAWA005S-DE	
		10 m R88A-CAWA010S-DE	
		15 m R88A-CAWA015S-DE	
		20 m R88A-CAWA020S-DE	
	For 200 V servo motors with brake SGMAH-□□A□□□CD-OY SGMPH-(01/02/04/08)A□□4CD-OY	3 m R88A-CAWA003B-DE	
		5 m R88A-CAWA005B-DE	
		10 m R88A-CAWA010B-DE	
		15 m R88A-CAWA015B-DE	
		20 m R88A-CAWA020B-DE	
	For 200 V servo motors without brake SGMPH-15A□□□1D-OY	3 m R88A-CAWB003S-DE	
		5 m R88A-CAWB005S-DE	
		10 m R88A-CAWB010S-DE	
		15 m R88A-CAWB015S-DE	
		20 m R88A-CAWB020S-DE	
	For 200 V servo motors with brake SGMPH-15A□□□CD-OY	3 m R88A-CAWB003B-DE	
		5 m R88A-CAWB005B-DE	
		10 m R88A-CAWB010B-DE	
		15 m R88A-CAWB015B-DE	
		20 m R88A-CAWB020B-DE	
	For 400 V servo motors without brake SGMAH-□□D□□□1D-OY SGMPH-□□D□□□1D-OY	3 m R88A-CAWK003S-DE	
		5 m R88A-CAWK005S-DE	
		10 m R88A-CAWK010S-DE	
		15 m R88A-CAWK015S-DE	
		20 m R88A-CAWK020S-DE	
	For 400 V servo motors with brake SGMAH-□□D□□□CD-OY SGMPH-□□D□□□CD-OY	3 m R88A-CAWK003B-DE	
		5 m R88A-CAWK005B-DE	
		10 m R88A-CAWK010B-DE	
		15 m R88A-CAWK015B-DE	
		20 m R88A-CAWK020B-DE	
	For 400 V servo motors SGMGH-(05/09/13)D□ SGMSH-(10/15/20)D□ SGMUH-(10/15)D□ For servo motors with brake a separate cable (R88A-CAWC0□□B-E) is needed	3 m R88A-CAWC003S-E	
		5 m R88A-CAWC005S-E	
		10 m R88A-CAWC010S-E	
		15 m R88A-CAWC015S-E	
		20 m R88A-CAWC020S-E	
	For 400 V servo motors SGMGH-(20/30)D□ SGMSH-(30/40/50)D□ SGMUH-(30/40)D□ For servo motors with brake a separate cable (R88A-CAWC0□□B-E) is needed	3 m R88A-CAWD003S-E	
		5 m R88A-CAWD005S-E	
		10 m R88A-CAWD010S-E	
		15 m R88A-CAWD015S-E	
		20 m R88A-CAWD020S-E	
	For 400 V servo motors SGMGH-44D□ For servo motors with brake a separate cable (R88A-CAWC0□□B-E) is needed	3 m R88A-CAWG003S-E	
		5 m R88A-CAWG005S-E	
		10 m R88A-CAWG010S-E	
		15 m R88A-CAWG015S-E	
		20 m R88A-CAWG020S-E	
	For 400 V servo motors SGMGH-55D□ For servo motors with brake a separate cable (R88A-CAWC0□□B-E) is needed	3 m R88A-CAWF003S-E	
		5 m R88A-CAWF005S-E	
		10 m R88A-CAWF010S-E	
		15 m R88A-CAWF015S-E	
		20 m R88A-CAWF020S-E	
	For 400 V servo motors SGMGH-(75/1A)D□ For servo motors with brake a separate cable (R88A-CAWC0□□B-E) is needed	3 m R88A-CAWH003S-E	
		5 m R88A-CAWH005S-E	
		10 m R88A-CAWH010S-E	
		15 m R88A-CAWH015S-E	
		20 m R88A-CAWH020S-E	
	For 400 V servo motors SGMGH-1ED□ For servo motors with brake a separate cable (R88A-CAWC0□□B-E) is needed	3 m R88A-CAWJ003S-E	
		5 m R88A-CAWJ005S-E	
		10 m R88A-CAWJ010S-E	
		15 m R88A-CAWJ015S-E	
		20 m R88A-CAWJ020S-E	

## Brake cable (For SGMGH/SH/UH motors)

Symbol	Specifications	Model	Appearance
⑤	Brake cable only. For 400 V servo motors with brake SGMGH-□□D□ SGMSH-□□D□ SGMUH-□□D□	3 m R88A-CAWC003B-E	
		5 m R88A-CAWC005B-E	
		10 m R88A-CAWC010B-E	
		15 m R88A-CAWC015B-E	
		20 m R88A-CAWC020B-E	

## Connectors

Specification	Model
Hypertac power connector IP67 (for 200 V motors SGMAH/PH-□□A□□□□D-OY)	SPOC-06K-FSDN169
Hypertac power connector IP67 (for 400 V motors SGMAH/PH-□□D□□□□D-OY)	LPRA-06B-FRBN170
Hypertac encoder connector IP67 (for motors SGMAH/PH-□□□□□□□D-OY)	SPOC-17H-FRON169
Military power connector IP67 (for 400 V motors SGMGH-(05/10/13)D□, SGMSH-(10/15/20)D□, SGMUH-(10/15)D□) (for SGBMH-□ fan)	MS3108E18-10S
Military power connector IP67 (for 400 V motors SGMGH-(20/30/44)D□, SGMSH-(30/40/50)D□, SGMUH-(30/40)D□)	MS3108E22-22S
Military power connector IP67 (for 400 V motors SGMGH-(55/75/1A/1E)D□)	MS3108E32-17S
Military brake connector IP67 (for 400 V servo motors SGMGH-□, SGMSH-□, SGMUH-□)	MS3108E10SL-3S
Military encoder connector IP67 (for motors SGMGH-□, SGMSH-□, SGMUH-□, SGBMH-□)	MS3108E20-29S

## Specifications

## Type SGMAH, 230V/400 V

## Ratings and specifications

Applied voltage		230 V						400 V	
Servo motor model SGMAH- □		A3A□	A5A□	01A□	02A□	04A□	08A□	03D□	07D□
Rated output	W	30	50	100	200	400	750	300	650
Rated torque	Nm	0.096	0.159	0.318	0.637	1.27	2.39	0.955	2.07
Instantaneous peak torque	Nm	0.286	0.477	0.955	1.91	3.82	7.16	3.82	7.16
Rated current	A (rms)	0.44	0.64	0.91	2.1	2.8	4.4	1.3	2.2
Instantaneous max. current	A (rms)	1.3	2.0	2.8	6.5	8.5	13.4	5.1	7.7
Rated speed	min <sup>-1</sup>	3000							
Max. speed	min <sup>-1</sup>	5000							
Torque constant	Nm/A (rms)	0.238	0.268	0.378	0.327	0.498	0.590	0.837	1.02
Rotor moment of inertia (JM)	kg·m <sup>2</sup> ×10 <sup>-4</sup>	0.017	0.022	0.036	0.106	0.173	0.672	0.173	0.672
Alowable load moment of inertia (JL)	Multiple of (JM)	30				20			
Rated power rate	kW/s	5.49	11.5	27.8	38.2	93.7	84.8	52.9	63.8
Rated angular acceleration	rad/s <sup>2</sup>	57,500	72,300	87,400	60,100	73,600	35,500	55,300	30,800
Aplicable encoder	Standard	Incremental encoder (13 bits: 2048P/R)							
	Option	Incremental / absolute encoder (16 bits: 16384P/R)							
Holding brake moment of inertia J		0.0085			0.058		0.14	0.058	0.14
Basic specifications	Time rating	Continuous							
	Insulation class	Class B							
	Ambient temperature	0 to +40 °C							
	Ambient humidity	20 to 80% (non-condensing)							
	Vibration class	15 μm or below							
	Enclosure	Totally-enclosed, self-cooled, IP55 (excluding shaft opening)							
	Vibration resistance	Vibration acceleration 49 m/s <sup>2</sup>							
	Mounting	Flange-mounted							

## Type SGMPH, 230V/400 V

## Ratings and specifications

Applied voltage		230 V					400 V			
Servo motor model SGMPH- □		01A□	02A□	04A□	08A□	15A□	02D□	04D□	08D□	15D□
Rated output	W	100	200	400	750	1500	200	400	750	1500
Rated torque	Nm	0.318	0.637	1.27	2.39	4.77	0.637	1.27	2.39	4.77
Instantaneous peak torque	Nm	0.955	1.91	3.82	7.16	14.3	1.91	3.82	7.16	14.3
Rated current	A (rms)	0.89	2.0	2.6	4.1	7.5	1.4	1.4	2.6	4.5
Instantaneous max. current	A (rms)	2.8	6.0	8.0	13.9	23.0	4.6	4.4	7.8	13.7
Rated speed	min <sup>-1</sup>	3000								
Max. speed	min <sup>-1</sup>	5000								
Torque constant	Nm/A (rms)	0.392	0.349	0.535	0.641	0.687	0.481	0.963	0.994	1.14
Rotor moment of inertia (JM)	kg·m <sup>2</sup> ×10 <sup>-4</sup>	0.0491	0.193	0.331	2.10	4.02	0.193	0.331	2.10	4.02
Allowable load moment of inertia (JL)	Multiple of (JM)	25	15	7	5		15	7	5	
Rated power rate	kW/s	20.6	21.0	49.0	27.1	56.7	21.0	49.0	27.1	56.7
Rated angular acceleration	rad/s <sup>2</sup>	64,800	33,000	38,500	11,400	11,900	33,000	38,500	11,400	11,900
Applicable encoder	Standard	Incremental encoder (13 bits: 2048P/R)								
	Option	Incremental / absolute encoder (16 bits: 16384P/R)								
Holding brake moment of inertia J	kg·m <sup>2</sup> ×10 <sup>-4</sup>	0.029	0.109		0.875		0.109		0.875	
Basic specifications	Time rating	Continuous								
	Insulation class	Class B								
	Ambient temperature	0 to +40 °C								
	Ambient humidity	20 to 80% (non-condensing)								
	Vibration class	15 µm or below								
	Enclosure	Totally-enclosed, self-cooled, IP55 (excluding shaft opening)								
	Vibration resistance	Vibration acceleration 49 m/s <sup>2</sup>								
	Mounting	Flange-mounted								

## Type SGMGH, 400 V

### Ratings and specifications

Applied voltage		400 V											
Servo motor model SGMGH- □		05D□	09D□	13D□	20D□	30D□	44D□	55D□	75D□	1AD□	1ED□		
Rated output	kW	0.45	0.85	1.3	1.8	2.9	4.4	5.5	7.5	11	15		
Rated torque	Nm	2.84	5.39	8.34	11.5	18.6	28.4	35.0	48.0	70.0	95.4		
Instantaneous peak torque	Nm	8.92	13.8	23.3	28.7	45.1	71.1	90.7	123	175	221		
Rated current	A (rms)	1.9	3.5	5.4	8.4	11.9	16.5	20.8	25.4	28.1	37.2		
Instantaneous max. current	A (rms)	5.5	8.5	14	20	28	40.5	55	65	70	85		
Rated speed	min <sup>-1</sup>	1500											
Max. speed	min <sup>-1</sup>	3000									2,000		
Torque constant	Nm/A (rms)	1.64	1.65	1.68	1.46	1.66	1.82	1.74	2.0	2.56	2.64		
Rotor moment of inertia (JM)	kg·m <sup>2</sup> x10 <sup>-4</sup>	7.24	13.9	20.5	31.7	46.0	67.5	89.0	125	281	315		
Alowable load moment of inertia (JL)	Multiple of (JM)	5											
Rated power rate	kW/s	11.2	20.9	33.8	41.5	75.3	120	137	184	174	289		
Rated angular acceleration	rad/s <sup>2</sup>	3,930	3,880	4,060	3,620	4,050	4,210	3,930	3,850	2,490	3,030		
Aplicable encoder	Standard	Incremental encoder (17 bits: 16384P/R)											
	Option	Absolute encoder (17 bits: 16384P/R)											
Holding brake moment of inertia J		kg·m <sup>2</sup> x10 <sup>-4</sup>		2.10						8.50		18.8	37.5
Basic specifications	Time rating		Continuous										
	Insulation class		Class F										
	Ambient temperature		0 to +40 °C										
	Ambient humidity		20 to 80% (non-condensing)										
	Vibration class		15 μm or below										
	Enclosure		Totally-enclosed, self-cooled, IP67 (excluding shaft opening)										
	Vibration resistance		Vibration acceleration 24.5 m/s <sup>2</sup>										
	Mounting		Flange-mounted										

## Type SGMSH, 400 V

### Ratings and specifications

Applied voltage		400 V					
Servo motor model SGMSH- □		10D□	15D□	20D□	30D□	40D□	50D□
Rated output	kW	1.0	1.5	2.0	3.0	4.0	5.0
Rated torque	Nm	3.18	4.9	6.36	9.8	12.6	15.8
Instantaneous peak torque	Nm	9.54	14.7	19.1	29.4	37.8	47.6
Rated current	A (rms)	2.8	4.7	6.2	8.9	12.5	13.8
Instantaneous max. current	A (rms)	8.5	14	19.5	28	38	42
Rated speed	min <sup>-1</sup>	3,000					
Max. speed	min <sup>-1</sup>	5,000					
Torque constant	Nm/A (rms)	1.27	1.15	1.12	1.19	1.07	1.24
Rotor moment of inertia (JM)	kg·m <sup>2</sup> x10 <sup>-4</sup>	1.74	2.47	3.19	7.0	9.60	12.3
Alowable load moment of inertia (JL)	Multiple of (JM)	5					
Rated power rate	kW/s	57.9	97.2	127	137	166	202
Rated angular acceleration	rad/s <sup>2</sup>	18,250	19,840	19,970	14,000	13,160	12,780
Aplicable encoder	Standard	Incremental encoder (17 bits: 16384P/R)					
	Option	Absolute encoder (17 bits: 16384P/R)					
Holding brake moment of inertia J	kg·m <sup>2</sup> x10 <sup>-4</sup>	0.325			2.10		
Basic specifications	Time rating	Continuous					
	Insulation class	Class F					
	Ambient temperature	0 to +40 °C					
	Ambient humidity	20 to 80% (non-condensing)					
	Vibration class	15 μm or below					
	Enclosure	Totally-enclosed, self-cooled, IP67 (excluding shaft opening)					
	Vibration resistance	Vibration acceleration 24.5 m/s <sup>2</sup>					
	Mounting	Flange-mounted					

## Type SGMUH, 400 V

## Ratings and specifications

Applied voltage		400 V			
Servo motor model SGMUH- □		10D□	15D□	30D□	40D□
Rated output	kW	1.0	1.5	3.0	4.0
Rated torque	Nm	1.59	2.45	4.9	6.3
Instantaneous peak torque	Nm	6.5	11	21.5	29
Rated current	A (rms)	2.7	4.1	8.1	9.6
Instantaneous max. current	A (rms)	8.5	14	28	38.5
Rated speed	min <sup>-1</sup>	6000			
Max. speed	min <sup>-1</sup>	6000			
Torque constant	Nm/A (rms)	0.81	0.83	0.81	0.80
Rotor moment of inertia (JM)	kg·m <sup>2</sup> ×10 <sup>-4</sup>	1.74	2.47	7.0	9.6
Allowable load moment of inertia (JL)	Multiple of (JM)	5			
Rated power rate	kW/s	14.5	24.3	34.3	41.3
Rated angular acceleration	rad/s <sup>2</sup>	9130	9910	7000	6550
Applicable encoder	Standard	Incremental Encoder (17 bits: 16384P/R)			
	Option	-			
Holding brake moment of inertia J		kg·m <sup>2</sup> ×10 <sup>-4</sup>		0.252.10	
Basic specifications	Time rating		Continuous		
	Insulation class		Class F		
	Ambient temperature		0 to +40 °C		
	Ambient humidity		20 to 80% (non-condensing)		
	Vibration class		15 μm or below		
	Enclosure		Totally-enclosed, self-cooled, IP67 (excluding shaft opening)		
	Vibration resistance		Vibration acceleration 24.5 m/s <sup>2</sup>		
Mounting		Flange-mounted			

## Type SGMBH, 400 V

## Ratings and specifications

Type	SGMBH-□		2BD□A	3ZD□A	3GD□A	4ED□A	5ED□A
Performance	Rated output	kW	22	30	37	45	55
	Rated torque	Nm	140	191	236	286	350
	Stalling torque	Nm	140	191	236	286	350
	Instantaneous peak torque	Nm	280	382	471	572	700
	Rated current	A(rms)	58	80	100	127	150
	Innstantaneous max. current	A(rms)	120	170	210	260	310
	Rated / max. speed	min <sup>-1</sup>	1500/2000				
	Rotor inertia	kg·m <sup>2</sup>	0.0592	0.0773	0.139	0.151	0.197
Structure	Protective enclosure		IP44				
	Mounting method		Flange			Flange foot mount <sup>*1</sup>	
Encoder		Standard	Incremental, absolute: 17 bits 16384P/R or equivalent <sup>*2</sup>				
		Option	Absolute: 20 bits 16384P/R or equivalent				
Usage temperature			0 to 40 °C				
Usage humidity			20 to 80% (non-condensing)				

\*1 37 kW and 45 kW motors with brakes are foot mount type

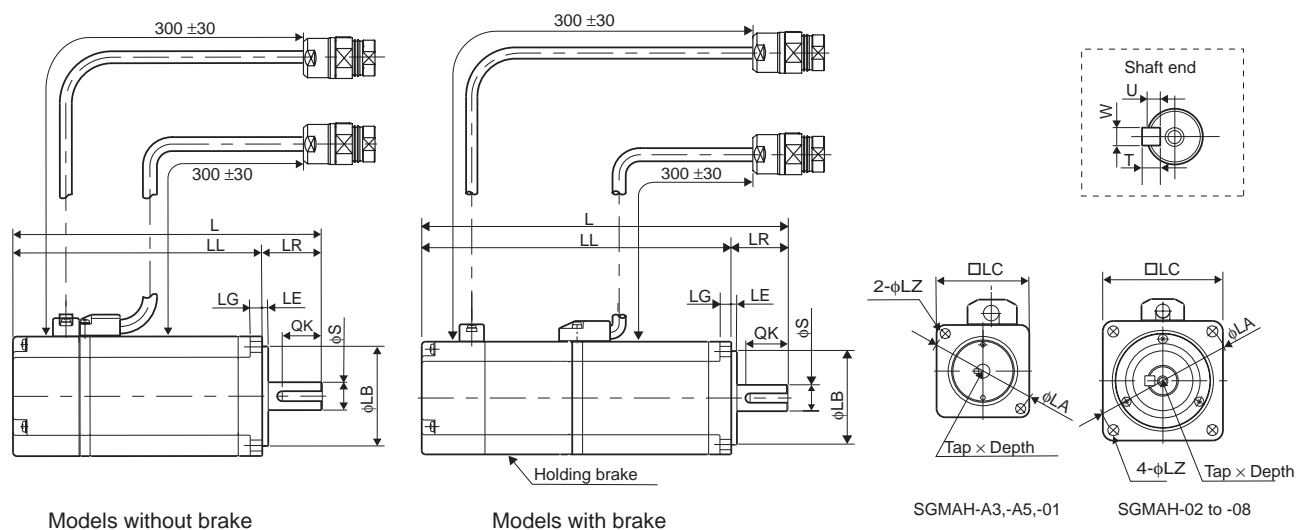
\*2 The number of output pulses of servo drive is 16384P/R for both 17-bit and 20-bit encoders (no dividing).

## Dimensions

### Servo motors

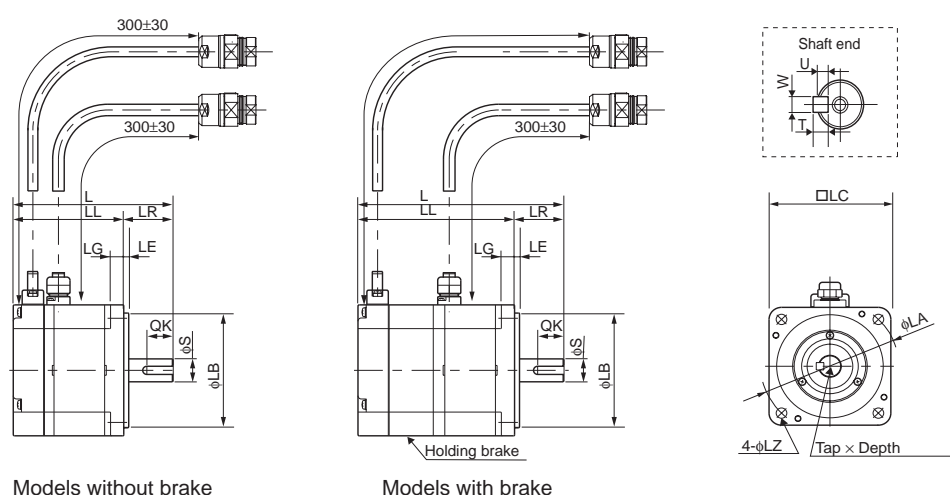
#### Type SGMAH (230/400 V)

Dimensions (mm)	Without brake		With brake		LR	Flange surface						Shaft end					
Model	L	LL	L	LL		LA	LB	LC	LE	LG	LZ	S	QK	W	T	U	Tap × Depth
SGMAH-A3A□A6□D-OY	94.5	69.5	126	101	25	46	30 <sup>h7</sup>	40	2.5	5	4.3	6 <sup>h6</sup>	14	2	2	1.2	M2.5 x 5L
SGMAH-A5A□A6□D-OY	102.0	77	133.5	108.5													
SGMAH-01A□A6□D-OY	119.5	94.5	160	135								8 <sup>h6</sup>		3	3	1.8	M3 x 6L
SGMAH-02A□A6□D-OY	126.5	96.5	166	136	30	70	50 <sup>h7</sup>	60	3	6	5.5	14 <sup>h6</sup>	20	5	5	3	M5 x 8L
SGMAH-03D□A6□D-OY	154.5	124.5	194	164													
SGMAH-04A□A6□D-OY																	
SGMAH-07D□A6□D-OY	185	145	229.5	189.5	40	90	70 <sup>h7</sup>	80	3	8	7	16 <sup>h6</sup>	30				
SGMAH-08A□A6□D-OY																	



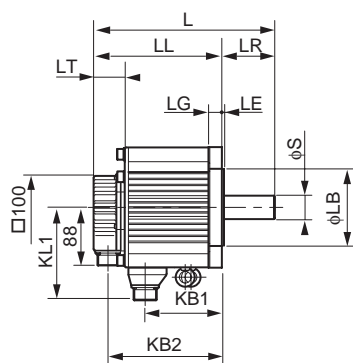
#### Type SGMPH (230/400 V)

Dimensions (mm)	Without brake		With brake		LR	Flange surface						Shaft end					
Model	L	LL	L	LL		LA	LB	LC	LE	LG	LZ	S	QK	W	T	U	Tap × Depth
SGMPH-01□□□6□D-OY	87	62	116	91	25	70	50 <sup>h7</sup>	60	3	6	5.5	8 <sup>h6</sup>	14	3	3	1.8	M3x6L
SGMPH-02□□□6□D-OY	97	67	128.5	98.5	30	90	70 <sup>h7</sup>	80	3	8	7	14 <sup>h6</sup>	16	5	5	3	M5x8L
SGMPH-04□□□6□D-OY	117	87	148.5	118.5													
SGMPH-08□□□6□D-OY	126.5	86.5	160	120	40	145	110 <sup>h7</sup>	120	3.5	10	10	16 <sup>h6</sup>	22				
SGMPH-15□□□6□D-OY	154.5	114.5	188	148								19 <sup>h6</sup>		6	6	3.5	M6x10L

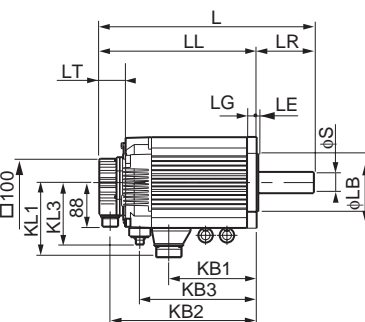


## Type SGMGH (400 V)

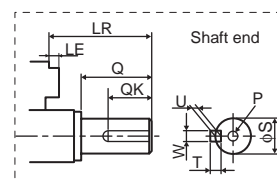
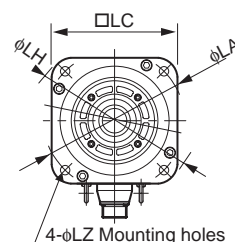
Dimensions (mm)	Without brake			With brake					LR	LT	KB1	KL1	Flange surface						Shaft end							
Model	L	LL	KB2	L	LL	KB2	KB3	KL3					LA	LB	LC	LE	LG	LH	LZ	S	Q	QK	W	T	U	P
SGMGH-05D□A6□-OY	196	138	117	234	176	154	109	98	58	46	65	109	145	110	130	6	12	165	9	19	40	25	5	5	3	M5x12L
SGMGH-09D□A6□-OY	219	161	140	257	199	177	132				88															
SGMGH-13D□A6□-OY	243	185	164	281	223	201	156				112									22			6	6	3.5	
SGMGH-20D□A6□-OY	245	166	144	296	217	195	137	123	79	47	89	140	200	114.3	180	3.2	18	230	13.5	35	76	60	10	8	5	M12x25L
SGMGH-30D□A6□-OY	271	192	170	322	243	221	163				115															
SGMGH-44D□A6□-OY	305	226	204	356	277	255	197				149															
SGMGH-55D□A6□-OY	373	260	238	424	311	289	231		113		174	150								42	110	90	12			M16x32L
SGMGH-75D□A6□-OY	447	334	312	498	385	363	305				248															
SGMGH-1AD□A6□-OY	454	338	316	499	383	362	315	142	116	47	251	168	235	200	220	4	18	270	13.5	42	110	90	12	8	5	M16x32L
SGMGH-1ED□A6□-OY	573	457	435	635	519	497	415			48	343						20			55			16	10	6	M20x40L



Models without brake

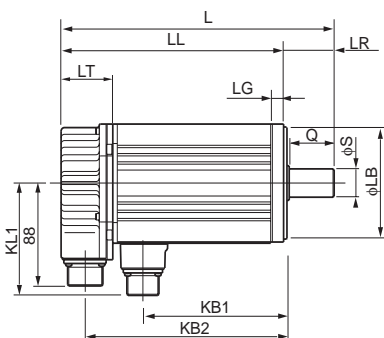


Models with brake

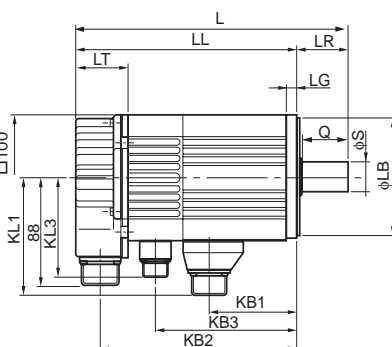


## Type SGMSh (400 V)

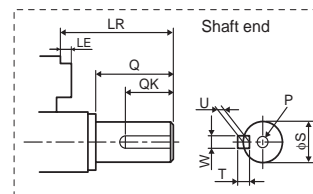
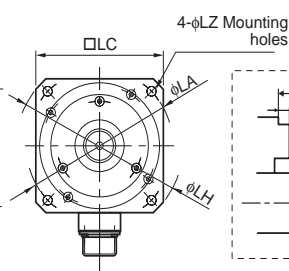
Dimensions (mm)	Without brake			With brake					LR	LT	KB1	KL1	Flange surface						Shaft end							
Model	L	LL	KB2	L	LL	KB2	KB3	KL3					LA	LB	LC	LE	LG	LH	LZ	S	Q	QK	W	T	U	P
SGMSh-10D□A6□-OY	194	149	128	238	193	171	120	85	45	46	76	96	115	95 <sup>h7</sup>	100	3	10	130	7	24 <sup>h6</sup>	40	32	8	7	4	M8x16L
SGMSh-15D□A6□-OY	220	175	154	264	219	197	146				102															
SGMSh-20D□A6□-OY	243	198	177	287	242	220	169				125															
SGMSh-30D□A6□-OY	262	199	178	300	237	216	170	98	63		124	114	145	110 <sup>h7</sup>	130	6	12	165	9	28 <sup>h6</sup>	55	50				
SGMSh-40D□A6□-OY	299	236	215	337	274	253	207				161															
SGMSh-50D□A6□-OY	339	276	255	377	314	293	247				201															



Models without brake



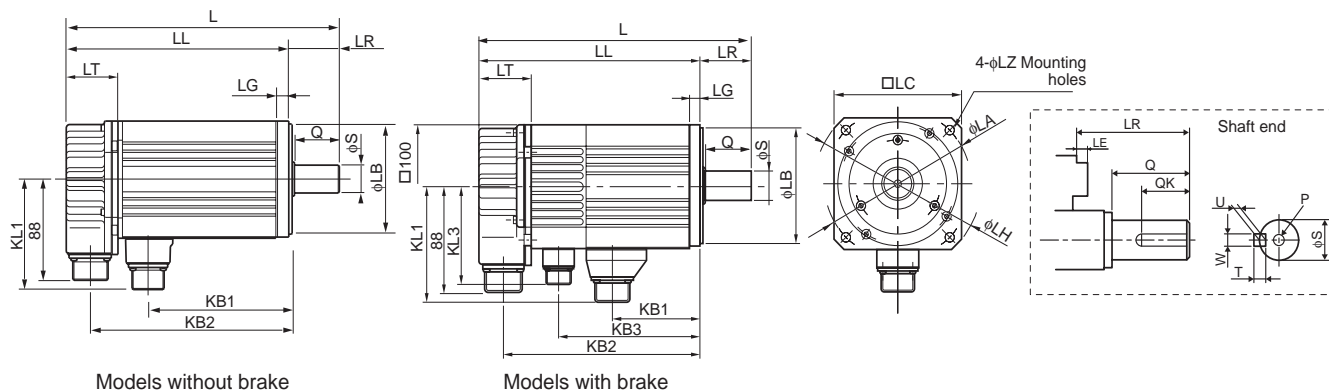
Models with brake





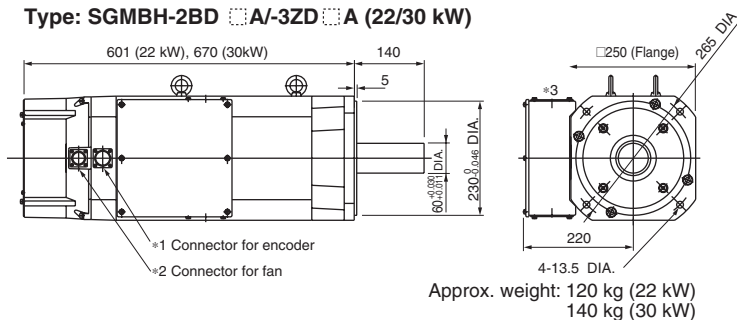
## Type SGMUH (400 V)

Dimensions (mm)	Without brake			With brake					LR	LT	KB1	KL1	Flange surface							Shaft end							
Model	L	LL	KB2	L	LL	KB2	KB3	KL3					LA	LB	LC	LE	LG	LH	LZ	S	Q	QK	W	T	U	P	
SGMUH-10D□A6□-OY	194	149	128	238	193	171	120	85	45	46	76	96	130	110	116	3.5	10	150	9	24 <sup>h6</sup>	40	32	8	7	4	M8x16L	
SGMUH-15D□A6□-OY	220	175	154	264	219	197	146				102																
SGMUH-30D□A6□-OY	262	202	181	300	237	219	173	98	60		127	114	165	130	155		12	190	11	28 <sup>h6</sup>	55	50					
SGMUH-40D□A6□-OY	327	269	245	362	302	281	210			71	164																

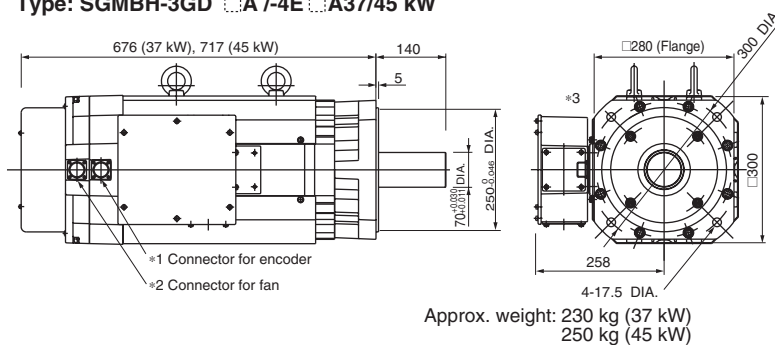


## Type SGMUH (400 V)

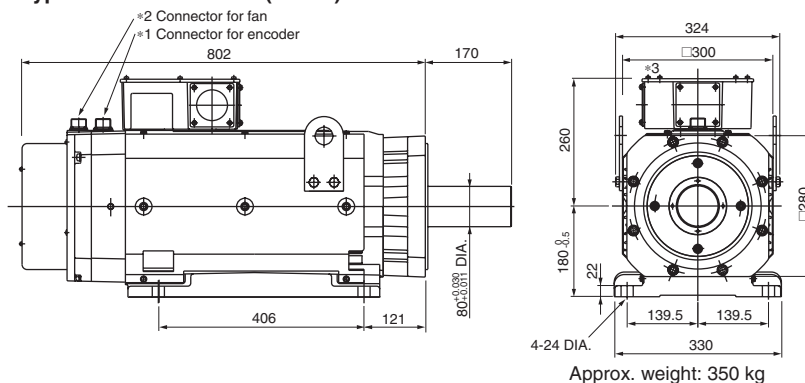
### Type: SGMUH-2BD □A/3ZD □A (22/30 kW)



### Type: SGMUH-3GD □A /4E □A37/45 kW

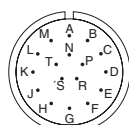


### Type: SGMUH-5ED □A (55 kW)

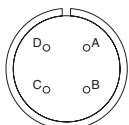


\*1 Connector for encoder

\*2 Connector for fan



Receptacle: 97F-3102E20-29P  
Plug IP67 (L-shape): MS3108E20-29S



Receptacle: CE05-2A18-10PD-B  
Plug IP67 (L-shape): MS3108E18-10S



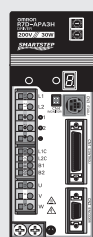
## Ultra-compact motor

The SmartStep motors offer the simplicity and cost-effectiveness of a stepper with the added advantages of a servo system.

- Sizes 30 W to 800 W, rated speed 3,000 rpm
- Cylindrical and flat servo motor types are available
- Peak torque up to three times continuous torque during 3 seconds
- Easy to install with prebuilt cables
- Motors with brake are available

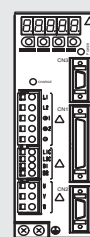
## Ordering information

(Refer to servo drive chapter)



Servodrive controlled by pulses

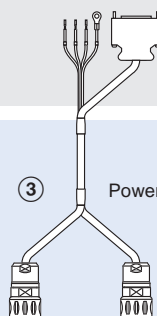
② SmartStep servo drive



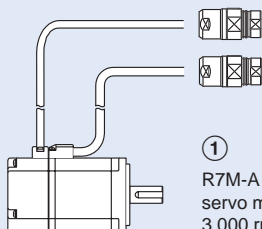
Intelligent servo drive

② XtraDrive

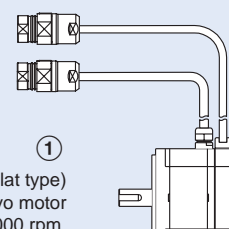
Drive options



③ Power and encoder cables



① R7M-A (cylindrical type) servo motor 3,000 rpm (30-750 W)



① R7M-AP (flat type) servo motor 3,000 rpm (100-750 W)

**Note:** The symbols ①②③... show the recommended sequence to select the servo motor and cables

## Servo motor

### Cylindrical servo motors (3,000-r/min)

Symbol	Specifications			Servo motor model	Compatible servo drives ②		
	Design	Rated torque	Capacity		SmartStep	XtraDrive	
①	Cylindrical servo motors (3,000-r/min)	Without brake	0.095 Nm	30 W	R7M-A03030-S1-D	R7D-APA3H	XD-P3-MN01
			0.159 Nm	50 W	R7M-A05030-S1-D	R7D-APA5H	XD-P5-MN01
			0.318 Nm	100 W	R7M-A10030-S1-D	R7D-AP01H	XD-01-MN01
			0.637 Nm	200 W	R7M-A20030-S1-D	R7D-AP02H	XD-02-MN01
			1.27 Nm	400 W	R7M-A40030-S1-D	R7D-AP04H	XD-04-MN01
			2.39 Nm	750 W	R7M-A75030-S1-D	R7D-AP08H	XD-08-MN
	Straight shaft with key	With brake	0.095 Nm	30 W	R7M-A03030-BS1-D	R7D-APA3H	XD-P3-MN01
			0.159 Nm	50 W	R7M-A05030-BS1-D	R7D-APA5H	XD-P5-MN01
			0.318 Nm	100 W	R7M-A10030-BS1-D	R7D-AP01H	XD-01-MN01
			0.637 Nm	200 W	R7M-A20030-BS1-D	R7D-AP02H	XD-02-MN01
			1.27 Nm	400 W	R7M-A40030-BS1-D	R7D-AP04H	XD-04-MN01
			2.39 Nm	750 W	R7M-A75030-BS1-D	R7D-AP08H	XD-08-MN

## Flat servo motors (3,000-r/min)

Symbol	Specifications				Servo motor model	Compatible servo drives ②	
	Design		Rated torque	Capacity		SmartStep	XtraDrive
①	Flat servo motors (3,000-r/min)	Without brake	0.318 Nm	100 W	R7M-AP10030-S1-D	R7D-AP01H	XD-01-MN01
			0.637 Nm	200 W	R7M-AP20030-S1-D	R7D-AP02H	XD-02-MN01
			1.27 Nm	400 W	R7M-AP40030-S1-D	R7D-AP04H	XD-04-MN01
			2.39 Nm	750 W	R7M-AP75030-S1-D	R7D-AP08H	XD-08-MN
	Straight shaft with key	With brake	0.318 Nm	100 W	R7M-AP10030-BS1-D	R7D-AP01H	XD-01-MN01
			0.637 Nm	200 W	R7M-AP20030-BS1-D	R7D-AP02H	XD-02-MN01
			1.27 Nm	400 W	R7M-AP40030-BS1-D	R7D-AP04H	XD-04-MN01
			2.39 Nm	750 W	R7M-AP75030-BS1-D	R7D-AP08H	XD-08-MN

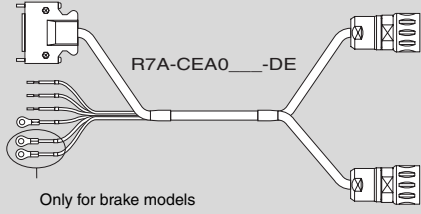
## Servo drive

**Note:** Choosing SmartStep drive or XtraDrive affects to the encoder cable needed

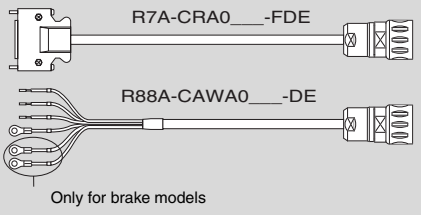
② Refer to SmartStep servo drive or XtraDrive chapter for detailed drive specifications and selection of drive accessories

## Servo motor cables for SmartStep drive

### Standard cable (power + encoder)

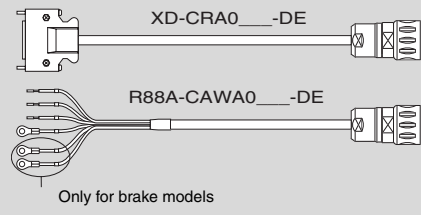
Symbol	Drive	Specifications		Power cable model	Encoder cable model	Appearance
③	SmartStep	For servo motors without brake R7M-A(P)□□□30-S1-D	3 m	R7A-CEA003S-DE		
			5 m	R7A-CEA005S-DE		
			10 m	R7A-CEA010S-DE		
			15 m	R7A-CEA015S-DE		
			20 m	R7A-CEA020S-DE		
		For servo motors with brake R7M-A(P)□□□30-BS1-D	3 m	R7A-CEA003B-DE		
			5 m	R7A-CEA005B-DE		
			10 m	R7A-CEA010B-DE		
			15 m	R7A-CEA015B-DE		
			20 m	R7A-CEA020B-DE		

### Flexible cables (power + encoder)

Symbol	Drive	Specifications		Power cable model	Encoder cable model	Appearance
③	SmartStep	For servo motors without brake R7M-A(P)□□□30-S1-D	3 m	R88A-CAWA003S-DE	R7A-CRA003-FDE	
			5 m	R88A-CAWA005S-DE	R7A-CRA005-FDE	
			10 m	R88A-CAWA010S-DE	R7A-CRA010-FDE	
			15 m	R88A-CAWA015S-DE	R7A-CRA015-FDE	
			20 m	R88A-CAWA020S-DE	R7A-CRA020-FDE	
		For servo motors with brake R7M-A(P)□□□30-BS1-D	3 m	R88A-CAWA003B-DE	R7A-CRA003-FDE	
			5 m	R88A-CAWA005B-DE	R7A-CRA005-FDE	
			10 m	R88A-CAWA010B-DE	R7A-CRA010-FDE	
			15 m	R88A-CAWA015B-DE	R7A-CRA015-FDE	
			20 m	R88A-CAWA020B-DE	R7A-CRA020-FDE	

## Servo motor cables for XtraDrive drive

### Flexible cables (power + encoder)

Symbol	Drive	Specifications		Power cable model	Encoder cable model	Appearance
③	XtraDrive	For servo motors without brake R7M-A(P)□□□30-S1-D	3 m	R88A-CAWA003S-DE	XD-CRA003-DE	
			5 m	R88A-CAWA005S-DE	XD-CRA005-DE	
			10 m	R88A-CAWA010S-DE	XD-CRA010-DE	
			15 m	R88A-CAWA015S-DE	XD-CRA015-DE	
			20 m	R88A-CAWA020S-DE	XD-CRA020-DE	
		For servo motors with brake R7M-A(P)□□□30-BS1-D	3 m	R88A-CAWA003B-DE	XD-CRA003-DE	
			5 m	R88A-CAWA005B-DE	XD-CRA005-DE	
			10 m	R88A-CAWA010B-DE	XD-CRA010-DE	
			15 m	R88A-CAWA015B-DE	XD-CRA015-DE	
			20 m	R88A-CAWA020B-DE	XD-CRA020-DE	

## Connectors

Specifications	Model
SmartStep connectors kit.	Models included in kit
SmartStep encoder connector (for CN2)	R7A-CNA01R
Hypertac power connector female	SPOC-06K-FSDN169
Hypertac encoder connector female	SPOC-17H-FRON169

## Specifications

### General specifications

Item	Specification
Ambient operating temperature	0 °C to 40 °C
Ambient operating humidity	20% to 80% (with no condensation)
Ambient storage temperature	-20 °C to 60 °C
Ambient storage humidity	20% to 80% (with no condensation)
Storage / operating atmosphere	No corrosive gases.
Vibration resistance	10 to 2,500 Hz in X, Y, and Z directions with 0.2 mm double amplitude or acceleration of 24.5 m/s <sup>2</sup> max., whichever is smaller
Impact resistance	Acceleration 98 m/s <sup>2</sup> max., in a vertical direction, two times
Insulation resistance	Between power line terminals and FG: 10 MΩ min. (at 500 V DC)
Dielectric strength	Between power line terminals and FG: 1,500 V AC for 1 min at 50/60 Hz
Run position	Any direction
Insulation grade	Type B
Structure	Totally-enclosed self-cooling
Protective structure	IP55 for both the cylindrical and flat servo motors
Vibration grade	V-15
Mounting method	Flange-mounting
International standards	Approval obtained for UL, cUL, and EN (EMC directive and low-voltage directive)

### Performance specifications

#### Flat servo motors

Item	R7M-AP10030-□	R7M-AP20030-□	R7M-AP40030-□	R7M-AP75030-□
Rated output	100 W	200 W	400 W	750 W
Rated torque	0.318 Nm	0.637 Nm	1.27 Nm	2.39 Nm
Rated rotation speed	3,000 r/min	3,000 r/min	3,000 r/min	3,000 r/min
Momentary maximum rotation speed	4,500 r/min	4,500 r/min	4,500 r/min	4,500 r/min
Momentary maximum torque	0.96 Nm	1.91 Nm	3.82 Nm	7.1 Nm
Rated current	0.89 A (rms)	2.0 A (rms)	2.6 A (rms)	4.1 A (rms)
Momentary maximum current	2.8 A (rms)	6.0 A (rms)	8.0 A (rms)	13.9 A (rms)
Rotor inertia	$6.5 \times 10^{-6}$ kg·m <sup>2</sup>	$2.09 \times 10^{-5}$ kg·m <sup>2</sup>	$3.47 \times 10^{-5}$ kg·m <sup>2</sup>	$2.11 \times 10^{-4}$ kg·m <sup>2</sup>
Power rate	15.7 kW/s	19.4 kW/s	46.8 kW/s	26.9 kW/s
Allowable radial load	78 N	245 N	245 N	392 N
Allowable thrust load	49 N	68 N	68 N	147 N
Weight	Without brake	0.7 kg	1.4 kg	2.1 kg
	With brake	0.9 kg	1.9 kg	2.6 kg
Encoder resolution	2,000 pulses/revolution for phase-A and phase-B, 1 pulse/revolution for phase-Z			
Radiation shield dimensions	t6 × 250 mm square			t12 × 300 mm square
Brake specifications	Brake inertia	$3.1 \times 10^{-6}$ kg·m <sup>2</sup>	$1.52 \times 10^{-5}$ kg·m <sup>2</sup>	$1.52 \times 10^{-5}$ kg·m <sup>2</sup>
	Excitation voltage	24 V DC ±10%		
	Power consumption (at 20 °C)	7.5 W	7.6 W	8.2 W
	Current consumption (at 20 °C)	0.31 A	0.32 A	0.34 A
	Static friction torque	0.4 Nm min.	0.9 Nm min.	1.9 Nm min.
	Attraction time	60 ms max.	40 ms max.	60 ms max.
	Release time	20 ms max.	20 ms max.	20 ms max.
	Backlash	1°	1°	1°
	Rating	Continuous	Continuous	Continuous
	Insulation grade	Type F	Type F	Type F
Applicable servo driver (R7D-)	AP01H	AP02H	AP04H	AP08H

#### Cylindrical servo motors

Item	R7M-A03030-□	R7M-A05030-□	R7M-A10030-□	R7M-A20030-□	R7M-A40030-□	R7M-A75030-□
Rated output	30 W	50 W	100 W	200 W	400 W	750 W
Rated torque	0.095 Nm	0.159 Nm	0.318 Nm	0.637 Nm	1.27 Nm	2.39 Nm
Rated rotation speed	3,000 r/min	3,000 r/min	3,000 r/min	3,000 r/min	3,000 r/min	3,000 r/min
Momentary maximum rotation speed	4,500 r/min	4,500 r/min	4,500 r/min	4,500 r/min	4,500 r/min	4,500 r/min
Momentary maximum torque	0.29 Nm	0.48 Nm	0.96 Nm	1.91 Nm	3.82 Nm	7.1 Nm
Rated current	0.42 A (rms)	0.6 A (rms)	0.87 A (rms)	2.0 A (rms)	2.6 A (rms)	4.4 A (rms)
Momentary maximum current	1.3 A (rms)	1.9 A (rms)	2.8 A (rms)	6.0 A (rms)	8.0 A (rms)	13.9 A (rms)
Rotor inertia	$1.7 \times 10^{-6}$ kg·m <sup>2</sup>	$2.2 \times 10^{-6}$ kg·m <sup>2</sup>	$3.6 \times 10^{-6}$ kg·m <sup>2</sup>	$1.19 \times 10^{-5}$ kg·m <sup>2</sup>	$1.87 \times 10^{-5}$ kg·m <sup>2</sup>	$6.67 \times 10^{-5}$ kg·m <sup>2</sup>
Power rate	5.31 kW/s	11.5 kW/s	28.1 kW/s	34.1 kW/s	86.3 kW/s	85.6 kW/s
Allowable radial load	68 N	68 N	78 N	245 N	245 N	392 N
Allowable thrust load	54 N	54 N	54 N	74 N	74 N	147 N
Weight	Without brake	0.3 kg	0.4 kg	0.5 kg	1.1 kg	1.7 kg
	With brake	0.6 kg	0.7 kg	0.8 kg	1.6 kg	2.2 kg
Encoder resolution	2,000 pulses/revolution for phase-A and phase-B, 1 pulse/revolution for phase-Z					
Radiation shield dimensions	t6×250 mm square					

Item		R7M-A03030-□	R7M-A05030-□	R7M-A10030-□	R7M-A20030-□	R7M-A40030-□	R7M-A75030-□
Brake specifications	Brake inertia	$0.85 \times 10^{-6} \text{ kg-m}^2$	$0.85 \times 10^{-6} \text{ kg-m}^2$	$0.85 \times 10^{-6} \text{ kg-m}^2$	$6.4 \times 10^{-6} \text{ kg-m}^2$	$6.4 \times 10^{-6} \text{ kg-m}^2$	$1.7 \times 10^{-5} \text{ kg-m}^2$
	Excitation voltage	24 V DC $\pm 10\%$ V					
	Power consumption (at 20 °C)	6 W	6 W	6 W	7 W	7 W	7.7 W
	Current consumption (at 20 °C)	0.25 A	0.25 A	0.25 A	0.29 A	0.29 A	0.32 A
	Static friction torque	0.2 Nm min.	0.2 Nm min.	0.34 Nm min.	1.47 Nm min.	1.47 Nm min.	2.45 Nm min.
	Attraction time	30 ms max.	30 ms max.	30 ms max.	60 ms max.	60 ms max.	60 ms max.
	Release time	60 ms max.	60 ms max.	60 ms max.	20 ms max.	20 ms max.	20 ms max.
	Backlash	1°	1°	1°	1°	1°	1°
	Rating	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
	Insulation grade	Type F	Type F	Type F	Type F	Type F	Type F
Applicable servo driver (R7D-)		APA3H	APA5H	AP01H	AP02H	AP04H	AP08H

## Dimensions

### Cylindrical servo motors (3,000 r/min)

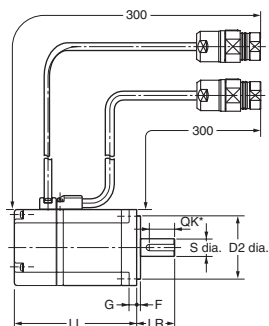
200 V AC: 30 W/50 W / 100 W / 200 W / 400 W / 750 W

Without brake: R7M-A03030-S1-D/A05030-S1-D/A10030-S1-D/A20030-S1-D/A40030-S1-D/A75030-S1-D

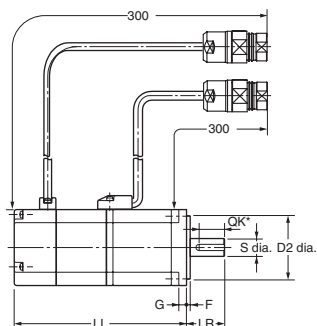
With brake: R7M-A03030-BS1-D/A05030-BS1-D/A10030-BS1-D/A20030-BS1-D/A40030-BS1-D/A75030-BS1-D

Model	Dimensions (mm)													
	LL		LR	Flange surface						Axis end				
	Without brake	With brake		C	D1	D2	F	G	Z	S	QK	b	h	t1
R7M-A03030□	69.5	101	25	40	46	30h7	2.5	5	Two, 4.3 dia.	6h6	14	2	2	1.2
R7M-A05030□	77	108.5												
R7M-A10030□	94.5	135								8h6		3	3	1.8
R7M-A20030□	96.5	136	30	60	70	50h7	3	6	Four, 5.5 dia.	14h6	20	5	5	3
R7M-A40030□	124.5	164												
R7M-A75030□	145	189.5	40	80	90	70h7	3	8	Four, 7 dia.	16h6	30			

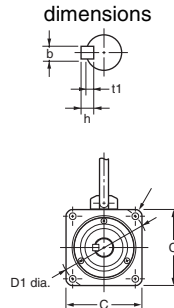
R7M-A□□□30-S1-D (without brake)



R7M-A□□□30-BS1-D (with brake)



Axis end dimensions



Hole with "Z" mark

### Flat servo motors (3,000 r/min)

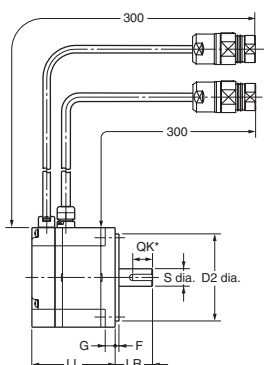
200 V AC: 100 W / 200 W / 400 W / 750 W

Without brake: R7M-AP10030-S1-D/AP20030-S1-D/AP40030-S1-D/AP75030-S1-D

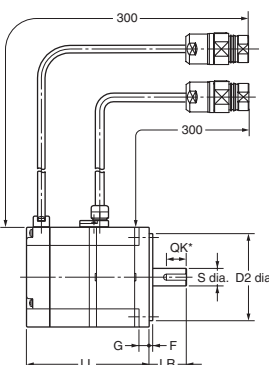
With brake: R7M-AP10030-BS1-D/AP20030-BS1-D/AP40030-BS1-D/AP75030-BS1-D

Model	Dimensions (mm)													
	LL		LR	Flange surface						Axis end				
	Without brake	With brake		C	D1	D2	F	G	Z	S	QK	b	h	t1
R7M-AP10030□	62	91	25	60	70	50h7	3	6	5.5	8h6	14	3	3	1.8
R7M-AP20030□	67	98.5	30	80	90	70h7	3	8	7	14h6	16	5	5	3
R7M-AP40030□	87	118.5												
R7M-AP75030□	86.5	120	40	120	145	110h7	3.5	10	10	16h6	22			

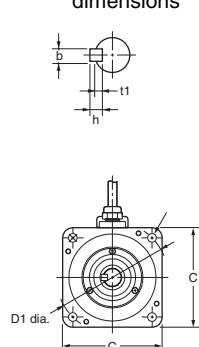
R7M-AP□□□30-S1-D (without brake)



R7M-AP□□□30-BS1-D (with brake)

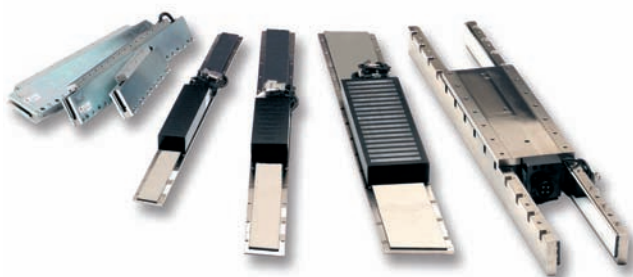


Axis end dimensions



Four, Z-dia. mounting holes

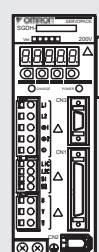
## Direct drive linear servo motors for faster machine cycles



- Direct control of the motors using XtraDrive and Sigma-II drives
- Improved machine performance
- Easy of operation & high reliability
- Designed for high force density in compact packages
- Exhibits exceptional force linearity even at near the peak force regions
- Extremely energy efficient, due to its optimised magnetic circuitry design and high-density windings

## Ordering information

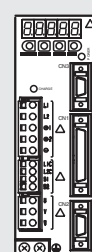
(Refer to servo drive chapter)



Servo drive with option boards for flexible system configuration

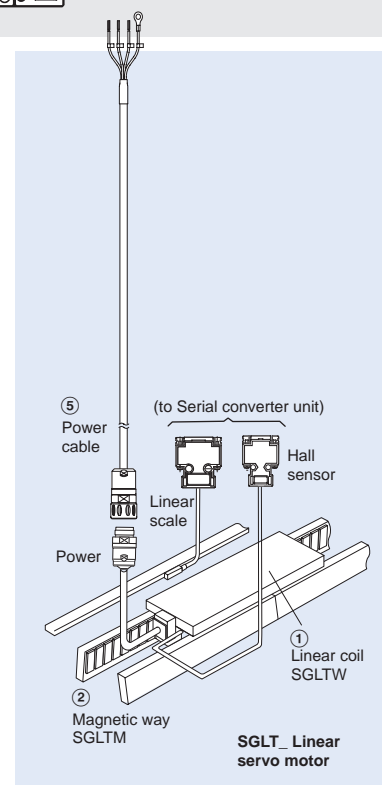
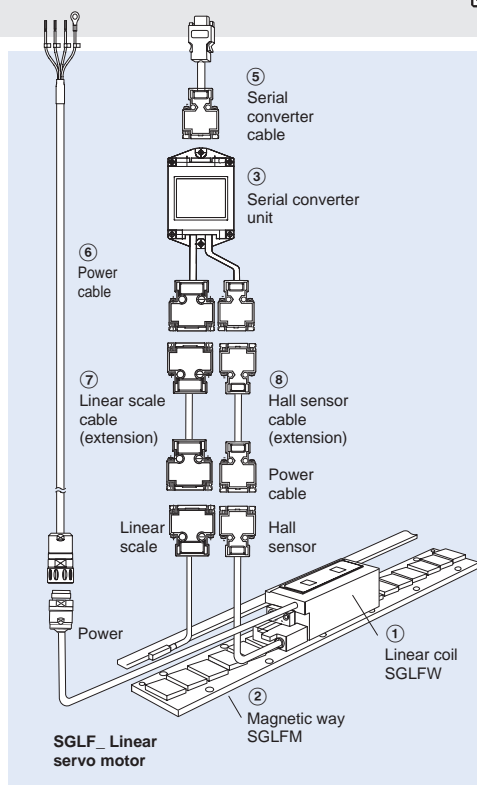
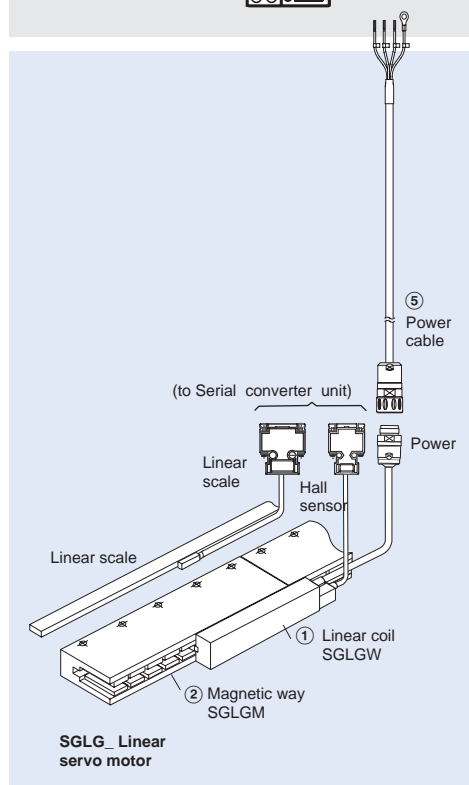
④ Sigma-II servo drive

Drive options



Intelligent servo drive

④ XtraDrive




**Note:** The symbols ①②③ .. show the recommended sequence to select the servo motor, cables and serial converter for a linear motor system



## Servo motor


## GLGW / SGLGM coreless type (200 V)

With standard-force magnetic ways - 230V AC single phase

Symbol	Specifications		Model				
	Rated force	Peak force	① Linear coil	② Magnetic way	③ Serial converter	④ Servo drive	
						Sigma-II series	XtraDrive
①②③④ 	13.5 N	40 N	SGLGW-30A050CPD	SGLGM-30108A	JZDP-D008-250	SGDH-A5AE-OY	XD-P5-MN01
	27 N	80 N	SGLGW-30A080CPD	SGLGM-30216A SGLGM-30432A	JZDP-D008-251	SGDH-01AE-OY	XD-01-MN01
	47 N	140 N	SGLGW-40A140CPD	SGLGM-40090CT	JZDP-D008-252	SGDH-01AE-OY	XD-01-MN01
	93 N	280 N	SGLGW-40A253CPD	SGLGM-40225CT	JZDP-D008-253	SGDH-02AE-OY	XD-02-MN01
	140 N	420 N	SGLGW-40A365CPD	SGLGM-40360CT SGLGM-40405CT SGLGM-40450CT	JZDP-D008-254	SGDH-04AE-OY	XD-04-MN01
	73 N	220 N	SGLGW-60A140CPD	SGLGM-60090CT	JZDP-D008-258	SGDH-02AE-OY	XD-02-MN01
	147 N	440 N	SGLGW-60A253CPD	SGLGM-60225CT	JZDP-D008-259	SGDH-04AE-OY	XD-04-MN01
	220 N	660 N	SGLGW-60A365CPD	SGLGM-60360CT SGLGM-60405CT SGLGM-60450CT	JZDP-D008-260	SGDH-08AE-S-OY	XD-08-MN
	325 N	1300 N	SGLGW-90A200CPD	SGLGM-90252A SGLGM-90504A	JZDP-D008-260	SGDH-15AE-S-OY	XD-15-MN

**Note:** - Linear coils with design revision C are equivalent to previous versions. The serial converter required for revision C coil has changed from previous version, select it according to the table above.  
 - Magnetic ways with design revision C and revision B can be combined.


With high-force magnetic ways - 230V AC single phase

Symbol	Specifications		Model				
	Rated force	Peak force	① Linear coil	② Magnetic way	③ Serial converter	④ Servo drive	
						Sigma-II series	XtraDrive
①②③④ 	57 N	230 N	SGLGW-40A140CPD	SGLGM-40090CT-M	JZDP-D008-255	SGDH-02AE-OY	XD-02-MN01
	114 N	460 N	SGLGW-40A253CPD	SGLGM-40225CT-M	JZDP-D008-256	SGDH-04AE-OY	XD-04-MN01
	171 N	690 N	SGLGW-40A365CPD	SGLGM-40360CT-M SGLGM-40405CT-M SGLGM-40450CT-M	JZDP-D008-257	SGDH-08AE-S-OY	XD-08-MN
	89 N	360 N	SGLGW-60A140CPD	SGLGM-60090CT-M	JZDP-D008-261	SGDH-02AE-OY	XD-02-MN01
	178 N	720 N	SGLGW-60A253CPD	SGLGM-60225CT-M	JZDP-D008-262	SGDH-08AE-S-OY	XD-08-MN
	267 N	1080 N	SGLGW-60A365CPD	SGLGM-60360CT-M SGLGM-60405CT-M SGLGM-60450CT-M	JZDP-D008-263	SGDH-15AE-S-OY	XD-15-MN

**Note:** - Linear coils with design revision C are equivalent to previous versions. The serial converter required for revision C coil has changed from previous version, select it according to the table above.  
 - Magnetic ways with design revision C and revision B can be combined.


## SGLFW / SGLFM iron-core type

230V AC single phase

Symbol	Specifications		Model				
	Rated force	Peak force	① Linear coil	② Magnetic way	③ Serial converter	④ Servo drive	
						Sigma-II series	XtraDrive
①②③④ 	25 N	86 N	SGLFW-20A090APD	SGLFM-20324AC	JZDP-A008-017	SGDH-02AE-OY	XD-02-MN01
	40 N	125 N	SGLFW-20A120APD	SGLFM-20540AC SGLFM-20756AC	JZDP-A008-018	SGDH-02AE-OY	XD-02-MN01
	80 N	220 N	SGLFW-35A120APD	SGLFM-35324AC	JZDP-A008-019	SGDH-02AE-OY	XD-02-MN01
	160 N	440 N	SGLFW-35A230APD	SGLFM-35540AC SGLFM-35756AC	JZDP-A008-020	SGDH-08AE-S-OY	XD-08-MN01
	280 N	600 N	SGLFW-50A200BPD	SGLFM-50405AC	JZDP-A008-181	SGDH-08AE-S-OY	XD-08-MN
	560 N	1200 N	SGLFW-50A380BPD	SGLFM-50675AC SGLFM-50945AC	JZDP-A008-182	SGDH-15AE-S-OY	XD-15-MN
	560 N	1200 N	SGLFW-1ZA200BPD	SGLFM-1Z405AC SGLFM-1Z675AC SGLFM-1Z945AC	JZDP-A008-183	SGDH-15AE-S-OY	XD-15-MN

**Note:** Serial converters with design revision A (JZDP-A008-xxx) will be replaced by revision D (JZDP-D008-xxx), both models are fully compatible.


400V AC three phase

Symbol	Specifications		Model				
	Rated force	Peak force	① Linear coil	② Magnetic way	③ Serial converter	④ Servo drive	
						Sigma-II series	XtraDrive
①②③④ 	80 N	220 N	SGLFW-35D120APD	SGLFM-35324AC	JZDP-A008-211	SGDH-05DE-OY	XD-05-TN
	160 N	440 N	SGLFW-35D230APD	SGLFM-35540AC SGLFM-35756AC	JZDP-A008-212	SGDH-05DE-OY	XD-05-TN
	280 N	600 N	SGLFW-50D200BPD	SGLFM-50405AC	JZDP-A008-189	SGDH-10DE-OY	XD-10-TN
	560 N	1200 N	SGLFW-50D380BPD	SGLFM-50675AC SGLFM-50945AC	JZDP-A008-190	SGDH-15DE-OY	XD-15-TN
	560 N	1200 N	SGLFW-1ZD200BPD	SGLFM-1Z405AC	JZDP-A008-191	SGDH-15DE-OY	XD-15-TN
	1120 N	2400 N	SGLFW-1ZD380BPD	SGLFM-1Z675AC SGLFM-1Z945AC	JZDP-A008-192	SGDH-30DE-OY	XD-30-TN
	1500 N	3600 N	SGLFW-1ED380BP	SGLFM-1E135AC	JZDP-D008-333	SGDH-20DE-OY	XD-20-TN
	2250 N	5400 N	SGLFW-1ED560BP		JZDP-D008-334	SGDH-30DE-OY	XD-30-TN

**Note:** Serial converters with design revision A (JZDP-A008-xxx) will be replaced by revision D (JZDP-D008-xxx), both models are fully compatible.

## SGLTW / SGLTM iron-core type

400V AC three phase

Symbol	Specifications		Model				
	Rated force	Peak force	① Linear coil	② Magnetic way	③ Serial converter	④ Servo drive	
						Sigma-II series	XtraDrive
	300 N	600 N	SGLTW-35D170HPD	SGLTM-35324HC	JZDP-A008-193	SGDH-10DE-OY	XD-10-TN
	600 N	1200 N	SGLTW-35D320HPD	SGLTM-35540HC	JZDP-A008-194	SGDH-20DE-OY	XD-20-TN
	450 N	900 N	SGLTW-50D170HPD	SGLTM-50324HC	JZDP-A008-195	SGDH-10DE-OY	XD-10-TN
	900 N	1800 N	SGLTW-50D320HPD	SGLTM-50540HC	JZDP-A008-196	SGDH-20DE-OY	XD-20-TN
	670 N	2600 N	SGLTW-40D400BP	SGLTM-40405AC	JZDP-A008-197	SGDH-30DE-OY	XD-30-TN
	1000 N	4000 N	SGLTW-40D600BP	SGLTM-40675AC	JZDP-A008-198	SGDH-50DE-OY	XD-50-TN
	1300 N	5000 N	SGLTW-80D400BP	SGLTM-80405AC	JZDP-A008-199	SGDH-50DE-OY	XD-50-TN
	2000 N	7500 N	SGLTW-80D600BP	SGLTM-80675AC	JZDP-A008-200	SGDH-75DE-OY	-

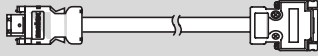
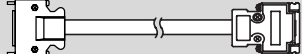
**Note:** Serial converters with design revision A (JZDP-A008-xxx) will be replaced by revision D (JZDP-D008-xxx), both models are fully compatible.

## Servo drive


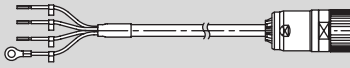
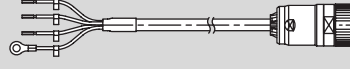
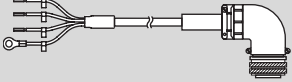
**Note:** Choosing Sigma-II drive or XtraDrive affects to the serial converter cable needed.

④ Refer to Sigma-II servo drive or XtraDrive chapter for detailed drive specifications and selection of drive accessories.

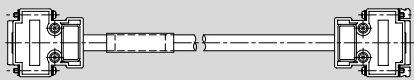
## Serial converter cable to servo drive

Symbol	Specifications	Model	Appearance
⑤	Sigma-II drive to serial converter cable	3 m JZSP-CLP70-03-E	
		5 m JZSP-CLP70-05-E	
		10 m JZSP-CLP70-10-E	
		15 m JZSP-CLP70-15-E	
		20 m JZSP-CLP70-20-E	
	XtraDrive drive to serial converter cable	3 m XD-CLP70-03-E	
		5 m XD-CLP70-05-E	
		10 m XD-CLP70-10-E	
		15 m XD-CLP70-15-E	
		20 m XD-CLP70-20-E	

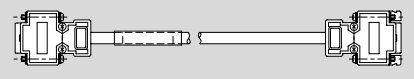
## Power cables

Symbol	Specifications	Model	Appearance
⑥	For 200 V servo motors SGLGW-30A□□□□□D SGLGW-40A□□□□□D SGLGW-60A□□□□□D SGLFW-20A□□□□□D SGLFW-35A□□□□□D	3 m R88A-CAWA003S-DE	
		5 m R88A-CAWA005S-DE	
		10 m R88A-CAWA010S-DE	
		15 m R88A-CAWA015S-DE	
		20 m R88A-CAWA020S-DE	
	For 200 V servo motors SGLGW-90A200□□□D SGLFW-50A□□□□□B□D SGLFW-1ZA200B□□D	3 m R88A-CAWB003S-DE	
		5 m R88A-CAWB005S-DE	
		10 m R88A-CAWB010S-DE	
		15 m R88A-CAWB015S-DE	
		20 m R88A-CAWB020S-DE	
	For 400 V servo motors SGLFW-35D□□□□□A□D SGLFW-50D200□□□D SGLTW-35D170H□□D SGLTW-50D170H□□D	3 m R88A-CAWK003S-DE	
		5 m R88A-CAWK005S-DE	
		10 m R88A-CAWK010S-DE	
		15 m R88A-CAWK015S-DE	
		20 m R88A-CAWK020S-DE	
	For 400 V servo motors SGLFW-50D380□□□D SGLFW-1ZD□□□□□B□D SGLTW-35D320H□□D SGLTW-50D320H□□D	3 m R88A-CAWL003S-DE	
		5 m R88A-CAWL005S-DE	
		10 m R88A-CAWL010S-DE	
		15 m R88A-CAWL015S-DE	
		20 m R88A-CAWL020S-DE	
	For 400 V servo motors SGLFW-1ED□□□□□B□ SGLTW-40D□□□□□B□ SGLTW-80D□□□□□B□	3 m R88A-CAWD003S-E	
		5 m R88A-CAWD005S-E	
		10 m R88A-CAWD010S-E	
		15 m R88A-CAWD015S-E	
		20 m R88A-CAWD020S-E	

## Linear scale cable to serial converter

Symbol	Specifications	Model	Appearance
⑦	Extension cable for <b>Renishaw</b> linear scale to serial converter. (connector DB-15) (the extension cable is optional)	1 m JZSP-CLL00-01-E	
		3 m JZSP-CLL00-03-E	
		5 m JZSP-CLL00-05-E	
		10 m JZSP-CLL00-10-E	
		15 m JZSP-CLL00-15-E	
	Extension cable for <b>Heidenhain</b> linear scale to serial converter (connector DB-15) (when a Heidenhain scale is used the extension cable is required)	1 m JZSP-CLL20-01-E	
		3 m JZSP-CLL20-03-E	
		5 m JZSP-CLL20-05-E	
		10 m JZSP-CLL20-10-E	
		15 m JZSP-CLL20-15-E	

## Hall sensor cable to serial converter

Symbol	Specifications	Model	Appearance
⑧	Extension cable for linear scale to serial converter (the extension cable is optional)	1 m JZSP-CLL10-01-E	
		3 m JZSP-CLL10-03-E	
		5 m JZSP-CLL10-05-E	
		10 m JZSP-CLL10-10-E	
		15 m JZSP-CLL10-15-E	

## Connectors

Specification	Model
Hypertac power connector IP67 (for 200V motor coils SGL□W-□□A□□□□□D)	SPOC-06K-FSDN169
Hypertac power connector IP67 (for 400V motor coils SGL□W-□□D□□□□□□D)	LPRA-06B-FRBN170
Military power connector IP67 (for motor coils SGLTW-40□/80□ and SGLFW-1ED□)	MS3108E22-22S

## Dimensioning software

Specifications	Model
SigmaSize	MOTION TOOLS CD

## Servo motor specifications

## Coreless SGLGW/SGLGM - (with standard-force magnetic ways)

Voltage		230 V								
Linear servo motor model SGLGW-		30A		40A			60A			90A
		050C	080C	140C	253C	365C	140C	253C	365C	200C
Rated force*	N	12.5	25	47	93	140	70	140	210	325
Rated current*	A(rms)	0,51	0,79	0.8	1.6	2.4	1,16	2,2	3,3	4.4
Instantaneous peak force*	N	40	80	140	280	420	220	440	660	1300
Instantaneous peak current*	A(rms)	1.62	2.53	2.4	4.9	7.3	3.5	7.0	10.5	17.6
Coil assembly mass	kg	0.10	0.15	0.34	0.60	0.87	0.42	0.76	1.10	2.15
Force constant	N / A(rms)	26.4	33.9	61.5	61.5	61.5	66.6	66.6	66.6	78
BEMF constant	V / (m / s)	8.8	11.3	20.5	20.5	20.5	22.2	22.2	22.2	26.0
Motor constant	N / √W	3.7	5.6	7.8	11.0	13.5	11.1	15.7	19.2	26.0
Electrical time constant	ms	0.2	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1.4
Mechanical time constant	ms	7.30	4.78	5.59	4.96	4.77	3.41	3.08	2.98	3.18
Thermal resistance (with heat sink)	K / W	5,19	3,11	1,67	0,87	0,58	1,56	0,77	0,51	0,39
Thermal resistance (without heat sink)	K / W	-	-	3,02	1,80	1,23	2,59	1,48	1,15	-
Magnetic attraction	N	0	0	0	0	0	0	0	0	0
Head sink size	mm	200x300x12 300x400x12 400x500x12 200x300x12 300x400x12 400x500x12 800x900x12								
Basic specifications	Time rating	Continuous								
	Insulation class	Class B								
	Ambient temperature	0 to +40 °C								
	Ambient humidity	20 to 80% (non-condensing)								
	Insulation resistance	500 VDC, 10 MΩ min.								
	Excitation	Permanent magnet								
	Dielectric strength	1500 VAC for 1 minute								
	Protection methods	Self-cooled, air-cooling								
	Allowable winding temperature	130 °C								

**Note:** - The items marked with an \* and "force and speed characteristics" are the values at a motor winding temperature of 100 °C during operation in combination with a servo drive. The others are at 20 °C (68 °F).

- The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in the following table is mounted on the coil assembly.

## Coreless SGLGW/SGLGM - (with high-force magnetic ways)

Voltage		230 V					
Linear servo motor model SGLGW-		40A			60A		
		140C	253C	365C	140C	253C	365C
Rated force*	N	57	114	171	85	170	255
Rated current*	A(rms)	0.8	1.6	2.4	1.2	2.2	3.3
Instantaneous peak force*	N	230	460	690	360	720	1080
Instantaneous peak current*	A(rms)	3.2	6.5	9.7	5.0	10.0	14.9
Coil assembly mass	kg	0.34	0.60	0.87	0.42	0.76	1.10
Force constant	N / A(rms)	76.0	76.0	76.0	77.4	77.4	77.4
BEMF constant	V / (m / s)	25.3	25.3	25.3	25.8	25.8	25.8
Motor constant	N / $\sqrt{W}$	9.6	13.6	16.7	12.9	18.2	22.3
Electrical time constant	ms	0.4	0.4	0.4	0.5	0.5	0.5
Mechanical time constant	ms	3.69	3.24	3.12	2.52	2.29	2.21
Thermal resistance (with heat sink)	K / W	1.67	0.87	0.58	1.56	0.77	0.51
Thermal resistance (without heat sink)	K / W	3.02	1.80	1.23	2.59	1.48	1.15
Magnetic attraction	N	0	0	0	0	0	0
Head sink size	mm	200x300x12	300x400x12	400x500x12	200x300x12	300x400x12	400x500x12
Basic specifications	Time rating	Continuous					
	Insulation class	Class B					
	Ambient temperature	0 to +40 °C					
	Ambient humidity	20 to 80% (non-condensing)					
	Insulation resistance	500 VDC, 10 M $\Omega$ min.					
	Excitation	Permanent magnet					
	Dielectric strength	1500 VAC for 1 minute					
	Protection methods	Self-cooled, air-cooling					
Allowable winding temperature		130 °C					

**Note:** - The item servo drive. The others are at 20 °C (68 °F).

- The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in the following table is mounted on the coil assembly.

## Iron-core SGLFW/SGLFM (200V)

Voltage		230 V						
Linear servo motor model SGLFW-		20A		35A		50A		12A
		090A	120A	120A	230A	200B	380B	200B
Rated force*	N	25	40	80	160	280	560	560
Rated current*	A(rms)	0.7	0.8	1.4	2.8	5.0	10.0	8.7
Instantaneous peak force*	N	86	125	220	440	600	1200	1200
Instantaneous peak current*	A(rms)	3.0	2.9	4.4	8.8	12.4	25.0	21.6
Coil assembly mass	kg	0.7	0.9	1.3	2.3	3.5	6.9	6.4
Force constant	N / A(rms)	36.0	54.0	62.4	62.4	60.2	60.2	69.0
BEMF constant	V / (m / s)	12.0	18.0	20.8	20.8	20.1	20.1	23.0
Motor constant	N / $\sqrt{W}$	7.9	9.8	14.4	20.4	34.3	48.5	52.4
Electrical time constant	ms	3.2	3.3	3.6	3.6	15.9	15.8	18.3
Mechanical time constant	ms	11.0	9.3	6.2	5.5	3.0	2.9	2.3
Thermal resistance (with heat sink)	K / W	4.35	3.19	1.57	0.96	0.82	0.32	0.6
Thermal resistance (without heat sink)	K / W	7.69	5.02	4.10	1.94	1.48	0.74	0.92
Magnetic attraction	N	314	462	809	1586	1650	3260	3300
Head sink size	mm	125x125x13				254x254x25	400x500x40	254x254x25
Basic specifications	Time rating	Continuous						
	Insulation class	Class B						
	Ambient temperature	0 to +40 °C						
	Ambient humidity	20 to 80% (non-condensing)						
	Insulation resistance	500 VDC, 10 MΩ min.						
	Excitation	Permanent magnet						
	Dielectric strength	1500 VAC for 1 minute						
	Protection methods	Self-cooled						
Allowable winding temperature		130 °C						

**Note:** - The items marked with an \* and "Force and speed characteristics" are the values at a motor winding temperature of 100 °C during operation in combination with a servo drive. The others are at 20 °C (68 °F).

- The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in the following table is mounted on the coil assembly.

## Iron-core SGLFW/SGLFM (400V)

Voltage		400 V							
Linear servo motor model SGLFW-		35D		50D		12D		1ED	
		120A	230A	200B	380B	200B	380B	380B	560B
Rated force*	N	80	160	280	560	560	1,120	1,500	2,250
Rated current*	A(rms)	0.7	1.4	2.3	4.5	4.9	9.8	6.4	9.6
Instantaneous peak force*	N	220	440	600	1,200	1,200	2,400	3,600	5,400
Instantaneous peak current*	A(rms)	2.3	4.6	5.6	11.0	12.3	24.6	18.1	27.2
Coil assembly mass	kg	1.3	2.3	3.5	6.9	6.4	11.5	22.0	33.0
Force constant	N / A(rms)	120.2	120.2	134.7	134.7	122.6	122.6	250	250
BEMF constant	V / (m / s)	40.1	40.1	44.9	44.9	40.9	40.9	83.2	83.2
Motor constant	N / $\sqrt{W}$	13.8	19.5	33.4	47.2	51.0	72.1	95.4	117
Electrical time constant	ms	3.5	3.5	15.0	15.0	17.4	17.2	19.7	19.6
Mechanical time constant	ms	5.5	5.5	3.2	3.2	2.5	2.2	1.8	1.8
Thermal resistance (with heat sink)	K / W	1.57	0.96	0.82	0.32	0.6	0.28	0.21	0.13
Thermal resistance (without heat sink)	K / W	4.1	1.94	1.48	0.74	0.92	0.55	0.50	0.35
Magnetic attraction	N	810	1,590	1,650	3,260	3,300	6,520	9,780	14,600
Head sink size	mm	254x254x25 400x500x40 254x254x25 400x500x40 609x762x50 762x1270x64							
Basic specifications	Time rating	Continuous							
	Insulation class	Class B							
	Ambient temperature	0 to +40 °C							
	Ambient humidity	20 to 80% (non-condensing)							
	Insulation resistance	500 VDC, 10 MΩ min.							
	Excitation	Permanent magnet							
	Dielectric strength	1500 VAC for 1 minute							
	Protection methods	Self-cooled							
Allowable winding temperature	130 °C								

**Note:** - The items marked with an \* and "force and speed characteristics" are the values at a motor winding temperature of 100 °C during operation in combination with a servo drive. The others are at 20 °C (68 °F).

- The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in the following table is mounted on the coil assembly.

## Iron-core SGLTW/SGLTM (400 V)

Voltage		400 V							
Linear servo motor model SGLTW-		35D		50D		40D		80D	
		170H	320H	170H	320H	400B	600B	400B	600B
Rated force*	N	300	600	450	900	670	1,000	1,300	2,000
Rated current*	A(rms)	3.2	6.5	3.2	6.3	3.7	5.5	7.2	11.1
Instantaneous peak force*	N	600	1,200	900	1,800	2,600	4,000	5,000	7,500
Instantaneous peak current*	A(rms)	7.5	15.1	7.3	14.6	20.7	30.6	37.6	56.4
Coil assembly mass	kg	4.7	8.8	6	11	15	23	25	36
Force constant	N / A(rms)	99.6	99.6	153.3	153.3	196.1	196.1	194.4	194.4
BEMF constant	V / (m / s)	33.2	33.2	51.1	51.1	65.4	65.4	64.8	64.8
Motor constant	N / $\sqrt{W}$	36.3	51.4	48.9	69.1	59.6	73	85.9	105.2
Electrical time constant	ms	14.3	14.3	15.6	15.6	14.4	14.4	15.4	15.4
Mechanical time constant	ms	3.5	3.5	2.5	2.5	4.2	4.2	3.2	3.2
Thermal resistance (with heat sink)	K / W	0.76	0.4	0.61	0.3	0.24	0.2	0.22	0.18
Thermal resistance (without heat sink)	K / W	1.26	0.83	0.97	0.8	0.57	0.4	0.47	0.33
Magnetic attraction* <sup>1</sup>	N	0	0	0	0	0	0	0	0
Magnetic attraction* <sup>2</sup>	N	1,400	2,780	2,000	3,980	3,950	5,890	7,650	11,400
Head sink size	mm	400x500x40							
Basic specifications	Time rating	Continuous							
	Insulation class	Class B							
	Ambient temperature	0 to +40 °C							
	Ambient humidity	20 to 80% (non-condensing)							
	Insulation resistance	500 VDC, 10 MW min.							
	Excitation	Permanent magnet							
	Dielectric strength	1500 VAC for 1 minute							
	Protection methods	Self-cooled							
	Allowable winding temperature	130 °C							

\*1. The unbalanced magnetic gap resulting from the coil assembly installation condition causes a magnetic attraction of the coil assembly.

\*2. The value indicates the magnetic attraction generated on one side of the magnetic way.

**Note:** - The items marked with an \* and "force and speed characteristics" are the values at a motor winding temperature of 100 °C during operation in combination with a servo drive. The others are at 20 °C (68 °F).

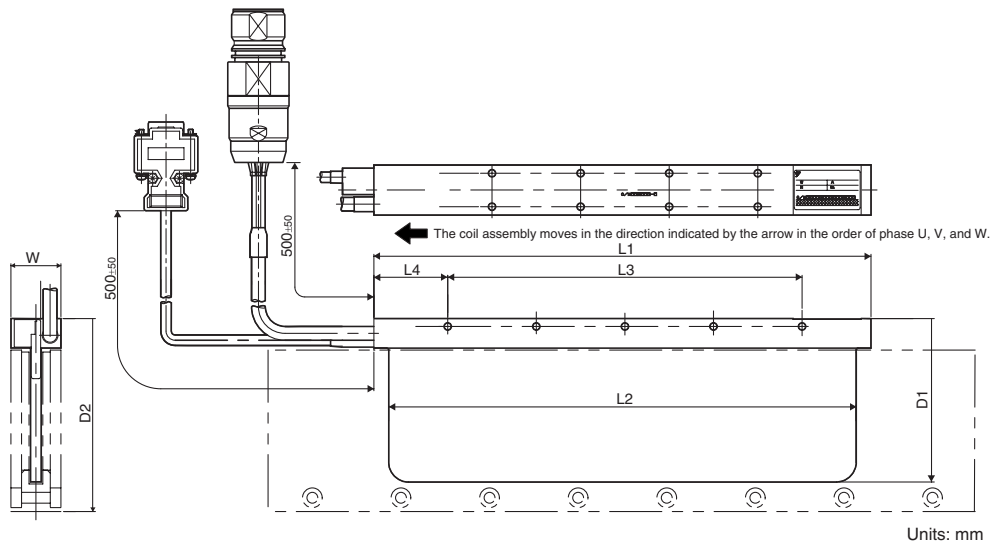
- The above specifications show the values under the cooling condition when a heat sink (aluminium board) listed in the following table is mounted on the coil assembly.

## Dimensions

### Coreless SGLG□-□

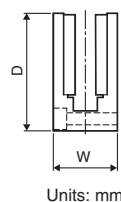
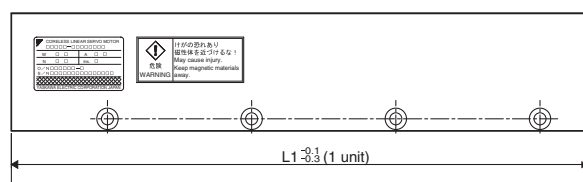
#### Coil assembly: SGLGW-□

Coil assembly model SGLGW-	L1	L2	L3	L4	D1	D2	W	Approx. weight kg
30A050□□D	50	48	30	15	48.5	57	22	0.14
30A080□□D	80	72	50	15	48.5	57	22	0.19
40A140□□D	140	125	90	30	63	78	25.4	0.40
40A253□□D	252.5	237.5	180	37.5	63	78	25.4	0.66
40A365□□D	365	350	315	30	63	78	25.4	0.93
60A140□□D	140	125	90	30	83	98	25.4	0.48
60A253□□D	252.5	237.5	180	37.5	83	98	25.4	0.82
60A365□□D	365	350	315	30	83	98	25.4	1.16
90A200□□D	199	189	130	40	121	138	49	2.2



### Magnetic way: SGLGM-□

Magnetic way model SGLGM-	L1	D	Standard-force magnetic way		High-force magnetic way	
			W	Approx. weight kg	W	Approx. weight kg
30108A	108	44	24	0.6	-	-
30216A	216	44	24	1.1	-	-
30432A	432	44	24	2.3	-	-
40090C□	90	62	25.4	0.8	31.8	1.0
40225C□	225	62	25.4	2.0	31.8	2.6
40360C□	360	62	25.4	3.1	31.8	4.1
40405C□	405	62	25.4	3.5	31.8	4.6
40450C□	450	62	25.4	3.9	31.8	5.1
60090C□	90	82	25.4	1.1	31.8	1.3
60225C□	225	82	25.4	2.6	31.8	3.3
60360C□	360	82	25.4	4.1	31.8	5.2
60405C□	405	82	25.4	4.6	31.8	5.9
60450C□	450	82	25.4	5.1	31.8	6.6
90252A	252	110	50.8	7.3	-	-
90504A	504	110	50.8	14.7	-	-

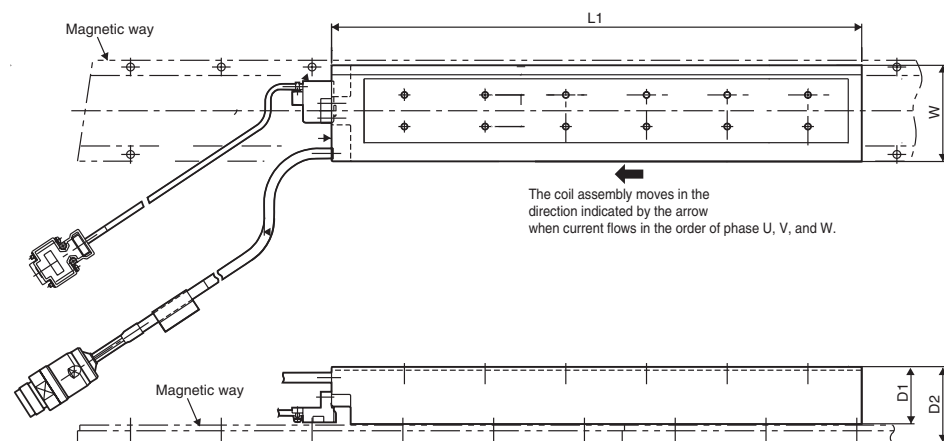




### Iron-core SGLF□-□

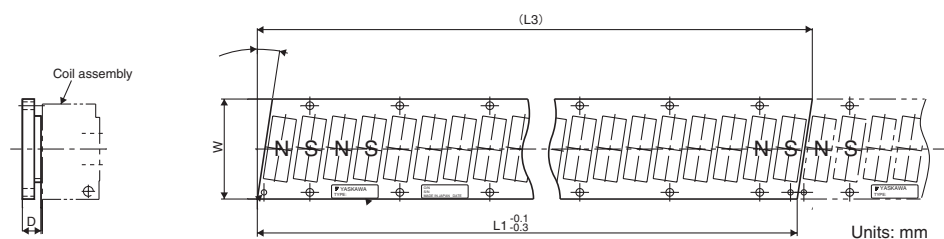
#### Coil assembly: SGLFW-□

Coil assembly model SGLFW-	L1	D1	D2	W	Approx. weight kg
20A090A□	91	34	45	40	0.7
20A120A□	127	34	45	40	0.9
35□120A□D	127	34	45	55	1.3
35□230A□D	235	34	45	55	2.3
50□200B□D	215	43	58	71.5	3.5
50□380B□D	395	43	58	71.5	6.9
1Z□200B□D	215	43	58	119	6.4
1ZD380B□D	395	43	58	119	11.5
1ED380B□	395	61	76	175	22
1ED560B□	605	61	76	175	33



#### Magnetic way: SGLFM-□

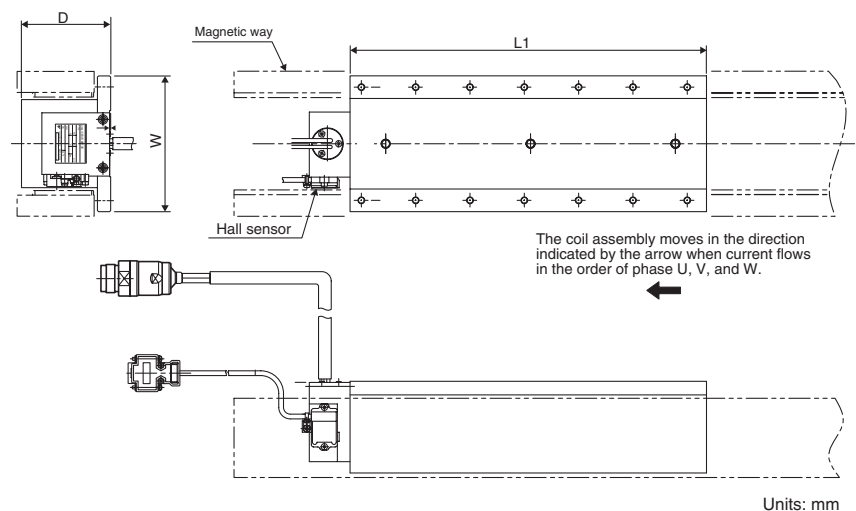
Magnetic way model SGLFM-	L1 <sup>-0.1</sup> <sub>-0.3</sub>	(L3)	D	W	Approx. weight kg
20324A	324	(331.6)	10	44	0.9
20540A	540	(547.6)	10	44	1.4
20756A	756	(763.6)	10	44	2
35324A	324	(334.4)	10	60	1.2
35540A	540	(550.4)	10	60	2
35756A	756	(766.4)	10	60	2.9
50405A	405	(416.3)	14	75	2.8
50675A	675	(686.3)	14	75	4.6
50945A	945	(956.3)	14	75	6.5
1Z405A	405	(423.9)	14	125	7.3
1Z675A	675	(693.9)	14	125	12
1Z945A	945	(963.9)	14	125	17
1E135A	135	(145.5)	14.2	200	2.4



## Iron-core SGLT□-□

### Coil assembly: SGLTW-□

Coil assembly model SGLTW-	L1	D	W	Approx. weight kg
35D320H□D	315	66	120	8.8
50D170H□D	170	81	120	6
50D320H□D	315	81	120	11
40D400B□	395	78	150	15
40D600B□	585	78	150	23
80D400B□	395	115	150	25
80D600B□	585	115	150	36

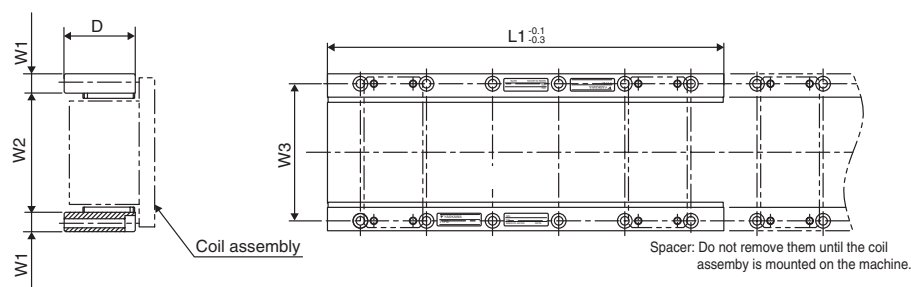


Units: mm

### Magnetic way: SGLTM-□

Magnetic way model SGLTM-	L1 <sup>-0.1 -0.3</sup>	D	W1	W2	W3	Approx. weight kg
35324H	324	55	15	90	107	4.8
35540H	540	55	15	90	107	8
35756H	756	55	15	90	107	11
50324H	324	70	19.1	90	112	8
50540H	540	70	19.1	90	112	13
50756H	756	70	19.1	90	112	18
40405A	405	63	19.1	111.8	131	9
40675A	675	63	19.1	111.8	131	15
40945A	945	63	19.1	111.8	131	21
80405A	405	100	19.1	111.8	131	14
80675A	675	100	19.1	111.8	131	24
80945A	945	100	19.1	111.8	131	34

- Note:**
- Two magnetic ways for both ends of coil assembly make one set. Spacers are mounted on magnetic ways for safety during transportation. Do not remove the spacers until the coil assembly is mounted on a machine.
  - The magnetic way may affect pacemakers. Keep a minimum distance of 200 mm from the magnetic way.
  - Two magnetic ways in a set can be connected to each other.
  - The dimensions marked with an \* are the dimensions between the magnetic ways. Be sure to follow exactly the dimensions specified in the figure above. Mount magnetic ways as shown in assembly dimensions. The values with an \* are the dimensions at preshipment.
  - Use socket headed screws of strength class 10.9 minimum for magnetic way mounting screws. Do not use stainless steel screws



# Inverters

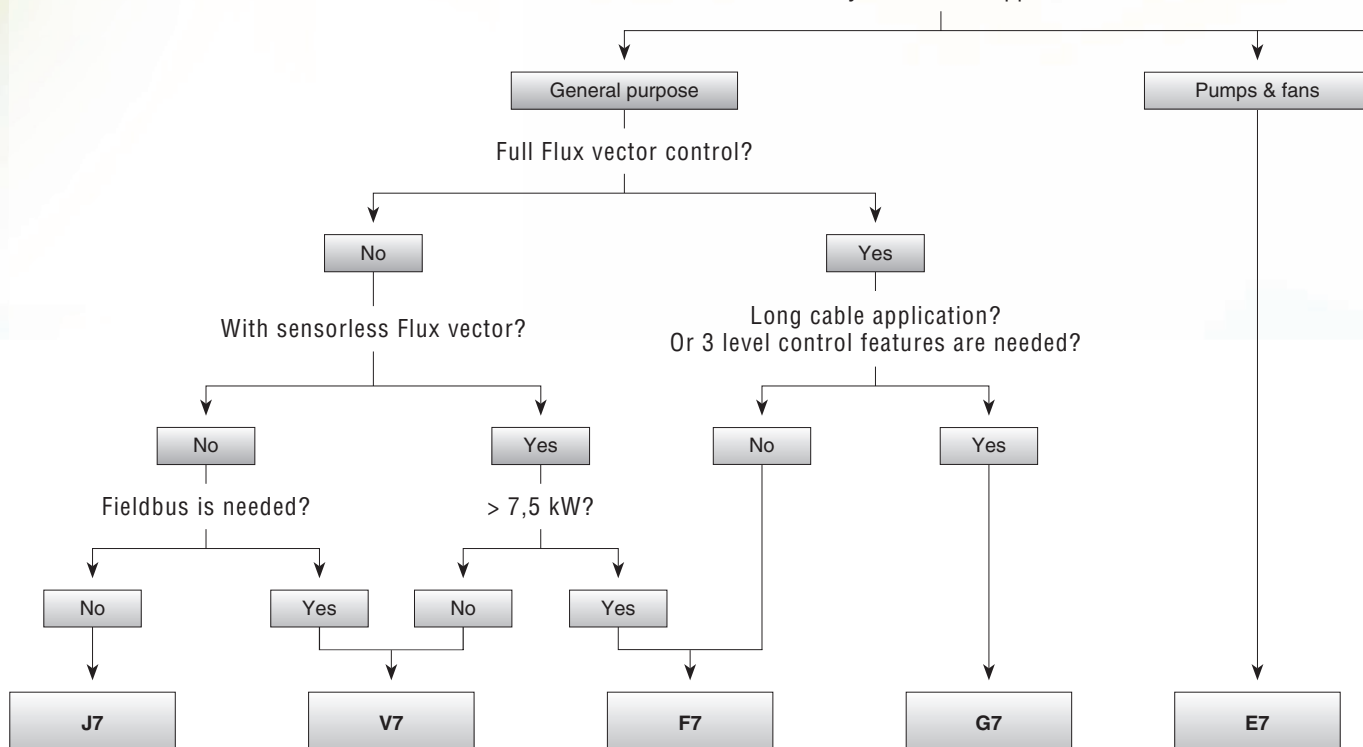
## Varispeed V7 – Sensorless flux vector in a pocket sized inverter

The Varispeed V7 is the perfect drive for standard industrial applications such as conveyor, cranes, grinders, etc. It delivers an amazing 100% torque at 0.5 Hz, ensuring a very stable motor speed. It is also extremely compact and silent. It can interface to all popular fieldbuses as an option. You can turn the V7 into a decentralised control station when adding a PLC option board.

- Sensorless vector control ensures 100% at 0.5Hz
- Compact size available in IP20 or IP67
- Silent operation with no current de-rating
- Programming software: CX-drive for parameter configuration
- CASE (inverter application software) and PLC option board



What is your inverter application?



# The E7 inverter expands with IP54 version

Omron’s new E7 IP54 solution provides inverter protection from non-conductive dust and water splashes. Now you can install the inverter on walls without the need for extra cabinet space, which saves on volume and costs in the main control panel, and eliminates the need to make difficult EMC and heat-loss calculations for the main control cabinet.

The E7 series also features very advanced PID control, an energy-saving algorithm, and standard accessories such as a PLC option board, communications option boards and software customisation to meet specific applications like pump sequencing.

- Robust metal chassis and built-in RFI filter
- Perfect solution for direct installation close to the motor






Lift application




L7



## Table of contents

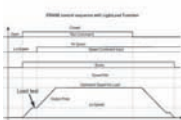
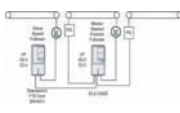
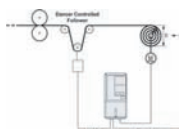
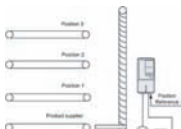
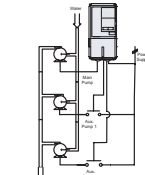
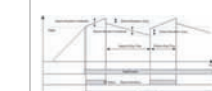
Selection table		368
Standard inverter	G7	370
	F7	375
	L7	380
	E7	384
	V7	388
	J7	392
Inverter PLCs	G7/F7/L7/E7 Inverter PLC	394
	V7 Inverter PLC	396
Inverter application software	Case	398

## Selection table

Model	G7	F7	L7
			
Type	World's first three level inverter architecture	The industrial workhorse	Made to drive lifts
400 V Three-phase 200 V Three-phase 200 V Single-phase	0.4 kW to 300 kW 0.4 kW to 110 kW N/A	0.4 kW to 300 kW 0.4 kW to 110 kW N/A	4.0 kW to 55 kW 3.7 kW to 55 kW N/A
Application	High performance, long cable lines	General and high-end applications	Lift control with asynchronous or synchronous motors
Control method	Open and close loop for vector and V/F control.	Open and close loop for vector and V/F control.	Open and close loop for vector and V/F control.
Torque features	150% at 0.0 Hz (CLV) 150% at 0.3 Hz (OLV)	150% at zero speed (CLV) 150% at 0.5 Hz (OLV)	150% at zero speed (CLV) 150% at 0.5 Hz (OLV)
Connectivity	Memobus DeviceNet PROFIBUS-DP CANopen LONWorks Ethernet	Memobus DeviceNet PROFIBUS-DP CANopen LONWorks Ethernet MECHATROLINK-II	Memobus DeviceNet PROFIBUS-DP CANopen LONWorks Ethernet
Customisation options	- PLC option board - Inverter application software	- PLC option board - Inverter application software	- PLC option board - Inverter application software
Page	370	375	380

Model	E7	V7	J7
			
Type	Drive your energy cost down	Sensorless flux vector in a pocket sized inverter	Small, simple and smart
400V Three-Phase 200V Three-Phase 200V Single-Phase	0.4 kW to 300 kW 0.4 kW to 110 kW N/A	0.2 kW to 7.5 kW 0.1 kW to 7.5 kW 0.1 kW to 4.0 kW	0.2 kW to 4.0 kW 0.1 kW to 4.0 kW 0.1 kW to 1.5 kW
Application	Pumps and fans (variable torque)	Compact general purpose	Simple speed control
Control method	V/F control	Sensorless vector and V/F control	V/F control
Torque features	120% at 0.5 Hz.	100% at 0.5 Hz.	150% at 3 Hz.
Connectivity	Memobus Metasys N2 L&S Apogee LONWorks DeviceNet PROFIBUS-DP CANopen	Memobus DeviceNet PROFIBUS-DP CANopen MECHATROLINK-II	Memobus
Customisation options	- PLC option board - Inverter application software - IP54 enclosure	- PLC option board - Inverter application software - IP65 enclosure	N/A
Page	384	388	392

Model	G7/F7/L7/E7 inverter PLC	V7 inverter PLC
		
Type	The OMRON PLC embedded into the OMRON-Yaskawa inverter family	The OMRON PLC embedded into V7 inverter
Supported inverter	Varispeed G7 / F7 / L7 / E7	Varispeed V7
I/O's	6 DI, 4DO in PLC board. 256 I/O's by Comopbus/S distributed network.	6 DI, 4DO
Calendar / clock	Yes	Available on RS-422/485 type
Encoder interface	Yes	No
Connectivity	Peripheral port RS-232C RS-422/485 Compobus/S master DeviceNet slave	Peripheral port RS-232C RS-422/485
Software	CX-Programmer CX-One	CX-Programmer CX-One
Page	394	396

Inverter application software						
						
	<b>S-7071</b>	<b>S-8161</b>	<b>S-8180</b>	<b>S-8795</b>	<b>S-8801</b>	<b>S-9381</b>
Type	CRANE software	ELS - electronic line shaft software	Winder software	Point to point software	Pump sequencer software	Traverse software
Application	Crane applications	Position and speed follower applications	Winding and unwinding applications	Point to point positioning applications	Pump sequencer application up to 2 auxiliary pumps	Textile wire winding application.
Supported inverter	Varispeed F7	Varispeed F7	Varispeed F7	Varispeed F7	Varispeed E7	Varispeed V7
Page	398					



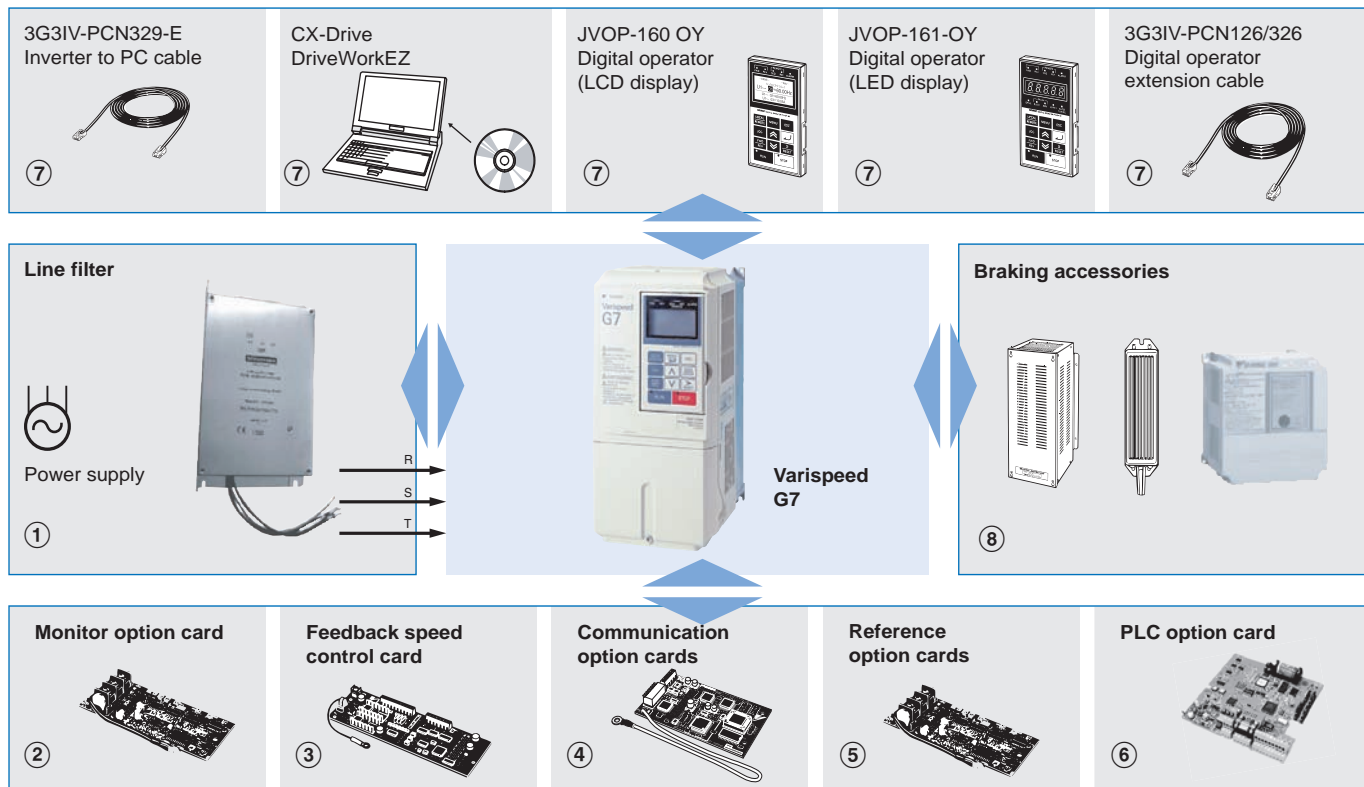


## World's first three level inverter

The G7 has the world's first 400V 3-level inverter architecture that eliminates or minimises the installation problems associated with IGBT switching and protects the entire motor-drive system.

- 3-level control reduces voltage peaks on motor windings by up to 50%. There is no need for an AC reactor on long motor cables.
- Flux-vector control. Excellent performance in open-loop mode with 150% torque at 0.3Hz
- Silent operation. No current de-rating in silent mode
- Wide selection of option cards
- Programming software: CX-Drive for parameter configuration. DriveWorkEZ for object-orientated programming.

## Ordering information



## Varispeed G7

## 200 V

Specifications			Model
IP20	0.4 kW	3.2 A	CIMR-G7C20P41
	0.75 kW	6.0 A	CIMR-G7C20P71
	1.5 kW	8.0 A	CIMR-G7C21P51
	2.2 kW	12 A	CIMR-G7C22P21
	3.7 kW	18 A	CIMR-G7C23P71
	5.5 kW	27 A	CIMR-G7C25P51
	7.5 kW	34 A	CIMR-G7C27P51
	11 kW	49 A	CIMR-G7C20111
	15 kW	66 A	CIMR-G7C20151
IP00	18.5 kW	80 A	CIMR-G7C20181
	22 kW	96 A	CIMR-G7C20220
	30 kW	130 A	CIMR-G7C20300
	37 kW	160 A	CIMR-G7C20370
	45 kW	183 A	CIMR-G7C20450
	55 kW	224 A	CIMR-G7C20550
	75 kW	300 A	CIMR-G7C20750
	90 kW	358 A	CIMR-G7C20900
	110 kW	415 A	CIMR-G7C21100

## 400 V

Specifications			Model
IP20	0.4 kW	1.8 A	CIMR-G7C40P41
	0.75 kW	3.4 A	CIMR-G7C40P71
	1.5 kW	4.8 A	CIMR-G7C41P51
	2.2 kW	6.2 A	CIMR-G7C42P21
	3.7 kW	9 A	CIMR-G7C43P71
	5.5 kW	15 A	CIMR-G7C45P51
	7.5 kW	21 A	CIMR-G7C47P51
	11 kW	27 A	CIMR-G7C40111
	15 kW	34 A	CIMR-G7C40151
IP00	18.5 kW	42 A	CIMR-G7C40181
	22 kW	52 A	CIMR-G7C40220
	30 kW	65 A	CIMR-G7C40300
	37 kW	80 A	CIMR-G7C40370
	45 kW	97 A	CIMR-G7C40450
	55 kW	128 A	CIMR-G7C40550
	75 kW	165 A	CIMR-G7C40750
	90 kW	195 A	CIMR-G7C40900
	110 kW	240 A	CIMR-G7C41100
	132 kW	270 A	CIMR-G7C41320
	160 kW	235 A	CIMR-G7C41600
	185 kW	370 A	CIMR-G7C41850
	220 kW	450 A	CIMR-G7C42200
	300 kW	605 A	CIMR-G7C43000

## ① Line filters

## 200 V

Inverter model	Line filters			
Varispeed G7	Type	EN55011 class	Current (A)	Weight (kg)
CIMR-G7C20P4	3G3RV-PFI3010-SE	B, 25 m A, 100 m	10	1.1
CIMR-G7C20P7				
CIMR-G7C21P5				
CIMR-G7C22P2	3G3RV-PFI3018-SE	B, 25 m A, 100 m	18	1.3
CIMR-G7C23P7	3G3RV-PFI2035-SE	B, 25 m A, 100 m	35	1.4
CIMR-G7C25P5				
CIMR-G7C27P5	3G3RV-PFI2060-SE	B, 25 m A, 100 m	60	3
CIMR-G7C2011				
CIMR-G7C2015	3G3RV-PFI2100-SE	B, 25 m A, 100 m	100	4.9
CIMR-G7C2018				
CIMR-G7C2022	3G3RV-PFI2130-SE	A, 100 m	130	4.3
CIMR-G7C2030				
CIMR-G7C2037	3G3RV-PFI2160-SE	A, 100 m	160	6.0
CIMR-G7C2045	3G3RV-PFI2200-SE	A, 100 m	200	11.0
CIMR-G7C2055				
CIMR-G7C2075				
CIMR-G7C2090	3G3RV-PFI3400-SE	A, 100 m	400	18.5
CIMR-G7C2110	3G3RV-PFI3600-SE	A, 100 m	600	11.0

## 400 V

Inverter model	Line filters			
Varispeed G7	Model	EN 55011 class	Current (A)	Weight (kg)
CIMR-G7C40P4	3G3RV-PFI3010-SE	B, 25 m A, 100 m	10	1.1
CIMR-G7C40P7				
CIMR-G7C41P5				
CIMR-G7C42P2	3G3RV-PFI3018-SE	B, 25 m A, 100 m	18	1.3
CIMR-G7C43P7				
CIMR-G7C44P0				
CIMR-G7C45P5	3G3RV-PFI3035-SE	B, 25 m A, 100 m	35	2.1
CIMR-G7C47P5				
CIMR-G7C4011	3G3RV-PFI3060-SE	B, 25 m A, 100 m	60	4.0
CIMR-G7C4015				
CIMR-G7C4018	3G3RV-PFI3070-SE	A, 100 m	70	3.4
CIMR-G7C4022				
CIMR-G7C4030	3G3RV-PFI3130-SE	A, 100 m	130	4.7
CIMR-G7C4037				
CIMR-G7C4045				
CIMR-G7C4055	3G3RV-PFI3170-SE	A, 100 m	170	6.0
CIMR-G7C4075				
CIMR-G7C4090	3G3RV-PFI3200-SE	A, 100 m	250	11
CIMR-G7C4110				
CIMR-G7C4132	3G3RV-PFI3400-SE	A, 100 m	400	18.5
CIMR-G7C4160				
CIMR-G7C4185	3G3RV-PFI3600-SE	A, 100 m	600	11.0
CIMR-G7C4220				
CIMR-G7C4300	3G3RV-PFI3800-SE	A, 100 m	800	31.0

## ② Monitor option cards

Type	Model	Description	Function
Monitor option card	AO-08 / 3G3IV-PAO08	Analog monitor card	Outputs analog signal for monitoring inverter output state (output freq., output current etc.) after absolute value conversion. Output resolution: 8 bits (1/256) Output voltage: 0 to 10 V (non isolated) Output channel: 2 channels
	AO-12 / 3G3IV-PAO12		Outputs analog signal for monitoring inverter output state (output freq., output current etc.) Output resolution: 11 bits (1/2048) + code Output voltage: 0 to 10 V (non isolated) Output channel: 2 channels
	DO-08 / 3G3IV-PDO08	Digital output card	Outputs isolated type digital signal for monitoring inverter run state (alarm signal, zero speed detection etc.). Output channel: Photo coupler 6 channels (48 V, 50 mA or less) Relay contact output 2 channels (250 VAC, 1 A or less 30 VDC, 1 A or less)
	DO-02C / 3G3IV-PDO02C	2C-relay output card	Two multi-function contact outputs (2C-relay) can be used other than those of the inverter proper unit.

## ③ Feedback speed control cards

Type	Model	Description	Function
Feedback speed control card	PG-A2 / 3G3FV-PPGA2	PG speed controller card (used for V/f control with PG or flux vector)	Phase A pulse (single pulse) inputs (voltage, complementary, open collector input) PG frequency range: approx. 30 kHz max. [Power supply output for PG: +12 V, max. current 200 mA] Pulse monitor output: +12 V, 20 mA
	PG-B2 / 3G3FV-PPGB2		Phase A and B pulse inputs (exclusively for complementary input) PG frequency range: approx. 30 kHz max. [Power supply output for PG: +12 V, Max. current 200 mA] Pulse monitor output: Open collector, +24 V, Max. current 30 mA
	PG-D2 / 3G3FV-PPGD2		Phase A pulse (differential pulse) input for V/f control (RS-422 input) PG frequency range: approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422
	PG-X2 / 3G3FV-PPGX2		Phase A, B and Z pulse (differential pulse) inputs (RS-422 input) PG frequency range: approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422

## ④ Communication option cards

Type	Model	Description	Function
Communication option card	SI-N1	DeviceNet option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through DeviceNet communication with the host controller.
	SI-P1	PROFIBUS-DP option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through PROFIBUS-DP communication with the host controller.
	SI-S1	CANopen option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through CANopen communication with the host controller.
	SI-J	LONWORKS option card	Used for HVAC control, running or stopping the inverter, setting or referencing parameters, and monitoring output current, watt-hours, or similar items through LONWORKS communications with peripheral devices.
	CM090	Ethernet option card	Modbus TCP/IP Ethernet interface unit
	SI-T	MECHATROLINK-II option board	High speed motion bus. Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through MECHATROLINK-II communication with the host controller. Host controller : Trajexia, MCH or MP Series *1

\*1 Please refer to Trajexia, MCH or MP Series section for host controllers detailed information.

## ⑤ Reference option Cards

Type	Model	Description	Function
Reference option card	AI-14U / 3G3IV-PAI14U	Analog input card	2 channel high resolution analog input card Channel 1: 0 to 10 V (20K $\Omega$ ) Channel 2: 4 to 20 mA (250 $\Omega$ ) Resolution 14 bit
	AI-14B / 3G3IV-PAI14B		3 Channel high resolution analog input card Signal level: -10 to +10V (20 K $\Omega$ ) 4 to 20 mA (250 $\Omega$ ) Resolution: 13 bit + sign
	DI-08 / 3G3IV-PDI08	Digital reference card	8 bit digital speed reference input card
	DI-16H2 / 3G3IV-PDI16H2		16 bit digital speed reference input card

## ⑥ PLC option boards

Type	Model	Description	Function
PLC option	3G3RV-P10ST8-E	PLC option	Full PLC features, wireless installation and seamless access to the inverter parameters and analogue / digital inputs and outputs. Embedded Compubus/S fieldbus Standard OMRON tools can be used for programming
	3G3RV-P10ST8-DRT-E	PLC option with DeviceNet	Same features than standard models with DeviceNet support.

## ⑦ Accessories

Type	Model	Description	Function
Digital operator	JVOP-160-OY	5 lines LCD digital operator 7 language support	Configuration and monitoring device.
	JVOP-161-OY	7 segment LED digital operator	
Accessories	3G3IV-PCN126	Digital operator extension cable 1 meter	Cable to connect the inverter and the digital operator when it's not plugged into the inverter.
	3G3IV-PCN326	3 meters	
	3G3IV-PCN329-E	PC configuration cable	Cable to connect inverter and PC

## ⑦ Software

Model	Description	Function
CX-DRIVE	Computer software	Configuration and monitoring software tool for drives. (Version 1.1 or higher)
CX-ONE	Computer software	Complete automation software including CX-Drive

## ⑧ Braking Unit, braking resistor unit

**Note:** For braking units specifications and models refer to the G7 datasheet Cat-No: I37E-EN-02

## Specifications

## 200 V

Model CIMR-G7C□			20P4	20P7	21P5	22P2	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055	2075	2090	2110
Max. applicable motor output <sup>*1</sup>		kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Output characteristics	Inverter capacity	kVA	1.2	2.3	3.0	4.6	6.9	10	13	19	25	30	37	50	61	70	85	110	140	160
	Rated current	A	3.2	6	8	12	18	27	34	49	66	80	96	130	160	183	224	300	358	415
	Max. voltage		3-phase, 200/208/220/230/240 V (proportional to input voltage)																	
	Max. output frequency		400 Hz (programmable)																	
Power supply	Rated input voltage and frequency		3-phase 200/208/220/230/240 V, 50/60 Hz <sup>*2</sup>																	
	Allowable voltage fluctuation		+10%, -15%																	
	Allowable frequency fluctuation		±5%																	
Harmonic wave prevention	DC reactor		Option										Provided							
	12-Pulse input		Not available										Available <sup>*3</sup>							

<sup>\*1</sup> Standard 4-pole motors are used for max. applicable motor output. Choose the inverter model whose rated current is allowable within the motor rated current range.

<sup>\*2</sup> When using the inverter of 200 V class 30 kW or more with a cooling fan of three-phase 230 V 50 Hz or 240 V 50/60 Hz power supply, a transformer for the cooling fan is required.

<sup>\*3</sup> A 3-wired transformer is required at 12-pulse input.

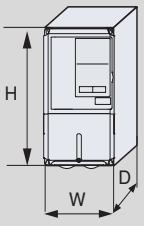
## 400 V

Model CIMR-G7C□			40P4	40P7	41P5	42P2	43P7	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4185	4220	4300
Max. applicable motor output <sup>*1</sup>		kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	300
Output characteristics	Inverter capacity	kV	1.4	2.6	3.7	4.7	6.9	11	16	21	26	32	40	50	61	74	98	130	150	180	210	250	280	340	460
	Rated current	A	1.8	3.4	4.8	6.2	9	15	21	27	34	42	52	65	80	97	128	165	195	240	270	325	370	450	605
	Max. voltage	3-phase, 380/400/415/440/460/480 V (proportional to input voltage)																							
	Max. output frequency	400 Hz (programmable)																							
Power supply	Rated input voltage and frequency	3-phase 380/400/415/440/460/480 V, 50/60 Hz																							
	Allowable voltage fluctuation	+10%, -15%																							
	Allowable frequency fluctuation	±5%																							
Harmonic wave prevention	DC reactor	Option										Provided													
	12-Pulse input	Not available										Available <sup>*2</sup>													

<sup>\*1</sup> Standard 4-pole motors are used for max. applicable motor output. Choose the inverter model whose rated current is allowable within the motor rated current range.

<sup>\*2</sup> A 3-wired transformer is required at 12-pulse input.

## Dimensions

Specifications		Drive model	H	W	D	
3 phase 200 VAC	0.4 kW	CIMR-G7C20P41	140	280	157	
	0.75 kW	CIMR-G7C20P71				
	1.5 kW	CIMR-G7C21P51				
	2.2 kW	CIMR-G7C22P21			177	
	3.7 kW	CIMR-G7C23P71				
	5.5 kW	CIMR-G7C25P51	200	300	197	
	7.5 kW	CIMR-G7C27P51				
	11 kW	CIMR-G7C20111	240	350	207	
	15 kW	CIMR-G7C20151				
	18.5 kW	CIMR-G7C20181	250	400	258	
	22 kW	CIMR-G7C20220	275	450	258	
	30 kW	CIMR-G7C20300	375	600	298	
	37 kW	CIMR-G7C20370			328	
	45 kW	CIMR-G7C20450	450	725	348	
	55 kW	CIMR-G7C20550				
	75 kW	CIMR-G7C20750	500	850	358	
	90 kW	CIMR-G7C20900	575	885	378	
	110 kW	CIMR-G7C21100				
3 phase 400 VAC	0.4 kW	CIMR-G7C40P41	140	280	157	
	0.75 kW	CIMR-G7C40P71				
	1.5 kW	CIMR-G7C41P51			177	
	2.2 kW	CIMR-G7C42P21				
	3.7 kW	CIMR-G7C43P71				
	5.5 kW	CIMR-G7C45P51	200	300	197	
	7.5 kW	CIMR-G7C47P51				
	11 kW	CIMR-G7C40111	240	350	207	
	15 kW	CIMR-G7C40151				
	18.5 kW	CIMR-G7C40181	275	450	258	
	22 kW	CIMR-G7C40220				
	30 kW	CIMR-G7C40300	325	550	283	
	37 kW	CIMR-G7C40370				
	45 kW	CIMR-G7C40450				
	55 kW	CIMR-G7C40550	450	725	348	
	75 kW	CIMR-G7C40750				
	90 kW	CIMR-G7C40900	500	850	358	
	110 kW	CIMR-G7C41100				
	132 kW	CIMR-G7C41320	575	916	378	
	160 kW	CIMR-G7C41600				
	185 kW	CIMR-G7C41850	710	1305	415	
	220 kW	CIMR-G7C42200				
	300 kW	CIMR-G7C43000	916	1475		

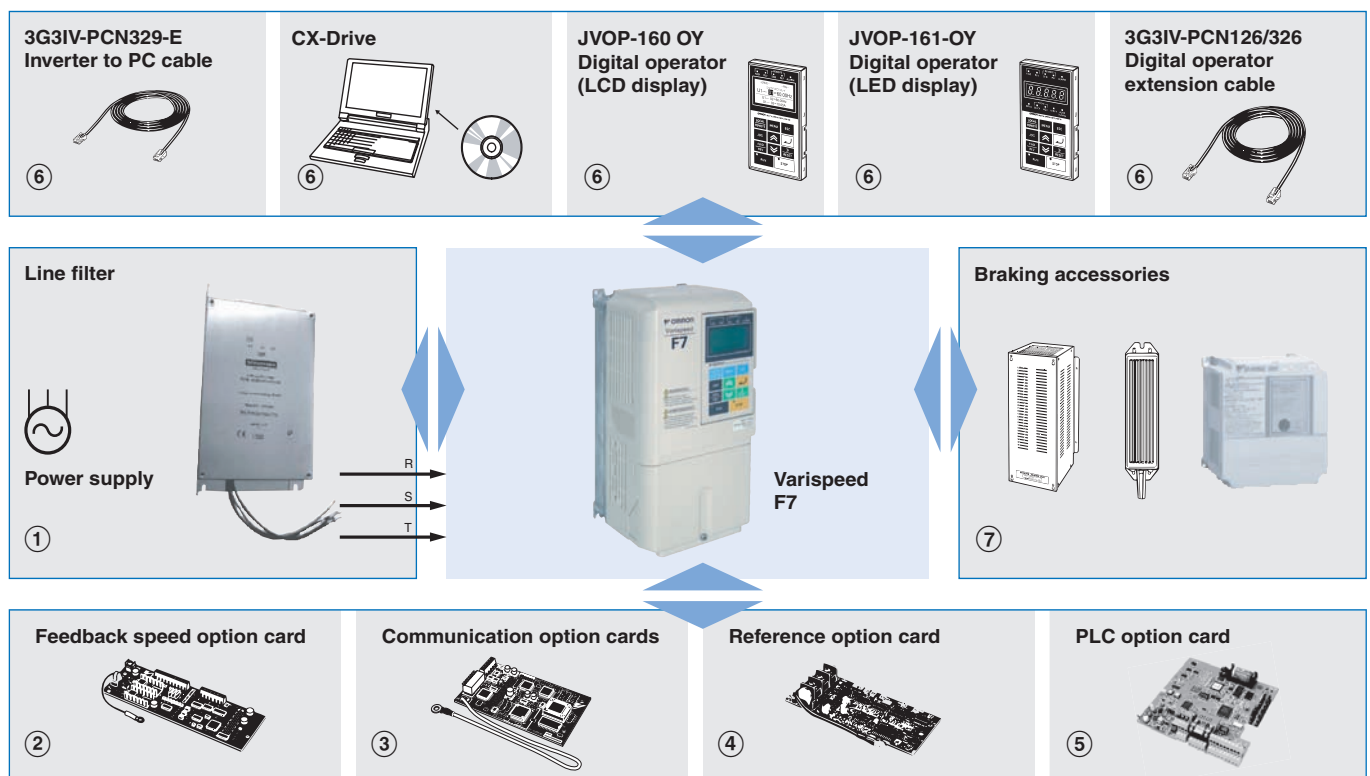


## The industrial workhorse

The F7 drive is the industrial workhorse of adjustable frequency drives. It is intended to handle every conventional drive application found in a typical industrial manufacturing plant from simple variable torque pumping to sophisticated networked material handling

- Flux vector control. Excellent performance in open-loop mode with 150% torque at 0.5 Hz
- Silent operation. No current de-rating in silent mode
- Wide selection of option cards
- Programming software: CX-Drive for parameter configuration
- CASE (inverter application software) and PLC option board

## Ordering information





## Varispeed F7

## 200 V

Specifications			Model
IP20	0.55 kW	3.2 A	CIMR-F7Z20P41
	0.75 kW	4.1 A	CIMR-F7Z20P71
	1.5 kW	7.0 A	CIMR-F7Z21P51
	2.2 kW	9.6 A	CIMR-F7Z22P21
	3.7 kW	15 A	CIMR-F7Z23P71
	5.5 kW	23 A	CIMR-F7Z25P51
	7.5 kW	31 A	CIMR-F7Z27P51
	11 kW	45 A	CIMR-F7Z20111
	15 kW	58 A	CIMR-F7Z20151
	18.5 kW	71 A	CIMR-F7Z20181
IP00	22 kW	85 A	CIMR-F7Z20220
	30 kW	115 A	CIMR-F7Z20300
	37 kW	145 A	CIMR-F7Z20370
	45 kW	180 A	CIMR-F7Z20450
	55 kW	215 A	CIMR-F7Z20550
	75 kW	283 A	CIMR-F7Z20750
	90 kW	346 A	CIMR-F7Z20900
	110 kW	415 A	CIMR-F7Z21100

## 400 V

Specifications			Model
IP20	0.55 kW	1.8 A	CIMR-F7Z40P41
	0.75 kW	2.1 A	CIMR-F7Z40P71
	1.5 kW	3.7 A	CIMR-F7Z41P51
	2.2 kW	5.3 A	CIMR-F7Z42P21
	3.7 kW	7.6 A	CIMR-F7Z43P71
	4.0 kW	8.7 A	CIMR-F7Z44P01
	5.5 kW	12.5 A	CIMR-F7Z45P51
	7.5 kW	17 A	CIMR-F7Z47P51
	11 kW	24 A	CIMR-F7Z40111
	15 kW	31 A	CIMR-F7Z40151
	18.5 kW	39 A	CIMR-F7Z40181
IP00	22 kW	45 A	CIMR-F7Z40220
	30 kW	60 A	CIMR-F7Z40300
	37 kW	75 A	CIMR-F7Z40370
	45 kW	91 A	CIMR-F7Z40450
	55 kW	112 A	CIMR-F7Z40550
	75 kW	150 A	CIMR-F7Z40750
	90 kW	180 A	CIMR-F7Z40900
	110 kW	216 A	CIMR-F7Z41100
	132 kW	260 A	CIMR-F7Z41320
	160 kW	304 A	CIMR-F7Z41600
	185 kW	370 A	CIMR-F7Z41850
	220 kW	506 A	CIMR-F7Z42200
	300 kW	675 A	CIMR-F7Z43000

## ① Line filters

## 200 V

Inverter model	Line filters			
Varispeed F7	Type	EN55011 class	Current (A)	Weight (kg)
CIMR-F7Z20P4 CIMR-F7Z20P7 CIMR-F7Z21P5 CIMR-F7Z22P2	3G3RV-PFI3010-SE	B, 25 m A, 100 m	10	1.1
CIMR-F7Z23P7 CIMR-F7Z25P5 CIMR-F7Z27P5 CIMR-F7Z2011	3G3RV-PFI3018-SE	B, 25 m A, 100 m	18	1.3
CIMR-F7Z2015 CIMR-F7Z2018	3G3RV-PFI2035-SE	B, 25 m A, 100 m	35	1.4
CIMR-F7Z2022 CIMR-F7Z2030	3G3RV-PFI2060-SE	B, 25 m A, 100 m	60	3
CIMR-F7Z2037 CIMR-F7Z2045 CIMR-F7Z2055	3G3RV-PFI2100-SE	B, 25 m A, 100 m	100	4.9
CIMR-F7Z2075 CIMR-F7Z2090	3G3RV-PFI2130-SE	A, 100 m	130	4.3
CIMR-F7Z2110	3G3RV-PFI2160-SE	A, 100 m	160	6.0
	3G3RV-PFI2200-SE	A, 100 m	200	11.0
	3G3RV-PFI3400-SE	A, 100 m	400	18.5
	3G3RV-PFI3600-SE	A, 100 m	600	11.0

## 400 V

Inverter model	Line filter			
Varispeed F7	Model	EN 55011 class*	Current (A)	Weight (kg)
CIMR-F7Z40P4 CIMR-F7Z40P7 CIMR-F7Z41P5 CIMR-F7Z42P2	3G3RV-PFI3010-SE	B, 25 m A, 100 m	10	1.1
CIMR-F7Z43P7 CIMR-F7Z44P0 CIMR-F7Z45P5 CIMR-F7Z47P5 CIMR-F7Z4011	3G3RV-PFI3018-SE	B, 25 m A, 100 m	18	1.3
CIMR-F7Z4015 CIMR-F7Z4018	3G3RV-PFI3035-SE	B, 25 m A, 100 m	35	2.1
CIMR-F7Z4022 CIMR-F7Z4030	3G3RV-PFI3060-SE	B, 25 m A, 100 m	60	4.0
CIMR-F7Z4037 CIMR-F7Z4045 CIMR-F7Z4055	3G3RV-PFI3070-SE	A, 100 m	70	3.4
CIMR-F7Z4075 CIMR-F7Z4090 CIMR-F7Z4110	3G3RV-PFI3130-SE	A, 100 m	130	4.7
CIMR-F7Z4132 CIMR-F7Z4160	3G3RV-PFI3170-SE	A, 100 m	170	6.0
CIMR-F7Z4185 CIMR-F7Z4220	3G3RV-PFI3200-SE	A, 100 m	250	11
CIMR-F7Z4300	3G3RV-PFI3400-SE	A, 100 m	400	18.5
	3G3RV-PFI3600-SE	A, 100 m	600	11.0
	3G3RV-PFI3800-SE	A, 100 m	800	31.0

## ② Feedback speed control cards

Type	Model	Description	Function
Feedback speed control card	PG-A2 / 3G3FV-PPGA2	PG speed controller card (Used for V/f control with PG or flux vector)	Phase A pulse (single pulse) inputs (voltage, complementary, open collector input) PG frequency range: approx. 30 kHz max. [Power supply output for PG: +12 V, max. current 200 mA] Pulse monitor output: +12 V, 20 mA
	PG-B2 / 3G3FV-PPGB2		Phase A and B pulse inputs (exclusively for complementary input) PG frequency range: approx. 30 kHz max. [Power supply output for PG: +12 V, Max. current 200 mA] Pulse monitor output: Open collector, +24 V, Max. current 30 mA
	PG-D2 / 3G3FV-PPGD2		Phase A pulse (differential pulse) input for V/f control (RS-422 input) PG frequency range: approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422
	PG-X2 / 3G3FV-PPGX2		Phase A, B and Z pulse (differential pulse) inputs (RS-422 input) PG frequency range: approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422
	PG-Z2		Phase A, B and Z pulse (differential pulse) inputs (RS-422 input) PG frequency range: approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422 Dual channel encoder: 1st channel A, B, Z / 2nd channel A, B, Z or open collector

## ③ Communication option cards

Type	Model	Description	Function
Communication option card	3G3RV-PDRT2	DeviceNet option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through DeviceNet communication with the host controller.
	SI-P1	PROFIBUS-DP option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through PROFIBUS-DP communication with the host controller.
	SI-S1	CANopen option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through CANopen communication with the host controller.
	SI-J	LONWORKS option card	Used for HVAC control, running or stopping the inverter, setting or referencing parameters, and monitoring output current, watt-hours, or similar items through LONWORKS communications with peripheral devices.
	CM090	Ethernet option card	MODBUS TCP/IP Ethernet interface unit.
	SI-T	MECHATROLINK-II option board	High speed motion bus. Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through MECHATROLINK-II communication with the host controller. Host controller : Trajexia, MCH or MP Series *1

\*1 Please refer to Trajexia, MCH or MP Series section for host controllers detailed information.

## ④ Reference option cards

Type	Model	Description	Function
Reference option card	AI-14U / 3G3IV-PAI14U	Analog input card	2 channel high resolution analog input card Channel 1: 0 to 10 V (20K $\Omega$ ) Channel 2: 4 to 20 mA (250 $\Omega$ ) Resolution 14 bit
	AI-14B / 3G3IV-PAI14B		3 Channel high resolution analog input card Signal level: -10 to +10V (20 K $\Omega$ ) 4 to 20 mA (250 $\Omega$ ) Resolution: 13 bit + sign
	DI-08 / 3G3IV-PDI08	Digital reference card	8 bit digital speed reference input card
	DI-16H2 / 3G3IV-PDI16H2		16 bit digital speed reference input card

## ⑤ PLC option cards

Type	Model	Description	Function
PLC option card	3G3RV-P10ST8-E	PLC option	Full PLC features, wireless installation and seamless access to the inverter parameters and analogue/digital inputs and outputs. Embedded Compibus/S fieldbus Standard OMRON tools can be used for programming
	3G3RV-P10ST8-DRT-E	PLC option with DeviceNet	Same features than standard model with DeviceNet support.

## ⑥ Accessories

Type	Model	Description	Function
Digital operator	JVOP-160-OY	5 lines LCD digital operator 7 Language support	Configuration and monitoring device
	JVOP-161-OY	7 segment LED digital operator	
Accessories	3G3IV-PCN126 3G3IV-PCN326	Digital operator extension cable 1 meters 3 meters	Cable to connect the inverter and the digital operator when it's not plugged into the inverter
	3G3IV-PCN329-E	PC configuration cable	Cable to connect inverter and PC

## ⑥ Computer Software

Type	Model	Description	Function
Software	CX-DRIVE	Computer software	Configuration and monitoring software tool for drives
	CX-ONE	Computer software	Complete OMRON automation software including CX-Drive

## ⑦ Braking unit, braking resistor unit

**Note:** For braking units specifications and models refer to the G7 datasheet Cat-No: I23E-EN-02

## Specifications

## 200 V Class

Model CIMR-F7Zo		20P4	20P7	21P5	22P2	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055	2075	2090	2110	
Max. applicable motor output <sup>1</sup>		kW	0.55	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110
Output characteristics	Inverter capacity	kVA	1.2	1.6	2.7	3.7	5.7	8.8	12	17	22	27	32	44	55	69	82	110	130	160
	Rated current	A	3.2	4.1	7.0	9.6	15	23	31	45	58	71	85	115	145	180	215	283	346	415 <sup>*2</sup>
	Max. voltage	3-phase, 200/208/220/230/240 V (proportional to input voltage)																		
	Max. output frequency	Heavy duty (low carrier, constant torque applications): 150 Hz max Normal duty 1 or 2 (high / reduced carrier, variable torque applications): 400 Hz max																		
Power supply	Rated input voltage and frequency	3-phase 200/208/220/230/240 V, 50/60 Hz <sup>*3</sup>																		
	Allowable voltage fluctuation	+10%, -15%																		
	Allowable frequency fluctuation	±5%																		
Harmonic wave prevention	DC reactor	Option											Provided							
	12-pulse input	Not available											Available <sup>*4</sup>							

<sup>1</sup> Our standard 4-pole motors are used for max. applicable motor output. Choose the inverter model whose rated current is allowable within the motor rated current range.

<sup>2</sup> 322 A in case of heavy duty mode

<sup>3</sup> When using the inverter of 200 V class 37 kW or more with a cooling fan of three-phase 230 V 50 Hz or 240 V 50/60 Hz power supply, a transformer for the cooling fan is required.

<sup>4</sup> A 3-wired transformer is required at 12-pulse input.

## 400 V Class

Model CIMR-F7Zo		40P4	40P7	41P5	42P2	43P7	44P0	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090	4110	4132	4160	4185	4220	4300	
Max. applicable motor output <sup>1</sup>		kW	0.55	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	300
Output characteristics	Inverter capacity	kVA	1.4	1.6	2.8	4.0	5.8	6.6	9.5	13	18	24	30	34	46	57	69	85	110	140	160	200	230	280	390	510
	Rated current	A	1.8	2.1	3.7	5.3	7.6	8.7	12.5	17	24	31	39	45	60	75	91	112	150	180	216	260	304	370	506	675
	Max. voltage	3-phase, 380/400/415/440/460/480 V (proportional to input voltage)																								
	Max. output frequency	Heavy duty (low carrier, constant torque applications): 150 Hz max Normal duty 1 or 2 (high / reduced carrier, variable torque applications): 400 Hz max																								
Power supply	Rated input voltage and frequency	3-phase 380/400/415/440/460/480 V, 50/60 Hz																								
	Allowable voltage fluctuation	+10%, -15%																								
	Allowable frequency fluctuation	±5%																								
Harmonic wave prevention	DC reactor	Option												Provided												
	12-pulse input	Not available												Available <sup>*4</sup>												

<sup>1</sup> Our standard 4-pole motors are used for max. applicable motor output. Choose the inverter model whose rated current is allowable within the motor rated current range.

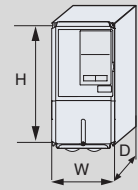
<sup>2</sup> 405 A in case of heavy duty mode

<sup>3</sup> 540 A in case of heavy duty mode

<sup>4</sup> A 3-wired transformer is required at 12-pulse input.

## Dimensions

Specifications		Drive model	H	W	D	
3 phase 200 VAC	0.55 kW	CIMR-F7Z20P41	140	280	157	
	0.75 kW	CIMR-F7Z20P71				
	1.5 kW	CIMR-F7Z21P51				
	2.2 kW	CIMR-F7Z22P21				
	3.7 kW	CIMR-F7Z23P71			177	
	5.5 kW	CIMR-F7Z25P51				
	7.5 kW	CIMR-F7Z27P51	200	300	197	
	11 kW	CIMR-F7Z20111		310		
	15 kW	CIMR-F7Z20151	240	350	207	
	18.5 kW	CIMR-F7Z20181		380		
	22 kW	CIMR-F7Z20220	250	400	258	
	30 kW	CIMR-F7Z20300	275	450		
	37 kW	CIMR-F7Z20370	375	600	298	
	45 kW	CIMR-F7Z20450			328	
	55 kW	CIMR-F7Z20550	450	725	348	
	75 kW	CIMR-F7Z20750				
	90 kW	CIMR-F7Z20900	500	850	358	
	110 kW	CIMR-F7Z21100	575	885	378	
3 phase 400 VAC	0.55 kW	CIMR-F7Z40P41	140	280	157	
	0.75 kW	CIMR-F7Z40P71				
	1.5 kW	CIMR-F7Z41P51				
	2.2 kW	CIMR-F7Z42P21			177	
	3.7 kW	CIMR-F7Z43P71				
	4.0 kW	CIMR-F7Z44P71				
	5.5 kW	CIMR-F7Z45P51				
	7.5 kW	CIMR-F7Z47P51	200	300	197	
	11 kW	CIMR-F7Z40111				
	15 kW	CIMR-F7Z40151	240	350	207	
	18.5 kW	CIMR-F7Z40181				
	22 kW	CIMR-F7Z40220	275	450	258	
	30 kW	CIMR-F7Z40330				
	37 kW	CIMR-F7Z40370	325	550	283	
	45 kW	CIMR-F7Z40450				
	55 kW	CIMR-F7Z40550				
	75 kW	CIMR-F7Z40750	450	725	348	
	90 kW	CIMR-F7Z40900				
	110 kW	CIMR-F7Z41100	500	850	358	
	132 kW	CIMR-F7Z41320				
	160 kW	CIMR-F7Z41600	575	916	378	
	185 kW	CIMR-F7Z41850	710	1305	413	
	220 kW	CIMR-F7Z42200				
	300 kW	CIMR-F7Z43000	916	1475	413	



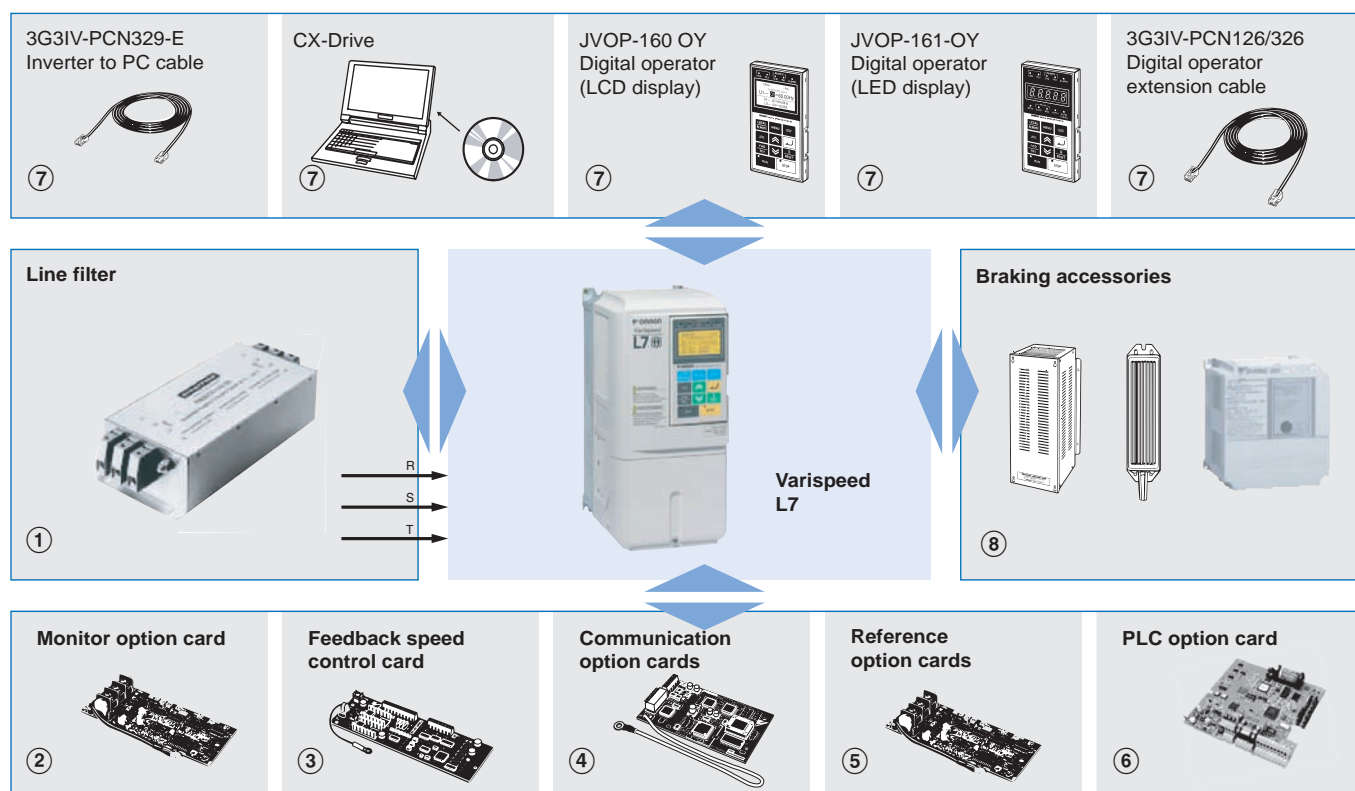


## Made to drive lifts

The L7 is the ultimate drive for lift applications up to 3 m/s. High starting torque, silent operation, lift-specific operator interface and operation with both AC and PM motors are standard features of the L7 inverter.

- One model to control AC and PM motors
- Silent operation with no current de-rating
- Safety Cat 3 stop. Cat.0 embedded as standard.
- UPS or battery operation for emergency rescue.
- Motor auto-tuning at standstill and at RUN
- Programming software: CX-Drive for parameter configuration

## Ordering information



### Varispeed L7

#### 200 V

Specifications	Model		
3 x 200 V	3.7 kW	17.5 A	CIMR-L7Z23P7
	5.5 kW	25 A	CIMR-L7Z25P5
	7.5 kW	33 A	CIMR-L7Z27P5
	11 kW	49 A	CIMR-L7Z2011
	15 kW	64 A	CIMR-L7Z2015
	18.5 kW	80 A	CIMR-L7Z2018
	22 kW	96 A	CIMR-L7Z2022
	30 kW	130 A	CIMR-L7Z2030
	37 kW	160 A	CIMR-L7Z2037
	45 kW	183 A	CIMR-L7Z2045
	55 kW	224 A	CIMR-L7Z2055

#### 400 V

Specifications	Model		
3 x 400 V	4.0 kW	11 A	CIMR-L7Z44P0
	5.5 kW	14 A	CIMR-L7Z45P5
	7.5 kW	18 A	CIMR-L7Z47P5
	11 kW	27 A	CIMR-L7Z4011
	15 kW	34 A	CIMR-L7Z4015
	18.5 kW	41 A	CIMR-L7Z4018
	22 kW	48 A	CIMR-L7Z4022
	30 kW	65 A	CIMR-L7Z4030
	37 kW	80 A	CIMR-L7Z4037
	45 kW	96 A	CIMR-L7Z4045
	55 kW	128 A	CIMR-L7Z4055

## ① Line filters

## 200 V

Inverter model	Line filters			
Varispeed L7	Type	EN55011 class	Current (A)	Weight (kg)
CIMR-L7Z23P7	3G3RV-PFI2035-SE	B, 25 m	35	1.4
CIMR-L7Z25P5		A 100 m		
CIMR-L7Z27P5	3G3RV-PFI2060-SE	B, 25 m	60	3
CIMR-L7Z2011		A 100 m		
CIMR-L7Z2015	3G3RV-PFI2100-SE	B, 25 m	100	4.9
CIMR-L7Z2018		A 100 m		
CIMR-L7Z2022	3G3RV-PFI2130-SE	A, 100 m	130	4.3
CIMR-L7Z2030				
CIMR-L7Z2037	3G3RV-PFI2160-SE	A, 100 m	160	6.0
CIMR-L7Z2045	3G3RV-PFI2200-SE	A, 100 m	200	11.0
CIMR-L7Z2055				

## 400 V

Inverter model	Line filters			
Varispeed L7	Type	EN55011 class	Current (A)	Weight (kg)
CIMR-L7Z44P0	3G3RV-PFI3018-SE	B, 25 m	18	1.3
CIMR-L7Z45P5		A 100 m		
CIMR-L7Z47P5	3G3RV-PFI3035-SE	B, 25 m	35	2.1
CIMR-L7Z4011		A 100 m		
CIMR-L7Z4015	3G3RV-PFI3060-SE	B, 25 m	60	4.0
CIMR-L7Z4018		A 100 m		
CIMR-L7Z4022	3G3RV-PFI3070-SE	A, 100 m	70	3.4
CIMR-L7Z4030				
CIMR-L7Z4037	3G3RV-PFI3130-SE	A, 100 m	130	4.7
CIMR-L7Z4045				
CIMR-L7Z4055				

## ① Line filters

Inverter model	Line filters			
Varispeed L7	Type	EN55011 class	Current (A)	Weight (kg)
CIMR-L7Z44P0	3G3RV-PFI3018B-SE	B, 25 m	18	1,0
CIMR-L7Z45P5		A 100 m		
CIMR-L7Z47P5	3G3RV-PFI3035B-SE	B, 25 m	35	1,5
CIMR-L7Z4011		A 100 m		
CIMR-L7Z4015	3G3RV-PFI3060B-SE	B, 25 m	60	2,2
CIMR-L7Z4018		A 100 m		



## ② Monitor option cards

Type	Model	Description	Function
Monitor option card	DO-08 / 3G3IV-PDO08	Digital output card	Outputs isolated type digital signal for monitoring inverter run state (alarm signal, zero speed detection etc.) . Output channel: photo coupler 6 channels (48 V, 50 mA or less) Relay contact output 2 channels (250 VAC, 1 A or less, 30 VDC, 1 A or less)
	DO-02C / 3G3IV-PDO02C	2C-relay output card	Two multi-function contact outputs (2C-relay) can be used other than those of the inverter proper unit.

## ③ Feedback speed control cards

Type	Model	Description	Function
Feedback speed control card	PG-A2 / 3G3FV-PPGA2	PG speed controller card (Used for V/f control with PG or Flux Vector)	Phase A pulse (single pulse) inputs (voltage, complementary, open collector input) PG frequency range: Approx. 30 kHz max. [Power supply output for PG: +12 V, max. current 200 mA] Pulse monitor output: +12 V, 20 mA
	PG-B2 / 3G3FV-PPGB2		Phase A and B pulse inputs (exclusively for complementary input) PG frequency range: Approx. 30 kHz max. [Power supply output for PG: +12 V, Max. current 200 mA] Pulse monitor output: Open collector, +24 V, Max. current 30 mA
	PG-D2 / 3G3FV-PPGD2		Phase A pulse (differential pulse) input for V/f control (RS-422 input) PG frequency range: Approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422
	PG-X2 / 3G3FV-PPGX2		Phase A, B and Z pulse (differential pulse) inputs (RS-422 input) PG frequency range: Approx. 300 kHz max. [Power supply output for PG: +5 V or +12 V, Max. current 200 mA] Pulse monitor output: RS-422
	PG-F2		Hiperface and endat encoder option.

## ④ Communication option cards

Type	Model	Description	Function
Communication option card	SI-N1	DeviceNet option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through DeviceNet communication with the host controller.
	SI-P1	PROFIBUS-DP option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through PROFIBUS-DP communication with the host controller.
	SI-S1	CANopen option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through CANopen communication with the host controller. It supports DSP402 CANOpen standard protocol for drives control in speed control.
	SI-J	LONWORKS option card	Used for HVAC control, running or stopping the inverter, setting or referencing parameters, and monitoring output current, watt-hours, or similar items through LONWORKS communications with peripheral devices.



## ⑤ Reference option cards

Model	Description	Function
AI-14U / 3G3IV-PAI14U	Analog input card	2 channel high resolution analog input card Channel 1: 0 to 10 V (20 kΩ) Channel 2: 4 to 20 mA (250 Ω) Resolution 14 bit
AI-14B / 3G3IV-PAI14B		3 channel high resolution analog input card Signal level: -10 to +10 V (20 kΩ) 4 to 20 mA (250 Ω) Resolution: 13 bit + sign
DI-08 / 3G3IV-PDI08	Digital reference card	8 bit digital speed reference input card
DI-16H2 / 3G3IV-PDI16H2		16 bit digital speed reference input card

## ⑥ PLC option boards

Model	Description	Function
3G3RV-P10ST8-E	PLC option	Full PLC features, wireless installation and seamless access to the inverter parameters and analogue / digital inputs and outputs. Embedded Compibus/S fieldbus Standard OMRON tools can be used for programming
3G3RV-P10ST8-DRT-E	PLC option with DeviceNet	Same features than standard models with DeviceNet support.

## ⑦ Accessories

Type	Model	Description	Function
Digital operator	JVOP-160-OY	5 lines LCD digital operator 7 language support	Configuration and monitoring device.
	JVOP-161-OY	7 segment LED digital operator	
Accessories	3G3IV-PCN126	Digital operator extension cable 1 meter	Cable to connect the inverter and the digital operator when it's not plugged into the inverter.
	3G3IV-PCN326	3 meters	
	3G3IV-PCN329-E	PC configuration cable	Cable to connect inverter and PC.

## ⑦ Software

Model	Description	Installation
CX-DRIVE	Computer software	Configuration and monitoring software tool for Drives
CX-ONE	Computer software	Complete OMRON automation software including CX-Drive

## ⑧ Braking unit, braking resistor unit

**Note:** For braking units specifications and models refer to the G7 datasheet Cat-No: I22E-EN-02

## Specifications

## 200 V class

Model	CIMR-L7ZZ□	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055
Max. applicable motor output <sup>1</sup>	kW	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Output characteristics	Inverter capacity	kVA	7	10	14	20	27	33	40	54	67	93
	Rated current	A	17.5	25	33	49	64	80	96	130	160	224
	Max. voltage	3-phase; 200, 208, 220, 230, or 240 VAC (proportional to input voltage.)										
	Max. output frequency	Up to 120Hz available by programming.										
Power supply	Rated input voltage and frequency	3-phase, 200/208/220/230/240 VAC, 50/60 Hz										
	Rated input current A	21	25	40	52	68	96	115	156	176	220	269
	Allowable voltage fluctuation	+ 10%, - 15%										
	Allowable frequency fluctuation	±5%										
Harmonic wave prevention	DC reactor	Optional						Built in				
	12-pulse input	Not possible						Possible				

<sup>1</sup> The maximum applicable motor output is given for a standard 4-pole Yaskawa motor. When selecting the actual motor and Inverter, be sure that the inverter rated current is applicable for the motor's rated current.

**Note:** A transformer with dual star-delta secondary is required on the power supply for 12-pulse rectification.

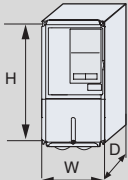
## 400 V class

Model CIMR-L7ZZ□		44P0	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	
Output characteristics	Max. applicable motor output <sup>†</sup>	kW	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55
	Inverter capacity	kVA	9	12	15	22	28	34	40	54	67	80	106
	Rated current	A	11	14	18	27	34	41	48	65	80	96	128
	Max. voltage	3-phase; 380, 400, 415, 440, 460, or 480 VAC (proportional to input voltage.)											
	Max. output frequency	120 Hz max.											
Power supply	Rated input voltage and frequency	3-phase, 380, 400, 415, 440, 460 or 480 VAC, 50/60 Hz											
	Rated input current A	13.2	17	22	32	41	49	58	78	96	115	154	
	Allowable voltage fluctuation	+ 10%, - 15%											
	Allowable frequency fluctuation	±5%											
Harmonic wave prevention	DC reactor	Optional						Built in					
	12-pulse input	Not possible						Possible					

<sup>\*1</sup> The maximum applicable motor output is given for a standard 4-pole Yaskawa motor. When selecting the actual motor and inverter, be sure that the inverter's rated current is applicable for the motor's rated current.

**Note:** A transformer with dual star-delta secondary is required on the power supply for 12-pulse rectification.

## Dimensions

Specifications		Drive model		H	W	D	
3-phase 200 VAC	3.7 kW	CIMR-L7Z23P77		140	280	177	
	5.5 kW	CIMR-L7Z25P57					
	7.5 kW	CIMR-L7Z27P57		200	300	197	
	11 kW	CIMR-L7Z20117			310		
	15 kW	CIMR-L7Z20157		240	350	207	
	18.5 kW	CIMR-L7Z20187			380		
	22 kW	CIMR-L7Z20227		254	464	258	
	30 kW	CIMR-L7Z20300		275	450	258	
	37 kW	CIMR-L7Z20370		375	600	298	
	45 kW	CIMR-L7Z20450				328	
	55 kW	CIMR-L7Z20550		450	725	348	
3-phase 400 VAC	4.0 kW	CIMR-L7Z44P77		140	280	177	
	5.5 kW	CIMR-L7Z45P57					
	7.5 kW	CIMR-L7Z47P57		200	300	197	
	11 kW	CIMR-L7Z40117					
	15 kW	CIMR-L7Z40157		240	350	207	
	18.5 kW	CIMR-L7Z40187					
	22 kW	CIMR-L7Z40227		275	535	258	
	30 kW	CIMR-L7Z40307					
	37 kW	CIMR-L7Z40377		325	715	283	
	45 kW	CIMR-L7Z40457					
	55 kW	CIMR-L7Z40557					

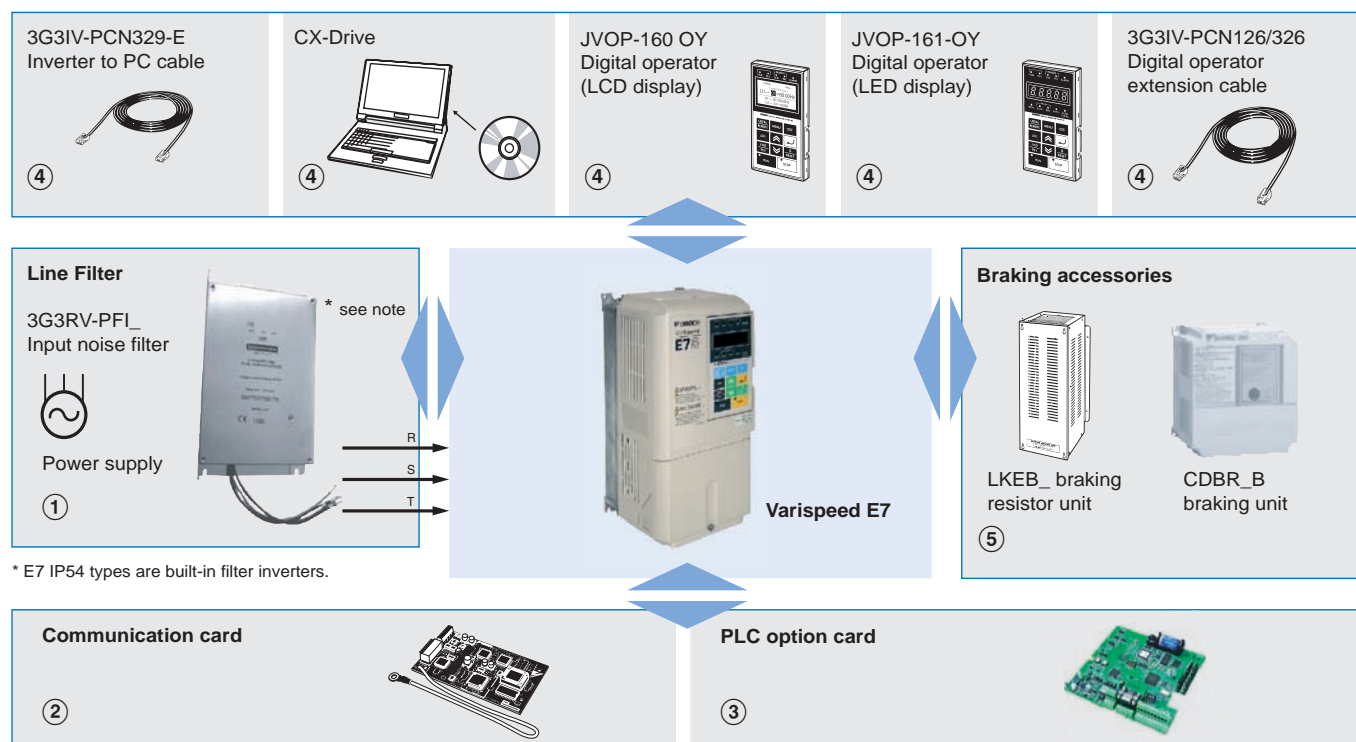


## Drive your energy costs down

The E7 is designed for variable torque applications such as fans and centrifugal pumps. It is supplied with V/f control and normal duty overload rating of 110% for one minute. A unique feature of the E7 is the energy-saving algorithm, which allows an extra saving of up to 20%.

- E7 IP54 solution with robust metal chassis and built-in RFI filter
- Adaptive energy-saving algorithm
- Silent operation
- 12-pulse configuration for low-current harmonics
- Programming software: CX-Drive for parameter configuration

## Ordering information



## Varispeed E7

### 200 V

Specifications			Model
IP20	0.55 kW	3.2 A	CIMR-E7Z20P41
	0.75 kW	4.1 A	CIMR-E7Z20P71
	1.5 kW	7.0 A	CIMR-E7Z21P51
	2.2 kW	9.6 A	CIMR-E7Z22P21
	3.7 kW	15 A	CIMR-E7Z23P71
	5.5 kW	23 A	CIMR-E7Z25P51
	7.5 kW	31 A	CIMR-E7Z27P51
	11 kW	45 A	CIMR-E7Z20111
	15 kW	58 A	CIMR-E7Z20151
IP00	18.5 kW	71 A	CIMR-E7Z20181
	22 kW	85 A	CIMR-E7Z20220
	30 kW	115 A	CIMR-E7Z20300
	37 kW	145 A	CIMR-E7Z20370
	45 kW	180 A	CIMR-E7Z20450
	55 kW	215 A	CIMR-E7Z20550
	75 kW	283 A	CIMR-E7Z20750
	90 kW	345 A	CIMR-E7Z20900
	110 kW	415 A	CIMR-E7Z21100

### 400 V

Specifications			Model
IP20	0.55 kW	1.8 A	CIMR-E7Z40P41
	0.75 kW	2.1 A	CIMR-E7Z40P71
	1.5 kW	3.7 A	CIMR-E7Z41P51
	2.2 kW	5.3 A	CIMR-E7Z42P21
	3.7 kW	7.6 A	CIMR-E7Z43P71
	4.0 kW	8.7 A	CIMR-E7Z44P01
	5.5 kW	12.5 A	CIMR-E7Z45P51
	7.5 kW	17 A	CIMR-E7Z47P51
	11 kW	24 A	CIMR-E7Z40111
	15 kW	31 A	CIMR-E7Z40151
	18.5 kW	39 A	CIMR-E7Z40181

Specifications			Model
IP00	22 kW	45 A	CIMR-E7Z40220
	30 kW	60 A	CIMR-E7Z40300
	37 kW	75 A	CIMR-E7Z40370
	45 kW	91 A	CIMR-E7Z40450
	55 kW	112 A	CIMR-E7Z40550
	75 kW	150 A	CIMR-E7Z40750
	90 kW	180 A	CIMR-E7Z40900
	110 kW	216 A	CIMR-E7Z41100
	132 kW	260 A	CIMR-E7Z41320
	160 kW	304 A	CIMR-E7Z41600
	185 kW	370 A	CIMR-E7Z41850
	220 kW	506 A	CIMR-E7Z42200
	300 kW	675 A	CIMR-E7Z43000

### ① Line filters \*1

#### 200 V

Inverter model	Line filters			
Varispeed E7	Type	EN55011 Class	Current (A)	Weight (kg)
CIMR-E7Z20P4	3G3RV-PFI3010-SE	B, 25 m A, 100 m	10	1.1
CIMR-E7Z20P7				
CIMR-E7Z21P5				
CIMR-E7Z22P2	3G3RV-PFI3018-SE	B, 25 m A, 100 m	18	1.3
CIMR-E7Z23P7	3G3RV-PFI2035-SE	B, 25 m A, 100 m	35	1.4
CIMR-E7Z25P5				
CIMR-E7Z27P5	3G3RV-PFI2060E-SE	B, 25 m A, 100 m	60	3
CIMR-E7Z2011				
CIMR-E7Z2015	3G3RV-PFI2100-SE	B, 25 m A, 100 m	100	4.9
CIMR-E7Z2018				
CIMR-E7Z2022	3G3RV-PFI2130-SE	A, 100 m	130	4.3
CIMR-E7Z2030				
CIMR-E7Z2037	3G3RV-PFI2160-SE	A, 100 m	160	6.0
CIMR-E7Z2045	3G3RV-PFI2200-SE	A, 100 m	200	11.0
CIMR-E7Z2055				
CIMR-E7Z2075	3G3RV-PFI3400-SE	A, 100 m	400	18.5
CIMR-E7Z2090				
CIMR-E7Z2110	3G3RV-PFI3600-SE	A, 100 m	600	11.0

\*1. E7 IP54 types are built-in filter inverters.

### Varispeed E7 IP54

#### 400 V

Specifications			Model
IP54	7.5 kW	17 A	CIMR-E7Z47P52
	11 kW	24 A	CIMR-E7Z40112
	15 kW	31 A	CIMR-E7Z40152
	18.5 kW	39 A	CIMR-E7Z40182
	22 kW	45 A	CIMR-E7Z40222
	30 kW	60 A	CIMR-E7Z40302
	37 kW	75 A	CIMR-E7Z40372
	45 kW	91 A	CIMR-E7Z40452
	55 kW	112 A	CIMR-E7Z40552

#### 400 V

Inverter model	Line filter			
Varispeed E7	Model	EN 55011 class	Current (A)	Weight (kg)
CIMR-E7Z40P4	3G3RV-PFI3010-SE	B, 25 m A, 100 m	10	1.1
CIMR-E7Z40P7				
CIMR-E7Z41P5				
CIMR-E7Z42P2				
CIMR-E7Z43P7	3G3RV-PFI3018-SE	B, 25 m A, 100 m	18	1.3
CIMR-E7Z44P0				
CIMR-E7Z45P5				
CIMR-E7Z47P5	3G3RV-PFI3035-SE	B, 25 m A, 100 m	35	2.1
CIMR-E7Z4011				
CIMR-E7Z4015	3G3RV-PFI3060-SE	B, 25 m A, 100 m	60	4.0
CIMR-E7Z4018				
CIMR-E7Z4022	3G3RV-PFI3070-SE	A, 100 m	70	3.4
CIMR-E7Z4030				
CIMR-E7Z4037	3G3RV-PFI3130-SE	A, 100 m	130	4.7
CIMR-E7Z4045				
CIMR-E7Z4055				
CIMR-E7Z4075	3G3RV-PFI3170-SE	A, 100 m	170	6.0
CIMR-E7Z4090	3G3RV-PFI3200-SE	A, 100 m	250	11
CIMR-E7Z4110				
CIMR-E7Z4132	3G3RV-PFI3400-SE	A, 100 m	400	18.5
CIMR-E7Z4160				
CIMR-E7Z4185	3G3RV-PFI3600-SE	A, 100 m	600	11.0
CIMR-E7Z4220				
CIMR-E7Z4300	3G3RV-PFI3800-SE	A, 100 m	800	31.0

### ② Communication cards

Type	Model	Description	Function
Communication option cards	3G3RV-PDRT2	DeviceNet option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through DeviceNet communication with the host controller.
	SI-P1	PROFIBUS-DP option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through PROFIBUS-DP communication with the host controller.
	SI-S1	CANopen option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through CANopen communication with the host controller.
	CM090	Ethernet option card	MODBUS TCP/IP Ethernet interface unit.
	SI-J1	LONWORKS option card	Used for HVAC control, running or stopping the inverter, setting or referencing parameters, and monitoring output current, watt-hours, or similar items through LONWORKS communications with peripheral devices.

### ③ PLC Option card

Type	Model	Description	Function
PLC option cards	3G3RV-P10CDT-E	PLC option	Full features, wireless installation and seamless access to the inverter parameters and analogue / digital inputs and outputs Embedded Compobus/S fieldbus Standard OMRON tools can be used for programming
	3G3-P10CDT-E-DRT	PLC option with DeviceNet	Same features than standard models with DeviceNet support

## ④ Accessories

Type	Model	Description	Function
Digital operators	JVOP-160-OY	5 lines LCD digital operator <sup>*1</sup>	Configuration and monitoring device.
	JVOP-161-OY	7 segment LED digital operator	
	JVOP-162	Hand-Off auto operator	
Accessories	3G3IV-PCN126	Digital operator extension cable 1 meter	Cable to connect the inverter and the digital operator when it's not plugged into the inverter.
	3G3IV-PCN326	3 meters	
	3G3IV-PCN329-E	PC configuration cable	Cable to connect inverter and PC

<sup>\*1</sup> LCD digital operator is the standard in IP54 types

## ④ Computer software

Type	Model	Description	Function
Software	CX-DRIVE	Computer software	Configuration and monitoring software tool for drives
	CX-ONE	Computer software	Complete OMRON automation software including CX-Drive

## ⑤ Braking unit, braking resistor unit

**Note:** For braking units specifications and models refer to the G7 datasheet Cat-No: I21E-EN-02

## Specifications

## 200 V class

Model CIMR-E7Z□		20P4	20P7	21P5	22P2	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055	2075	2090	2110	
Max. applicable motor output <sup>*1</sup>	kW	0.55	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	
	kVA	1.2	1.6	2.7	3.7	5.7	8.8	12	17	22	27	32	44	55	69	82	110	130	160	
Output characteristics	Rated current	A	3.2	4.1	7.0	9.6	15	23	31	45	58	71	85	115	145	180	215	283	346	415
	Max. voltage		3-phase; 200, 220, 230, or 240 VAC (Proportional to input voltage.)																	
	Max. output frequency		200.0																	
Power supply	Rated input voltage and frequency		3-phase, 200/208/220/230/240 VAC, 50/60 Hz																	
	Allowable voltage fluctuation		+ 10%, - 15%																	
	Allowable frequency fluctuation		±5%																	
Harmonic wave prevention	DC reactor	Optional											Built in							
	12-pulse input	Not possible											Possible <sup>*2</sup>							

<sup>\*1</sup> Standard 4-pole motors are used for max. applicable motor output. Choose the inverter model whose rated current is allowable within the motor rated current range.

<sup>\*2</sup> A 3-wire transformer is required on the power supply for 12-phase rectification

## 400 V class

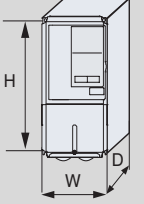
Model CIMR-E7ZZ4□		0P4	0P7	1P5	2P2	3P7	4P0	5P5	7P5	011	015	018	022	030	037	045	055	075	090	110	132	160	185	220	300		
IP54 model: CIMR-E7Z4□		---	---	---	---	---	---	---	7P52	0112	0152	0182	0222	0302	0372	0452	0552	---	---	---	---	---	---	---	---		
Output characteristics	Max. applicable motor output <sup>†</sup>	kW	0.55	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	300	
	Inverter	kVA	1.4	1.6	2.8	4.0	5.8	6.6	9.5	13	18	24	30	34	46	57	69	85	110	140	160	200	230	280	390	510	
	Rated current	A	1.8	2.1	3.7	5.3	7.6	8.7	12.5	17	24	31	39	45	60	75	91	112	150	180	216	260	304	370	506	675	
	Max. voltage	3-phase; 380, 400, 415, 440, 460, or 480 VAC (Proportional to input voltage.)																									
	Max. output frequency	200.0																									
Power supply	Rated input voltage and frequency	3-phase, 380, 400, 415, 440, 460 or 480 VAC, 50/60 Hz																									
	Allowable voltage fluctuation	+ 10%, - 15%																									
	Allowable frequency fluctuation	±5%																									
Harmonic wave prevention	DC reactor	Optional												Built in													
	12-pulse input	Not possible												Possible <sup>**2</sup>													

<sup>\*1</sup> Standard 4-pole motors are used for max. applicable motor output. Choose the inverter model whose rated current is allowable within the motor rated current range.

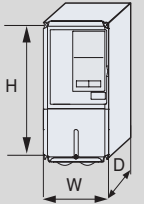
<sup>\*\*2</sup> A 3-wire transformer is required on the power supply for 12-phase rectification  
To agg 400V class

## Dimensions

## Varispeed E7

Specifications		Drive model	H	W	D	
3 phase 200 VAC	0.55 kW	CIMR-E7Z20P41	140	280	157	
	0.75 kW	CIMR-E7Z20P71				
	1.5 kW	CIMR-E7Z21P51				
	2.2 kW	CIMR-E7Z22P21				
	3.7 kW	CIMR-E7Z23P71			177	
	5.5 kW	CIMR-E7Z25P51				
	7.5 kW	CIMR-E7Z27P51	200	300	197	
	11 kW	CIMR-E7Z20111		310		
	15 kW	CIMR-E7Z20151	240	350	207	
	18.5 kW	CIMR-E7Z20181		380		
	22 kW	CIMR-E7Z20220	250	400	258	
	30 kW	CIMR-E7Z20300		450		
	37 kW	CIMR-E7Z20370	375	600	298	
	45 kW	CIMR-E7Z20450			328	
	55 kW	CIMR-E7Z20550	450	725	348	
	75 kW	CIMR-E7Z20750				
	90 kW	CIMR-E7Z20900	500	850	358	
	110 kW	CIMR-E7Z21100	575	885	378	
3 phase 400 VAC	0.55 kW	CIMR-E7Z40P41	140	280	157	
	0.75 kW	CIMR-E7Z40P71				
	1.5 kW	CIMR-E7Z41P51				
	2.2 kW	CIMR-E7Z42P21				
	3.7 kW	CIMR-E7Z43P71			177	
	4.0 kW	CIMR-E7Z44P71				
	5.5 kW	CIMR-E7Z45P51	200	300	197	
	7.5 kW	CIMR-E7Z47P51				
	11 kW	CIMR-E7Z40111	240	350	207	
	15 kW	CIMR-E7Z40151				
	18.5 kW	CIMR-E7Z40181	275	450	258	
	22 kW	CIMR-E7Z40220				
	30 kW	CIMR-E7Z40300	325	550	283	
	37 kW	CIMR-E7Z40370				
	45 kW	CIMR-E7Z40450	450	725	348	
	55 kW	CIMR-E7Z40550				
	75 kW	CIMR-E7Z40750	500	850	358	
	90 kW	CIMR-E7Z40900				
	110 kW	CIMR-E7Z41100	575	916	378	
	132 kW	CIMR-E7Z41320				
	160 kW	CIMR-E7Z41600	710	1305	413	
	185 kW	CIMR-E7Z41850				
	220 kW	CIMR-E7Z42200	916	1475	413	
	300 kW	CIMR-E7Z43000				

## Varispeed E7 IP54

Specifications		Drive model	H	W	D	
3 phase 400 VAC	7.5 kW	CIMR-E7Z47P52	350	600	240	
	11 kW	CIMR-E7Z40112				
	15 kW	CIMR-E7Z40152			260	
	18.5 kW	CIMR-E7Z40182	410	650	300	
	22 kW	CIMR-E7Z40222				
	30 kW	CIMR-E7Z40302	580	750	330	
	37 kW	CIMR-E7Z40372				
	45 kW	CIMR-E7Z40452				
	55 kW	CIMR-E7Z40552				



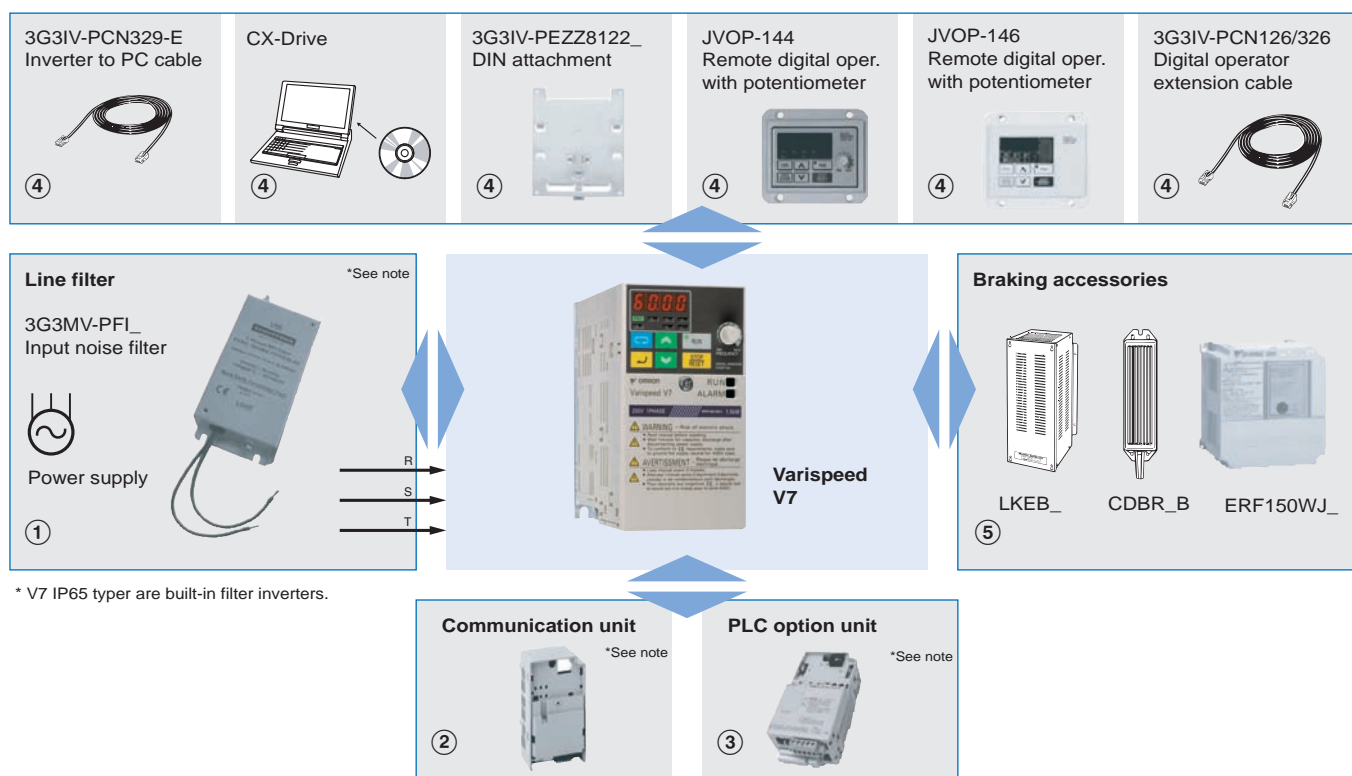
## Sensorless vector control inverter



The Varispeed V7 is the perfect drive for standard industrial applications such as conveyors, cranes, grinders, etc. It delivers an amazing 100% torque at 0.5 Hz, ensuring a very stable motor speed. It is also extremely compact and silent. It can interface to all popular field buses as an option. You can turn the V7 into a decentralised control station by adding a PLC option board.

- Sensorless vector control ensures 100% at 0.5 Hz
- Compact size available in IP20 or IP65
- Silent operation with no current de-rating
- Programming software: CX-Drive for parameter configuration
- CASE (inverter application software) and PLC option board

### Ordering information



\* V7 IP65 typer are built-in filter inverters.

\* Option frames are needed for V7 IP65 type.

### Varispeed V7

#### 200 V

Specifications			Model
1 x 200 V	0.12 kW	0.8 A	CIMR-V7AZB0P10
	0.25 kW	1.6 A	CIMR-V7AZB0P20
	0.55 kW	3.0 A	CIMR-V7AZB0P40
	1.1 kW	5.0 A	CIMR-V7AZB0P70
	1.5 kW	8.0 A	CIMR-V7AZB1P50
	2.2 kW	11.0 A	CIMR-V7AZB2P20
	4.0 kW	17.5 A	CIMR-V7AZB4P00
3 x 200 V	0.12 kW	0.8 A	CIMR-V7AZ20P10
	0.25 kW	1.6 A	CIMR-V7AZ20P20
	0.55 kW	3.0 A	CIMR-V7AZ20P40
	1.1 kW	5.0 A	CIMR-V7AZ20P70
	1.5 kW	8.0 A	CIMR-V7AZ21P50
	2.2 kW	11.0 A	CIMR-V7AZ22P20
	4.0 kW	17.5 A	CIMR-V7AZ24P00
	5.5 kW	25.0 A	CIMR-V7AZ25P51
	7.5 kW	33.0 A	CIMR-V7AZ27P51

#### 400 V

Specifications			Model
3 x 400 V	0.37 kW	1.2 A	CIMR-V7AZ40P20
	0.55 kW	1.8 A	CIMR-V7AZ40P40
	1.1 kW	3.4 A	CIMR-V7AZ40P70
	1.5 kW	4.8 A	CIMR-V7AZ41P50
	2.2 kW	5.5 A	CIMR-V7AZ42P20
	3.0 kW	7.2 A	CIMR-V7AZ43P00
	4.0 kW	9.2 A	CIMR-V7AZ44P00
	5.5 kW	14.8 A	CIMR-V7AZ45P51
	7.5 kW	18.0 A	CIMR-V7AZ47P51

## Varispeed V7 IP65

## 200 V

Specifications			Model
1 x 200 V	0.55 kW	3.0 A	CIMR-V7TZB0P405
	1.1 kW	5.0 A	CIMR-V7TZB0P705
	1.5 kW	8.0 A	CIMR-V7TZB1P505
	2.2 kW	11.0 A	CIMR-V7TZB2P205

## 400 V

Specifications			Model
3 x 400 V	0.55 kW	1.8 A	CIMR-V7TZ40P405
	1.1 kW	3.4 A	CIMR-V7TZ40P705
	1.5 kW	4.8 A	CIMR-V7TZ41P505
	2.2 kW	5.5 A	CIMR-V7TZ42P205
	3.0 kW	7.2 A	CIMR-V7TZ43P005
	4.0 kW	9.2 A	CIMR-V7TZ44P005

① Line filters<sup>\*1</sup>

Inverter		Line filter			
Voltage	Model CIMR-V7AZ	Schaffner	Rasmi	Rated current (A)	Weight (kg)
3-phase 200 VAC	20P1 / 20P2 / 20P4 / 20P7	3G3MV-PFI2010-SE	3G3MV-PFI2010-E	10	0.8
	21P5 / 22P2	3G3MV-PFI2020-SE	3G3MV-PFI2020-E	20	1.0
	24P0	3G3MV-PFI2030-SE	3G3MV-PFI2030-E	30	1.1
	25P5 / 27P5	-	3G3MV-PFI2050-E	50	2.3
Single-phase 200 VAC	B0P1 / B0P2 / B0P4	3G3MV-PFI1010-SE	3G3MV-PFI1010-E	10	0.6
	B0P7 / B1P5	3G3MV-PFI1020-SE	3G3MV-PFI1020-E	20	1.0
	B2P2	3G3MV-PFI1030-SE	3G3MV-PFI1030-E	30	1.1
	B4P0	3G3MV-PFI1040-SE	3G3MV-PFI1040-E	40	1.2
3-phase 400 VAC	40P2 / 40P4	3G3MV-PFI3005-SE	3G3MV-PFI3005-E	5	1.0
	40P7 / 41P5 / 42P2	3G3MV-PFI3010-SE	3G3MV-PFI3010-E	10	1.0
	40P4	3G3MV-PFI3020-SE	3G3MV-PFI3020-E	15	1.1
	45P5 / 47P5	3G3MV-PFI3030-SE	3G3MV-PFI3030-E	30	2.3

\*1. V7 IP65 types are built-in filter inverters.

## ② Communication cards

Type	Model	Description	Function
Communication option board	3G3MV-PDRT2 <sup>*1</sup>	DeviceNet option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through DeviceNet communication with the host controller.
	SI-P1/V7 <sup>*1</sup>	PROFIBUS-DP option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through PROFIBUS-DP communication with the host controller.
	SI-S1/V7 <sup>*1</sup>	Can open option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through CANopen communication with the host controller.
	3G3MV-PCORT21 <sup>*1</sup>	Can open gateway	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through CANopen communication with the host controller.
	SI-T1/V7 <sup>*1</sup>	MECHATROLINK-II option card	Used for running or stopping the inverter, setting or referencing parameters, and monitoring output frequency, output current, or similar items through MECHATROLINK-II communication with the host controller. High speed motion bus. Host controller: Trajexia, MCH or MP Series. <sup>*2</sup>

<sup>\*1</sup> Option frames are needed for V7 IP65 type. Please refer to motion and drive catalogue or contact your OMRON representative.

<sup>\*2</sup> Please refer to Trajexia, MCH or MP series section for host controllers detailed information.

## ③ PLC option card

Type	Model	Description	Function
PLC option card	3G3MV-P10CDT-E <sup>*1</sup>	PLC option	Full PLC features, wireless installation and seamless access to the inverter parameters and analogue/digital inputs and outputs. Standard OMRON tools can be used for programming Calendar / clock
	3G3MV-P10CDT3-E <sup>*1</sup>	PLC option with RS 422/485	Same features than standard models with RS 422/485 support.

<sup>\*1</sup> Option frames are needed for V7 IP65 type. Please refer to motion and drive catalogue or contact your OMRON representative.

## ④ Accessories

Types	Model	Description	Functions
Digital operator	JVOP-146	Remote digital operator without potentiometer	Configuration and monitoring device
	JVOP-144	Remote digital operator with potentiometer	Configuration and monitoring device
	72606-CVS31060	Blank cover	-----
	3G3IV-PEZZ0838BA	Digital operator case	-----
Accessories	3G3IV-PCN126 3G3IV-PCN326	Digital operator extension cable 1 meters 3 meters	Cable to connect the inverter and the digital operator when it's not plugged into the inverter
	3G3IV-PCN329-E	PC configuration cable	Cable to connect inverter and PC

## ④ Computer software

Types	Model	Description	Installation
Software	CX - DRIVE	Computer software	Configuration and monitoring software tool for drives. (Version 1.1 or higher)
	CX - ONE	Computer software	Complete automation software including CX-Drive

## ⑤ Braking unit, braking resistor unit

**Note:** For braking units specifications and models refer to the V7 datasheet Cat-No: I20E-EN-02

## Specifications

## 200 V class

IP20 single-phase: CIMR-V7AZ		B0P1	B0P2	B0P4	B0P7	B1P5	B2P2	B4P0
IP65 single-phase: CIMR-V7TZ		---	---	B0P405	B0P705	B1P505	B2P205	---
Three-phase CIMR-V7AZ		20P1	20P2	20P4	20P7	21P5	22P2	24P0
Maximum permissible motor output kW <sup>*1</sup>		0.12	0.25	0.55	1.1	1.5	2.2	4.0
Output characteristics	Inverter capacity kVA	0.3	0.6	1.1	1.9	3.0	4.2	6.7
	Rated output current A	0.8	1.6	3.0	5.0	8.0	11.0	17.5
	Max. output voltage	Proportional to input voltage: 0..240 V						
	Max. output frequency	400 Hz						
Power supply	Rated input voltage and frequency	3-phase 200..230V 50/60 Hz Single-phase 200..240V 50/60 Hz						
	Allowable voltage fluctuation	-15%..+10%						
	Allowable frequency fluctuation	+5%						

<sup>\*1</sup> Based on a standard 4-pole motor for maximum applicable motor output. Select the inverter model within the allowable motor rated current

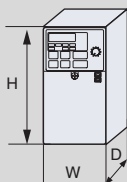
## 400 V class

IP20 three-phase: CIMR-V7AZ		40P2	40P4	40P7	41P5	42P2	43P0	44P0	44P5	47P5
IP65 three-phase: CIMR-V7TZ		---	40P405	40P705	41P505	42P205	43P005	44P005	---	---
Maximum permissible motor output kW <sup>*1</sup>		0.37	0.55	1.1	1.5	2.2	3.0	4.0	5.5	7.5
Output characteristics	Inverter capacity kVA	0.9	1.4	2.6	3.7	4.2	5.5	7.0	11.0	14.0
	Rated output current A	1.2	1.8	3.4	4.8	5.5	7.2	9.2	14.8	18.0
	Max. output voltage	Proportional to input voltage: 0..400 V								
	Max. output frequency	400 Hz								
Power supply	Rated input voltage and frequency	3-phase 380..460 VAC, 50/60 Hz								
	Allowable voltage fluctuation	-15%..+10%								
	Allowable frequency fluctuation	+5%								

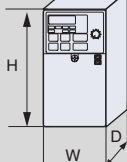
<sup>\*1</sup> Based on a standard 4-pole motor for maximum applicable motor output. Select the inverter model within the allowable motor rated current

## Dimensions

## Varispeed V7

Specifications		Drive model	H	W	D	
1-phase 200 VAC	0.12 kW	CIMR-V7AZB0P10	68	128	76	
	0.25 kW	CIMR-V7AZB0P20				
	0.55 kW	CIMR-V7AZB0P40			131	
	1.1 kW	CIMR-V7AZB0P70	108		140	
	1.5 kW	CIMR-V7AZB1P50			156	
	2.2 kW	CIMR-V7AZB2P20			163	
	4.0 kW	CIMR-V7AZB4P00	170		180	
3-phase 200 VAC	0.12 kW	CIMR-V7AZ20P10	68	128	76	
	0.25 kW	CIMR-V7AZ20P20				
	0.55 kW	CIMR-V7AZ20P40			108	
	1.1 kW	CIMR-V7AZ20P70	108		128	
	1.5 kW	CIMR-V7AZ21P50			131	
	2.2 kW	CIMR-V7AZ22P20			140	
	4.0 kW	CIMR-V7AZ24P00	140		143	
	5.5 kW	CIMR-V7AZ25P51	180		170	
	7.5 kW	CIMR-V7AZ27P51				
3-phase 400 VAC	0.37 kW	CIMR-V7AZ40P20	108	128	92	
	0.55 kW	CIMR-V7AZ40P40			110	
	1.1 kW	CIMR-V7AZ40P70			140	
	1.5 kW	CIMR-V7AZ41P50	140		156	
	2.2 kW	CIMR-V7AZ42P20				
	3.0 kW	CIMR-V7AZ43P00			143	
	4.0 kW	CIMR-V7AZ44P00	180	260	170	
	5.5 kW	CIMR-V7AZ45P51				
	7.5 kW	CIMR-V7AZ47P51				

## Varispeed V7 IP65

Specifications		Drive model	H	W	D	
1-phase 200 VAC	0.55 kW	CIMR-V7TZB0P405	260	275	150.3	
	1.1 kW	CIMR-V7TZB0P705				
	1.5 kW	CIMR-V7TZB1P505				
	2.2 kW	CIMR-V7TZB2P205				
3-phase 200 VAC	0.55 kW	CIMR-V7TZ40P405	260	275	150.3	
	1.1 kW	CIMR-V7TZ40P705				
	1.5 kW	CIMR-V7TZ41P505				
	2.2 kW	CIMR-V7TZ42P205				
	3.0 kW	CIMR-V7TZ43P005				
	4.0 kW	CIMR-V7TZ44P005				

**Note:** For option frames sizes needed for V7 option boards please refer to motion and drive catalogue or contact your OMRON representative.

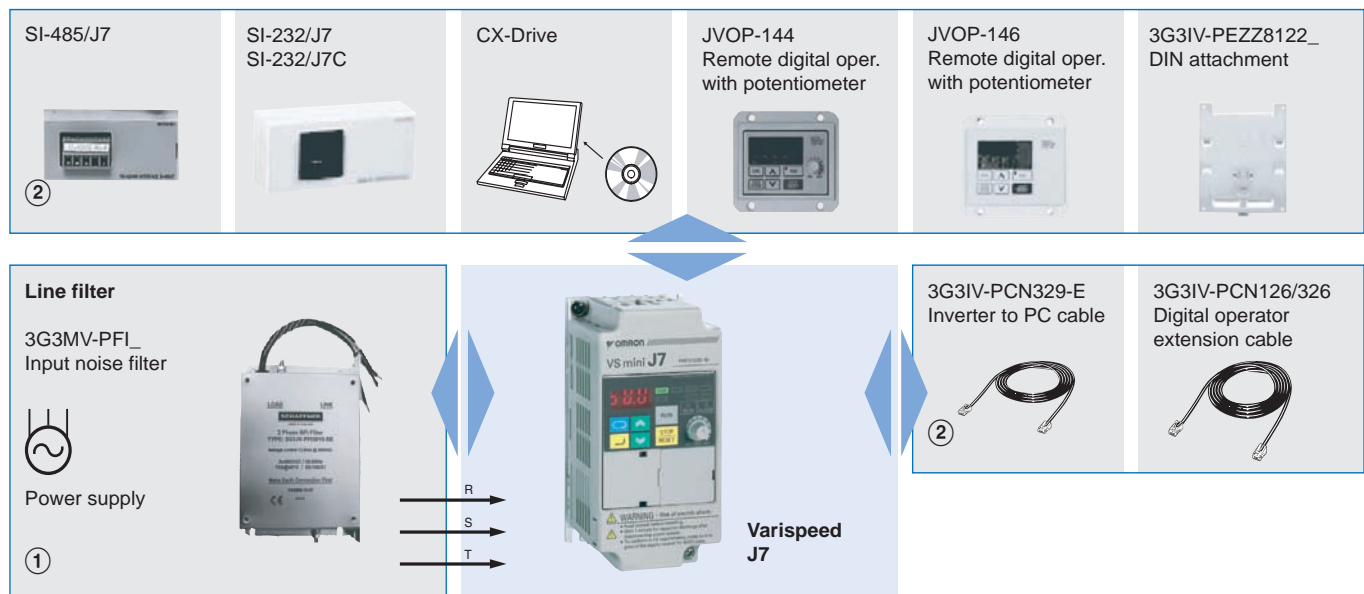


## Small, simple and smart

With simplicity and cost-effectiveness in mind, the J7 was designed to meet low-end simple applications such as conveyors, fans and pumps in small power applications. With on-line torque compensation the J7 can deliver 100% torque down to 1.5 Hz. For quick installation and set-up the J7 is fitted as standard with a digital operator and speed volume.

- Easy to use. Just WIRE and RUN.
- Good torque performance: 100% torque at 1.5 Hz, 150% at 3 Hz
- Compact size
- RS-485 and RS-232C option unit
- Programming software: CX-Drive for parameter configuration

## Ordering information



## Varispeed J7

### 200 V

Specifications	Model		
1 x 200 V	0.12 kW	0.8 A	CIMR-J7AZB0P10
	0.25 kW	1.6 A	CIMR-J7AZB0P20
	0.55 kW	3.0 A	CIMR-J7AZB0P40
	1.1 kW	5.0 A	CIMR-J7AZB0P70
	1.5 kW	8.0 A	CIMR-J7AZB1P50
3 x 200 V	0.12 kW	0.8 A	CIMR-J7AZ20P10
	0.25 kW	1.6 A	CIMR-J7AZ20P20
	0.55 kW	3.0 A	CIMR-J7AZ20P40
	1.1 kW	5.0 A	CIMR-J7AZ20P70
	1.5 kW	8.0 A	CIMR-J7AZ21P50
	2.2 kW	11.0 A	CIMR-J7AZ22P20
	4.0 kW	17.5 A	CIMR-J7AZ24P00

### 400 V

Specifications	Model		
3 x 400 V	0.37 kW	1.2 A	CIMR-J7AZ40P20
	0.55 kW	1.8 A	CIMR-J7AZ40P40
	1.1 kW	3.4 A	CIMR-J7AZ40P70
	1.5 kW	4.8 A	CIMR-J7AZ41P50
	2.2 kW	5.5 A	CIMR-J7AZ42P20
	3.0 kW	7.2 A	CIMR-J7AZ43P00
	4.0 kW	9.2 A	CIMR-J7AZ44P00

### ① Line filters

Inverter	Line filter				
Voltage	Model CIMR-J7AZ	Schaffner	Rasmi	Rated current (A)	Weight (kg)
3-phase 200 VAC	20P1 / 20P2 / 20P4 / 20P7	3G3JV-PFI2010-SE	3G3JV-PFI2010-E	10	0.68
	21P5 / 22P2	3G3JV-PFI2020-SE	3G3JV-PFI2020-E	16	0.84
	24P0	---	3G3JV-PFI2030-E	26	1.0
Single-phase 200 VAC	B0P1 / B0P2 / B0P4	3G3JV-PFI1010-SE	3G3JV-PFI1010-E	10	0.45
	B0P7 / B1P5	3G3JV-PFI1020-SE	3G3JV-PFI1020-E	20	0.68
3-phase 400 VAC	40P2 / 40P4	3G3JV-PFI3005-SE	3G3JV-PFI3005-E	5	0.57
	40P7 / 41P5 / 42P2	3G3JV-PFI3010-SE	3G3JV-PFI3010-E	10	0.67
	43P0 / 44P0	3G3JV-PFI3020-SE	3G3JV-PFI3020-E	20 / 15	1.0

## ② Accessories

Type	Model	Description	Functions
Digital operator	JVOP-146	Remote digital operator without potentiometer	Configuration and monitoring device
	JVOP-144	Remote digital operator with potentiometer	
Interface units	SI-232/J7 (3G3JV-PSI232J)	RS232 adapter	Another option SI-232/J7C (3G3JV-PSI232JC) is available, the only difference is that this one is removable.
	SI-485/J7 (3G3JV-PSI485J)	RS485 adapter	
Accessories	3G3IV-PCN126	Digital operator extension cable 1 meters	SI232/J7 is necessary to connect
	3G3IV-PCN326	3 meters	
	3G3IV-PCN329-E	PC configuration cable	SI232/J7 is necessary to connect

## ② Accessories

Type	Model	Description	Installation
Software	CX-DRIVE	Computer software	Configuration and monitoring software tool for drives
	CX-ONE	Computer software	Complete OMRON automation software including CX-Drive

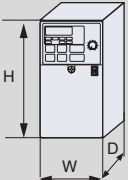
## Specifications

Voltage class		200V Single / three-phase							400V three-phase						
Model CIMR-J7AZ□	Three-phase	20P1	20P2	20P4	20P7	21P5	22P2	24P0	40P2	40P4	40P7	41P5	42P2	43P0	44P0
	Single-phase*	B0P1	B0P2	B0P4	B0P7	B1P5	—	—	—	—	—	—	—	—	—
Max. applicable motor output kW (HP) *2		0.12	0.25	0.55	1.1	1.5	2.2	4.0	0.37	0.55	1.1	1.5	2.2	3.0	4.0
Output Characteristics	Inverter capacity kVA	0.3	0.6	1.1	1.9	3.0	4.2	6.7	0.9	1.4	2.6	3.7	4.2	5.5	7.0
	Rated output current A	0.8	1.6	3	5	8	11	17.5	1.2	1.8	3.4	4.8	5.5	7.2	9.2
	Max. output voltage V	3-phase, 200 to 230 V (proportional to input voltage) Single-phase, 200 to 240 V (proportional to input voltage)							3-phase, 380 to 460 V (proportional to input voltage)						
	Max. output frequency	400 Hz (programmable)													
Power supply	Rated input voltage and frequency	3-phase, 200 to 230 V, 50/60Hz Single-phase, 200 to 240 V, 50/60Hz							3-phase, 380 to 460 V, 50/60Hz						
	Allowable voltage function	-15 to +10%													
	Allowable frequency function	±5%													

<sup>\*1</sup> Single-phase series inverter output is three-phase (for three-phase motors)

<sup>\*2</sup> Based on a standard 4-pole motor for max. applicable motor output. Select the inverter model whose rated current is larger than motor rated current

## Dimensions

Specifications		Drive model	H	W	D	
1 phase 200 VAC	0.12 kW	CIMR-J7AZB0P10	68	128	70	
	0.25 kW	CIMR-J7AZB0P20				
	0.55 kW	CIMR-J7AZB0P40			112	
	1.1 kW	CIMR-J7AZB0P70	108		129	
	1.5 kW	CIMR-J7AZB1P50			154	
3 phase 200 VAC	0.12 kW	CIMR-J7AZ20P10	68	128	70	
	0.25 kW	CIMR-J7AZ20P20				
	0.55 kW	CIMR-J7AZ20P40			102	
	1.1 kW	CIMR-J7AZ20P70			122	
	1.5 kW	CIMR-J7AZ21P50	108		129	
	2.2 kW	CIMR-J7AZ22P20			154	
	4.0 kW	CIMR-J7AZ24P00	140		161	
3 phase 400 VAC	0.37 kW	CIMR-J7AZ40P20	108	128	81	
	0.55 kW	CIMR-J7AZ40P40			99	
	1.1 kW	CIMR-J7AZ40P70			129	
	1.5 kW	CIMR-J7AZ41P50			154	
	2.2 kW	CIMR-J7AZ42P20				
	3.0 kW	CIMR-J7AZ43P00	140		161	
	4.0 kW	CIMR-J7AZ44P00				



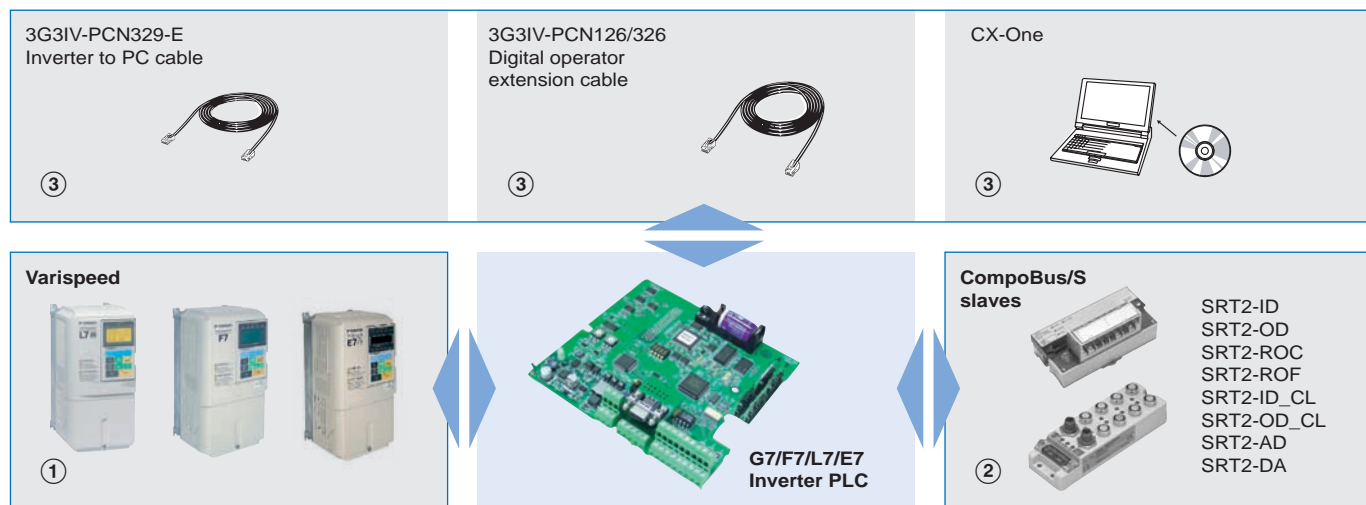


## The OMRON PLC embedded into the OMRON-Yaskawa inverter family

Bringing PLC functionality to the drive. You will be able to access the inverter parameters, analogue / digital I/Os, control up to 256 I/Os and DeviceNet connectivity. Ideal for applications such as winding / unwinding, HVAC installations, smart lifts and water treatment.

- Fully featured OMRON PLC embedded into the inverter
- Interrupt inputs, counter inputs, encoder inputs and pulse outputs
- Mechatronics functions (PWM, pulse and sync.)
- Memory backup
- Programmed using standard OMRON PLC software

## Ordering information



## Inverter PLC

Specifications						Model
Inputs	Ouputs	RTC	Compobus/S master	RS422 port	DeviceNet slave	
6	4	Yes	Yes	Yes	No	3G3RV-P10ST8-E
6	4	Yes	Yes	NO	Yes	3G3RV-P10ST8-DRT-E

### ① Inverters

Specifications	Model
3 level control method inverter	Varispeed G7
Flux vector control inverter	Varispeed F7
Lift inverter	Varispeed L7
Pumps & fans inverter	Varispeed E7

**Note:** For detailed information please refer to inverter section.

### ② Compobus/S slave

Specifications	Model
Compobus/S slaves	SRT2-XX <sup>*1</sup>

<sup>\*1</sup> For detailed information please refers to network I/O section

### ③ Cables

Specifications	Model
Computer connecting cable	3G3IV-PCN329-E
Programmable console cable	3G3IV-PCN126/326

### ③ Computer software

Specifications	Model
PLC programming software: CX-Programmer	CX-ONE
Inverter configurator software: CX-Drive	

## Specifications

## Specifications by product

Item	3G3RV-P10ST8-E	3G3RV-P10ST8-DRT-E
PLC core	CPM2C-S	CPM2C-S
Inputs	6 24 VDC inputs	6 24 VDC inputs
Outputs	4 sourcing / PNP transistor outputs	4 sourcing / PNP transistor outputs
Peripheral port	Yes	Yes
RS-232C port	Yes	Yes
RS-422 port	No	Yes
Calendar / clock	Yes	Yes
Memory backup	Flash memory and battery	Flash memory and battery
CompoBus/S master interface	Yes	Yes
Encoder interface	Yes	Yes
DeviceNet slave interface	No	Yes

## General specifications

Item	Specifications	
	3G3RV-P10ST8-E	3G3RV-P10ST8-DRT-E
Rated power supply voltage	24 VDC $+10\%$ / $-15\%$ (external power supply for I/O)	
Communications power supply voltage	---	11 to 25 VDC (supplied by communications connector)
Vibration resistance	10 to 20 Hz, 9.8 m/s <sup>2</sup> max. 20 to 50 Hz, 2 m/s <sup>2</sup> max	
Ambient operating temperature	-10 to 45 °C	
Ambient operating relative humidity	10% to 90% (no condensation)	
Ambient storage temperature	-20 to 70 °C	
Atmosphere	Must be free from corrosive gas	
I/O control method	Cyclic scan method	
Programming language	Ladder chart method	
Processing speed	Basic instructions	0.64 $\mu$ s (LD)
	Special instructions	7.8 $\mu$ s (MOV)
Program capacity	4,096 words	
Inverter interface	Direct interface with inverter through IR-memory, DM-memory, Transfer command	
CompoBus/S master functions	Remote I/O devices can be allocated up to 256 I/O points (128 inputs and 128 outputs)	
DeviceNet slave functions	Up to 64 words (32 input words and 32 output words) can be allocated to the DeviceNet Master's I/O.	
Interrupts	Interrupt inputs: 2 inputs Response time: 50 $\mu$ s	
	Interval timer interrupts: 1 input Set value: 0.5 to 319,968 ms Precision: 0.1 ms	Scheduled interrupts
		One-shot interrupt
	No interrupt	
High-speed counters	High-speed counter 1 input	No interrupt
	Differential phase mode (5 kHz) Pulse plus direction input mode (20 kHz) Up / down input mode (20 kHz) Increment mode (20 kHz)	Count-check interrupt (an interrupt can be generated when the count equals the set value or the count lies within a preset range.)
	Interrupt inputs (counter mode) 2 inputs	No interrupt
	Incrementing counter (2 kHz) Decrementing counter (2 kHz)	Count-up interrupt
Encoder interface	3 input modes: Differential-phase (up / down) Pulse plus direction Up / down pulse Maximum input frequency 50 kHz Maximum counter range 4,294,967,295 (2 <sup>32</sup> -1) Two capture registers, 3 selectable registration inputs One comparison value Counter reset through software or Z-phase Interrupt function	
Pulse outputs	2 outputs:	Single-phase pulse output without acceleration / deceleration 10 Hz to 10 kHz
	2 outputs:	Variable duty ratio pulse output 0.1 to 999.9 Hz, duty ratio 0 to 100%
	1 output:	Pulse output with trapezoidal acceleration / deceleration Pulse plus direction output, up / down pulse output, 10 Hz to 10 kHz
Synchronized pulse control	1 point	Input frequency range: 10 to 500 Hz, 20 Hz to 1 kHz, or 300 Hz to 20 kHz Output frequency range: 10 Hz to 10 kHz
Pulse catch inputs	2 bits Minimum pulse input: 50 $\mu$ s max. Used in common by input interrupts and input interrupt counter mode.	
Clock / calendar function	Shows the current year, month, day of the week, day of the month, hour, minute, and second.	
Communication function	Port 1 = Peripheral and RS-422: Host link, peripheral bus, no-protocol, programming console Port 2 = RS-232C port: Host link, no-protocol, 1:1 PLC link, 1:1 NT link	
Power-interruption hold function	Holds the contents of HR, AR, CNT, and DM Areas.	
Memory backup	Flash memory: Program, read-only DM area, and PC setup Memory backup: The read / write DM area, HR area, AR area, and counter values are backed up. (The battery has a 5-year lifetime at 25 °C and it is replaceable.)	
Self-diagnostic function	CPU errors, memory errors, communications errors, setting errors, battery errors	

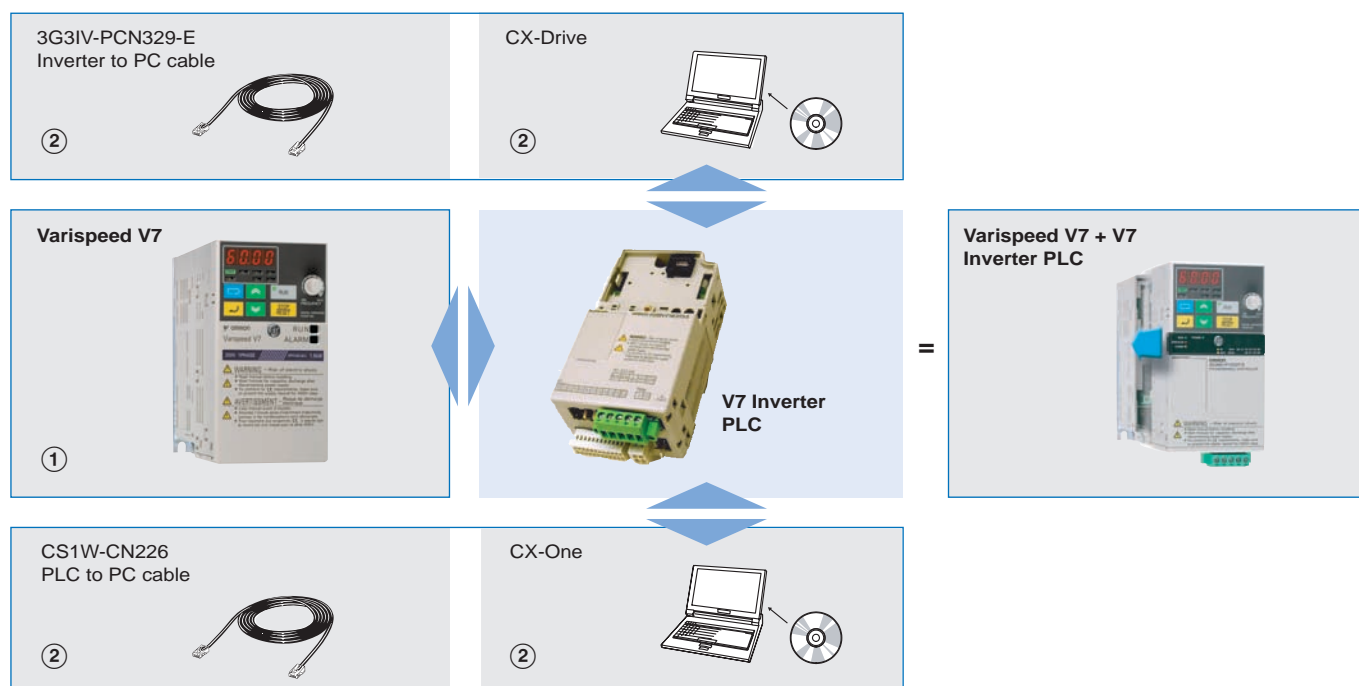


## The OMRON PLC embedded into the sensorless vector control inverter

This inverter-based architecture provides wireless installation and seamless access to the V7 parameters and analogue / digital I/Os. Ideal for applications such as door control, pump sequencing, intelligent conveyor, vertical-axis control and general positioning

- Fully featured OMRON PLC embedded into the inverter
- Interrupt inputs, counter inputs and pulse outputs
- Mechatronics functions (PWM, pulse and sync.)
- Memory backup
- Programmed using standard OMRON PLC software

## Ordering information



## Inverter PLC

Specifications				Model
Inputs	Outputs	RS422 port	RTC	
6	4	No	No	3G3MV-P10CDT-E
6	4	Yes	Yes	3G3MV-P10CDT3-E

### ① Inverters

Specifications	Model
Sensorless vector control inverter	Varispeed V7 <sup>*1</sup>

<sup>\*1</sup> For detailed information please refer to Varispeed V7 section.

### ② Cables

Specifications	Model
Computer connecting cable	CS1W-CN226
Programmable console cable	CS1W-CN224

### ② Software

Specifications	Model
PLC programming software: CX-Programmer	CX-ONE
Inverter configurator software: CX-Drive	

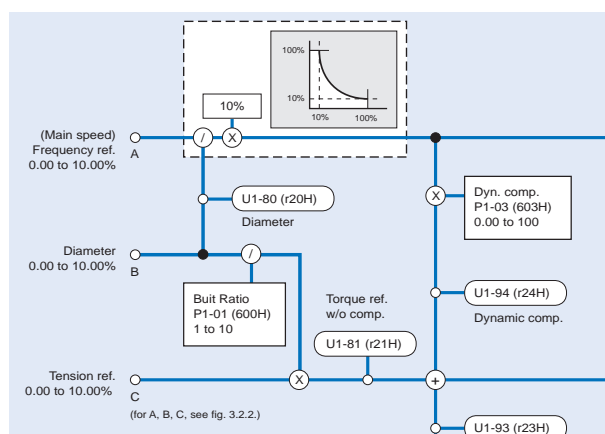
## Specifications

### Specifications by product

Item	3G3MV-P10CDT-E	3G3MV-P10CDT5-E	3G3MV-P10CDT3-E
PLC core	CPM2C-S	CPM2C-S	CPM2C-S
Inputs	6 24 VDC inputs	6 24 VDC inputs	6 24 VDC inputs
Outputs	3 sinking / NPN transistor outputs 1 relay output	3 sinking / PNP transistor outputs 1 relay output	3 sinking / NPN transistor outputs 1 relay output
Peripheral port	Yes	Yes	Yes
RS-232C port	Yes	Yes	Yes
RS-422/485 port	No	No	Yes
Calendar / clock	No	No	Yes
Memory backup	Flash memory and capacitor	Flash memory and capacitor	Flash memory and battery

### General specifications

Item		Specifications	
Rated power supply voltage		24 VDC +10%/-15% (External power supply for I/O)	
Vibration resistance		0.15 mm (10-57 Hz) 9.8 m/s <sup>2</sup> (57-150 Hz) 9.8 m/s <sup>2</sup> (57-150 Hz) In all directions (X, Y, Z)	
Ambient operating temperature		-10 to 45 °C	
Ambient operating relative humidity		10% to 90% (no condensation)	
Ambient storage temperature		-20 to 70 °C	
Atmosphere		Must be free from corrosive gas	
I/O control method		Cyclic scan method	
Programming language		Ladder chart method	
Processing speed	Basic instructions	0.64 μs (LD)	
	Special instructions	7.8 μs (MOV)	
Program capacity		4,096 words	
Output bits		01000 to 01003 (4 physical outputs)	
Inverter interface		Direct interface with V7 inverter through IR-memory DM-memory Transfer command	
Quick-response input		2 inputs (minimum input signal width: 50 μs)	
Interrupt processing	External interrupts	2 bits (used in common for input interrupt counter mode and high-speed inputs.)	
	Scheduled interrupts	1 bit (scheduled interrupts or one-shot interrupts)	
Interrupts		Interrupt inputs: 2 inputs Response time: 50 μs	
		Interval timer interrupts: 1 input Set value: 0.5 to 319,968 ms Precision: 0.1 ms	Scheduled interrupts One-shot interrupt
High-speed counters		High-speed counter 1 input Differential phase mode (5 kHz) Pulse plus direction input mode (20 kHz) Up / down input mode (20 kHz) Increment mode (20 kHz)	No interrupt Count-check interrupt (an interrupt can be generated when the count equals the set value or the count lies within a preset range.)
		Interrupt inputs (counter mode) 2 inputs Incrementing counter (2 kHz) Decrementing counter (2 kHz)	No interrupt Count-up interrupt
Pulse outputs		2 outputs:     Single-phase pulse output without acceleration / deceleration 10 Hz to 10 kHz 2 outputs:     Variable duty ratio pulse output 0.1 to 999.9 Hz, duty ratio 0 to 100% 1 output:      Pulse output with trapezoidal acceleration / deceleration Pulse plus direction output, up / down pulse output, 10 Hz to 10 kHz	
Synchronized pulse control		1 point Input frequency range: 10 to 500 Hz, 20 Hz to 1 kHz, or 300 Hz to 20 kHz Output frequency range: 10 Hz to 10 kHz	
Clock / calendar function		Yes. Shows the current year, month, day of the week, day of the month, hour, minute, and second.	
Communication function		Port 1 = Peripheral and RS-422:    Host link, peripheral bus, no-protocol, programming console Port 2 = RS-232C port:            Host link, no-protocol, 1:1 PLC link, 1:1 NT link	
Power-interruption hold function		Holds the contents of HR, AR, CNT, and DM areas.	
Memory backup		Non-volatile memory, user program, DM (read only), PLC setup Fixed internal lithium battery (5 years, not replaceable by the user) or capacitor DM (read / write), HR, SR and CNT areas	
Self-diagnostic function		CPU errors, memory errors, communications errors, setting errors, battery errors	

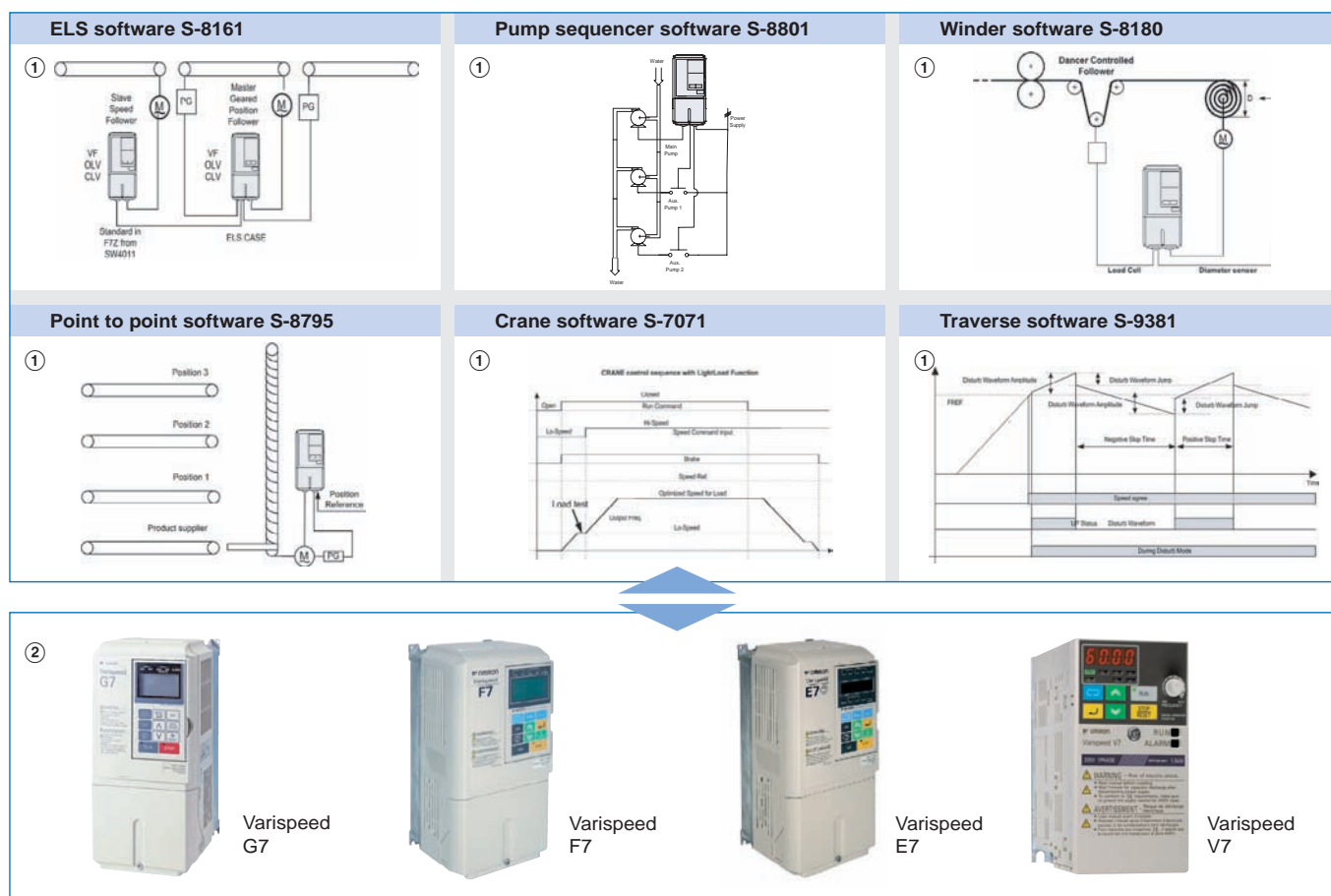


## Customised software to meet your specific application requirements

The customised application software gives to a standard inverter the features of a dedicated solution

- The CASE software is a special software file that can be downloaded into a standard inverter providing additional functionality.
- Logic functions can be added.
- I/O's settings can be set for special functionality.
- Specific parameters, monitors and alarms can be added with application units.

## Ordering information



**Note:** The symbols ①② show the recommended sequence to build the item name with CASE software.

## ① CASE software

Type	CASE software	Description	Application
CIMR-F7Z-S	7071	Dedicated software for crane applications	Cranes
	8161	Dedicated software for position and speed follower applications	Synchronized movements
	8180	Dedicated software for rewinding and unwinding applications	Rewinding & unwinding
	8795	Dedicated software for point to point position applications	Point to point movement applications
	7061	Dedicated software for 1.000 Hz output frequency	High speed
	8091	Dedicated software for position deceleration	Positioning at stopping.
CIMR-E7Z-S	8600	Dedicated software for local / remote smooth changover	Local / remote control
	8801	Dedicated software for pump sequencer applications	Water supply, building HVAC.
CIMR-V7AZ-S	8810	Dedicated software for dynamic current limitation	Industrial pumping
	9381	Dedicated software for textile wire winding applications	Textile winding
	5502	Dedicated software for kinetic energy backup	Control under power loss conditions
	9640	Dedicated software for dynamic PID change	Variable load
	9646	Dedicated software for modification on main frequency from F.R.	Fine speed adjustments
	9662	Dedicated software for valve cleaner sequences for filter units	Valves
	9666	Dedicated software for ceramics customised functionality	Ceramics
	9676	Dedicated software for textile customised functionality	Textile
	9683	Dedicated software for textile customised functionality	Textile

**Note:** - For other CASE software examples and ordering information, please contact your standard OMRON YASKAWA supplier.  
 - To request new CASE software customised to meet application specific functionality, please contact your standard OMRON YASKAWA supplier.

## ② Inverters

Specifications	Model
3 level control method inverter	Varispeed G7
Flux vector control inverter	Varispeed F7
Pumps & fans inverter	Varispeed E7
Sensorless vector control inverter	Varispeed V7

**Note:** Refer to the inverters G7 / F7 / E7 / V7 series chapter for detailed inverter specifications and selection.





## Index

61F-D21T . . . . .	194	E3G-M . . . . .	26	J7KNA . . . . .	173
61F-GP-N8 . . . . .	191	E3JK . . . . .	27	J7KNA-AR . . . . .	172
61F-GPN-BT / BC . . . . .	193	E3M-V . . . . .	28	J7MN . . . . .	178
A16 . . . . .	214	E3NT . . . . .	19	J7TKN . . . . .	176
A165E . . . . .	146	E3S-C . . . . .	15	JUSP-NS300 . . . . .	323
A22 . . . . .	216	E3S-CL . . . . .	16	JUSP-NS500 . . . . .	324
Case . . . . .	398	E3S-CR62/67 . . . . .	22	JUSP-NS600 . . . . .	325
CJ1 analog I/O and control units . . . . .	291	E3S-G . . . . .	29	K3GN . . . . .	272
CJ1 communication units . . . . .	294	E3S-LS3 . . . . .	30	K3HB-R, -P, -C . . . . .	276
CJ1 CPU units . . . . .	288	E3T . . . . .	12	K3HB-X, -H, -V, -S . . . . .	274
CJ1 digital I/O units . . . . .	290	E3X-DA-AN-S . . . . .	81	K3MA-J, -L, -F . . . . .	273
CJ1 position control units . . . . .	293	E3X-DA-AT-S . . . . .	80	K7L . . . . .	195
CJ1 power supplies, expansions . . . . .	289	E3X-DA-N . . . . .	71	K8AB-AS . . . . .	184
CJ1W-MCH71 . . . . .	319	E3X-DA-S . . . . .	75	K8AB-PA . . . . .	189
CJ1W-NC□ . . . . .	321	E3X-DA-SE-S . . . . .	79	K8AB-PH . . . . .	187
CJ1W-NCF71 . . . . .	320	E3X-MDA . . . . .	77	K8AB-PM . . . . .	188
Compact I/O DRT2 . . . . .	305	E3X-NA . . . . .	73	K8AB-TH . . . . .	224
Compact I/O SRT2 . . . . .	306	E3Z . . . . .	13	K8AB-VS . . . . .	185
CP1H CPU units . . . . .	285	E3Z-□G, E3Z-□J . . . . .	24	K8AB-VW . . . . .	186
CPM1A CPU units . . . . .	282	E3Z-B . . . . .	21	L7 . . . . .	380
CPM1A expansion units . . . . .	286	E3Z-Laser . . . . .	23	LY . . . . .	155
CPM2A CPU units . . . . .	283	E5□K / E5□K-T . . . . .	230	M16 . . . . .	218
CPM2C CPU units . . . . .	284	E5□N . . . . .	227	M22 . . . . .	219
CPM2C expansion units . . . . .	287	E5□R . . . . .	231	MK-I-S . . . . .	156
CS1 analog and process I/O units . . . . .	298	E5C2 . . . . .	225	Motion controllers . . . . .	316
CS1 communication units . . . . .	301	E5CSV . . . . .	226	MY . . . . .	153
CS1 CPU units . . . . .	295	E5ZN . . . . .	229	NE1A-SCPU01 . . . . .	112
CS1 digital I/O units . . . . .	297	E6A2-C . . . . .	34	PRT1-SCU11 . . . . .	233
CS1 position / motion control units . . . . .	300	E6C2-C/E6C3-C . . . . .	35	R88A-MCW151 . . . . .	322
CS1 power supplies, backplanes . . . . .	296	E6C3-A . . . . .	37	S82K . . . . .	242
D40B . . . . .	138	E6H-C . . . . .	36	S8PE . . . . .	243
D4B-□N . . . . .	144	E7 . . . . .	384	S8T-DCBU-01/-02 . . . . .	241
D4BL . . . . .	141	F150 . . . . .	102	S8TS . . . . .	240
D4BS . . . . .	136	F160 . . . . .	103	S8VM . . . . .	239
D4C . . . . .	203	F210 . . . . .	104	S8VS . . . . .	238
D4CC . . . . .	204	F250 . . . . .	105	SHL . . . . .	207
D4E_N . . . . .	205	F3S-B . . . . .	125	Sigma linear motors . . . . .	357
D4GL . . . . .	140	F3SL . . . . .	126	Sigma-II rotary servo motors . . . . .	342
D4MC . . . . .	206	F3SN-A / F3SH-A . . . . .	123	Sigma-II servo drive . . . . .	334
D4N . . . . .	142	F3SP-U4P . . . . .	129	SmartSlice I/O system . . . . .	304
D4N-□R . . . . .	145	F3S-TGR . . . . .	127	SmartStep drive . . . . .	339
D4NH . . . . .	137	F500 / F210 ETN . . . . .	106	SmartStep motors . . . . .	353
D4NL . . . . .	139	F7 . . . . .	375	Solid state relays . . . . .	160
D4NS . . . . .	135	Fiber optic sensors . . . . .	70	TJ1-Trajexia . . . . .	317
DST1-ID/DST1-MRD . . . . .	113	Field I/O DRT2 . . . . .	307	TL-T . . . . .	50
DZ . . . . .	209	G2RS . . . . .	152	TL-W . . . . .	49
E2A . . . . .	44	G3NA . . . . .	161	V530-R160 . . . . .	107
E2A3 . . . . .	47	G3PA . . . . .	163	V7 Inverter PLC . . . . .	396
E2AU . . . . .	53	G3PB . . . . .	164	V7 . . . . .	388
E2AX . . . . .	54	G3ZA . . . . .	165	WL . . . . .	202
E2C-EDA . . . . .	63	G7 . . . . .	370	X . . . . .	210
E2E . . . . .	43	G7/F7/L7/E7 Inverter PLC . . . . .	394	XtraDrive . . . . .	330
E2E . . . . .	62	G7SA . . . . .	147	Z . . . . .	211
E2E-□Y / E2F-□Y . . . . .	59	G9SA . . . . .	116	ZC-55 . . . . .	208
E2EC . . . . .	42	G9SB . . . . .	117	ZEN . . . . .	267
E2EL . . . . .	57	G9SX . . . . .	115	ZFV . . . . .	100
E2EQ . . . . .	58	H2C . . . . .	253	ZS-L . . . . .	88
E2EZ . . . . .	60	H3CR . . . . .	251	ZX-E . . . . .	90
E2F . . . . .	46	H3DE . . . . .	249	ZX-LT . . . . .	95
E2F-D . . . . .	56	H3DS . . . . .	248	ZX-T . . . . .	92
E2FQ . . . . .	61	H3YN . . . . .	250		
E2Q2 . . . . .	51	H5CX . . . . .	252		
E2Q4 . . . . .	52	H7CX . . . . .	262		
E2S . . . . .	48	H7EC . . . . .	258		
E3C-LDA . . . . .	31	H7ER . . . . .	260		
E3F2 . . . . .	17	H7ET . . . . .	259		
E3F2 . . . . .	20	H8GN . . . . .	261		
E3F2-□41 . . . . .	32	H8PS . . . . .	263		
E3F2-□Z . . . . .	25	HL5000 . . . . .	201		
E3FS . . . . .	128	J7 . . . . .	392		
E3G . . . . .	18	J7KN . . . . .	174		





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