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OMRON

MOTION CONTROL

Motion and Motor Control Solutions

Reliable, accurate positioning and motion control for seamless industrial automation

» Stand-alone open platform motion controller
» Servo drives and motors
» Energy-saving AC inverters
» PLC-based motion and position controllers
» Cam positioners and rotary encoders

Automation...simple...powerful.

Motion/Motor Controls

OMRON

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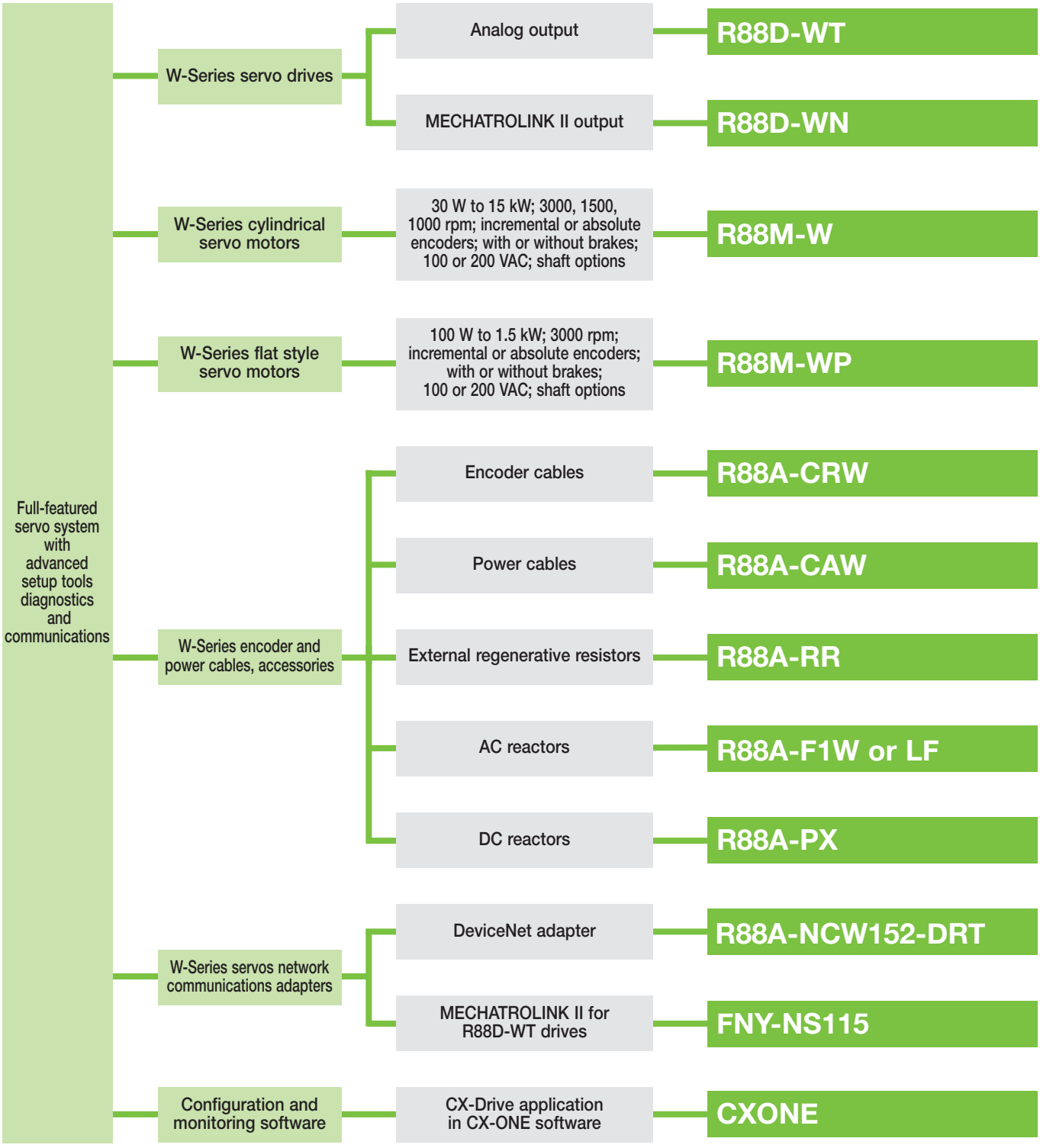
Motion Solutions

Selection Guide

Servo Drives and Motors



Motion Solutions

Selection Guide

OMRON

Servo Drives and Motors

Easy-to-set-up, economical servo system ideal for stepper system upgrades	SmartStep servo drives	Pulse output	R7D-AP
	SmartStep cylindrical servo motors	30 W to 750 W; 3,000 rpm; incremental encoder; with or without brakes; 100 or 200 VAC; shaft options	R7M-A
	SmartStep flat style servo motors	100 W to 750 W; 3000 rpm; with or without brakes; 100 or 200 VAC; shaft options	R7M-AP
	SmartStep cables and accessories	Power/encoder cables	R7A-CEA
		Accessories	R7A/R88A
	Configuration and monitoring software	CX-Drive application in CX-ONE software	CXONE

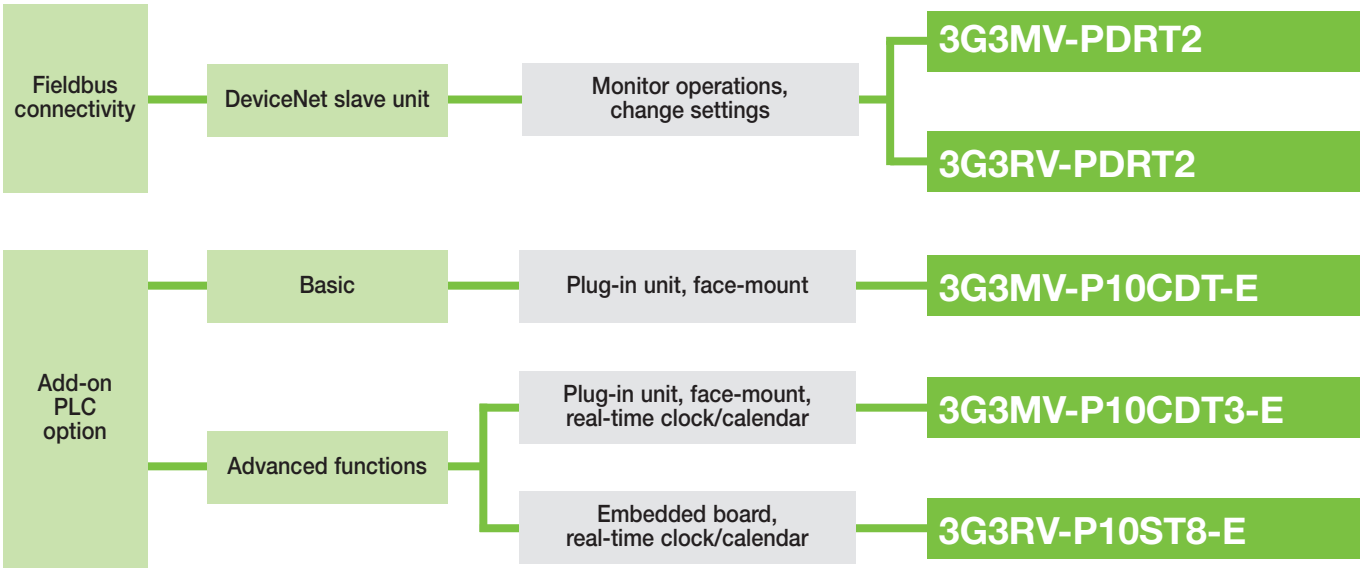
Inverters

General purpose applications	No flux vector control	1/8 to 5 HP, 1-phase, 240 VAC 3-phase, 230 VAC or 460 VAC	3G3JV
	Sensor-less flux vector control	1/8 to 10 HP, 1-phase 240 VAC, 3-phase 230 VAC or 460 VAC	3G3MV
	Full flux vector control	1/2 to 40 HP, 3-phase, 230 VAC or 460 VAC	3G3RV
Washdown applications	Sensor-less flux vector control	1/8 to 10 HP, 3-phase 230 VAC or 460 VAC	3G3MV (V7CU)
Pumps and fans	Full flux vector control	1/2 to 40 HP, 3-phase, 230 VAC or 460 VAC	3G3RV
Constant torque for machine automation	Flux vector control	2 to 200 HP, 3-phase, 600 V	G5+
Variable torque for building automation	Flux vector control	2 to 200 HP, 3-phase, 600 V	P5+

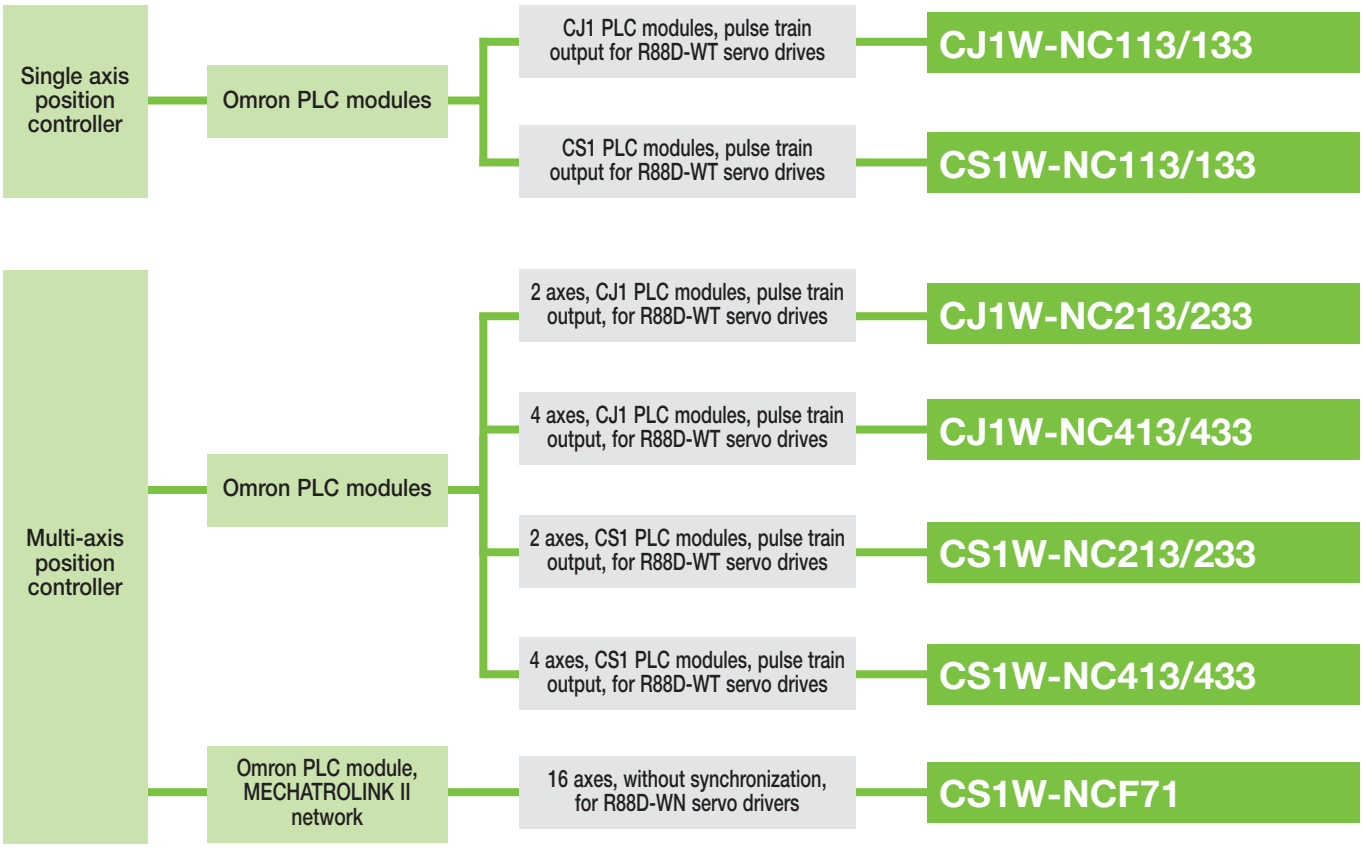
Motion Solutions

Selection Guide

Inverters



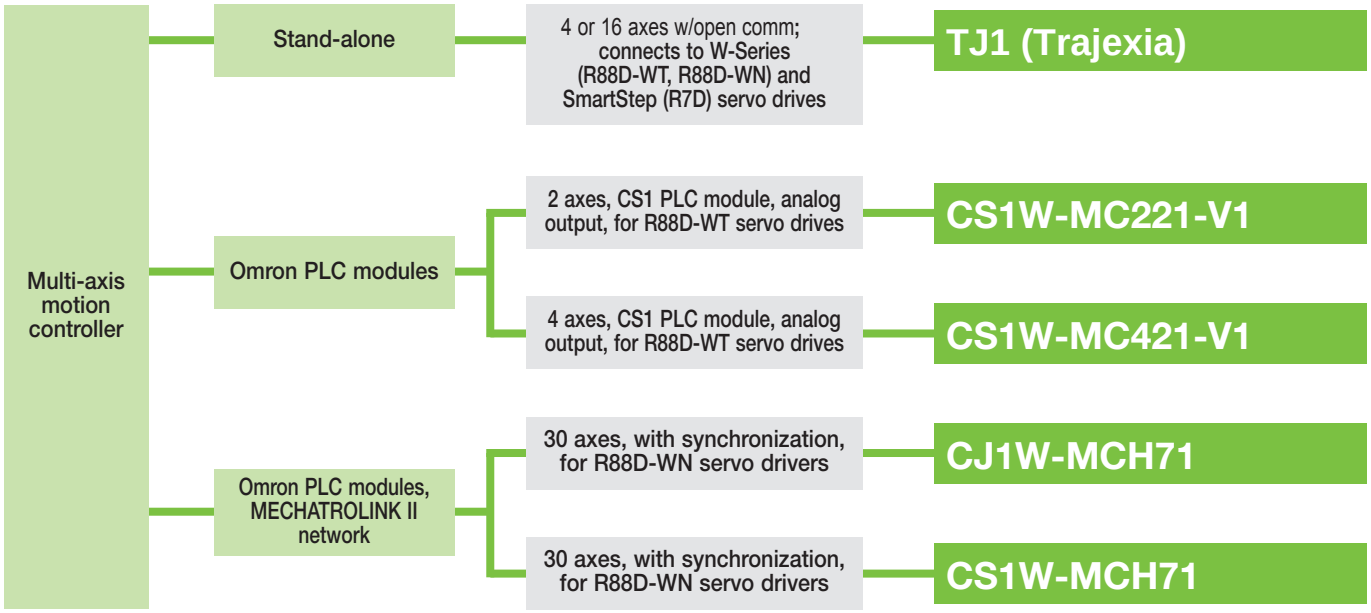
Position Controllers



Motion Solutions

Selection Guide

Motion Controllers



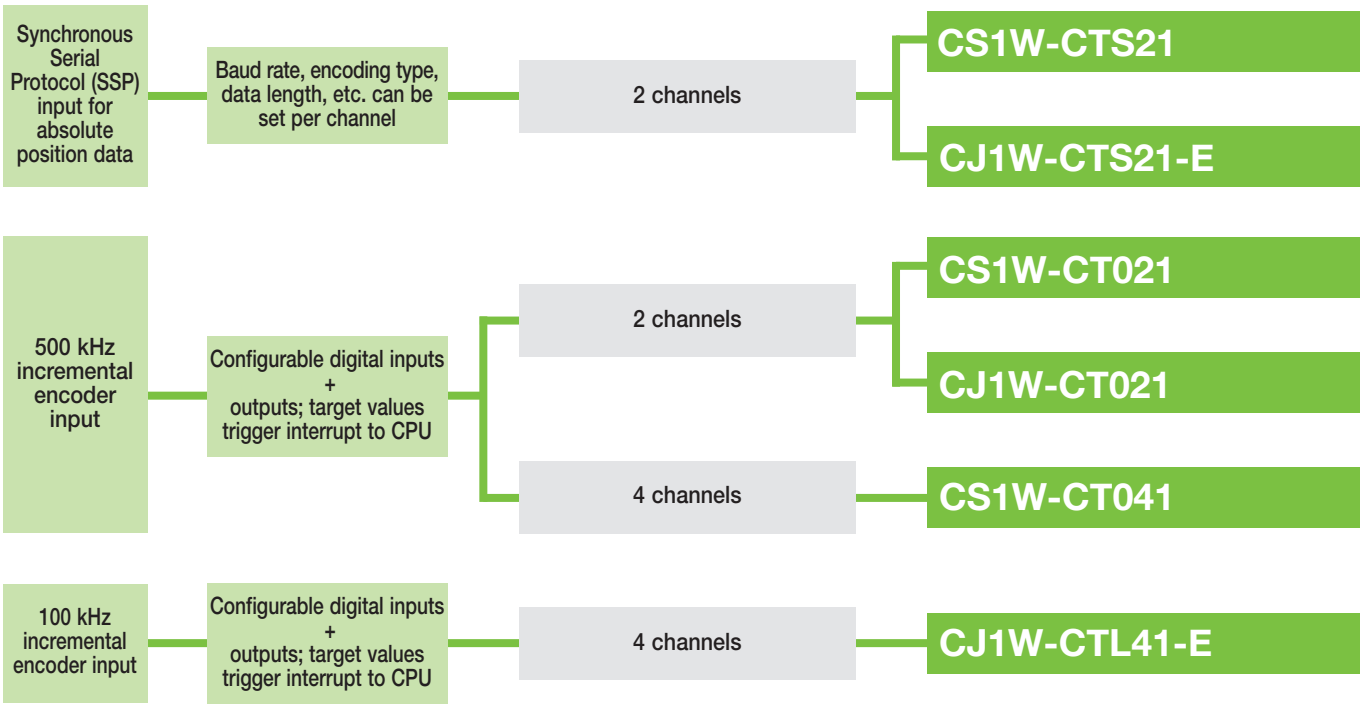
Motion Controllers Used with Servos and Inverters

Type	Controller	Servo	Inverter
Stand-alone	TJ1 (Trajexia)	W-Series: R88D-WT servo drives	3G3MV/3G3RV
PLC module	"-NC" modules or other controller with pulse train	W-Series: R88D-WT servo drives SmartStep: R7D servo drives	—
	"-MC" modules or other controller with analog output	W-Series: R88D-WT servo drives	3G3MV/3G3RV
PLC module with control over MECHATROLINK II	CJ1W-NCF71 module	W-Series: R88D-WN servo drives	—
	"-MCH71" modules	W-Series: R88D-WN servo drives	3G3MV/3G3RV

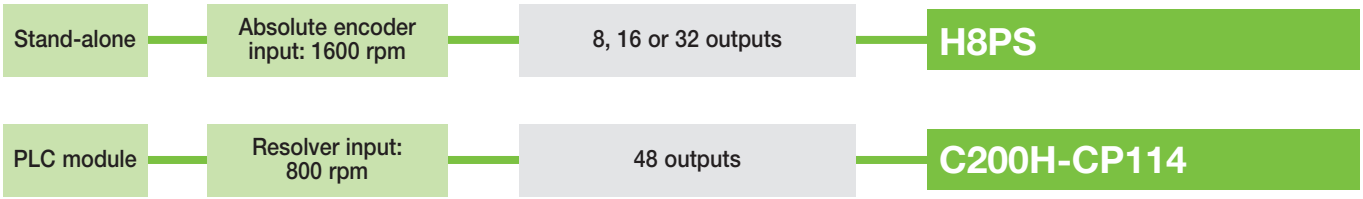
Motion Solutions

Selection Guide

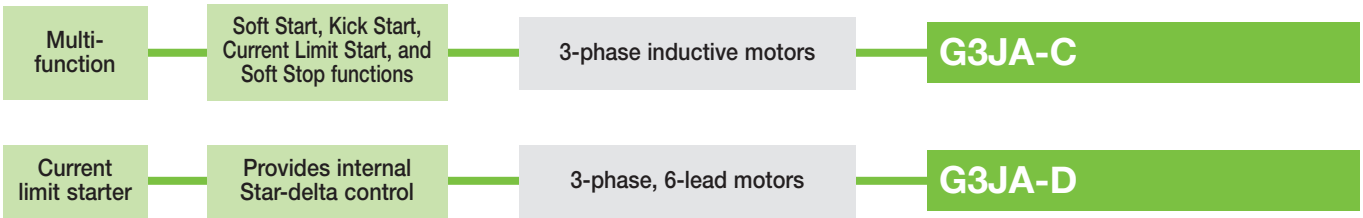
High-Speed Counter PLC Modules



Cam Positioners Emulate Mechanical Cam Switches

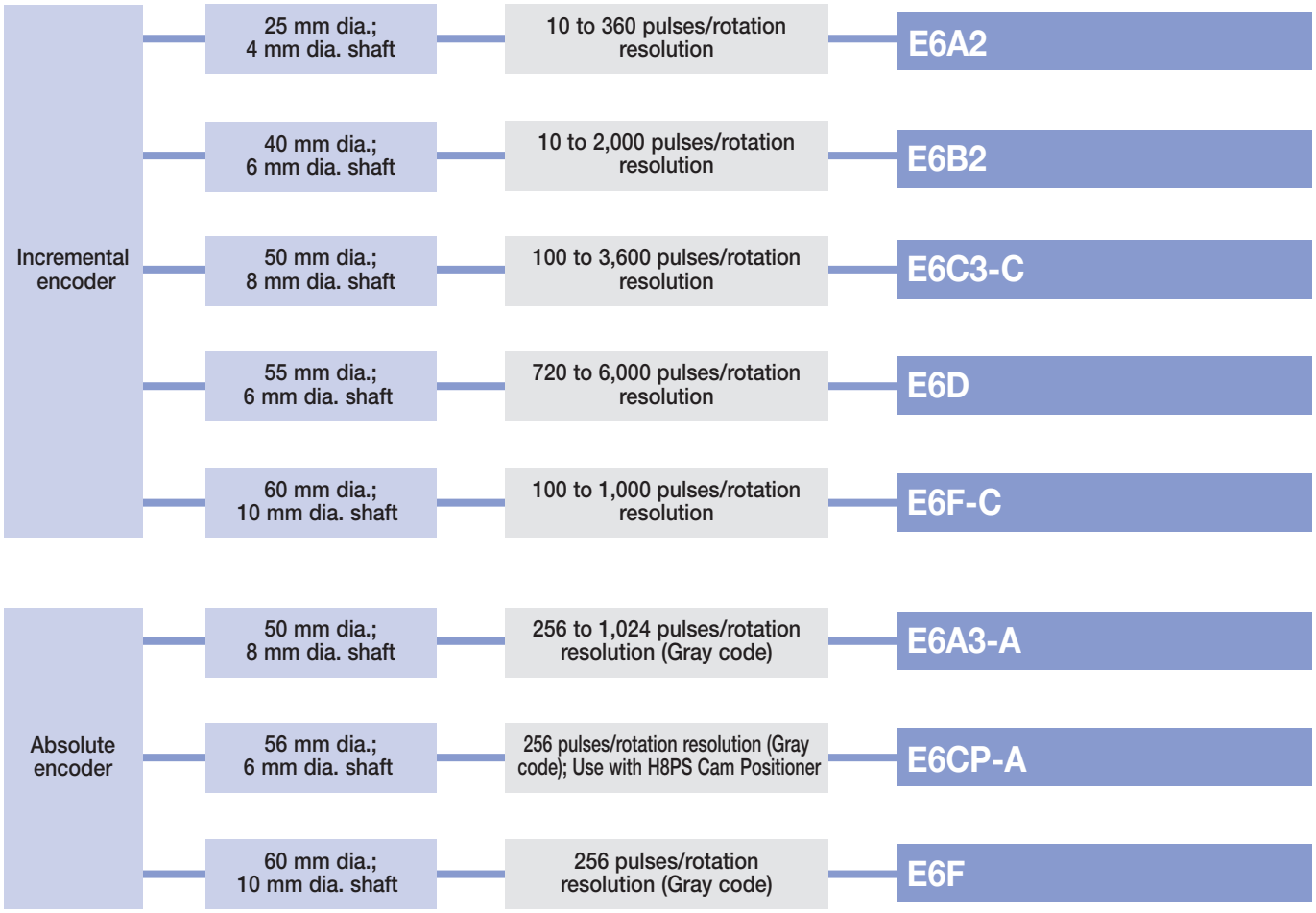


Soft Starters



Rotary Encoders

Selection Guide



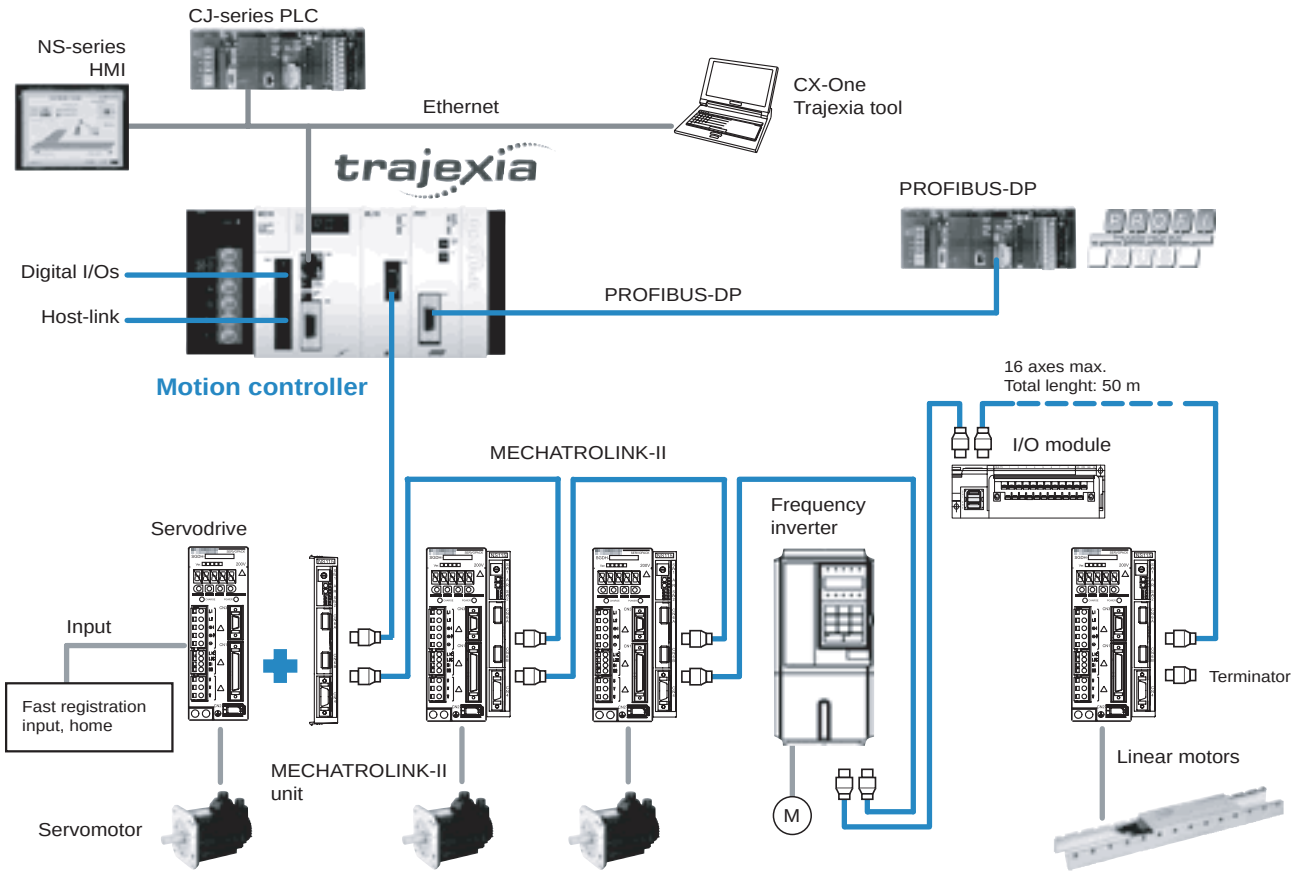
Trajexia Motion Controller
TJ1-□

Quick Link
G031

Stand-Alone Advanced Motion Controller Using Mechatrolink-II Motion Bus

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

System Configuration



Specifications

General Specifications

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

Motion Control Unit

Item		Details	
Model		TJ1-MC16	
Number of axes		16	
Number of inverters and I/O modules		8 maximum	
Number of Mechatrolink-II master units		Up to 4 Mechatrolink-II master units (TJ1-ML16, see below) can be connected	
Cycle time		Selectable 0.5 ms, 1 ms or 2 ms	
Programming language		BASIC-like Motion language	
Multi-tasking		Up to 14 tasks running simultaneously	
Digital I/O		16 Inputs and 8 Outputs freely configurable	
Measurement units		User definable	
Available memory for user programs		500 kb	
Data storage capacity		Up to 2 MB flash data storage	
Saving program data, motion controller		SRAM with battery backup and Flash-ROM	
Saving program data, personal computer		Trajexia Motion Perfect software manages a backup on the hard disk of the personal computer	
Communication ports		1 Ethernet port and 2 serial ports	
Firmware update		Via Trajexia software tool	
Ethernet port	Electrical characteristics	Conform to IEEE 802.3 (100BaseT)	
	Connector	RJ45 Ethernet connector	
Serial port	Electrical characteristics	Conform 1 port to RS-232C and 1 port to RS-485/RS-422A (selectable by switch)	
	Connector	SUB-D9 connector (Counterpart included in the package)	
	Synchronization	Start-stop synchronization (asynchronous)	
	Baud rate	1200 / 2400 / 4800 / 9600 / 19200 / 38400 bps	
	Transmission format	Databit Length	7 or 8 bit
		Stop bit	1 or 3 bit
		Parity Bit	Even/Odd/None
	Transmission mode	Point-to-multipoint (1:N)	
	Transmission protocol	RS-232C (1:1)	Host Link master protocol, Host Link slave protocol, ASCII general-purpose
		RS-422A (1:N)	Host Link master protocol, Host Link slave protocol, ASCII general-purpose
		RS-485 (1:N)	ASCII general-purpose
	Galvanic isolation	RS-422A port	
	Communication buffers	254 bytes	
	Flow control	None	
	Terminator	Yes, selectable by switch	
	Cable length	15 m for RS-232 and 500 m for RS-422/RS-485	

Mechatrolink-II Master Unit

Item	Specifications
Model	TJ1-ML16
Controlled devices with Mechatrolink-II interface	Servo drives, various I/O units and Frequency inverters
Electrical characteristics	Conform to MECHATROLINK standard
Communication ports	1 MECHATROLINK-II master
Transmission speed	10 Mbps
Communication cycle	0.5 ms, 1 ms or 2 ms
Stations slave types	Axes or Servo drives
	Frequency inverters
	I/O Modules
Number of stations per master / Cycle time	Max. 16 Stations / 2 ms
	Max. 8 Stations / 1 ms
	Max. 4 Stations / 0.5 ms
Transmission distance	Max. 50 meters without using repeater

Profibus Slave Unit

Items	Specifications
Model	TJ1-PRT
PROFIBUS standard	Conform to PROFIBUS-DP standard EN50170 (DP-V0)
Communication ports	1 PROFIBUS-DP slave
Transmission speed	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 and 12000 kbits/s
Node numbers	0 to 99
I/O size	For both directions a configurable size of 0 to 122 words (16-bit)
Galvanic isolation	Yes

DeviceNet Slave Unit

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

Flexible Axis Unit

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

Ordering Information

Trajexia Motion Controller

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

Trajexia — Axes Control Modules

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

Trajexia — Communication Modules

Name	Model
Trajexia DeviceNet Slave Unit	**TJ1-PRT**
Trajexia PROFIBUS-DP Slave Unit	**TJ1-PRT**

Mechatrolink-II — Related Devices

Name	Remarks	Model
Distributed I/O modules	64-point digital input and 64-point digital output (24 VDC)	**FNY-IO2310**
	Analog input: -10 V to +10 V, 4 channels	**FNY-AN2900**
	Analog output: -10 V to +10 V, 2 channels	**FNY-AN2910**
Mechatrolink-II cables	0.5 meter	**FNY-W6003-A5**
	1 meter	**FNY-W6003-01**
	3 meters	**FNY-W6003-03**
	5 meters	**FNY-W6003-05**
	10 meters	**FNY-W6003-10**
	20 meters	**FNY-W6003-20**
	30 meters	**FNY-W6003-30**
Mechatrolink-II terminator	Terminating resistor	**FNY-W6022**
Mechatrolink-II interface unit	For W-series Servo drives (Firmware version 39 or later)	**FNY-NS115**
	For Inverter (For Inverter's version supported contact your Omron sales office)	**SI-T/V7**
	For Inverter (For Inverter's version supported contact your Omron sales office)	**SI-T**

I/O Cables

Name	Remarks	Length	Model
I/O Cable for FNY-IO2310	With connector on the Distributed I/O module side (FNY-IO2310)	0.5 m	**FNY-W5410-05**
		1.0 m	**FNY-W5410-10**
		3.0 m	**FNY-W5410-30**

Servo System and Inverters

Note: Contact your Omron sales office for detailed specs and ordering information

Software

Specifications	Model
Trajexia Motion Perfect and CX-Drive V1.2 or higher	**TJ1-Tools**

Servos
W-Series

Quick Link
L100

High-Precision Positioning with Advanced Communications

Omron's compact W-Series servos were designed with zero compromise on quality reliability or performance. The servo amplifiers are ultra-compact with pulse and analog 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. MECHATROLINK-II high-speed bus provides instant communications between Omron's W-Series servo drives and PLC-based motion controllers and simplifies coordination of up to 30 axes.

Servo Driver Features

- 300% peak current for 3 seconds
- Automatic motor recognition with auto-tuning function
- Analog and pulse inputs for speed, torque and position control
- MECHATROLINK-II communications bus available built-in (WN-drives) or as an option unit (WT-drives)
- Field bus option units include DeviceNet and Profibus
- Special function option units available for motion controller and indexer
- Trace function allows oscilloscope function for monitoring

Servo Motor Features

- 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
- Slim profile and standard cylindrical motor types
- High resolution incremental encoders standard, absolute encoders available
- Built-in 24V brake available
- Shaft options include straight, with keyway, and with keyway and tap
- IP67 and shaft oil seal available

MECHATROLINK-II is a registered trademark of Yaskawa Corporation.

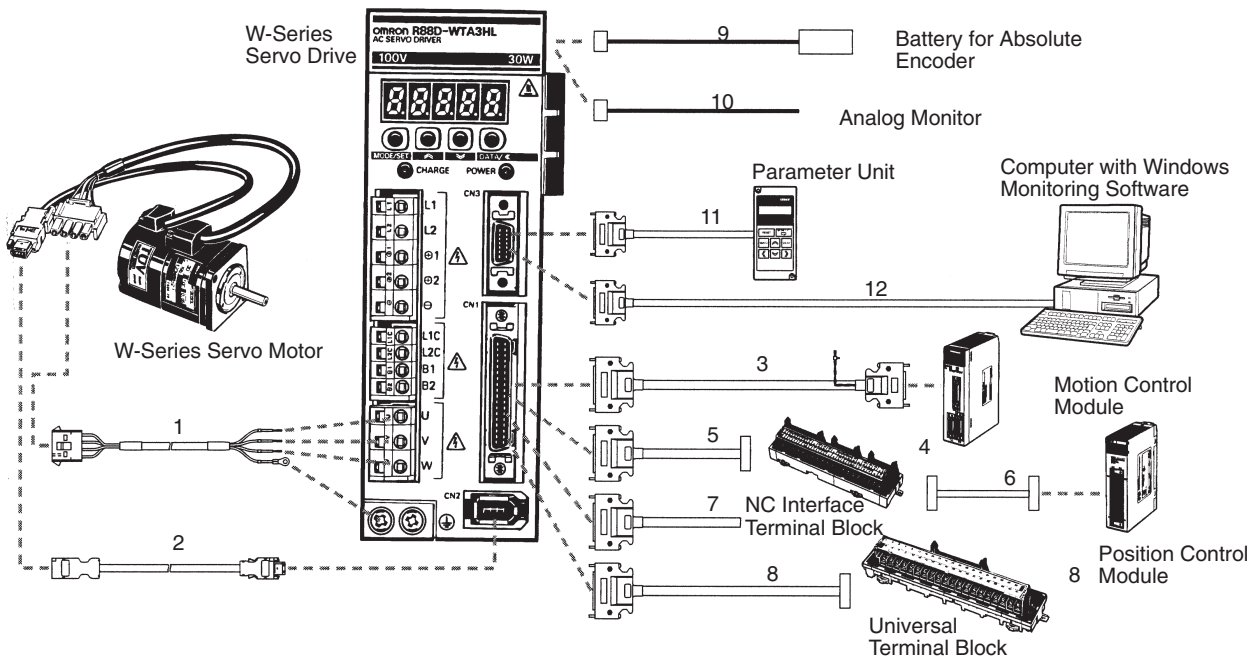
Servo Motor and Servo Drive Combinations

Servo motors with absolute encoders are available but not shown below.

Servo Motor (R88M-W□□□□□□-□□□)				Servo drive model with MECHATROLINK-II communications (R88D-WN□□□-ML2)			Servo drive model (R88D-WT□□□□)		
Description	**Capacity**	**Model (-W□□□□□□)**	**Brake and Shaft end options (-□□□)**	**100 V**	**200 V, 1-phase**	**200 V, 3-phase**	**100 V**	**200 V, 1-phase**	**200 V, 2-phase**
Cylindrical 3000 rpm, incremental encoder, IP55 (excluding shaft opening)	30 W	**03030H**	Without brake (blank) With brake (-B) Straight shaft (blank) Shaft with key (-S1) Shaft with key and tap (-S2)	—	—	—	A3HL	A3H	—
	50 W	**05030H**		A5L	A5H	—	A5HL	A5H	—
	100 W	**10030H**		01L	01H	—	01HL	01H	—
	200 W	**20030H**		02L	02H	—	02HL	02H	—
	400 W	**40030H**		04L	04H	—	—	04H	—
	750 W	**75030H**		—	08H	—	—	08H	08H
Cylindrical 3000 rpm, incremental encoder, IP67 (excluding shaft opening)	1 KW	**1K030H**	Without brake (blank) With brake (-B) Straight shaft (blank) Shaft with key and tap (-S2)	—	—	10H	—	—	10H
	1.5 KW	**1K530H**		—	—	15H	—	—	15H
	2 KW	**2K030H**		—	—	20H	—	—	20H
	3 KW	**3K030H**		—	—	30H	—	—	30H
	4 KW	**4K030H**		—	—	—	—	—	50H
	5 KW	**5K030H**		—	—	—	—	—	50H
Cylindrical 1500 rpm, incremental encoder, IP67 (excluding shaft opening)	450 W	**45015H**	Without brake (blank) With brake (-B) Straight shaft (blank) Shaft with key and tap (-S2)	—	—	05H	—	—	05H
	850 W	**85015H**		—	—	10H	—	—	10H
	1.3 KW	**1K315H**		—	—	15H	—	—	15H
	1.8 KW	**1K815H**		—	—	20H	—	—	20H
	2.9 KW	**2K915H**		—	—	—	—	—	30H
	4.4 KW	**4K415H**		—	—	—	—	—	50H
	5.5 KW	**5K515H**		—	—	—	—	—	60H*
	7.5 KW	**7K515H**		—	—	—	—	—	75H*
	11 KW	**11K015H**		—	—	—	—	—	150H*
	15 KW	**15K015H**		—	—	—	—	—	150H*
Cylindrical 1000 rpm, incremental encoder, IP67 (excluding shaft opening)	300 W	**30010H**	Without brake (blank) With brake (-B) Straight shaft (blank) Shaft with key and tap (-S2)	—	—	05H	—	—	05H
	600 W	**60010H**		—	—	10H	—	—	08H
	900 W	**90010H**		—	—	10H	—	—	10H
	1.2 KW	**1K210H**		—	—	15H	—	—	15H
	2 KW	**2K010H**		—	—	20H	—	—	20H
	3 KW	**3K010H**		—	—	—	—	—	30H
	4 KW	**4K010H**		—	—	—	—	—	50H
	5 KW	**5K010H**		—	—	—	—	—	60H*
Flat style, 3000 rpm, incremental encoder, IP55 (excluding shaft opening) or IP67 (including shaft opening)	100 W	**P10030H**	Without brake (blank) With brake (-B) Straight shaft (blank) Shaft with key (-S1) Shaft with key and tap (-S2)	01L	01H	—	01HL	01H	—
	200 W	**P20030H**		02L	02H	—	02HL	02H	—
	400 W	**P40030H**		04L	04H	—	—	04H	—
	750 W	**P75030H**		—	08H	—	—	08H	08H
	1.5 KW	**P1K530H**		—	—	15H	—	—	15H

Note: *A regenerative resistor (model R88A-RR8806) must be ordered with these servo drivers.

Ordering Information



Servo Drives (R88D)

Watts	Voltage	Phase	Model	
			Standard	With MECHATROLINK-II
30	100	1	**R88D-WTA3HL**	—
50	100	1	**R88D-WTA5HL**	**R88D-WNA5L-ML2**
100	100	1	**R88D-WT01HL**	**R88D-WN01L-ML2**
200	100	1	**R88D-WT02HL**	**R88D-WN02L-ML2**
400	100	1	—	**R88D-WN04L-ML2**
30	200	1	**R88D-WTA3H**	—
50	200	1	**R88D-WTA5H**	**R88D-WNA5H-ML2**
100	200	1	**R88D-WT01H**	**R88D-WN01H-ML2**
200	200	1	**R88D-WT02H**	**R88D-WN02H-ML2**
400	200	1	**R88D-WT04H**	**R88D-WN04H-ML2**
750	200	1	—	**R88D-WN08H-ML2**
500	200	3	**R88D-WT05H**	**R88D-WN05H-ML2**
750	200	3	**R88D-WT08H**	—
1000	200	3	**R88D-WT10H**	**R88D-WN10H-ML2**
1500	200	3	**R88D-WT15H**	**R88D-WN15H-ML2**
2000	200	3	**R88D-WT20H**	**R88D-WN20H-ML2**
3000	200	3	**R88D-WT30H**	**R88D-WN30H-ML2**
4000	200	3	**R88D-WT50H**	—
5000	200	3	**R88D-WT50H**	—
5500	200	3	**R88D-WT60H**	—
7500	200	3	**R88D-WT75H**	—
15,000	200	3	**R88D-WT150H**	—

Cylindrical Style Servo Motors

R88M-W□□□ □□ □- □ □ □□
4 5 6 7 8 9

Build a part number as follows:
R88M-W75030T-BS2 = 750 W, 3000 RPM, 200 VAC motor with absolute encoder, brakes, and shaft with key and tap

4	5	Basic model	6				7		8			9			
Capacity	**Rotation speed**	**Cylindrical style**	**Motor power supply and encoder type** H = 200 VAC, incremental L = 100 VAC, incremental T = 200 VAC, absolute S = 100 VAC absolute				**With/without brakes**		**Oil seal options** Blank = none O = oil seal			**Shaft shape** Blank: straight S1 = with key S2 = with key and tap S3 = straight with tap			
W	RPM	**R88M-W**	H	L	T	S	Blank	B	Blank	O	W	Blank	S1	S2	S3
30	3,000	**R88M-W03030**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes
50		**R88M-W05030**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes
100		**R88M-W10030**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes
200		**R88M-W20030**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes
400		**R88M-W40030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes
750		**R88M-W75030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	Yes	Yes	Yes
1 kW		**R88M-W1K030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
1.5 kW		**R88M-W1K530**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
2 kW		**R88M-W2K030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
3 kW		**R88M-W3K030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
4 kW		**R88M-W4K030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
5 kW		**R88M-W5K030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
450	1,500	**R88M-W45015**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
850		**R88M-W85015**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
1.3 kW		**R88M-W1K315**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
1.8 kW		**R88M-W1K815**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
2.9 kW		**R88M-W2K915**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
4.4 kW		**R88M-W4K415**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
5.5 kW		**R88M-W5K515**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
7.5 kW		**R88M-W7K515**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
11 kW		**R88M-W11K015**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
15 kW		**R88M-W15K015**	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
300	1,000	**R88M-W30010**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
600		**R88M-W60010**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
900		**R88M-W90010**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
1.2 kW		**R88M-W1K210**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
2 kW		**R88M-W2K010**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
3 kW		**R88M-W3K010**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
4 kW		**R88M-W4K010**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—
5.5 kW		**R88M-W5K510**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	—

Flat Style Servo Motors

R88M-WP□□□ □□ □- □ □ □□
4 5 6 7 8 9

Build a part number as follows:
R88M-WP20030H-BWS1 = 200 W, 3000 RPM, 200 VAC motor with absolute encoder, brakes, waterproof seal (IP67), and shaft with key

4	5	Basic model	6				7		8			9			
Capacity	**Rotation speed**	**Flat style**	**Motor power supply and encoder type** H = 200 VAC, incremental L = 100 VAC, incremental T = 200 VAC, absolute S = 100 VAC absolute				**With/without brakes**		**Waterproof (IP67) /oil seal options** Blank = none O = oil seal W = waterproof			**Shaft shape** Blank: straight S1 = with key S2 = with key and tap S3 = straight with tap			
W	RPM	**R88M-WP**	H	L	T	S	Blank	B	Blank	O	W	Blank	S1	S2	S3
100 W	3,000	**R88M-WP10030**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
200 W		**R88M-WP20030**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
400 W		**R88M-WP40030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
750 W		**R88M-WP75030**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.5 kW		**R88M-WP1K530**	Yes	—	Yes	—	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Circled numbers refer to the configuration diagram on page I-3.

① Servo Motor Power Cables

Applicable servo motors	Length	Model	
		For motors without brakes	For motors with brakes
30-W to 750-W Cylindrical style motors (3,000 RPM) 100-W to 750-W Flat style motors (3,000 RPM)	3 m	**R88A-CAWA003S**	**R88A-CAWA003B**
	5 m	**R88A-CAWA005S**	**R88A-CAWA005B**
	10 m	**R88A-CAWA010S**	**R88A-CAWA010B**
	15 m	**R88A-CAWA015S**	**R88A-CAWA015B**
	20 m	**R88A-CAWA020S**	**R88A-CAWA020B**
	30 m	**R88A-CAWA030S**	**R88A-CAWA030B**
	40 m	**R88A-CAWA040S**	**R88A-CAWA040B**
	50 m	**R88A-CAWA050S**	**R88A-CAWA050B**
1.5-kW Flat style motors	3 m	**R88A-CAWB003S**	**R88A-CAWB003B**
	5 m	**R88A-CAWB005S**	**R88A-CAWB005B**
	10 m	**R88A-CAWB010S**	**R88A-CAWB010B**
	15 m	**R88A-CAWB015S**	**R88A-CAWB015B**
	20 m	**R88A-CAWB020S**	**R88A-CAWB020B**
	30 m	**R88A-CAWB030S**	**R88A-CAWB030B**
	40 m	**R88A-CAWB040S**	**R88A-CAWB040B**
	50 m	**R88A-CAWB050S**	**R88A-CAWB050B**
300-W to 900-W Cylindrical style motors (1,000 RPM) 1-kW to 2-kW Cylindrical style motors (3,000 RPM)	3 m	**R88A-CAWC003S**	**R88A-CAWC003B**
	5 m	**R88A-CAWC005S**	**R88A-CAWC005B**
	10 m	**R88A-CAWC010S**	**R88A-CAWC010B**
	15 m	**R88A-CAWC015S**	**R88A-CAWC015B**
	20 m	**R88A-CAWC020S**	**R88A-CAWC020B**
	30 m	**R88A-CAWC030S**	**R88A-CAWC030B**
	40 m	**R88A-CAWC040S**	**R88A-CAWC040B**
	50 m	**R88A-CAWC050S**	**R88A-CAWC050B**
1.2-kW to 3-kW Cylindrical style servo motors (1,000 RPM) 3-kW to 5-kW Cylindrical style servo motors (3,000 RPM) 1.8 kW to 4.4 kW Cylindrical style servo motors (1,500 RPM)	3 m	**R88A-CAWD003S**	**R88A-CAWD003B**
	5 m	**R88A-CAWD005S**	**R88A-CAWD005B**
	10 m	**R88A-CAWD010S**	**R88A-CAWD010B**
	15 m	**R88A-CAWD015S**	**R88A-CAWD015B**
	20 m	**R88A-CAWD020S**	**R88A-CAWD020B**
	30 m	**R88A-CAWD030S**	**R88A-CAWD030B**
	40 m	**R88A-CAWD040S**	**R88A-CAWD040B**
	50 m	**R88A-CAWD050S**	**R88A-CAWD050B**
5.5 kW Cylindrical style servo motors (1,500 RPM) 4 kW Cylindrical style servo motors (1,000 RPM)	3 m	**R88A-CAWE003S**	**R88A-CAWE003B §**
	5 m	**R88A-CAWE005S**	**R88A-CAWE005B §**
	10 m	**R88A-CAWE010S**	**R88A-CAWE010B §**
	15 m	**R88A-CAWE015S**	**R88A-CAWE015B §**
	20 m	**R88A-CAWE020S**	**R88A-CAWE020B §**
	30 m	**R88A-CAWE030S**	**R88A-CAWE030B §**
	40 m	**R88A-CAWE040S**	**R88A-CAWE040B §**
	50 m	**R88A-CAWE050S**	**R88A-CAWE050B §**
7.5 to 11 kW Cylindrical style servo motors (1,500 RPM) 5.5 kW Cylindrical style servo motors (1,000RPM)	3 m	**R88A-CAWF003S**	**R88A-CAWF003B §**
	5 m	**R88A-CAWF005S**	**R88A-CAWF005B §**
	10 m	**R88A-CAWF010S**	**R88A-CAWF010B §**
	15 m	**R88A-CAWF015S**	**R88A-CAWF015B §**
	20 m	**R88A-CAWF020S**	**R88A-CAWF020B §**
	30 m	**R88A-CAWF030S**	**R88A-CAWF030B §**
	40 m	**R88A-CAWF040S**	**R88A-CAWF040B §**
	50 m	**R88A-CAWF050S**	**R88A-CAWF050B §**

§ For these motors with brake, a cable for power is required in addition to the brake cable. (Example, for servo motor model R88M-W5K515T-BS2, order both R88A-CAWE015S power cable and R88A-CAWE015B brake cable.)

Note: For 15kW Cylindrical style servomotors (1,500 RPM) use cable AWG4 x 4C UL62, with max. length 50 m and connectors plug MS3108B32-17S with cable plug MS3102A32-17P.

② Encoder Cables

Applicable servo motors	Length	Model
30-W to 750-W Cylindrical-style motors (3,000 RPM) 100-W to 1.5-kW Flat style Motors (3,000 RPM)	3 m	**R88A-CRWA003C**
	5 m	**R88A-CRWA005C**
	10 m	**R88A-CRWA010C**
	15 m	**R88A-CRWA015C**
	20 m	**R88A-CRWA020C**
	30 m	**R88A-CRWA030C**
	40 m	**R88A-CRWA040C**
	50 m	**R88A-CRWA050C**
1-kW to 5-kW Cylindrical-style motors (3,000 RPM) 300-W to 5.5-kW Cylindrical-style motors (1,000 RPM) 450-W to 15.0-kW Cylindrical-style motors (1,500 RPM)	3 m	**R88A-CRWB003N**
	5 m	**R88A-CRWB005N**
	10 m	**R88A-CRWB010N**
	15 m	**R88A-CRWB015N**
	20 m	**R88A-CRWB020N**
	30 m	**R88A-CRWB030N**
	40 m	**R88A-CRWB040N**
	50 m	**R88A-CRWB050N**

Cables and Accessories

Application	Description	Length	Model
③ Cables for Motion Control modules	Control cables for 1 axis (common to CS1, C200H, and CV-Series Controllers)	1 m	**R88A-CPW001M1**
		2 m	**R88A-CPW002M1**
		3 m	**R88A-CPW003M1**
		5 m	**R88A-CPW005M1**
	Control cables for 2 axes (common to SYSMAC CS1, C200H, and CV-Series controllers)	1 m	**R88A-CPW001M2**
		2 m	**R88A-CPW002M2**
		3 m	**R88A-CPW003M2**
		5 m	**R88A-CPW005M2**
④ Servo relay units connect cables from PLC position controller and servo drive	1-axis Position Control Unit (CS1W-NC113/133, CJ1W-NC113/133); does not support communications functions	—	**XW2B-20J6-1B**
	2-axis Position Control Unit (CS1W-NC213/233/413/433, CJ1W-NC213/233/413/433); does not support communications functions	—	**XW2B-40J6-2B**
	1-axis CQM1H-PLB21 and CQM1-CPU43-V1; does not support communications functions	—	**XW2B-20J6-3B**
	1-axis CJ1M-CPU22/23; does not support communications functions	—	**XW2B-20J6-8A**
	2-axis CJ1M-CPU22/23; does not support communications functions	—	**XW2B-40J6-9A**
⑤ Servo drive connecting cable	Connects Servo Relay Units XW2B-20J6-1B, XW2B-40J6-2B, XW2B-20J6-3B, XW2B-20J6-8A, or XW2B-40J6-9A	1 m	**XW2Z-100J-B4**
		2 m	**XW2Z-200J-B4**
	Connects Servo Relay Unit XW2B-40J6-4A	1 m	**XW2Z-100J-B8**
		2 m	**XW2Z-200J-B8**
⑥ Position controller PLC module cable	CQM1H-PLB21 and CQM1-CPU43-V1 to XW2B-20J6-3B servo relay unit	1 m	**XW2Z-100J-A3**
	CJ1W-NC113 to XW2B-20J6-1B servo relay unit	1 m	**XW2Z-100J-A16**
	CJ1W-NC213 or CJ1W-NC413 to XW2B-20J6-2B servo relay unit	1 m	**XW2Z-100J-A17**
	CJ1W-NC133 to XW2B-20J6-1B servo relay unit	1 m	**XW2Z-100J-A20**
	CJ1W-NC233 or CJ1W-NC433 to XW2B-40J6-2B servo relay unit	1 m	**XW2Z-100J-A21**
	CJ1M-CPU22 or CJ1M-CPU23 to XW2B-20J6-8A (1 axis) or XW2B-40J6-9A (2 axes) servo relay unit	1 m	**XW2Z-100J-A26**
	CS1W-NC113 to XW2B-20J6-1B servo relay unit	1 m	**XW2Z-100J-A8**
	CS1W-NC213 or CS1W-NC413 to XW2B-40J6-2B servo relay unit	1 m	**XW2Z-100J-A9**
	CS1W-NC133 to XW2B-20J6-B1 servo relay unit	1 m	**XW2Z-100J-A12**
	CS1W-NC233 or CS1W-NC433 to XW2B-40J6-2B servo relay unit	1 m	**XW2Z-100J-A13**
⑦ General purpose controller cables	Control cables with connector at one end	1 m	**R88A-CPW001S**
		2 m	**R88A-CPW002S**

Cables and Accessories (Continued)

Application	Description	Length	Model
⑧ Universal terminal block cable	Cables for universal terminal block XW2B-50G5	1 m	**R88A-CTW001N**
		2 m	**R88A-CTW002N**
	Control I/O connector; fits port CN1 (WT-series only)	—	**R88A-CNU11C**
	Control I/O connector; fits port CN1 (WN-series only)	—	**R88A-CNW01C**
	Universal terminal block	—	**XW2B-50G5**
	Cable from relay terminal block XW2B-20G4/XW2B-20G5/XW2D-20G6 to WN-series servo drive CN1	1 m	**XW2Z-100J-B16**
		2 m	**XW2Z-200J-B16**
	Cable from relay terminal block XW2B-20G4/XW2B-20G5/XW2D-20G6 to WT-series servo drive CN1	1 m	**XW2Z-100J-B15**
		2 m	**XW2Z-200J-B15**
⑨ Battery backup	Servo drives R88D-WT50H or less	—	**R88A-BAT01W**
	Servo drives R88D-WT60H/75H/150H	—	**R88A-BAT02W**
	Servo drives R88D-WN, all models (connected in series with encoder cables in ②)	0.3 m	**R88A-CRWC0R3C**
⑩ Analog monitor cable	Peripheral cable for analog monitoring; servo drive to PC; connects to port CN4	1 m	**R88A-CMW001S**
⑪ Parameter unit	Panel mount unit sets and displays servo drive parameters; includes cable	1 m	**R88A-PR02W**
⑫ Personal computer cable	Connects a personal computer for monitoring; servo drive to PC; connects to port CN3	2 m	**R88A-CCW002P2**

External Regenerative Resistors

Rating	Model
220 W 47 Ω	**R88A-RR22047S**
880 W 6.25 Ω	**R88A-RR88006***

* Resistor required for use with Servo Driver models R88D-WT60H/WT75H/WT150H.

DC Reactors

Applicable servo drive	Model
For R88D-WT30H	**R88A-PX5059**
For R88D-WT15H/WT20H	**R88A-PX5060**
For R88D-WT05H/WT08H/WT10H	**R88A-PX5061**
For R88D-WT02HL	**R88A-PX5062**
For R88D-WTA3HL/WTA5HL/WT01HL	**R88A-PX5063**
For R88D-WT50H	**R88A-PX5068**
For R88D-WT04H	**R88A-PX5069**
For R88D-WT02H	**R88A-PX5070**
For R88D-WTA3H/WTA5H/WT01H	**R88A-PX5071**

AC Reactors

Applicable servo drive	Model
For R88D-WTA3HL to WT01HL/-WD30H to WD02H	**R88A-F1W104-E**
For R88D-WT02HL/WT04H	**R88A-F1W107-E**
For R88D-WT05H/WT08H	**R88A-F1W115-E**
For R88D-WT10H	**R88A-F1W125-E**
For R88D-WT15H/WT20H	**LF-315K**
For R88D-WT30H	**LF-325K**
For R88D-WT50H	**LF-335K**
For R88D-WT60H	**LF-380K**

Network Communication Adapters

DeviceNet Option Unit mounts to a W-Series AC Servo drives and performs both DeviceNet communications functions and Position Control Unit functions. Parameters can be set, the operating status can be monitored, and faults can be predicted from a PLC up to 500 m away.

- **Trace Function:** When trigger conditions are satisfied, up to two analog elements and two ON/OFF elements can be recorded in the DeviceNet Option Unit and read from the PLC.
- **Monitor Item Reading Function:** The contents of AC Servo drive monitor display can be read from the PLC.
- **Batch Handling of Operating Information** for Servo Systems Information that can be displayed at W-series AC Servo Drivers using monitor functions (e.g., speed commands and speed feedback) can be read by a PLC using remote I/O functions.

Description	Model
DeviceNet Option Unit	**R88A-NCW152-DRT**
External I/O Connector	**R88A-CNU01R**
Cable for Setup Tool (IBM PC/AT or compatible; 2 m length	**R88A-CCW002P4**

MECHATROLINK-II Interface Unit for WT-Series Drives

Description	Cable length	Model
MECHATROLINK-II Interface Unit	—	**FNY-NS115**
MECHATROLINK-II cable	**0.5 m**	**FNY-W6003-A5**
	1 m	**FNY-W6003-01**
	3 m	**FNY-W6003-03**
	5 m	**FNY-W6003-05**
	10 m	**FNY-W6003-10**
	20 m	**FNY-W6003-20**
	30 m	**FNY-W6003-30**
MECHATROLINK-II terminating resistor	—	**FNY-W6022**

Servos
SmartStep

Quick Link
K091

Cost-Effective Servo Capability with Stepper Simplicity

Easily migrate from steppers to the higher precision of servos in minutes with Omron's SmartStep servo drivers and ultra-compact 3-phase servo motors. They accept pulse-train input that can be configured quickly via simple DIP switches and have an on-line auto-tuning function. SmartStep offers all the simplicity and cost-effectiveness of a stepper with the added advantages of the servo drive capability.

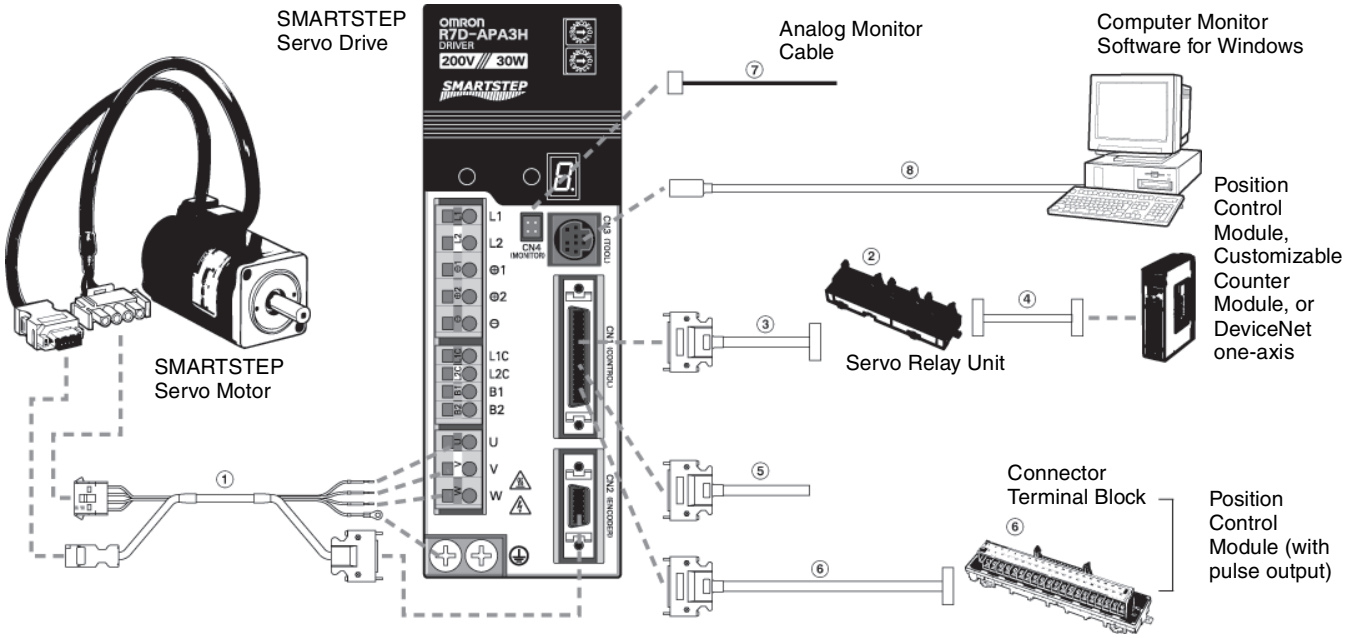
Motor Features

- Sizes 30 W to 750 W, rated speed 3,000 rpm
- Accepts incremental encoder input at 2,000 p/r
- Cylindrical and flat type servo motors available
- Peak torque up to three times continuous torque during 3 seconds
- Easy to install with pre-built cables
- Motors with brake are available

Driver Features

- Output range from 30 W to 750 W
- 300% peak current over nominal
- Control via pulse train (speed and position)
- Four position resolution settings:
  - 500 pulses/rotation (0.72°/step)
  - 1,000 pulses/rotation (0.36°/step)
  - 5,000 pulses/rotation (0.072°/step)
  - 10,000 pulses/rotation (0.036°/step)
- SmartStep does not require the use of PC configuration software, making setup as easy as using a stepper motor for basic capabilities
- To optimize performance, use PC software for on-line auto-tuning of values and monitoring

Ordering Information



Add cable length to the part number in place of □□□: 003 for 3 m cable, 005 for 5 m, 010 for 10 m, 015 for 15 m and 020 for 20 m.

Note: Circled numbers refer to the configuration diagram on page I-8.

SmartStep Servos

Wattage	Servo motor model	Servo drive model	①Power cable/Encoder cable model (Add cable length for □□□)
Cylindrical Servo Motors 100 VAC Without Brake, Shaft Without Keyway			
30 W	**R7M-A03030-S1**	**R7D-APA3L**	**R7A-CEA□□□S**
50 W	**R7M-A05030-S1**	**R7D-APA5L**	**R7A-CEA□□□S**
100 W	**R7M-A10030-S1**	**R7D-AP01L**	**R7A-CEA□□□S**
200 W	**R7M-A20030-S1**	**R7D-AP02L**	**R7A-CEA□□□S**
400 W	**R7M-A40030-S1**	**R7D-AP04L**	**R7A-CEA□□□S**
Cylindrical Servo Motors 100 VAC With Brake, Shaft With Keyway			
30 W	**R7M-A03030-BS1**	**R7D-APA3L**	**R7A-CEA□□□B**
50 W	**R7M-A05030-BS1**	**R7D-APA5L**	**R7A-CEA□□□B**
100 W	**R7M-A10030-BS1**	**R7D-AP01L**	**R7A-CEA□□□B**
200 W	**R7M-A20030-BS1**	**R7D-AP02L**	**R7A-CEA□□□B**
400 W	**R7M-A40030-BS1**	**R7D-AP04L**	**R7A-CEA□□□B**
Cylindrical Servo Motors 200 VAC Without Brake, Shaft With Keyway			
30 W	**R7M-A03030-S1**	**R7D-APA3H**	**R7A-CEA□□□S**
50 W	**R7M-A05030-S1**	**R7D-APA5H**	**R7A-CEA□□□S**
100 W	**R7M-A10030-S1**	**R7D-AP01H**	**R7A-CEA□□□S**
200 W	**R7M-A20030-S1**	**R7D-AP02H**	**R7A-CEA□□□S**
400 W	**R7M-A40030-S1**	**R7D-AP04H**	**R7A-CEA□□□S**
750 W	**R7M-A75030-S1**	**R7D-AP08H**	**R7A-CEA□□□S**
Cylindrical Servo Motors 200 VAC With Brake, Shaft With Keyway			
30 W	**R7M-A03030-BS1**	**R7D-APA3H**	**R7A-CEA□□□B**
50 W	**R7M-A05030-BS1**	**R7D-APA5H**	**R7A-CEA□□□B**
100 W	**R7M-A10030-BS1**	**R7D-AP01H**	**R7A-CEA□□□B**
200 W	**R7M-A20030-BS1**	**R7D-AP02H**	**R7A-CEA□□□B**
400 W	**R7M-A40030-BS1**	**R7D-AP04H**	**R7A-CEA□□□B**
750 W	**R7M-A75030-BS1**	**R7D-AP08H**	**R7A-CEA□□□B**
Flat Servo Motors 100 VAC Without Brake, Shaft With Keyway			
100 W	**R7M-AP10030-S1**	**R7D-AP01L**	**R7A-CEA□□□S**
200 W	**R7M-AP20030-S1**	**R7D-AP02L**	**R7A-CEA□□□S**
400 W	**R7M-AP40030-S1**	**R7D-AP04L**	**R7A-CEA□□□S**
Flat Servo Motors 100 VAC With Brake, Shaft With Keyway			
100 W	**R7M-AP10030-BS1**	**R7D-AP01L**	**R7A-CEA□□□B**
200 W	**R7M-AP20030-BS1**	**R7D-AP02L**	**R7A-CEA□□□B**
400 W	**R7M-AP40030-BS1**	**R7D-AP04L**	**R7A-CEA□□□B**
Flat Servo Motors 200 VAC Without Brake, Shaft With Keyway			
100 W	**R7M-AP10030-S1**	**R7D-AP01H**	**R7A-CEA□□□S**
200 W	**R7M-AP20030-S1**	**R7D-AP02H**	**R7A-CEA□□□S**
400 W	**R7M-AP40030-S1**	**R7D-AP04H**	**R7A-CEA□□□S**
750 W	**R7M-AP75030-S1**	**R7D-AP08H**	**R7A-CEA□□□S**
Flat Servo Motors 200 VAC With Brake, Shaft With Keyway			
100 W	**R7M-AP10030-BS1**	**R7D-AP01H**	**R7A-CEA□□□B**
200 W	**R7M-AP20030-BS1**	**R7D-AP02H**	**R7A-CEA□□□B**
400 W	**R7M-AP40030-BS1**	**R7D-AP04H**	**R7A-CEA□□□B**
750 W	**R7M-AP75030-BS1**	**R7D-AP08H**	**R7A-CEA□□□B**

Cables and Accessories

Description	Devices connected	Specification	Model
② Servo relay units connect cables from PLC position controller and servo drive	CS1W-NC113/133, CJ1W-NC113/133; 1 axis; does not support communications functions	—	**XW2B-20J6-1B**
	CS1W-NC213/233/413/433, CJ1W-NC213/233/413/433; 2 axes; does not support communications functions	—	**XW2B-40J6-2B**
	CQM1H-PLB21 and CQM1-CPU43-V1; 1 axis; does not support communications functions	—	**XW2B-20J6-3B**
	CS1W-NC213/233/413/433, CJ1W-NC213/233/ 413/433; 2 axes; supports communications functions	—	**XW2B-40J6-4A**
	CJ1M-CPU22/23; 1 axis; does not support communications functions	—	**XW2B-20J6-8A**
	CJ1M-CPU22/23; 2 axes; does not support communications functions	—	**XW2B-40J6-9A**
③ Universal terminal block cable to servo drive	Doesn't support communications functions. (For the XW2B-□□J6-□B)	1 m length	**XW2Z-100J-B5**
		2 m length	**XW2Z-200J-B5**
④ Position controller PLC module cable	CQM1H-PLB21 and CQM1-CPU43-V1 to XW2B-20J6-3B servo relay unit	1 m length	**XW2Z-100J-A3**
	CJ1W-NC113 to XW2B-20J6-1B servo relay unit	1 m length	**XW2Z-100J-A16**
	CJ1W-NC213 or CJ1W-NC413 to XW2B-20J6-2B servo relay unit	1 m length	**XW2Z-100J-A17**
	CJ1W-NC133 to XW2B-20J6-1B servo relay unit	1 m length	**XW2Z-100J-A20**
	CJ1W-NC233 or CJ1W-NC433 to XW2B-40J6-2B servo relay unit	1 m length	**XW2Z-100J-A21**
	CJ1M-CPU22 or CJ1M-CPU23 to XW2B-20J6-8A (1 axis) or XW2B-40J6-9A (2 axes) servo relay unit	1 m length	**XW2Z-100J-A26**
	CS1W-NC113 to XW2B-20J6-1B servo relay unit	1 m length	**XW2Z-100J-A8**
	CS1W-NC213 or CS1W-NC413 to XW2B-40J6-2B servo relay unit	1 m length	**XW2Z-100J-A9**
	CS1W-NC133 to XW2B-20J6-B1 servo relay unit	1 m length	**XW2Z-100J-A12**
	CS1W-NC233 or CS1W-NC433 to XW2B-40J6-2B servo relay unit	1 m length	**XW2Z-100J-A13**
⑤ Control cable	For general-purpose Controllers (mating connector for CJ1 on one end, open ended on the other end)	1 m length	**R88A-CPU001S**
		2 m length	**R88A-CPU002S**
⑥ Universal terminal block	For position control modules with pulse output and general-purpose controllers	—	**XW2B-40F5-P**
	Connector cable between terminal block and servo driver	1 m length	**R88A-CTU001N**
		2 m length	**R88A-CTU002N**
⑦ Analog monitor cable (port CN4)	Servo drive to PC	1 m length	**R88A-CMW001S**
⑧ Computer monitor cable (port CN3)	Servo drive to PC	2 m length	**R7A-CCA002P2**
Filters	For servo drive R7D-APA3H, APA5H, AP01H, AP02H; R7D-APA3L, APA5L, AP01L, AP02L	4 A, 250 VAC single phase	**R88A-FIW104-E**
	For servo drive R7D-AP04H, AP04L	7 A, 250 VAC single phase	**R88A-FIW107-E**
	For servo drive R7D-AP08H	15 A, 250 VAC single phase	**R88A-FIW115-E**
Control I/O connector (CN1)	—	—	**R88A-CNU01C**
SmartStep encoder connector (CN2)	—	—	**R7A-CNA01R**
External regeneration resistor	—	200 W, 47 Ω	**R88A-RR22047S**
Parameter copy unit with cable	—	—	**R7A-PR02A**
Configuration and monitoring software	For servo drives and inverters	Version 1.11 or higher	**CX-DRIVE**
Complete OMRON software suite	Includes CX-Drive	—	**CX-ONE**

Specifications

Servo Drives General Specifications

Item	Specification
Operating ambient	0° to 55° C (32° F to 131° F), 90% RH max. (with no condensation)
Storage ambient	-20° to 85° C (-4° F to 185° F), 90% RH 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^2 max., whichever is smaller
Impact resistance	Acceleration 19.6 m/s^2 max., in X, Y, and Z directions, three times
Insulation resistance	Between power line terminals and case: 0.5 MΩ min. (at 500 VDC)
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)

Servo Drives Performance Specifications

100 VAC Input Models

Item	Specification				
Model	**R7D-APA3L**	**R7D-APA5L**	**R7D-AP01L**	**R7D-AP02L**	**R7D-AP04L**
Rated output	30 W	50 W	100 W	200 W	400 W
Continuous output current (rms)	0.42	0.6	0.89	2.0	2.6
Momentary maximum output current (rms)	1.3	1.9	2.8	6.0	8.0
Control power supply	Single-phase 100/115 VAC (85 to 127 V) 50/60 Hz				
Main-circuit power supply	Single-phase 100/115 VAC (85 to 127 V) 50/60 Hz (Voltage doubler method)				
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 [kg (lb)]	0.8 (1.76)	0.8 (1.76)	0.8 (1.76)	0.8 (1.76)	1.1 (2.43)
Compatible motor voltage	200 V				
Compatible motor capacity	30 W	50 W	100 W	200 W	400 W
Command pulse response	250 kHz				
Applicable servo motor (R7M-)	A03030_	A05030_	A10030_	A20030_	A40030_
	—	—	AP10030_	AP20030_	AP40030_

200 VAC Input Models

Item	Specification					
Model	**R7D-APA3H**	**R7D-APA5H**	**R7D-AP01H**	**R7D-AP02H**	**R7D-AP04H**	**R7D-AP08H**
Rated output	30 W	50 W	100 W	200 W	400 W	750 W
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 [kg (lb)]	0.8 (1.76)	0.8 (1.76)	0.8 (1.76)	0.8 (1.76)	1.1 (2.43)	1.7 (3.75)
Servo motor voltage	200 V					
Servo 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	A20030	A40030	A75030
	—	—	AP10030	AP20030	AP40030	AP75030

Servo Motor General Specifications

Item	Specification
Operating ambient	0° C to 40° C (32° F to 104° F), 20% to 80% RH (with no condensation)
Storage ambient	-20° C to 60° C (-4° F to 140° F), 20% to 80% RH (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^2 max., whichever is smaller
Impact resistance	Acceleration 98 m/s^2max., in a vertical direction, two times
Insulation resistance	Between power line terminals and FG: 10 MΩ min. (at 500 VDC)
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)

Servo Motor Performance Specifications

Flat Servo Motors without Brakes

Item	R7M-AP10030-S1	R7M-AP20030-S1	R7M-AP40030-S1	R7M-AP75030-S1
Rated output	100 W	200 W	400 W	750 W
Rated torque	0.318 N•m	0.637 N•m	1.27 N•m	2.39 N•m
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 N•m	1.91 N•m	3.82 N•m	7.1 N•m
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	6.5×10^{-6} kg•m^2	2.09×10^{-5} kg•m^2	3.47×10^{-5} kg•m^2	2.11×10^{-4} kg•m^2
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 -S1)	0.7 kg	1.4 kg	2.1 kg	4.2 kg
Applicable servo driver	R7D-AP01H/L	R7D-AP02H/L	R7D-AP04H/L	R7D-AP08H
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

Flat Servo Motors with Brakes

Item		R7M-AP10030-BS1	R7M-AP20030-BS1	R7M-AP40030-BS1	R7M-AP75030-BS1
Rated output		100 W	200 W	400 W	750 W
Rated torque		0.318 N•m	0.637 N•m	1.27 N•m	2.39 N•m
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 N•m	1.91 N•m	3.82 N•m	7.1 N•m
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		6.5×10^{-6} kg•m^2	2.09×10^{-5} kg•m^2	3.47×10^{-5} kg•m^2	2.11×10^{-4} kg•m^2
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 (with brake -BS1)		0.9 kg	1.9 kg	2.6 kg	5.7 kg
Applicable servo driver		R7D-AP01H/L	R7D-AP02H/L	R7D-AP04H/L	R7D-AP08H
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**	3.1×10^{-6} kg•m^2	1.52×10^{-5} kg•m^2	1.52×10^{-5} kg•m^2	8.75×10^{-5} kg•m^2
	Excitation voltage	24 V DC ±10%			
	Power consumption (at 20° C)	6 W	5 W	7.6 W	7.5 W
	Current consumption (at 20° C)	0.25 A	0.21 A	0.32 A	0.31 A
	Static friction torque	0.4 N•m min.	0.9 N•m min.	1.9 N•m min.	3.5 N•m min.
	Attraction time	40 ms max.	40 ms max.	40 ms max.	40 ms max.
	Release time	20 ms max.	20 ms max.	20 ms max.	20 ms max.
	Backlash	1°	1°	1°	1°
	Rating	Continuous	Continuous	Continuous	Continuous
	Insulation grade	Type F	Type F	Type F	Type F

Cylindrical Servo Motors without Brakes

Item	R7M-A03030-S1	R7M-A05030-S1	R7M-A10030-S1	R7M-A20030-S1	R7M-A40030-S1	R7M-A75030-S1
Rated output	30 W	50 W	100 W	200 W	400 W	750 W
Rated torque	0.095 N•m	0.159 N•m	0.318 N•m	0.637 N•m	1.27 N•m	2.39 N•m
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 N•m	0.48 N•m	0.96 N•m	1.91 N•m	3.82 N•m	7.1 N•m
Rated current (rms)	0.42 A	0.6 A	0.87 A	2.0 A	2.6 A	4.4 A
Momentary maximum current (rms)	1.3 A	1.9 A	2.8 A	6.0 A	8.0 A	13.9 A
Rotor inertia	1.7×10^{-6} kg•m^2	2.2×10^{-6} kg•m^2	3.6×10^{-6} kg•m^2	1.19×10^{-5} kg•m^2	1.87×10^{-5} kg•m^2	6.67×10^{-5} kg•m^2
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	3.4 kg
Applicable servo driver	R7D-APA3H	R7D-APA5H	R7D-AP01H	R7D-AP02H	R7D-AP04H	R7D-AP08H
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					

Cylindrical Servo Motors with Brakes

Item		R7M-A0303-BS1	R7M-A05030-BS1	R7M-A10030-BS1	R7M-A20030-BS1	R7M-A40030-BS1	R7M-A75030-BS1
Rated output		30 W	50 W	100 W	200 W	400 W	750 W
Rated torque		0.095 N•m	0.159 N•m	0.318 N•m	0.637 N•m	1.27 N•m	2.39 N•m
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 N•m	0.48 N•m	0.96 N•m	1.91 N•m	3.82 N•m	7.1 N•m
Rated current (rms)		0.42 A	0.6 A	0.87 A	2.0 A	2.6 A	4.4 A
Momentary maximum current (rms)		1.3 A	1.9 A	2.8 A	6.0 A	8.0 A	13.9 A
Rotor inertia		1.7×10^{-6} kg•m^2	2.2×10^{-6} kg•m^2	3.6×10^{-6} kg•m^2	1.19×10^{-5} kg•m^2	1.87×10^{-5} kg•m^2	6.67×10^{-5} kg•m^2
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 with brake		0.6 kg	0.7 kg	0.8 kg	1.6 kg	2.2 kg	4.3 kg
Applicable servo driver		R7D-APA3H	R7D-APA5H	R7D-AP01H	R7D-AP02H	R7D-AP04H	R7D-AP08H
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					
Brake specifications	Brake inertia	0.85×10^{-6} kg•m^2	0.85×10^{-6} kg•m^2	0.85×10^{-6} kg•m^2	6.4×10^{-6} kg•m^2	6.4×10^{-6} kg•m^2	1.7×10^{-5} kg•m^2
	Excitation voltage	24 V DC ±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 N•m min.	0.2 N•m min.	0.34 N•m min.	1.47 N•m min.	1.47 N•m min.	2.45 N•m 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

Dimensions

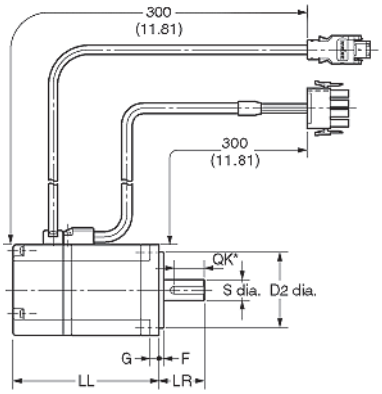
Servo Drives Dimensions (mm)

Input voltage	Rating	Drive model	H	W	D
1-phase, 100 VAC and 200 VAC	30 W	R7D-APA3H/L	160	55	130
	50 W	R7D-APA5H/L	160	55	130
	100 W	R7D-AP01H/L	160	55	130
	200 W	R7D-AP02H/L	160	55	130
	400 W	R7D-AP04H/L	160	75	130
1-phase, 200 VAC	750 W	R7D-AP08H	160	90	180

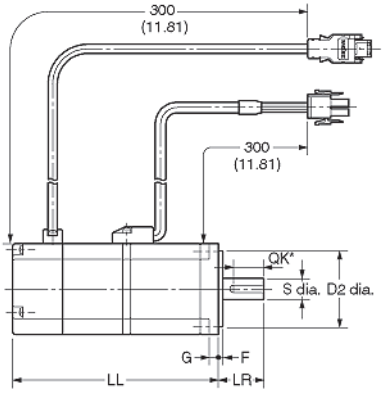
Cylindrical Servo Motors (3,000 r/min) Dimensions (mm)
200 VAC: 30 W/50 W/100 W/200 W/400 W/750 W

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

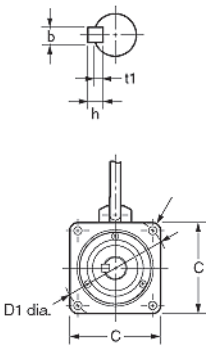
R7M-A□□□30(-S1) (Without Brake)



R7M-A□□□30(-S1) (With Brake)



***Axis End Dimensions**

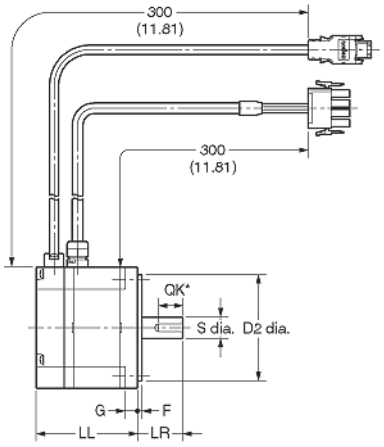


Model	Overall length		Flange surface			Axis end							
	LL	LR	C	D1	D2	F	G	Z	S	QK	b	h	t1
R7M-A03030-S1	69.5	25	40	46	30h7	2.5	5	Two, 4.3 dia.	6h6	14	2	2	1.2
R7M-A03030-BS1	101	25	40	46	30h7	2.5	5	Two, 4.3 dia.	6h6	14	2	2	1.2
R7M-A05030-S1	77	25	40	46	30h7	2.5	5	Two, 4.3 dia.	6h6	14	2	2	1.2
R7M-A05030-BS1	108.5	25	40	46	30h7	2.5	5	Two, 4.3 dia.	6h6	14	2	2	1.2
R7M-A10030-S1	94.5	25	40	46	30h7	2.5	5	Two, 4.3 dia.	8h6	14	3	3	1.8
R7M-A10030-BS1	135	25	40	46	30h7	2.5	5	Two, 4.3 dia.	8h6	14	3	3	1.8
R7M-A20030-S1	96.5	30	60	70	50h7	3	6	Four, 5.5 dia.	14h6	20	5	5	3
R7M-A20030-BS1	136	30	60	70	50h7	3	6	Four, 5.5 dia.	14h6	20	5	5	3
R7M-A40030-S1	124.5	30	60	70	50h7	3	6	Four, 5.5 dia.	14h6	20	5	5	3
R7M-A40030-BS1	164	30	60	70	50h7	3	6	Four, 5.5 dia.	14h6	20	5	5	3
R7M-A75030-S1	145	40	80	90	70h7	3	8	Four, 7 dia.	16h6	30	5	5	3
R7M-A75030-BS1	189.5	40	80	90	70h7	3	8	Four, 7 dia.	16h6	30	5	5	3

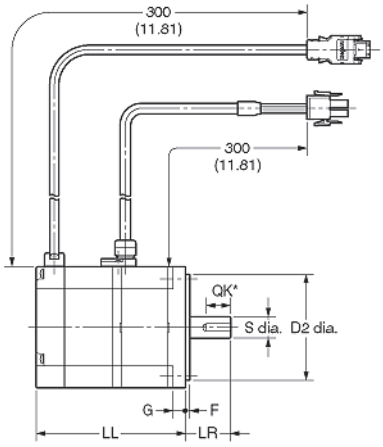
Flat Servo Motors (3,000 r/min) Dimensions (mm)
200 VAC: 100 W/200 W/400 W/750 W

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

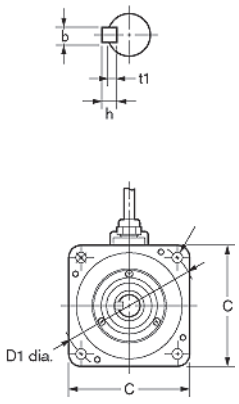
R7M-AP□□□30(-S1) (Without Brake)



R7M-AP□□□30(-S1) (With Brake)



***Axis End Dimensions**



Model	Overall length		Flange surface			Axis end							
	LL	LR	C	D1	D2	F	G	Z	S	QK	b	h	t1
R7M-AP10030-S1	62	25	60	70	50h7	2.5	6	5.5 dia.	8h6	14	3	3	1.8
R7M-AP10030-BS1	91	25	60	70	50h7	2.5	6	5.5 dia.	8h6	14	3	3	1.8
R7M-AP20030-S1	67	30	80	90	70h7	3	8	7 dia.	14h6	16	5	5	3
R7M-AP20030-BS1	98.5	30	80	90	70h7	3	8	7 dia.	14h6	16	5	5	3
R7M-AP40030-S1	87	30	80	90	70h7	3	8	7 dia.	14h6	16	5	5	3
R7M-AP40030-BS1	118.5	30	80	90	70h7	3	8	7 dia.	14h6	16	5	5	3
R7M-AP75030-S1	86.5	40	120	145	110h7	3.5	10	10 dia.	16h6	22	5	5	3
R7M-AP75030-BS1	120	40	120	145	110h7	3.5	10	10 dia.	16h6	22	5	5	3

Inverters
3G3JV

Quick Link
A031

Compact AC Inverter for Simple Motor Control

- Easy-to-use digital operator controls all parameter selections and settings
- Quick Start LEDs for quick setup and troubleshooting
- Fine-tune speed using the potentiometer on the digital operator
- Ideal for simple, small motor control applications — uses V/Hz control method
- Programmable output frequency, 400 Hz maximum
- Modbus serial communications
- Compact size: 5.04 H x 5.04 W x 6.34 D inches max. (230 VAC)
  - 5.04 H x 5.51 W x 6.34 D inches max. (460 VAC)

Specifications

Power supply		
Rated input voltage & frequency	3-phase, 200 to 230 V, 50/60 Hz Single-phase, 200 to 240 V, 50/60 Hz	3-phase, 380 to 460 V, 50/60 Hz
Allowable voltage fluctuation	-15% to +10%	
Allowable frequency fluctuation	±5%	
Control characteristics		
Control method	Sine Wave PWM (V/f control), possible to program any V/f pattern	
Frequency control range	0.1 to 400 Hz	
Frequency accuracy (temperature change)	Digital reference: ±0.01%, 14 to 122°F (-10 to +50°C) Analog reference: ±0.5%, 59 to 95°F (25±10°C)	
Frequency setting resolution	Digital reference: 0.1 Hz (less than 100 Hz)/1 Hz (100 Hz or more) Analog reference: (0:06/60 Hz) equivalent to 1/1000 of max. output frequency	
Output frequency resolution	0.01 Hz	
Overload capacity	150% rated output current for one minute	
Frequency setting signal	0 to 10 VDC (20 kΩ), 4 to 20 mA (250 Ω), 0 to 20 mA (250 Ω) frequency setting volume (selectable)	
Accel/Decel	0.1 to 999 sec. (accel./decel. time are independently programmed)	
Braking torque	Short-term average deceleration torque 0.13 HP, 0.25 HP: 150%; 0.5 HP, 1 HP: 100%; 2 HP: 50%; 3 HP or more: 20% Continuous regenerative torque: Approx. 20%	
Protective functions		
Motor overload protection	UL-recognized electronic thermal overload relay	
Instantaneous overcurrent	Motor coasts to a stop at approximately 250% rated output current	
Overload	Motor coasts to a stop after one minute at 150% rated output current Motor coasts to a stop at approximately 200% rated output current	
Overvoltage	Motor coasts to a stop if DC bus voltage exceed 410 V	Motor coasts to a stop if DC bus voltage exceeds 820 V
Undervoltage	Stops when DC bus voltage is approximately 200 V or less (approx. 160 V or less for single-phase series)	Stops when DC bus voltage is approximately 400 V or less
Momentary power loss	Stops if power loss is 15 ms or more. By setting inverter, operation can be continued if power is restored within approximately 0.5 s	
Cooling method	Cooling fan is provided for: 230 V, 1 HP or larger inverters (3-phase); 460 V, 2 HP or larger inverters (single-phase); other models are self-cooling	
Cooling fin overheat	Protected by electronic circuit	

Specifications (Continued)

Cooling fan fault	Protected by electronic circuit (fan-stalling detection)
Stall prevention	Individual levels during acceleration/running, enable/disable provided during deceleration
Ground fault	Protected by electronic circuit (rated output current level)
Power charge indication	RUN lamp stays ON or digital operator LED stays ON. (Charge LED is provided for 460 V) ON until the DC bus voltage becomes 50 V or less
Environmental conditions	
Enclosure rating	Open chassis: IP20
Location	Indoor (free from corrosive gases and dust)
Ambient temperature	Open chassis: 14 to 122°F (-10 to +50°C), not frozen
Storage temperature	-4 to 140°F (-20 to 60°C)
Humidity	95% RH (Non-condensing)
Elevation	1,000 m (3,281 feet) or below
Wiring distance	328 ft (100 m) or less between inverter and motor
Vibration	9.8 m/s^2 (1G) less than 20 Hz, up to 1.96 m/s^2 (0.2G) at 20 to 50 Hz
Other functions	
Multi-function inputs	Four of the following input signals are selectable: Reverse run (3-wire sequence), fault reset, external fault (NO/NC contact input), multi-step speed operation, Jog command, accel/decel time select, external baseblock (NO/NC contact input), speed search command, accel/decel hold command, LOCAL/REMOTE selection, communication/control circuit terminal selection, emergency stop fault, emergency stop alarm.
Multi-function outputs	Following output signals are selectable (1 NO/NC contact output): Fault, running, zero speed, at frequency, frequency detection (output frequency = or = set value), during overtorque detection, minor error, during baseblock, operation mode, inverter run ready, during fault retry, during under-voltage, during speed search, data output through communication.
Standard functions	Full-range automatic torque boost, slip compensation, DC injection braking current/time at start/stop frequency reference bias/gain, frequency reference with built-in potentiometer, MEMOBUS communications (RS-485/422, max. 19.2 K bps) capable with optional unit.

3G3JV Inverter Ordering Information

Description	Enclosure	Rating			Model
		HP	Voltage	Phase	
Compact inverter with V/Hz control	NEMA 1	1/8	240	1	**3G3JV-AB001-A**
		1/4	240	1	**3G3JV-AB002-A**
		3/4	240	1	**3G3JV-AB004-A**
		1	240	1	**3G3JV-AB007-A**
		2	240	1	**3G3JV-AB015-A**
		1/8	230	3	**3G3JV-A2001-A**
		1/4	230	3	**3G3JV-A2002-A**
		3/4	230	3	**3G3JV-A2004-A**
		1	230	3	**3G3JV-A2007-A**
		2	230	3	**3G3JV-A2015-A**
		3	230	3	**3G3JV-A2022-A**
		5	230	3	**3G3JV-A2037-A**
	Open chassis	1/2	460	3	**3G3JV-A4002-A**
		1	460	3	**3G3JV-A4004-A**
		2	460	3	**3G3JV-A4007-A**
		3	460	3	**3G3JV-A4015-A**
		3	460	3	**3G3JV-A4022-A**
		5	460	3	**3G3JV-A4037-A**

Manuals

Item	Description	Model
User's manual	3G3JV User's manual	**I528-E3-1**

Inverters
3G3MV

Quick Link
A032

Versatile Compact Inverter Offers Loop Vector and V/Hz Control

- Intuitive digital operator controls all parameter selections and settings
- Quick Start LEDs for fast setup and troubleshooting
- Standard PID control
- Modbus serial communications standard
- DeviceNet communications unit (optional) allows remote monitoring of Run/Stop status and operating conditions, and making changes to set values
- Fine-tune speed using the potentiometer on the digital operator
- User-selectable open loop vector and V/Hz control methods
- NEMA 4X models meet requirements for tough washdown and dust-tight environments
- NEMA 1 models available
- Compact size: Single phase, 230 VAC: 148 H x 170 W x 180 D mm max.
  - Three-phase, 230 VAC: 260 H x 180 W x 170 D mm max.
  - Three-phase, 460 VAC: 260 H x 180 W x 170 D mm max.
- Integrate a full-featured PLC into 3G3MV inverters with 6 input/4 output points, encoder input, interrupt inputs and pulse outputs; dual port RAM for 200 transfers per second; eliminates point-to-point wiring

Specifications

General Specifications

Power supply		
Rated input voltage & frequency	3-phase, 200 to 230 V, 50/60 Hz Single-phase, 200 to 240 V, 50/60 Hz	3-phase, 380 to 460 V, 50/60 Hz
Allowable voltage fluctuation	-15% to +10%	
Allowable frequency fluctuation	±5%	
Control characteristics		
Control method	Sine wave PWM (V/f control or voltage vector control, selectable); possible to program any V/f pattern	
Frequency control range	0.1 to 400 Hz	
Frequency accuracy (temperature change)	Digital reference: ±0.01%, 14 to 122°F (-10 to +50°C) Analog reference: ±0.5%, 59 to 95°F (25±10°C)	
Frequency setting resolution	Digital reference: 0.1 Hz (less than 100 Hz)/0.1 Hz (100 Hz or more) Analog reference: (0:06/60 Hz) equivalent to 1/1000 of max. output frequency	
Output frequency resolution	0.01 Hz	
Overload capacity	150% rated output current for one minute	
Frequency setting signal	0 to 10 VDC (20 kΩ), 4 to 20 mA (250 Ω), 0 to 20 mA (250 Ω) pulse train input, frequency setting potentiometer (Selectable)	
Accel/Decel	0.01 to 6000 seconds (accel/decel time are independently programmed 2 types)	
Braking torque	Short-term average deceleration torque: 0.1, 0.25 kW (0.13 HP, 0.25 HP): 150%; 0.55, 1.1 kW): (0.5 HP, 1 HP): 100% 1.5 kW (2 HP): 50%; 2.2 kW (3 HP) or more: 20% Continuous regenerative torque: Approx. 20% (150% with optional braking resistor, braking transistor built-in)	

General Specifications (Continued)

Protective functions		
Motor overload protection	UL-recognized electronic thermal overload relay	
Instantaneous overcurrent	Motor coasts to a stop at approximately 250% inverter rated current	
Overload	Motor coasts to a stop after one minute at 150% rated output current	
Overvoltage	Motor coasts to a stop if DC bus voltage exceeds 410 V	Motor coasts to a stop if DC bus voltage exceeds 820 V
Undervoltage	Stops when DC bus voltage is approximately 200 V or less (approx. 160 V or less for single-phase series)	Stops when DC bus voltage is approximately 400 V or less
Momentary power loss	Stops if power loss is 15 ms or more. By setting inverter, operation can be continued if power is restored within approximately 0.5 s	
Cooling method	Cooling fan is provided for the following models: 200 V, 0.75 kW or larger inverters (3-phase) 200 V, 1.5 kW or larger inverters (single-phase) Others models are self-cooling	
Cooling fin overheat	Protected by electronic circuit	
Cooling fan fault	Protected by electronic circuit (fan lock detection)	
Stall prevention	Individual levels during acceleration/running, enable/disable provided during coast to a stop	
Ground fault	Protected by electronic circuit (overcurrent level)	
Power charge indication	ON until the DC bus voltage becomes 50 V or less. RUN lamp stays ON or digital operator LED stays ON.	
Environmental conditions		
Enclosure rating	Enclosed wall mounted NEMA 1	
Location	Indoor (free from corrosive gases and dust)	
Ambient temperature	Enclosed wall mounted NEMA 1: 14 to 105° F (-10 to +40°C), not frozen	
Storage temperature	-4 to 140°F (-20 to 60°C)	
Humidity	95% RH or less (Non-condensing)	
Elevation	1,000 m (3,281 feet) or below	
Wiring distance	328 ft (100 m) or less between inverter and motor	
Vibration	9.8 m/s^2 (1G) less than 20 Hz, up to 2 m/s^2 (0.2G) at 20 to 50 Hz	
Other functions		
Multi-function inputs	Seven of the following input signals are selectable: Forward/reverse run (3-wire sequence), fault reset, external fault (NO/NC contact input), multi-step speed operation, Jog command, accel/decel time select, external base block (NO/NC contact input), speed search command, UP/DOWN command, accel/decel hold command, LOCAL/REMOTE selection, communication/control circuit terminal selection, emergency stop fault, emergency stop alarm, self test, PID control cancel, PID integral reset/hold	
Multi-function outputs	Following output signals are selectable (1 NO/NC contact output, 2 photo-coupler outputs): Fault, running, zero speed, at frequency, frequency detection (output frequency = or = set value), during overtorque detection, during undervoltage detection, minor error, during baseblock, operation mode, inverter run ready, during fault retry, during UV, during speed search, data output through communication, PID feedback loss detection	
Standard functions	Voltage vector control, full-range automatic torque boost, slip compensation, DC injection braking current/time at start/stop frequency reference bias/gain, MEMOBUS communications (RS-485/422, max. 19.2 K bps), PID control, energy-saving control, parameter copy, frequency reference with built-in potentiometer	

Inverter PLC Specifications

Model	**3G3MV-P10CDT3-E**	**3G3MV-P10CDT-E**
Type	Full feature PLC installs on face of 3G3MV inverters with 1/4 to 10 HP rating	
I/O points	6 input points (bi-directional input at 5 kHz; unidirectional input at 20 kHz) 4 output points (1 relay, 3 NPN transistor); I/O can be set for interrupt inputs (50 μs response) or pulse outputs	
Clock/calendar	Yes	No
Encoder interface	Yes	Yes
Connectivity	Direct HMI connection Peripheral port Serial ports: RS-232C, RS-422/485	Direct HMI connection Peripheral port RS-232C serial port
Memory backup	Flash memory and battery	Flash memory and capacitor
Dimensions	128 H x 68 W x 38.1 D mm	
Software	CX-Programmer included in CX-One	

Ordering Information

MV Inverter

Description	Enclosure	Rating			Model	
		HP	Voltage	Phase	NEMA 1 enclosure	NEMA 4X enclosure
Compact inverter with open loop vector and V/Hz control methods	NEMA 1 and NEMA 4X models available	1/8	230	1	**3G3MV-CB001**	—
		1/4	230	1	**3G3MV-CB002**	—
		3/4	230	1	**3G3MV-CB004**	—
		1	230	1	**3G3MV-CB007**	—
		2	230	1	**3G3MV-CB015**	—
		3	230	1	**3G3MV-CB022**	—
		5	230	1	**3G3MV-CB037**	—
		1/8	230	3	**3G3MV-C2001**	—
		1/4	230	3	**3G3MV-C2002**	**V7CU-20P2-N4**
		3/4	230	3	**3G3MV-C2004**	**V7CU-20P4-N4**
		1	230	3	**3G3MV-C2007**	**V7CU-20P7-N4**
		2	230	3	**3G3MV-C2015**	**V7CU-21P5-N4**
		3	230	3	**3G3MV-C2022**	**V7CU-22P2-N4**
		5	230	3	**3G3MV-C2037**	**V7CU-23P7-N4**
		7 1/2	230	3	**3G3MV-C2055**	**V7CU-25P5-N4**
		10	230	3	**3G3MV-C2075**	**V7CU-27P5-N4**
		1/2	460	3	**3G3MV-C4002**	**V7CU-40P2-N4**
		1	460	3	**3G3MV-C4004**	**V7CU-40P4-N4**
		2	460	3	**3G3MV-C4007**	**V7CU-40P7-N4**
		3	460	3	**3G3MV-C4015**	**V7CU-41P5-N4**
		3 1/2	460	3	**3G3MV-C4022**	**V7CU-42P2-N4**
		5	460	3	**3G3MV-C4037**	**V7CU-43P7-N4**
		10	460	3	**3G3MV-C4055**	**V7CU-45P5-N4**
		12 1/2	460	3	**3G3MV-C4075**	**V7CU-47P5-N4**

Accessories

Item	Description		Model
Inverter PLC	Advanced PLC with 6 inputs/4 outputs; built-in real-time clock/calendar and encoder interface; RS-422/485 and RS-232C serial communications		**3G3MV-P10CDT3-E**
	Standard PLC with 6 inputs/4outputs, encoder interface and RS-232C serial communications		**3G3MV-P10CDT-E**
DeviceNet unit	DeviceNet slave unit; permits a PLC to monitor Run/Stop and operating conditions and make changes in set values. Remote I/O and message communications can be used simultaneously between the PLC and 3G3MV inverter.		**3G3MV-PDRT2**
DIN rail mounting bracket	Single-phase, 230 VAC	3G3MV-□B001/-□B002/-□B004	**3G3IV-PEZZ08122A**
		3G3MV-□B007/-□B015	**3G3IV-PEZZ08122B**
		3G3MV-□B022	**3G3IV-PEZZ08122C**
		3G3MV-□B037	**3G3IV-PEZZ08122D**
	3-phase, 230 VAC	3G3MV-□2001/-□2002/-□2004/-□2007	**3G3IV-PEZZ08122A**
		3G3MV-□2015/-□2022	**3G3IV-PEZZ08122B**
		3G3MV-□2037	**3G3IV-PEZZ08122C**
	3-phase, 460 VAC	3G3MV-□4002/-□4004/-□4007/-□4015/-□4022	**3G3IV-PEZZ08122B**
		3G3MV-□4037	**3G3IV-PEZZ08122C**

Support Software and Programming Devices

Item	Description	Model
CX-Drive	Windows®-based programming software for setup; uploads and downloads parameters and monitoring	**Included in CX-ONE**
CX-Programmer	Sets up and monitors PLC operations	**Included in CX-ONE**

Manuals

Item	Description	Model
User's manual	3G3MV Series Multi-function Compact Inverter User Manual	**I527-E3-2**
DeviceNet unit	3G3MV-PDRT2 DeviceNet Communications Unit Operation Manual	**I539-E1-2**

Inverters
G5+

Quick Link
G089

Flux Vector Inverter 600V Constant Torque for Machine Automation

The G5+ Inverter offers ultra-fast processing. All systems are controlled by a 32-bit, 20 MHz RISC processor, which executes basic instructions in one clock cycle. The processor uses an innovative "5 stage pipeline architecture" which allows the processor to perform 5 instructions at one time. This results in a rating of 16 MIPS (Million Instructions Per Second).

- The control board is common to all chassis inverter sizes
- Field upgradeable Flash ROM
- Four programmable control modes to suit any specific application.
- Built-in motor auto-tuning for easy start-up
- 2 sets of motor constants — very useful in machine tools applications
- 2 Line x 16 characters alphanumeric operator makes programming easier to understand
- Dedicated Serial Communication Port allows to network the G5+ with other devices
- PID function with feedback loop
- Energy savings software helps reduce power consumption
- Customized CASE software for specific applications

Canada Only

Specifications

Power supply	
Rated input voltage & frequency	3-phase, 500/575/600 VAC, 50/60Hz
Allowable voltage fluctuation	-15% of 500 VAC; +10% of 600 VAC
Allowable frequency fluctuation	±5%
Control characteristics	
Control method	Sine coded PWM (digital flux vector)
Starting torque	150% below 1 Hz (150% at 0 RPM with PG)
Speed control range	100:1 (1000:1 with PG)
Speed control accuracy	±0.2% (±0.02% with PG)
Speed response	5 Hz (30 Hz with PG)
Torque limit	Can be set by parameter: 4 steps available
Torque accuracy	±5%
Torque response	20 Hz (40 Hz with PG)
Frequency control range	0.1 to 400 Hz
Frequency accuracy	Digital Command: ±0.01%, +14° to 104°F (-10° to 40°C) Analog Command: ±0.1%, 77±18°F (25±10°C)
Frequency setting resolution	Digital Operator Reference: 0.01 Hz (12 bits) Analog Reference: 0.03 Hz/60 Hz (14 bits)
Output frequency resolution	0.01 Hz
Overload capacity	150% rated output current for one minute
Frequency setting signal	-10 to +10 V, 0 to +10 V, 4 to 20 mA
Accel/Decel	0.01 to 6000.0 seconds (Accel/Decel time setting independently; 4 steps available)
Braking torque	Approximately 20% (Approximately 125% when using braking resistor*) *Set I3-04=0 (Stall Prevention selection during decel is disabled) when connecting braking transistors or braking resistor.
Protective functions	
Motor overload protection	UL-recognized electronic thermal overload relay

Specifications (Continued)

Instantaneous overcurrent	Motor coasts to a stop at approximately 200% rated output current
Fuse protection	Motor coasts to a stop at blown fuse
Overload	Motor coasts to a stop after one minute at 150% rated output current
Overvoltage	Motor coasts to a stop if converter output voltage exceeds 1,050 VDC at 600 V input
Undervoltage	Motor coasts to a stop if converter output voltage drops to 546 VDC or below at 600 V input
Momentary power loss	Immediate stop after 15ms or longer power loss (setting mode before shipment)
Fin overheat	Thermostat
Stall prevention	Stall prevention during accel/decel and constant speed operation
Ground fault	Provided by electronic circuit (overcurrent level)
Power charge indication	Charge led stays ON until bus voltage drops below 50 VDC
Environmental conditions	
Location	Indoor (Protected from corrosive gases and dust)
Ambient temperature	+14 to 104°F (-10 to 40°C) for NEMA 1 type +14 to 113°F (-10 to 45°C) for Open Chassis Type
Storage temperature	-4 to 140°F (-20 to 60°C)
Humidity	95% RH (Non-condensing)
Elevation	1,000 m (3,281 feet) or below
Wiring distance	328 ft (100 m) or less between inverter and motor
Vibration	9.8 m/s^2 (1G) less than 20 Hz, up to 1.96 m/s^2 (0.2G) at 20 to 50 Hz
Other functions	
Input signals	3 Analog Inputs available (0 to 10 V, -10 to +10 V, 4 to 20 mA)
Multi-function inputs	8 Digital Inputs with 6 programmable for functions such as: 3 wire sequencing (2 wire is standard), multi-step speed operation, fault reset, external fault (NO or NC), jog, accel/decel time select, MOP function, speed search command, Local/Remote selection, motor 1 or 2 selection, PID disable, PID reset, trim increase or decrease, fast stop, analog signal selection, and many others
Output signals	2 Analog Outputs (0 to 10 V) with 25 different settable functions
Multi-function outputs	4 Digital Outputs (Form C fault contacts plus 3 programmable outputs [1 form A, 2 open collector]). Programmable Output functions available are: run signal, zero speed, frequency agree (2), frequency detection (4), torque level detection (2), timer output, at current/torque limit, regenerating, minor or major fault, DB overheat, loss of reference, and many others.
Standard functions	Settable for V/Hz, open loop vector, or closed loop vector, DC injection braking, PID control, zero servo mode, energy saving mode, 4 accel/decel times with S-curve, 8 preset speeds, slip and torque compensation, 3 jump frequencies, stall prevention, auto restart, and many other standard features.

Ordering Information

G5+ Inverter

Description	Enclosure	Rating	Model
Flux vector inverter with constant torque control	NEMA 1	2 HP, 3.5 A, 575 VAC	**G5M-51P5-N1**
		3 HP, 4.1 A, 575 VAC	**G5M-52P2-N1**
		5 HP, 6.3 A, 575 VAC	**G5M-53P7-N1**
		7.5 HP, 9.8A, 575 VAC	**G5M-55P5-N1**
		10 HP, 12.5 A, 575 VAC	**G5M-57P5-N1**
		15 HP, 17.0 A, 575 VAC	**G5M-5011-N1**
		20 HP, 22.0 A, 575 VAC	**G5M-5015-N1**
		25 HP, 27.0 A, 575 VAC	**G5M-5018-N1**
		30 HP, 32.0 A, 575 VAC	**G5M-5022-N1**
		40 HP, 41.0 A, 575 VAC	**G5M-5030-N1**
		50 HP, 52.0 A, 575 VAC	**G5M-5037-N1**
		60 HP, 62.0 A, 575 VAC	**G5M-5045-N1**
		75 HP, 77 A, 575 VAC	**G5M-5055-N1**
		100 HP, 99 A, 575 VAC	**G5M-5075-N1**
	Open chassis	120 HP, 130 A, 575 VAC	**G5M-5090-N0**
		150 HP, 172 A, 575 VAC	**G5M-5110-N0**
		200 HP, 200 A, 575 VAC	**G5M-5160-N0**

Support Software and Programming Devices

Item	Description	Model
CX-Drive	Windows®-based programming software for sets up Uploads and downloads parameters and monitoring	**Included in CX-ONE**

Manuals

Item	Description	Model
User's manual	G5+ User's manual	**IM-G5**

Inverters
P5+

Quick Link
G089A

Powerful 600V Variable Torque Inverter for Building Automation

- Energy savings software helps reduce power consumption
- Built-in PID function allows feedback loop
- Highly programmable with 116 parameters
- UL listed electronic thermal overload that eliminates external devices
- Speed search function restarts a coasting motor without stopping it, after a power loss
- Multi-function Inputs (5) & Outputs (3) for increased flexibility
- 5 preset speeds (4 speeds + jog) allows multi-step operation
- Stall prevention/Current limit prevent overcurrent trips and motor stall
- Momentary power loss ride-through Continue the operation, after recovery from a momentary power loss
- Critical frequency lockouts (2) to avoid mechanical resonance (as in cooling towers)
- Alphanumeric digital operator makes programming easier to understand
- Communications cards for MetaSys N2, Apogee, and Echelon LONworks building automation protocols. Use optional communication card Modbus RTU to control up to 31 Drives
- Common control board across all models
- 3rd generation IGBT output section
- Terminals for optional DC link reactor (from 2HP / 600V up to 20 HP / 600V)
- Built-in braking IGBT (from 2HP / 600V up to 30 HP / 600V)
- Built-in RS-232C port for direct connection to programming tools

Canada Only

Specifications

Power Supply	
600V rated input voltage & frequency	3-phase, 500/575/600 VAC, 50/60 Hz
Allowable voltage fluctuation	-15% of 500 VAC, +10% of 600 VAC
Allowable frequency fluctuation	±5%
Control Characteristics	
Control method	Sine Wave PWM
Frequency control range	0.1 to 400 Hz
Frequency accuracy	Digital Operator Reference: 0.01% Analog Reference: 0.1%
Frequency setting resolution	Digital Operator Reference: 0.01 Hz Analog Reference: 0.06 Hz/60 Hz
Output frequency resolution	0.01 Hz
Overload capacity	120% rated output current for one minute (150% for constant torque rating)
Frequency setting signal	0 to +10 V (20 kΩ), 4 to 20 mA (250 Ω)
Accel/Decel	0.01 to 3600.0 sec (Accel/Decel time setting independently; 0.1sec)
Braking torque	Approximately 20%
Protective Functions	
Motor overload protection	UL recognized internal electronic thermal overload relay (I^2t)

Specifications (Continued)

Instantaneous overcurrent	Motor coasts to a stop at approximately 180% rated output current
Fuse protection	Motor coasts to a stop at blown fuse
Overload	Motor coasts to a stop after one minute at 120% rated output current (150% for constant torque)
Overvoltage	Motor coasts to a stop if converter output exceeds 1,050 VDC at 600 VAC input
Undervoltage	Motor coasts to a stop if converter output voltage drops below 546 VDC
Momentary power loss	Immediate stop after 15 ms or longer power loss (Continuous system operation during power loss less than 2 seconds is equipped as standard)
Fin overheat	Thermistor – OH1, OH2
Stall prevention	Stall prevention during accel/decel and constant speed operation
Ground fault	Provided by electronic circuit
Power charge indication	Charge LED stays on until bus voltage drops below 50 VDC
Environmental Conditions	
Location	Indoor (Protected from corrosive gases and dust)
Ambient temperature	+14 to 104°F (-10 to 40°C) for NEMA 1 type (not frozen) +14 to 113° F (-10 to 45° C) for Open Chassis type
Storage temperature	-4 to 140°F (-20 to 60°C)
Humidity	95% RH (non-condensing)
Elevation	1000 m (3281 feet) or below
Vibration	9.8 m/s^2 (1G) less than 20 Hz, up to 1.96 m/s^2 (0.2G) at 20 to 50 Hz
Wiring distance	328 ft (100 m) or less between inverter and motor
Other Functions	
Analog inputs	2 analog inputs available (0-10 V, 4-20 mA)
Multi-function digital inputs	6 Digital Inputs with 5 programmable for functions such as: 3 wire sequencing (2 wire is standard), multi-step speed operation, fault reset, external fault (NO or NC), jog, accel/decel time select, speed search command, Local/Remote selection, PID disable, PID reset, fast stop, serial communication select, timer start, parameter lockout, and many others.
Analog outputs	1 Analog Output (0-10 V) settable as output frequency, output current, output KW, or DC bus voltage.
Multi-function digital outputs	2 Programmable Digital Outputs (1 form C and 1 form A), Programmable functions available are: run signal, fault, at speed, frequency detection (2), overtorque detection (NO or NC), timer output, loss of reference or PID feedback, and many others.
Standard functions	DC injection braking, PID control, Energy Saving mode, 2 accel/decel times with S-curve, 4 preset speeds, selectable for constant or variable torque, 2 jump frequencies, stall prevention, auto restart, power-loss ride through, and many other standard features.

Ordering Information

P5+ Inverter

Description	Enclosure	Rating	Model
Variable torque inverter	NEMA 1	2 to 3 HP, 3.9 A, 600 VAC	**P5M-51P5-N1**
		5.0 HP, 7.0 A, 600 VAC	**P5M-53P7-N1**
		7.5/10 HP, 11 A, 600 VAC	**P5M-55P5-N1**
		15 HP, 19 A, 600 VAC	**P5M-5011-N1**
		20 HP, 25 A, 600 VAC	**P5M-5015-N1**
		25 HP, 30 A, 600 VAC	**P5M-5018-N1**
		30 HP, 36 A, 600 VAC	**P5M-5022-N1**
		40 HP, 46 A, 600 VAC	**P5M-5030-N1**
		50 HP, 58 A, 600 VAC	**P5M-5037-N1**
		60 HP, 69 A, 600 VAC	**P5M-5045-N1**
		75 HP, 86 A, 600 VAC	**P5M-5055-N1**
		100 HP, 111 A, 600 VAC	**P5M-5075-N1**
	Open chassis	125/150 HP, 145 A, 600 VAC	**P5M-5090-N0**
		200 HP, 192 A, 600 VAC	**P5M-5110-N0**

Manuals

Item	Description	Model
User's manual	User's manual	**IM-P5**

Inverters
RV

Quick Link
A036

Flux Vector Inverter for General-Purpose & High-End Applications

- Wide range of sizes available in 230 VAC and 460 VAC, from ½ to 150 HP in 230 VAC and ¾ to 500 HP in 460 VAC. It is UL, cUL and CE compliant
- Volts/Hertz setting for simple applications and open or closed loop vector control for advanced applications satisfy most motor control needs
- Built-in functions like PID parameter calculation, Energy savings, Configurable digital and analog I/O, Over-current tripping protection ensures uninterrupted operation, DC Bus choke above 30 HP, and 12 pulse rectification standard above 50 HP (100 HP at 460 V)
- New static auto-tune function that eliminates the need for motor rotation to determine and set parameters
- High-slip braking function for intermittent braking applications shortens motor stopping time by one-third without using braking resistors
- Broad Network Communications available like a built-in RS-485/422 Modbus communications protocol and made available optional cards for DeviceNet (3G3RV-PDRT2), Modbus Plus (CM071), Ethernet Modbus TCP/IP (CM090), LONWorks (CM048) and Profibus-DP (CM061)

Canada Only

- High reliability with an MTBF of 28 years
- Easy to maintain and inspect the cooling fan with detachable fan design and life-prolonging automatic fan shutoff; split cover panel allows safe access to control terminals
- Quick inverter setup simplified through a quick program mode and the standard keypad doubles as a copy unit to set multiple drives
- Removable terminal strip eliminates the need to re-wire the drive
- Integrate a PLC into 3G3RV inverters with 6 input/4 output points, clock/calendar and encoder interface built in
- All RV models have a unique, low-carrier PWM control to suppress audible noise

Specifications

Inverters

Control characteristics	
Control method	Sine wave PWM; Closed loop flux vector, Open loop vector control, V/f control, V/f with PG control (switched by parameter setting)
Speed control range	100:1 (1000:1 with PG)
Speed control accuracy	±0.2% (25°C ±10°C) (±0.02% with PG)
Speed control response	5 Hz (30 Hz with PG)
Torque characteristics	Heavy duty/CT selected (low carrier, fixed torque applications): 150% /0.5 Hz (Open or closed loop vector control) Normal duty/VT selected (high carrier, variable torque applications): 120%/0.5 Hz
Frequency control range	0.01 to 300 Hz (CT selected.), 0.01 to 400 Hz (VT selected.)
Frequency accuracy (temperature characteristics)	Digital references: ±0.01% (-10°C to +40°C) Analog references: ±0.1% (25°C ±10°C)
Frequency setting resolution	Digital references: 0.01 Hz Analog references: 0.03 Hz/60 Hz (10 bit with sign)
Output frequency resolution	0.001 Hz
Overload capacity and maximum current	Heavy duty/CT selected: 150% of rated output current per minute Normal duty/VT selected: Approximately 110% of rated output current per minute
Frequency setting signal	Voltage input of 0 to ±10 or 0 to 10 (20 kΩ) VDC or current input of 4 to 20 mA
Acceleration/deceleration time	0.01 to 6000.0 s (4 selectable combinations of independent acceleration and deceleration settings)
Braking torque	Approximately 20% (Approximately 125% with Braking Resistor option) (100% + with High Slip Braking)
Main control functions	Auto restart after momentary power loss, speed searches, overtorque detection, torque limits, 16-speed control (maximum), acceleration/deceleration time changes, S-curve acceleration/deceleration, 2-wire or 3-wire sequence, auto-tuning (rotational or stationary), dwell functions, cooling fan ON/OFF control, slip compensation, torque compensation, jump frequencies, upper and lower frequency limits, DC injection braking for starting and stopping, high-slip braking, PID control (with sleep function), energy saving control, RS-485/422A communications (Conforms to Modbus, 19.2 kbps maximum), fault reset, and function copying

Protective functions	
Motor protection	UL recognized protection by electronic thermal overload relay (i^2t).
Overcurrent protection	Instantaneous protection. Stops at approximately 200% of rated output current.
Overload protection	Heavy duty/CT selected (low carrier, fixed torque applications): 150% of rated output current per minute (not for 110 kW) Normal duty/VT selected (high carrier, variable torque applications): Approximately 110% of rated output current per minute
Overvoltage protection	200 Class Inverter: Stops when main-circuit DC voltage is above 410 VDC. 400 Class Inverter: Stops when main-circuit DC voltage is above 820 VDC.
Undervoltage protection	200 Class Inverter: Stops when main-circuit DC voltage is below 190 VDC. 400 Class Inverter: Stops when main-circuit DC voltage is below 380 VDC.
Momentary power loss ridethru	Stops for 15 ms or more. By selecting the momentary power loss method, operation can be continued if power is restored within 2 s.
Cooling fin overheating	Protection by thermistor
Grounding protection	Protection by electronic circuits. (Overcurrent level)
Charge indicator	Lit when the main circuit DC voltage is approximately 50 V or more.
Environmental conditions	
Application site	Indoor (no corrosive gas, dust, etc.)
Ambient operating temperature	-10°C to 40°C (Closed wall-mounted type) / 10°C to 45°C (Open chassis type)
Storage temperature	-20°C to + 60°C (short-term temperature during transportation)
Ambient operating humidity	95% max. (with no condensation)
Altitude	3300 ft (1000 m) max.
Vibration	10 to 20 Hz, 9.8 m/s^2 max.; 20 to 50 Hz, 2 m/s^2 max, oscillation vibration of 20 Hz
Protective enclosure	Enclosed, wall-mounting (NEMA1: Equivalent to IP20) or Mounted in a panel (equivalent to IP00)

Inverter PLC

Model	3G3RV-P10ST8-E
Type	Embedded board PLC, installs inside 3G3RV inverters
I/O points	6 input points, 4 output points on the PLC board 256 I/O by using CompoBus/S distributed network
Clock/calendar	Yes
Encoder interface	Yes
Connectivity	Peripheral port Serial ports: RS-232C, RS-422/485 CompoBus/S master DeviceNet slave
Software	CX-Programmer included in CX-One

Ordering Information

RV Inverter

Description	Enclosure	Rating	Model
Flux vector inverter with selectable constant torque and variable torque	NEMA 1	0.5 HP 3.2 A, 230 VAC	**RV-A2004**
		1.0 HP 4.1 A, 230 VAC	**RV-A2007**
		2 HP 7 A, 230 VAC	**RV-A2015**
		3 HP 9.6 A, 230 VAC	**RV-A2022**
		5 HP 15 A, 230 VAC	**RV-A2037**
		7.5 HP 23 A, 230 VAC	**RV-A2055**
		10 HP 31 A, 230 VAC	**RV-A2075**
		15 HP 45 A, 230 VAC	**RV-A2110**
		20 HP 58 A, 230 VAC	**RV-A2150**
		25 HP 71 A, 230 VAC	**RV-A2185**
		30 HP 85 A, 230 VAC	**RV-A2220**
		40 HP 115 A, 230 VAC	**RV-A2300**
	Open chassis	50 HP 145 A, 230 VAC	**RV-B2370**
		60 HP 180 A, 230 VAC	**RV-B2450**
		75 HP 215 A, 230 VAC	**RV-B2550**
		100 HP 283 A, 230 VAC	**RV-B2750**
		125 HP 346 A, 230 VAC	**RV-B2900**
		150 HP 415 A, 230 VAC	**RV-B211K**

RV Inverter (Continued)

Description	Enclosure	Rating	Model
Flux vector inverter with selectable constant torque and variable torque (cont'd)	NEMA 1	¾ HP 1.8 A, 460 VAC	**RV-A4004**
		1 HP 2.1 A, 460 VAC	**RV-A4007**
		2 HP 3.7 A, 460 VAC	**RV-A4015**
		3 HP 5.3 A, 460 VAC	**RV-A4022**
		5 HP 7.6 A, 460 VAC	**RV-A4037**
		7.5 HP 12.5 A, 460 VAC	**RV-A4055**
		10 HP 17 A, 460 VAC	**RV-A4075**
		15 HP 24 A, 460 VAC	**RV-A4110**
		20 HP 31 A, 460 VAC	**RV-A4150**
		25 HP 39 A, 460 VAC	**RV-A4185**
		30 HP 45 A, 460 VAC	**RV-A4220**
		40 HP 60 A, 460 VAC	**RV-A4300**
		50 HP 75 A, 460 VAC	**RV-A4370**
		60 HP 91 A, 460 VAC	**RV-A4450**
		75 HP 112 A, 460 VAC	**RV-A4550**
	Open chassis	100 HP 150 A, 460 VAC	**RV-B4750**
		150 HP 180 A, 460 VAC	**RV-B4900**
		200 HP 260 A, 460 VAC	**RV-B413K**
		250 HP 304 A, 460 VAC	**RV-B416K**
		300 HP 370 A, 460 VAC	**RV-B418K**
		400 HP 506 A, 460 VAC	**RV-B422K**
		500 HP 675 A, 460 VAC	**RV-B430K**

Accessories

Item	Description	Model
Inverter PLC	Embedded PLC board with 6 inputs/4 outputs; built-in clock/calendar and encoder interface; CompoBus/S master and DeviceNet slave network capabilities	**3G3RV-P10ST8-E**
DeviceNet unit	DeviceNet slave unit; permits a PLC to monitor Run/Stop and operating conditions and make changes in set values. Remote I/O and message communications can be used simultaneously between the PLC and 3G3RV inverter	**3G3RV-PDRT2**

Support Software and Programming Devices

Item	Description	Model
CX-Drive	Windows®-based programming software for sets up Uploads and downloads parameters and monitoring	**Included in CX-ONE**

Manuals

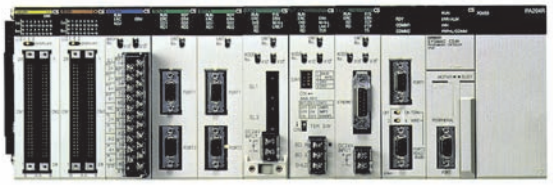
Item	Description	Model
User's manual	3G3RV Series Multi-function Compact Inverter User Manual	**I540-E3-02**
DeviceNet unit	3G3□V-PDRT2 DeviceNet Communications Unit Operation Manual	**I539-E1-02**

Position Controllers
CJ1/CS1-NC/-CT/-HC

PLC-Based Accurate Positioning Control

From simple position measurement to multi-axis synchronized control, Omron offers a full range of PLC-based solutions:

- High-Speed Counter modules gather position information from SSI or incremental encoders. Actual positions are compared with internally started target values.
- Position Control modules 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 control modules equipped with MECHATROLINK-II interface can control multiple drives through a single, high-speed data link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.



MECHATROLINK-II is a registered trademark of Yaskawa Corporation.

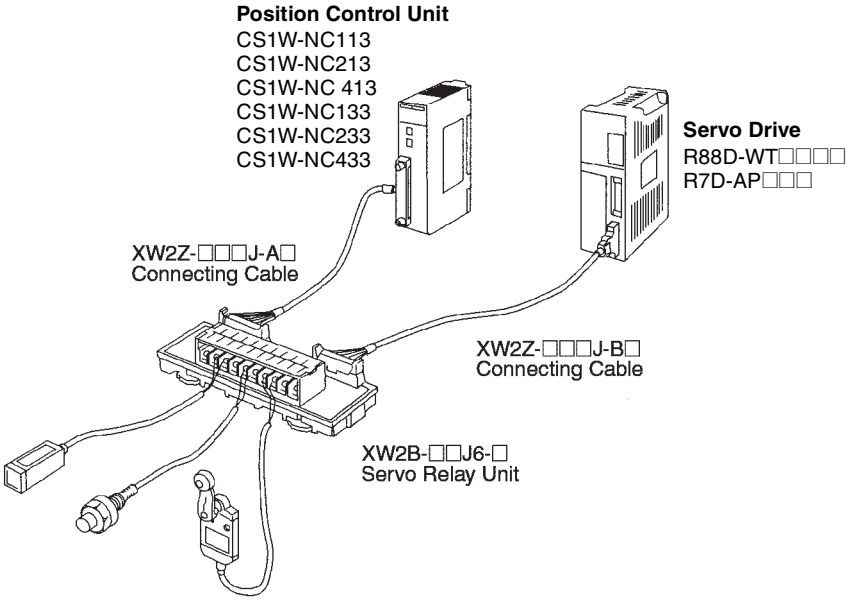
Ordering Information

CS1 Series

Modules are counted as Special I/O and occupy one rack slot.

Channels /axes	Type	Signal type	Current consumption	Remarks	Servo series	Connection type	Model
2	SSI inputs (absolute position data)	Synchronous Serial Protocol	320 mA	Baud rate, encoding type, data length, etc. can be set per channel	—	M3 screw	**CS1W-CTS21**
2	500 kHz counter	Line driver, 24 V	360 mA	Configurable digital inputs + outputs; target values trigger interrupt to CPU	—	1 x 40 pt (Fujitsu)	**CS1W-CT021**
4			450 mA		—	2 x 40 (MIL-spec)	**CS1W-CT041**
1	Position controller	Open collector, 24 V	250 mA	500 kpps pulse outputs; inputs for origin, limit switches, stop, interrupt Use CX-Position software	WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CS1W-NC113**
2			250 mA		WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CS1W-NC213**
4			360 mA		WT-Series U-Series SmartStep	2 x 40 pt (Fujitsu)	**CS1W-NC413**
1	Position controller	Line driver	250 mA		WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CS1W-NC133**
2			250 mA		WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CS1W-NC233**
4			360 mA		WT-Series U-Series SmartStep	2 x 40 pt (Fujitsu)	**CS1W-NC433**
16	Position controller	MECHATROLINK-II	360 mA	Position, speed and torque control; access to all drive parameters Use CX-Motion NCF	WN-Series ML2	Mechatro-Link-II	**CS1W-NCF71**

Servo Relay Unit Connection Compatibility with CS1 Position Control Modules



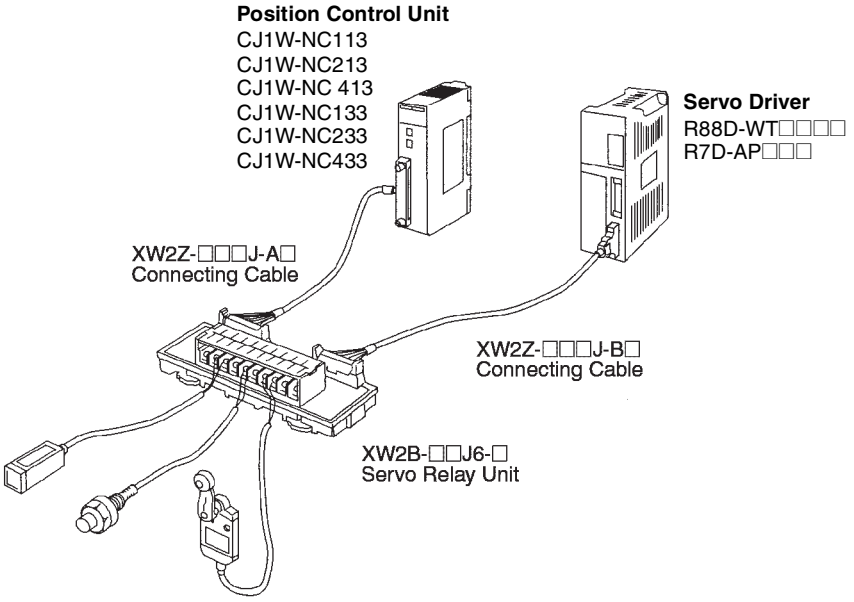
Position control unit (PCU)	Cable between PCU and servo relay unit	Servo relay unit	Cable between servo relay unit and servo driver	Servo driver
CS1W-NC113	XW2Z-050J-A6 (0.5 m) XW2Z-100J-A6 (1 m)	XW2B-20J6-1B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
	XW2Z-050J-A8 (0.5 m) XW2Z-100J-A8 (1 m)	XW2B-20J6-1B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
CS1W-NC213 CS1W-NC413	XW2Z-050J-A7 (0.5 m) XW2Z-100J-A7 (1 m)	XW2B-40J6-2B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
		XW2B-40J6-4A	XW2Z-100J-B8 (1 m) XW2Z-200J-B8 (2 m)	R88D-WT□□□□ when using RS-422
	XW2Z-050J-A9 (0.5 m) XW2Z-100J-A9 (1 m)	XW2B-40J6-2B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
		XW2B-40J6-4A	XW2Z-100J-B7 (1 m) XW2Z-200J-B7 (2 m)	R7D-AP□□□ when using RS-422
CS1W-NC133	XW2Z-050J-A10 (0.5 m) XW2Z-100J-A10 (1 m)	XW2B-20J6-1B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
	XW2Z-050J-A12 (0.5 m) XW2Z-100J-A12 (1 m)	XW2B-20J6-1B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
CS1W-NC233 CS1W-NC433	XW2Z-050J-A11 (0.5 m) XW2Z-100J-A11 (1 m)	XW2B-40J6-2B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
		XW2B-40J6-4A	XW2Z-100J-B8 (1 m) XW2Z-200J-B8 (2 m)	R88D-WT□□□□ when using RS-422
	XW2Z-050J-A13 (0.5 m) XW2Z-100J-A13 (1 m)	XW2B-40J6-2B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
		XW2B-40J6-4A	XW2Z-100J-B7 (1 m) XW2Z-200J-B7 (2 m)	R7D-AP□□□ when using RS-422
CS1W-HCP22-V1	XW2Z-050J-A29 (0.5 m) XW2Z-050J-A32 (0.5 m)	XW2B-80J7-1A	XW2Z-100J-B11 (1 m) XW2Z-200J-B11 (2 m)	R88D-WT□□□□
	XW2Z-100J-A29 (1 m) XW2Z-100J-A32 (1 m)		XW2Z-100J-B12 (1 m) XW2Z-200J-B12 (2 m)	R7D-AP□□□

CJ1 Series

Modules are counted as Special I/O, except 16-point CJ1W-NCF71, which is a CPU bus module.

Channels/ axes	Type	Signal type	Current consumption	Remarks	Servo series	Connection type	Model
2	SSI inputs (absolute position data)	Synchronous Serial Protocol	300 mA	Baud rate, encoding type, data length, etc. can be set per channel	—	M3 screw	**CJ1W-CTS21-E**
2	500 kHz counter	Line driver, 24 V	280 mA	Configurable digital inputs + outputs; Target values trigger interrupt to CPU	—	1 x 40 pt (Fujitsu)	**CJ1W-CT021**
4	100 kHz counter	Line driver, 24 V via terminal block	320 mA		—	1 x 40 (MIL-spec)	**CJ1W-CTL41-E**
1	Position controller	Open collector, 24 V	250 mA	500 kpps pulse outputs; inputs for origin, limit switches, stop, interrupt Use CX-Position software	WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CJ1W-NC113**
2			250 mA		WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CJ1W-NC213**
4			360 mA		WT-Series U-Series SmartStep	2 x 40 pt (Fujitsu)	**CJ1W-NC413**
1	Position controller	Line driver	250 mA		WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CJ1W-NC133**
2			250 mA		WT-Series U-Series SmartStep	1 x 40 pt (Fujitsu)	**CJ1W-NC233**
4			360 mA		WT-Series U-Series SmartStep	2 x 40 pt (Fujitsu)	**CJ1W-NC433**
16	Position controller	Mechatro-Link-II	360 mA	Position, speed and torque control; access to all drive parameters Use CX-Motion NCF	WN-Series ML2	Mechatro-Link-II	**CJ1W-NCF71**

Servo Relay Unit Connection Compatibility with CJ1 Position Control Modules



Position control unit (PCU)	Cable between PCU and servo relay unit	Servo relay unit	Cable between servo relay unit and servo driver	Servo driver
CJ1W-NC113	XW2Z-050J-A14 (0.5 m) XW2Z-100J-A14 (1 m)	XW2B-20J6-1B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
	XW2Z-050J-A16 (0.5 m) XW2Z-100J-A16 (1 m)	XW2B-20J6-1B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
CJ1W-NC213 CJ1W-NC413	XW2Z-050J-A15 (0.5 m) XW2Z-100J-A15 (1 m)	XW2B-40J6-2B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
		XW2B-40J6-4A	XW2Z-100J-B8 (1 m) XW2Z-200J-B8 (2 m)	R88D-WT□□□□ when using RS-422
	XW2Z-050J-A17 (0.5 m) XW2Z-100J-A17 (1 m)	XW2B-40J6-2B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
		XW2B-40J6-4A	XW2Z-100J-B7 (1 m) XW2Z-200J-B7 (2 m)	R7D-AP□□□ when using RS-422
CJ1W-NC133	XW2Z-050J-A18 (0.5 m) XW2Z-100J-A18 (1 m)	XW2B-20J6-1B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
	XW2Z-050J-A20 (0.5 m) XW2Z-100J-A20 (1 m)	XW2B-20J6-1B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
CJ1W-NC233 CJ1W-NC433	XW2Z-050J-A19 (0.5 m) XW2Z-100J-A19 (1 m)	XW2B-40J6-2B	XW2Z-100J-B4 (1 m) XW2Z-200J-B4 (2 m)	R88D-WT□□□□
		XW2B-40J6-4A	XW2Z-100J-B8 (1 m) XW2Z-200J-B8 (2 m)	R88D-WT□□□□ when using RS-422
	XW2Z-050J-A21 (0.5 m) XW2Z-100J-A21 (1 m)	XW2B-40J6-2B	XW2Z-100J-B5 (1 m) XW2Z-200J-B5 (2 m)	R7D-AP□□□
		XW2B-40J6-4A	XW2Z-100J-B7 (1 m) XW2Z-200J-B7 (2 m)	R7D-AP□□□ when using RS-422

Software Documentation

Description	Specification	Model
CX-Position support software	Included in CX-ONE	**Manual W433**
CX-Motion NCF support software	Included in CX-ONE	**Manual W436**

Motion Controllers
CJ1/CS1-MC

High-Speed PLC-Based Motion Controllers

Motion control modules for CJ1 and CS1 PLC series are equipped with MECHATROLINK-II interface that can control multiple drives through a single, high-speed data link. Message routing through multiple communication layers allows the attached drives to be configured from any point in the control network.

- PLC-based motion controller eliminates integration of motion controllers from other suppliers
- Complete digital control of drives via MECHATROLINK-II replaces SERCOS programming
- Controls a total of 32 axes (30 physical max.)
- Simplified wiring saves design time and installation and maintenance costs
- Real multi-tasking and parallel programming
- Simple to develop and modify motion programs using BASIC
- Access to the complete system from one point allows quick troubleshooting and effective time management
- Linear, circular, and helical interpolation for accurate positioning
- Electronic axes synchronization produces smooth motion
- Electronic cam profiles simulates popular mechanical ones to shorten setup
- Dedicated inputs/outputs on the controller
- All features of the W-Series servos are available

MECHATROLINK-II is a registered trademark of Yaskawa Corporation.

MECHATROLINK-II High-Speed Motion Link

This high-speed interface replaces the costly discrete wiring required with traditional systems. Just one MECHATROLINK-II cable eliminates the need for about 15 to 18 wires for each axis, simplifying wiring, and reducing installation costs and time. It also means that maintenance and troubleshooting are minimized. With a baud rate of up to 10 MHz, the MECHATROLINK-II link provides communication cycle times of 0.5 ms for 4 axes, to 4 ms for 30 axes, ensuring fast, precise motion control.

Ordering Information

CJ1/CS1 Motion Controllers

Type	Axes	Output type	Rating	Servo series	PLC series	Current consumption	Model
Motion control module	2 axes	Analog	Uses G language Uses CX-Motion software	WT-Series U-Series	CS1	0.60 A (w/ Teaching Box: 0.80)	**CS1W-MC221-V1**
	4 axes	Analog	Uses G language Uses CX-Motion software	WT-Series U-Series	CS1	0.70 A (w/ Teaching Box: 1.00)	**CS1W-MC421-V1**
	30 axes	MECHATRO-LINK-II	Uses CX-Motion MCH software; MECHATROLINK-II high-speed bus provides instant communications between the motional controller and Omron's W-Series servo drives Functions: Electronic cam profiles and axis synchronization; Registration inputs; accesses all drive parameters; gear functions	WN-Series ML2	CS1	0.8 A, 5 VDC (counts as CPU bus unit)	**CS1W-MCH71**
				WN-Series ML2	CJ1-H/ CJ1M	0.6 A, 5 VDC (counts as CPU bus unit)	**CJ1W-MCH71**

Servo Driver Connection Cables to Motion Control Modules

Motion Control Unit (MCU)	Control axes	Terminal block model	I/O Cable model (between Terminal Block and MCU)	Servo driver
CS1W-MC221	2	**XW2B-20J6-6**	**XW2Z-100J-F1 (1 m)**	R88D-W
CS1W-MC421	4	**XW2B-40J6-7**	**XW2Z-100J-F1 (1 m)**	

Cables Between Motion Control Unit and Servo Driver

Servo driver	Cable length	Cable between MCU and Servo Driver	
		1 axis model	2-axis model
R88D-W	1 m	**R88A-CPW001M1**	**R88A-CPW001M2**
	2 m	**R88A-CPW002M1**	**R88A-CPW002M2**
	3 m	**R88A-CPW003M1**	**R88A-CPW003M2**
	5 m	**R88A-CPW005M1**	**R88A-CPW005M2**

MECHATROLINK-II Accessories and Cables

Motion Control Unit	Description	Specification	Model
CJ1W-MCH71 CS1W-MCH71	MECHATROLINK-II Interface Unit	For W-Series servo drivers	**FNY-NS115**
	24 VDC I/O Module	64 inputs/64 outputs	**FNY-IO2310**
	Counter Module	2-channel reversible counter	**FNY-PL2900**
	Pulse Output Module	For pulse positioning	**FNY-PL2910**
	Cables for W-Series with USB connectors and ring core	0.5 m	**FNY-W6003-A5**
		1 m	**FNY-W6003-01**
		3 m	**FNY-W6003-03**
		5 m	**FNY-W6003-05**
		10 m	**FNY-W6003-10**
		20 m	**FNY-W6003-20**
		30 m	**FNY-W6003-30**
	Terminating resistor for MECHATROLINK-II	—	**FNY-W6022**
	Repeater for MECHATROLINK-II	—	**FNY-REP2000**
	CX-Motion MCH support software		**Included in CX-ONE**
	CX-Motion support software		**Included in CX-ONE**

Soft Starters
G3JA

Quick Link
R002

3-Phase Hybrid Soft Starters Extend Motor Life

- G3JA-D Current Limit Starter for 3-phase, 6-lead motors provides internal Star-delta control and simplifies wiring. Star-delta and protective functions are included in this single unit
- G3JA-C Soft Start, Kick Start, Current Limit Start, and Soft Stop functions for 3-phase inductive motors satisfy motor performance needs for a wide range of applications. Internal protections include protection against overload and phase loss
- Smooth motor starts and stops can reduce mechanical shock, leading to longer motor life, less frequent servicing and lower maintenance costs
- Reduced power loss through hybrid control: Power supplied through a thyristor during starting or stopping and through a bypass relay during stable operation
- Slim 45-mm body saves installation space; all models have the same shape

- Electronic Thermal Overload Relay built in protects the motor from problems such as burning due to motor overload or locking. The overload class can be set to OFF, 10, 15, or 20
- Optional Auxiliary Contact Block enhances operation monitoring by providing an output of operating status
- Meets UL508; cULus listed; complies with IEC standards, etc.

Soft Starters Ordering Information

Current Limit Starters

Supply voltage	Main circuit operating current (A)		Lamp load (kW)			HP			Model
	Current rating	Adjustable range	200 VAC 50/60 Hz	230 VAC 50 Hz	380/400/415 VAC 50 Hz	200 VAC 60 Hz	230 VAC 60 Hz	460 VAC 60 Hz	
100 to 240 VAC, 50/60 Hz	3	1 to 3	0.2 to 0.4	0.55	1.1	0.5	0.5	0.5 to 1.5	**G3JA-D403B AC100-240**
	9	3 to 9	0.55 to 1.5	2.2	4	0.75 to 2	0.75 to 2	1.5 to 5	**G3JA-D409B AC100-240**
	16	5.3 to 16	1.1 to 2.2	4	7.5	1.5 to 3	1.5 to 5	5 to 10	**G3JA-D416B AC100-240**
	20	6.7 to 20	1.5 to 3.7	5.5	7.5	2 to 5	2 to 5	5 to 10	**G3JA-D420B AC100-240**
	25	9.2 to 27.7	2.2 to 5.5	5.5	11	3 to 7.5	3 to 7.5	7.5 to 15	**G3JA-D425B AC100-240**
	32	10.9 to 32.9	3.7 to 7.5	7.5	15	3 to 10	5 to 10	7.5 to 20	**G3JA-D432B AC100-240**
	51	17.3 to 51.9	5.5 to 11	15	22	5 to 15	7.5 to 15	15 to 30	**G3JA-D451B AC100-240**
	64	21.3 to 64	5.5 to 15	18.5	30	7.5 to 20	7.5 to 20	20 to 40	**G3JA-D464B AC100-240**

Current Limit Starters (Continued)

Supply voltage	Main circuit operating current (A)		Lamp load (kW)			HP			Model
	Current rating	Adjustable range	200 VAC 50/ 60 Hz	230 VAC 50 Hz	380/400/415 VAC 50 Hz	200 VAC 60 Hz	230 VAC 60 Hz	460 VAC 60 Hz	
24 VAC/ VDC	3	1 to 3	0.2 to 0.4	0.55	1.1	0.5	0.5	0.5 to 1.5	**G3JA-D403B AC/DC24**
	9	3 to 9	0.55 to 1.5	2.2	4	0.75 to 2	0.75 to 2	1.5 to 5	**G3JA-D409B AC/DC24**
	16	5.3 to 16	1.1 to 2.2	4	7.5	1.5 to 3	1.5 to 5	5 to 10	**G3JA-D416B AC/DC24**
	20	6.7 to 20	1.5 to 3.7	5.5	7.5	2 to 5	2 to 5	5 to 10	**G3JA-D420B AC/DC24**
	25	9.2 to 27.7	2.2 to 5.5	5.5	11	3 to 7.5	3 to 7.5	7.5 to 15	**G3JA-D425B AC/DC24**
	32	10.9 to 32.9	3.7 to 7.5	7.5	15	3 to 10	5 to 10	7.5 to 20	**G3JA-D432B AC/DC24**
	51	17.3 to 51.9	5.5 to 11	15	22	5 to 15	7.5 to 15	15 to 30	**G3JA-D451B AC/DC24**
	64	21.3 to 64	5.5 to 15	18.5	30	7.5 to 20	7.5 to 20	20 to 40	**G3JA-D464B AC/DC24**

Multi-function Soft Starters

Supply voltage	Main Circuit Operating Current (A)		KW at 350% of load			HP at 350% of load			Model
	Current rating	Adjustable range	200 VAC 50/60 Hz	230 VAC 50 Hz	380/400/415 VAC 50 Hz	200 VAC 60 Hz	230 VAC 60 Hz	460 VAC 60 Hz	
100 to 240 VAC, 50/60 Hz	3	1 to 3	0.2 to 0.4	0.55	1.1	0.5	0.5	0.5 to 1.5	**G3JA-C403B AC100-240**
	9	3 to 9	0.55 to 1.5	2.2	4	0.75 to 2	0.75 to 2	1.5 to 5	**G3JA-C409B AC100-240**
	16	5.3 to 16	1.1 to 2.2	4	7.5	1.5 to 3	1.5 to 5	5 to 10	**G3JA-C416B AC100-240**
	19	6.3 to 19	1.5 to 3.7	4	7.5	1.5 to 5	2 to 5	5 to 10	**G3JA-C419B AC100-240**
	25	8.3 to 25	2.2 to 5.5	5.5	11	3 to 7.5	3 to 7.5	7.5 to 15	**G3JA-C425B AC100-240**
	30	10 to 30	2.2 to 5.5	7.5	15	3 to 7.5	5 to 10	7.5 to 20	**G3JA-C430B AC100-240**
	37	12.3 to 37	3.7 to 7.5	7.5	18.5	5 to 10	5 to 10	10 to 25	**G3JA-C437B AC100-240**
24 VAC/ VDC	3	1 to 3	0.2 to 0.4	0.55	1.1	0.5	0.5	0.5 to 1.5	**G3JA-C403B AC/DC24**
	9	3 to 9	0.55 to 1.5	2.2	4	0.75 to 2	0.75 to 2	1.5 to 5	**G3JA-C409B AC/DC24**
	16	5.3 to 16	1.1 to 2.2	4	7.5	1.5 to 3	1.5 to 5	5 to 10	**G3JA-C416B AC/DC24**
	19	6.3 to 19	1.5 to 3.7	4	7.5	1.5 to 5	2 to 5	5 to 10	**G3JA-C419B AC/DC24**
	25	8.3 to 25	2.2 to 5.5	5.5	11	3 to 7.5	3 to 7.5	7.5 to 15	**G3JA-C425B AC/DC24**
	30	10 to 30	2.2 to 5.5	7.5	15	3 to 7.5	5 to 10	7.5 to 20	**G3JA-C430B AC/DC24**
	37	12.3 to 37	3.7 to 7.5	7.5	18.5	5 to 10	5 to 10	10 to 25	**G3JA-C437B AC/DC24**

Accessories

Description	Specification	Model
Fan	Allows increased switching frequency from 4/hr to 10/hr	**G32J-CF64**
Auxiliary contact	1 NO contact	**G32J-CA10**
Auxiliary contacts	2 NO contacts	**G32J-CA20**
Auxiliary contact	1 NC contact	**G32J-CA01**
Auxiliary contacts	1 NO + 1 NC contacts	**G32J-CA11**
Terminal block adapters	Set of 2	**G32J-TA10**

Cam Positioner
H8PS

Quick Link
I081

Easy-to-Use Standalone Cam Positioner Uses Encoder Input

- High-speed operation at 1600 r/min and high precision settings to 0.5°
- Advanced angle compensation function compensates for output delays
- Highly visible display with reverse-lit LCD for long-distance legibility
- Fits a 1/4 DIN panel cutout
- Front panel and surface/DIN rail mounting models (track mounting adapter optional)
- 8, 16 and 32 outputs models
- Bank function for multi-product production (8 banks)
- Use Omron absolute encoders for cam input; available with easy-to-install connector
  - E6CP-AG5C-C 256 2M for 256 pulse/rev resolution
  - E6C3-AG5C-C 360 2M for 360 pulse/rev resolution
  - E6F-AG5C-C 720 2M for 720 pulse/rev resolution
- IP40 front panel rating; waterproof and protective covers available

Specifications

- Supply voltage: 24 VDC
- Inputs: Encoder input: Connection to a dedicated absolute encoder
  - External inputs: bank inputs 1/2/4, origin input, start input (16-/32-output models)
- Control output:
  - 8-output Models: 8 cam outputs, 1 RUN output, 1 pulse output
  - 16-output Models 16 cam outputs, 1 RUN output, 1 pulse output
  - 32-output Models: 32 cam outputs, 1 RUN output, 1 pulse output
- Output ratings:
  - Cam outputs, RUN output: NPN or PNP open collector, 100 mA at 30 VDC
  - Pulse outputs: NPN or PNP open collector, 30 mA at 30 VDC
- Dimensions: 96 H x 96 W x 65 D mm

Ordering Information

Cam Positioners

Number of outputs	Mounting method	Dimensions L x W x H mm	Output type	Bank function	Model
8 outputs	Panel mounting	96 x 96 x 67.5	NPN open collector	None	**H8PS-8B**
			PNP open collector	None	**H8PS-8BP**
8 outputs	DIN rail or surface mounting	96 x 96 x 60.6	NPN open collector	None	**H8PS-8BF**
			PNP open collector	None	**H8PS-8BFP**
16 outputs	Panel mounting	96 x 96 x 67.5	NPN open collector	None	**H8PS-16B**
			PNP open collector	None	**H8PS-16BP**
16 outputs	DIN rail or surface mounting	96 x 96 x 60.6	NPN open collector	None	**H8PS-16BF**
			PNP open collector	None	**H8PS-16BFP**
32 outputs	Panel mounting	96 x 96 x 67.5	NPN open collector	None	**H8PS-32B**
			PNP open collector	None	**H8PS-32BP**
32 outputs	DIN rail or surface mounting	96 x 96 x 60.6	NPN open collector	None	**H8PS-32BF**
			PNP open collector	None	**H8PS-32BFP**

Absolute Encoders and Couplers

Full descriptions are listed under Rotary Encoders elsewhere in this catalog.

Type	Resolution	Shaft diameter	Cable length	Encoder Model
Economy	256	6 mm	2 m	**E6CP-AG5C-C 256 2M**
Standard	256	8 mm	1 m	**E6C3-AG5C-C 256 1M**
	256	8 mm	2 m	**E6C3-AG5C-C 256 2M**
	360	8 mm	2 m	**E6C3-AG5C-C 360 2M**
	720	8 mm	2 m	**E6C3-AG5C-C 720 2M**
Rugged	256	10 mm	2 m	**E6F-AG5C-C 256 2M**
	360	10 mm	2 m	**E6F-AG5C-C 360 2M**
	720	10 mm	2 m	**E6F-AG5C-C 720 2M**

Accessories

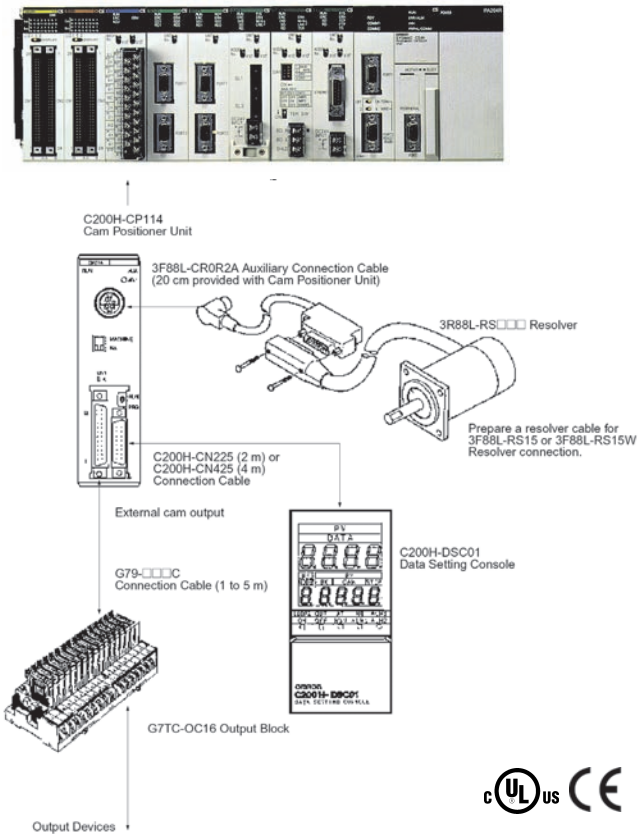
Description	Specification	Model
Discrete wire output cable	2 m length	**Y92S-41-200**
Connector type output cable	2 m length	**E5ZE-CBL200**
Support software	CD-ROM	**H8PS-SOFT-V1**
Parallel input adapter	Two units can operate in parallel	**Y92C-30**
Protective cover	Hard plastic, fits H8PS	**Y92A-96B**
Watertight cover	NEMA 4 protection for H8PS front panel	**Y92A-96N**
DIN-rail mounting adapter	Use with H8PS-□BF□ models	**Y92F-91**
Encoder extension cable	5 m length (for E5CP, E6C3-A, E6F-A)	**E69-DF5**

Cam Positioner
C200H-CP114

Quick Link
P016B

PLC-Based Cam Positioner Uses Resolver Input

- Simulates mechanical cam switches, integrates control into Omron's CS1 Series PLC
- Fast operation at 800 r/min and accurate settings to 1°
- Front panel origin adjustment from 1° to 359°
- Setting/display unit panels mounts for easy setup and monitoring
- Bank function for multi-product production (8 banks each hold 48 data points)
- EPROM memory backs up bank and data settings
- CW/CCW direction, cam data protection and setting protection set by rear mounted DIP switches



Specifications

- Supply voltage: 5 VDC from PLC
- Inputs: Resolver: 800 rpm resolution
- Angle detection cycle: 200 μs at 5 kHz sampling frequency
- Control output: 16 external NPN transistor outputs; can be assigned to internal outputs
  - 32 internal only outputs
- Number of ON/OFF control operations: 7 outputs per cam max.
- Bank function: 8 banks, each stores 48 points of cam output data

Cam Positioner

Number of inputs	Number of outputs	Mounting method	Dimensions H x W x D mm	Output type/rating	Bank function	Model
1 resolver input	48 outputs: 16 internal/external 32 internal only	CS1 PLC mounting	130 x 34.5 x 101	NPN open collector/ 100 mA at 24 VDC; 8 points max. ON simultaneously	8 banks	**C200H-CP114**

Resolvers

Use Omron's 3F88L-RS17 or 3F88L-RS15 series resolvers or commercially available models.

Rotary Encoders—Absolute
E6C3-A

Quick Link P060A

Water Resistant Encoder for Tough Environments

- IP65f drip-proof, oil-proof construction with sealed bearing
- 8 mm stainless steel shaft provides superior shaft loading performance: Radial: 8 kg-f; Axial: 5.1 kg-f
- NPN, or PNP open collector or voltage outputs
- Optimum angle control when combined with cam positioner (stand-alone H8PS or PLC-based) or encoder-input PLC position control modules
- Response frequency: 20 kHz max., 5,000 rpm max.
- Pre-wired with 1 meter cable; 2 meter cable available, connector version available for direct connection to an H8PS Cam Positioning unit

Absolute Rotary Encoders

When ordering, specify the resolution in addition to the model number (example: E6C3-AG5C 360P/R 1M).

Size	Shaft	Supply voltage	Output configuration	Output code	Resolution (pulses/rotation)	Connection method	Model
50 dia. x 43 D mm	8 dia. x 15 L mm, stainless steel	12 to 24 VDC	NPN open-collector output	Gray	256, 360, 720	2 m connector for H8PS Cam Positioner	**E6C3-AG5C-C**
					256, 360, 720, 1,024	Pre-wired, 1 m cable	**E6C3-AG5C**
				Binary	32, 40		**E6C3-AN5C**
				BCD	6, 8, 12		**E6C3-AB5C**
			PNP open-collector output	Gray	256, 360, 720, 1,024		**E6C3-AG5B**
				Binary	32, 40		**E6C3-AN5B**
				BCD	6, 8, 12		**E6C3-AB5B**
		5 VDC	Voltage output	Binary	256		**E6C3-AN1E**
		12 VDC					**E6C3-AN2E**

Rotary Encoders—Absolute
E6CP

Quick Link F029

Low-Cost Absolute Encoder, 50 mm Diameter

- High-precision detection of automatic machine timing, also ideal for robot limit signals
- Absolute encoder performance at the cost of an incremental encoder
- Gray code output eliminates reading mistakes
- Lightweight, plastic body construction, IP50 enclosure rating
- Shaft loading: Radial: 3 kg-f; Axial: 2 kg-f
- Open collector output
- Response frequency: 5 kHz max., 1,000 rpm max.
- Pre-wired with 2-meter cable, connector version available for direct connection to an H8PS Cam Positioning unit

Absolute Rotary Encoders

Size	Shaft	Power supply voltage	Output configuration	Output code	Resolution (pulses/ rotation)	Connection method	Model
50 dia. x 55 D mm	6 dia. x 10 L mm	5 to 12 VDC	Open-collector output	Gray	256 (8-bit)	Pre-wired, 2 m cable	**E6CP-AG3C**
		12 to 24 VDC					**E6CP-AG5C**
						2 m cable with connector for H8PS Cam Positioner	**E6CP-AG5C-C**

Rotary Encoders—Absolute
E6F-A

Quick Link
F031

Rugged Encoder for High-Precision Detection

- 10 mm stainless steel shaft and rugged construction provide the highest shaft loading among Omron encoders: Radial: 12 kg-f, Thrust: 5 kg-f
- IP65f water and oil-proof construction
- High response speed for faster control: Gray code: 20 kHz; BCD: 10 kHz, 5,000 rpm max.
- Combine with H8PS Cam Positioner or PLC encoder input module for optimum angle control
- Pre-wired with 2-meter cable, connector version available for direct connection to an H8PS Cam Positioning unit

Absolute Rotary Encoders

When ordering, specify the resolution in addition to the model number (example: E6F-AG5C 256 P/R).

Size	Shaft	Power supply voltage	Output configuration	Output code	Resolution (pulses/ rotation)	Connection method	Model
60 mm dia. x 65 D mm	10 dia. x 20 L mm	5 to 12 VDC	NPN open collector	BCD	360	Pre-wired 2 m cable	**E6F-AB3C**
		12 to 24 VDC	NPN open collector	BCD	360	Pre-wired 2 m cable	**E6F-AB5C**
			PNP open collector	BCD	360	Pre-wired 2 m cable	**E6F-AB5B**
			NPN open collector	Gray code	256, 360, 720	2 m cable with connector for H8PS Cam Positioner	**E6F-AG5C-C**
			NPN open collector		256, 360, 720, 1,024	Pre-wired 2 m cable	**E6F-AG5C**
			PNP open collector				**E6F-AG5B**

Rotary Encoders—Incremental
E6A2-C

Quick Link
F020

Miniature Positioning Solution for Tight Spaces

- High response frequency and noise immunity make encoders ideal for factory automation applications with 10 to 500 pulses/revolution
- Space saving enclosure: 25 mm dia.
- 4 mm shaft with load rating of: Radial: 1 kg-f; Axial: 0.5 kg-f
- Open collector output, other output types available
- Output phases: A/A, B and A, B, Z (reversible) are available
- Response frequency: 20 kHz max., 5,000 rpm max.
- Enclosure rating: IP50
- Pre-wired with 0.5 meter cable

Incremental Rotary Encoders

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/ revolution)	Model
25 dia. x 31 D mm	4 dia. x 10 L mm	12 to 24 VDC	NPN open collector, 30 mA max.	100	**E6A2-CW5C 100P/R 05M**
				200	**E6A2-CW5C 200P/R 05M**

Rotary Encoders—Incremental
E6B2-C

Quick Link
F022

General-Purpose Compact Encoders

- High resolution models (up to 2000 pulses per revolution available) substantially improve measuring accuracy
- Rugged construction: 6 mm shaft with load rating of: Radial: 3 kg-f; Axial: 2 kg-f
- Output phases: A, B, Z (reversible)
- Response frequency: up to 100 kHz max., 6,000 rpm max.
- Protected against short-circuit and reversed connections for highly reliable operation
- Available with NPN and PNP open collector, voltage and line driver outputs
- Enclosure rating: IP50
- Pre-wired with 0.5- or 2-meter cables

Incremental Rotary Encoders

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/ revolution)	Cable length	Model
40 mm dia. x 44 D mm	6 dia. x 15 L mm	12 to 24 VDC	NPN open collector, 35 mA max.	100	2 m	**E6B2-CWZ6C 100P/R 2M**
				200	2 m	**E6B2-CWZ6C 200P/R 2M**
				360	0.5 m	**E6B2-CWZ6C 360P/R 05M**
				360	2 m	**E6B2-CWZ6C 360P/R 2M**
				500	2 m	**E6B2-CWZ6C 500P/R 2M**
				600	2 m	**E6B2-CWZ6C 600P/R 2M**
				1000	0.5 m	**E6B2-CWZ6C 1000P/R 05M**
				1000	2 m	**E6B2-CWZ6C 1000P/R 2M**
		5 VDC	Line driver: High: -20 mA or 2.5 V min. Low: +20 mA or 0.5 V max.	1000	0.5 m	**E6B2-CWZ1X 1000P/R 05M**

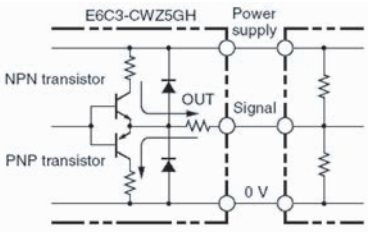
Rotary Encoders—Incremental
E6C3-C

Quick Link P060

Water Resistant Incremental Encoder for Tough Environments

- High resolution solutions from 100 to 3600 pulses/revolution
- IP65f drip-proof, oil-proof construction with sealed bearing
- 8 mm stainless steel shaft provides a load rating of: Radial: 88 kg-f; Axial: 5 kg-f
- Complementary outputs simplify interfacing to NPN or PNP input devices
- Output phases: A, B and Z (reversible)
- Response frequency: 125 kHz max. (65 kHz for Z-phase), 5,000 rpm max.
- Surge protection built in
- Voltage and line driver output versions available
- Pre-wired with 1 meter cable, 2 meter cable is available

Incremental Rotary Encoders-Complementary NPN and PNP Outputs

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/ revolution)	Model
50 dia. x 43 D mm	8 dia. x 15 L mm, stainless steel	12 to 24 VDC	 Complementary output (NPN and PNP), 35 mA max.	100	**E6C3-CWZ5GH 100P/R 1M**
				200	**E6C3-CWZ5GH 200P/R 1M**
				360	**E6C3-CWZ5GH 360P/R 1M**
				500	**E6C3-CWZ5GH 500P/R 1M**
				720	**E6C3-CWZ5GH 720P/R 1M**
				800	**E6C3-CWZ5GH 800P/R 1M**
				1000	**E6C3-CWZ5GH 1000P/R 1M**
				2048	**E6C3-CWZ5GH 2048P/R 1M**
				2500	**E6C3-CWZ5GH 2500P/R 1M**
				3600	**E6C3-CWZ5GH 3600P/R 1M**

Rotary Encoders—Incremental
E6D

Quick Link F030

Rugged, High-Resolution Encoder

- Resolution as high as 6,000 pulses/revolution in a rugged construction
- Outputs: A, B (reversible) and Z (zero)
- 55 mm diameter housing
- Superb reliability and accuracy: phase error as small as 1/4T ±0.07T
- High response frequency of 200 kHz, 12,000 rpm max.
- 6 mm shaft with load rating of: radial: 5 kg-f; axial: 3 kg-f

Incremental Rotary Encoders

Add resolution (pulses/revolution) before P/R in the model number.

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/ revolution)	Cable length	Model
40 mm dia. x 44 D mm	6 dia. x 15 L mm	12 VDC	NPN open collector, 35 mA max.	720, 800, 1000, 1024, 1200, 1500, 1800, 2000, 2048, 2500, 3000, 3200, 3600, 4096, 5000, 6000	0.5 m	**E6D-CWZ2C□□□□P/R 05M**
		5 VDC			0.5 m	**E6D-CWZ1E□□□□P/R 05M**

Rotary Encoders—Incremental
E6F-C

Quick Link Q037

Rugged Encoder with Strongest Shaft

- 10 mm stainless steel shaft and rugged construction provides the highest shaft loading among Omron encoders: Radial: 12 kg-f, Thrust: 5 kg-f
- IP65f water- and oil-proof construction
- 60 mm diameter housing
- Complementary output for longer cable length extension
- High response frequency of 83 kHz, 5,000 rpm max.
- Output load short-circuit protection to reduce risks from incorrect wiring
- Pre-wired 2 meter cable

Incremental Rotary Encoders

Add resolution (pulses/revolution) before P/R in the model number.

Size	Shaft	Supply voltage	Output configuration	Resolution (pulses/ revolution)	Cable length	Model
60 mm dia. x 65 D mm	10 dia. x 20 L mm	12 to 24 VDC	Complementary NPN and PNP, ±30 mA	100, 200, 360, 500, 600, 1000	2 m	**E6F-CWZ5GP/R 2M**

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