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MITSUBISHI ELECTRIC
Changes for the Better

General-Purpose AC Servo MELSERVO-J4 Series
CC-Link IE Field Network Servo Amplifier
MR-J4-GF(-RJ) 100 V

May 2018

New Product Release
SV1805-2E

NEW Capacities of 100 W, 200 W, and 400 W in 100 V class are newly added.

■ MR-J4-GF covers 0.1 kW to 0.4 kW in the 100 V class, 0.1 kW to 22 kW in the 200 V class, and 0.6 kW to 22 kW in the 400 V class.

Ver.UP Compatible with Low-Profile Direct Drive Motors *1

■ MR-J4-GF servo amplifiers are compatible with TM-RG2M and TM-RU2M low-profile direct drive motors, realizing further reduction in size and mass.

*1. Use MR-J4-GF(-RJ) servo amplifiers with software version A5 or later.

Product Lines of MR-J4-GF (Note 1)

Model	Power supply	Capacity
MR-J4-GF(-RJ)	1-phase 100 V AC NEW	0.1 kW to 0.4 kW
	3-phase 200 V AC	0.1 kW to 22 kW
	3-phase 400 V AC	0.6 kW to 22 kW

0.1 kW 1 kW 10 kW

Notes: 1. Refer to "MELSERVO-J4 catalog (L(NA)03058)" for the servo amplifiers in 200 V/400 V classes.

Compatible with Low-Profile Direct Drive Motors (Note 1)

The newly upgraded MR-J4-GF servo amplifiers are now compatible with TM-RG2M and TM-RU2M low-profile direct drive motors.

Series	Motor outer diameter	Torque
TM-RG2M TM-RU2M Low Profile	ø130 mm	2.2 N·m, 8.8 N·m
	ø180 mm	4.5 N·m, 13.5 N·m
	ø230 mm	9 N·m, 27 N·m

Rated torque
Maximum torque

1 N·m 10 N·m 100 N·m

Notes: 1. Use servo amplifiers with software version A5 or later.

Model Designation for Servo Amplifier

M R - J 4 - 1 0 G F 1 - ___

Mitsubishi Electric general-purpose AC servo amplifier MELSERVO-J4 Series

Symbol	Power supply
1	1-phase 100 V AC

Symbol	Interface
GF	CC-Link IE Field

Symbol	Rated output [kW]
10	0.1
20	0.2
40	0.4

Symbol	Special specification
None	Standard
RJ	Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible/ functional safety unit compatible (Note 3)
ED	MR-J4-_GF_ without a dynamic brake (Note 1)
RU	MR-J4-_GF_-RJ without a dynamic brake (Note 1)
EB	MR-J4-_GF_ with a special coating specification (3C2) (Note 2)
KS	MR-J4-_GF_-RJ with a special coating specification (3C2) (Note 2)

Notes: 1. Dynamic brake which is built in the servo amplifiers is removed. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system. Refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for details.
2. The special coating (JIS C60721-3-3/IEC 60721-3-3 classification 3C2) is applied to the circuit board of the servo amplifier. Refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for details.
3. When the servo amplifier is connected to CC-Link IE Field Network Basic, an MR-D30 functional safety unit is not supported.

Combinations of Servo Amplifier and Servo Motor

MR-J4-GF1/MR-J4-GF1-RJ (100 V)

Servo amplifier	Rotary servo motor	Linear servo motor (primary side) (Note 1)	Direct drive motor
MR-J4-10GF1(-RJ)	HG-KR053(B), 13(B) HG-MR053(B), 13(B)	-	-
MR-J4-20GF1(-RJ)	HG-KR23(B) HG-MR23(B)	LM-U2PAB-05M-0SS0 LM-U2PBB-07M-1SS0	TM-RG2M002C30 TM-RU2M002C30 TM-RG2M004E30 TM-RU2M004E30 TM-RFM002C20
MR-J4-40GF1(-RJ)	HG-KR43(B) HG-MR43(B)	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-K2P1A-01M-2SS1 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0	TM-RG2M004E30 (Note 2) TM-RU2M004E30 (Note 2) TM-RG2M009G30 TM-RU2M009G30 TM-RFM004C20

Notes: 1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to "MELSERVO-J4 Catalog (L(NA)03058)".
2. This combination increases the rated and maximum torque.

MR-J4-GF/MR-J4-GF-RJ (200 V) (Note 1)

Servo amplifier	Direct drive motor
MR-J4-20GF(-RJ)	TM-RG2M002C30 TM-RU2M002C30 TM-RG2M004E30 TM-RU2M004E30 TM-RFM002C20
MR-J4-40GF(-RJ)	TM-RG2M004E30 (Note 2) TM-RU2M004E30 (Note 2) TM-RG2M009G30 TM-RU2M009G30 TM-RFM004C20

Notes: 1. Use servo amplifiers with software version A5 or later for TM-RG2M/TM-RU2M series. Refer to "MELSERVO-J4 catalog (L(NA)03058)" for the combinations with rotary servo motors and linear servo motors.
2. This combination increases the rated and maximum torque.

Combinations of Servo Amplifier and Servo Motor with Functional Safety

MR-J4-GF1-RJ (100 V)

Servo amplifier	Servo motor with functional safety
MR-J4-10GF1-RJ	HG-KR053(B)W0C, 13(B)W0C
MR-J4-20GF1-RJ	HG-KR23(B)W0C
MR-J4-40GF1-RJ	HG-KR43(B)W0C

MR-J4-GF1/MR-J4-GF1-RJ
(CC-Link IE Field Network Interface (Note 10)) Specifications (100 V)

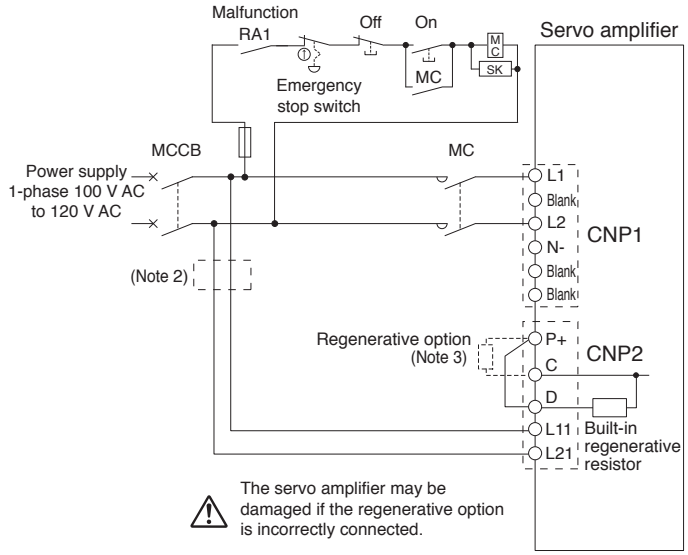
Servo amplifier model MR-J4-_(-RJ)			10GF1	20GF1	40GF1
Output	Rated voltage		3-phase 170 V AC		
	Rated current	[A]	1.1	1.5	2.8
Main circuit power supply input	Voltage/frequency (Note 1)		1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current	[A]	3.0	5.0	9.0
	Permissible voltage fluctuation		1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation		±5% maximum		
Control circuit power supply input	Voltage/frequency		1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
	Rated current	[A]	0.4		
	Permissible voltage fluctuation		1-phase 85 V AC to 132 V AC		
	Permissible frequency fluctuation		±5% maximum		
	Power consumption	[W]	30		
Interface power supply			24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))		
Control method			Sine-wave PWM control/current control method		
Permissible regenerative power	Built-in regenerative resistor (Note 2, 3)	[W]	-	10	10
Dynamic Brake (Note 4)			Built-in		
CC-Link IE Field communication cycle (Note 9)			0.5 ms, 1.0 ms, 2.0 ms, 4.0 ms		
Communication function	USB		Connect a personal computer (MR Configurator2 compatible)		
Encoder output pulse			Compatible (A/B/Z-phase pulse)		
Analog monitor			2 channels		
Positioning mode			Point table method, indexer method		
Fully closed loop control	MR-J4-GF		Two-wire type communication method		
	MR-J4-GF-RJ		Two-wire/four-wire type communication method		
Load-side encoder interface	MR-J4-GF		Mitsubishi Electric high-speed serial communication		
	MR-J4-GF-RJ		Mitsubishi Electric high-speed serial communication, A/B/Z-phase differential input signal		
Servo functions			Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function (including failure prediction), power monitoring function, scale measurement function, super trace control, lost motion compensation		
Protective functions			Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection		
Functional safety			STO (IEC/EN 61800-5-2)		
Safety performance	Standards certified by CB (Note 8)		EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2		
	Response performance		8 ms or less (STO input OFF → energy shut-off)		
	Test pulse input (STO) (Note 7)		Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum		
	Mean time to dangerous failure (MTTFd)		MTTFd ≥ 100 [years] (314a)		
	Diagnostic coverage (DC)		DC = Medium, 97.6 [%]		
	Probability of dangerous Failure per Hour (PFH)		PFH = 6.4 × 10^{-9} [1/h]		
Compliance with global standards			Refer to "Compliance with Global Standards and Regulations" on p.6 in this brochure.		
Structure (IP rating)			Natural cooling, open (IP20)		
Close mounting			Possible (Note 6)		
Environment	Ambient temperature		Operation: 0 ˚C to 55 ˚C (non-freezing), storage: -20 ˚C to 65 ˚C (non-freezing)		
	Ambient humidity		Operation/storage: 5 %RH to 90 %RH (non-condensing)		
	Ambience		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust		
	Altitude		2000 m or less above sea level (Note 5)		
	Vibration resistance		5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y, and Z axes)		
Mass		[kg]	1.0	1.0	1.0

MR-J4-GF1/MR-J4-GF1-RJ
(CC-Link IE Field Network Interface (Note 10)) Specifications (100 V)

Notes: 1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in "MELSERVO-J4 catalog (L(NA)03058)" for the permissible regenerative power [W] when regenerative option is used.
4. When using the dynamic brake, refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use the servo amplifiers at 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for details.
9. The command communication cycle depends on the controller specifications and the number of axes connected.
10. These models also support CC-Link IE Field Network Basic. To use this network, switch the network setting with the slide switches. Refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (CC-Link IE Field Network Basic)" for CC-Link IE Field Network Basic.

Main/Control Circuit Power Supply Connection Example (Note 1)

● For 1-phase 100 V AC



Notes: 1. To turn on/off the main circuit power supply by a DC power supply, refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for a connection example of the power supply circuit.
2. When wires used for L11 and L21 are thinner than those for L1 and L2, install an overcurrent protection device (molded-case circuit breaker, fuse, etc.) to protect the branch circuit. Refer to "MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)" for details.
3. Disconnect a short-circuit bar between P+ and D when connecting the regenerative option externally.

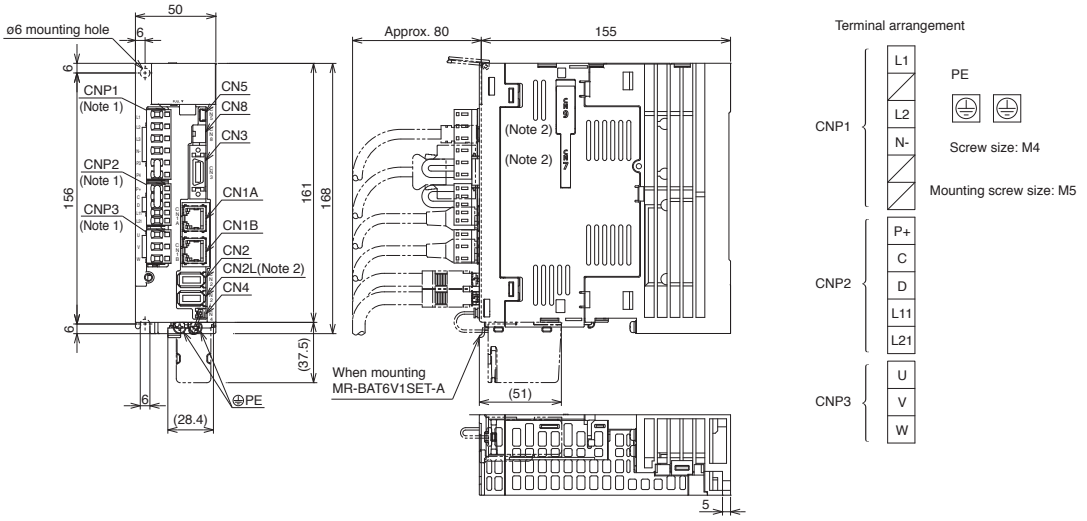
⚠ Be sure to read through Instruction Manual for the actual wiring and use. Use the equipment after you have a full knowledge of the equipment, safety information and instructions.

MR-J4-GF1/MR-J4-GF1-RJ Dimensions

●MR-J4-10GF1, MR-J4-10GF1-RJ

●MR-J4-20GF1, MR-J4-20GF1-RJ

●MR-J4-40GF1, MR-J4-40GF1-RJ



[Unit: mm]

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-GF servo amplifier.

Compliance with Global Standards and Regulations

MELSERVO-J4 series complies with global standards.

Servo amplifier

Europe (EC)	Low voltage directive	EN 61800-5-1 EN 60950-1 (MR-J4-03A6 and MR-J4W2-0303B6 also comply with this standard.)
	EMC directive	EN 61800-3 Category C3
	Machinery directive	EN ISO 13849-1 Category 3 PL e / EN 62061 SIL CL 3 / EN 61800-5-2
	RoHS directive	EN 50581
North America	UL standard	UL 508C
	CSA standard	CSA C22.2 No.14
China	National Standard of the People's Republic of China (GB standards)	GB 12668.501, GB 12668.3
	Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products (Chinese RoHS)	Compliant (Article 13 (Names and the content of hazardous substances are described in Instruction Manuals.)) Compliant (Article 14 (Marking for the Restricted Use of Hazardous Substances is labeled.))
	China Compulsory Certification (CCC)	N/A
Korea	Korea Radio Wave Law (KC)	KN 61800-3
Russia, Belarus, Kazakhstan	Certification system of the Eurasian Economic Union (EAC)	TR CU 004, TR CU 020

Product List

Item		Model	Rated output	Main circuit power supply
Servo amplifier MR-J4-GF	100 V class	MR-J4-10GF1	0.1 kW	1-phase 100 V AC to 120 V AC
		MR-J4-20GF1	0.2 kW	1-phase 100 V AC to 120 V AC
		MR-J4-40GF1	0.4 kW	1-phase 100 V AC to 120 V AC
Servo Amplifiers MR-J4-GF-RJ		MR-J4-10GF1-RJ	0.1 kW	1-phase 100 V AC to 120 V AC
		MR-J4-20GF1-RJ	0.2 kW	1-phase 100 V AC to 120 V AC
		MR-J4-40GF1-RJ	0.4 kW	1-phase 100 V AC to 120 V AC

List of Instruction Manuals

Instruction Manuals for MELSERVO-J4 series are listed below:

Manual name	Manual No.
MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (Motion Mode)	SH-030218ENG
MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (I/O Mode)	SH-030221ENG
MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (CC-Link IE Field Network Basic)	SH-030273ENG
MELSERVO-J4 Servo Amplifier Instruction Manual (Trouble Shooting)	SH-030109ENG
HG-MR HG-KR HG-SR HG-JR HG-RR HG-UR HG-AK Servo Motor Instruction Manual (Vol. 3)	SH-030113ENG
LM-H3 LM-U2 LM-F LM-K2 Linear Servo Motor Instruction Manual	SH-030110ENG
TM-RFM TM-RG2M TM-RU2M Direct Drive Motor Instruction Manual	SH-030112ENG

The instruction manuals listed above are available in PDF format. MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manuals (Motion Mode) and (I/O Mode), and MELSERVO-J4 Servo Amplifier Instruction Manual (Trouble Shooting) are also supported by e-Manual. Please download e-Manual Viewer from the App Store or Google Play.

■MITSUBISHI ELECTRIC FA e-Manual (tablet version)

■Supported versions

OS	OS version	Model
iOS	iOS 8.1 or later	Apple iPad 2, iPad (3rd generation), iPad (4th generation), iPad Air, iPad Air 2, iPad mini, iPad mini 2, iPad mini 3, iPad mini 4
Android™	Android™ 4.3 / 4.4 / 5.0	ASUS Nexus7™ (2013) (Note 1)

Notes: 1. Other than listed, a tablet with a resolution of 1920 × 1200 (WUXGA) (7-inch) or higher is recommended.

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ISO 14001 JACO EC 98 J 2017 UKAS MANAGEMENT SYSTEMS 0051

ISO 9001 BUREAU VERITAS Certification UKAS MANAGEMENT SYSTEMS 0008

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