1.3 Servo amplifier standard specifications

1.3.1 Integrated 2-axis servo amplifier

Model MR-J4W2-			22B	44B	77B	1010B
Output	Rated voltage		3-phase 170 V AC			
	Rated current (each axis)	[A]	1.5	2.8	5.8	6.0
Main circuit power supply input	Voltage/Frequency		3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz			3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz
	Rated current (Note 11)	[A]	2.9	5.2	7.5	9.8
	Permissible voltage fluctuation		3-phase or 1-phase 170 V AC to 264 V AC			3-phase 170 V AC to 264 V AC
	Permissible frequency fluctuation		Within ±5%			
	Power supply capacity	[kVA]	Refer to section 10.2.			
	Inrush current	[A]	Refer to section 10.5.			
Control circuit power supply input	Voltage/Frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz			
	Rated current	[A]	0.4			
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC			
	Permissible frequency fluctuation		Within ±5%			
	Power consumption	[W]	55			
	Inrush current	[A]	Refer to section 10.5.			
Interface power supply	Voltage		24 V DC ± 10%			
	Power supply capacity		0.35 A (Note 1)			
Control method			Sine-wave PWM control, current control method			
Capacitor regeneration	Reusable regenerative energy (Note 2)	[J]	17	21	44	
	Moment of inertia J equivalent to the permissible charging amount (Note 3)	[× 10^{-4} kg • m^2]	3.45	4.26	8.92	
	Mass equivalent to the permissible charging amount (Note 4)	LM-H3 [kg]	3.8	4.7	9.8	
		LM-K2 LM-U2 [kg]	8.5	10.5	22.0	
Built-in regenerative resistance		[W]	20		100	
Dynamic brake			Built-in			
SSCNET III/H command communication cycle (Note 9)			0.222 ms, 0.444 ms, 0.888 ms			
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)			
Encoder output pulse			Compatible (A/B-phase pulse)			
Analog monitor			None			
Fully closed loop control			Compatible (Note 8)			
Scale measurement function			Compatible (Note 10)			
Load-side encoder interface			Mitsubishi Electric high-speed serial communication (Note 6)			
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, and error excessive protection			

Model MR-J4W2-			22B	44B	77B	1010B
Functional safety			STO (IEC/EN 61800-5-2) (Note 7)			
Safety performance	Standards certified by CB (Note 12)		EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL3, EN 61800-5-2			
	Response performance		8 ms or less (STO input off → energy shut off)			
	Test pulse input (STO) (Note 5)		Test pulse interval: 1 Hz to 25 Hz Test pulse off time: Up to 1 ms			
	Mean time to dangerous failure (MTTFd)		MTTFd ≥ 100 [years] (314a)			
	Diagnosis converge (DC)		DC = Medium, 97.6 [%]			
	Average probability of dangerous failures per hour (PFH)		6.4×10^{-9} [1/h]			
Compliance with global standards	CE marking		LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061			
	UL standard		UL 508C			
Structure (IP rating)			Natural cooling, open (IP20)	Force cooling, open (IP20)		
Close mounting			Possible			
Environment	Ambient temperature	Operation	0 °C to 55 °C (non-freezing)			
		Storage	-20 °C to 65 °C (non-freezing)			
	Ambient humidity	Operation	5 %RH to 90 %RH (non-condensing)			
		Storage				
	Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt			
	Altitude		2000 m or less above sea level (Note 13)			
	Vibration		5.9 m/s^2 or less at 10 Hz to 55 Hz (directions of X, Y and Z axes)			
Mass [kg]			1.5		2.0	

Note 1. 0.35 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.

2. Reusable regenerative energy corresponds to energy generated under the following conditions.
   Rotary servo motor: Regenerative energy is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to stop.
   Linear servo motor: Regenerative energy is generated when the machine, whose mass is equivalent to the permissible charging amount, decelerates from the maximum speed to stop.
   Direct drive motor: Regenerative energy is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to stop.
3. Moment of inertia when the motor decelerates from the rated speed to stop
   Moment of inertia for two axes when two motors decelerate simultaneously
   Moment of inertia for each axis when multiple motors do not decelerate simultaneously
   The values also apply to the direct drive motor.
4. Mass when the machine decelerates from the maximum speed to stop
   The primary-side (coil) mass is included.
   Mass for two axes when two motors decelerate simultaneously
   Mass for each axis when multiple motors do not decelerate simultaneously
5. Test pulse is a signal which instantaneously turns off a signal to the servo amplifier at a constant period for external circuit to self-diagnose.
6. The load-side encoder is compatible only with two-wire type communication method. Not compatible with pulse train interface (A/B/Z-phase differential output type).
7. STO is common for all axes.
8. Fully closed loop control is compatible with the servo amplifiers with software version A3 or later.
   Check the software version of the servo amplifier using MR Configurator2.
9. The command communication cycle depends on the controller specifications and the number of axes connected.
10. The scale measurement function is available for the MR-J4W2-_B servo amplifiers of software version A8 or later. Check the software version of the servo amplifier with MR Configurator2.
11. This value is applicable when a 3-phase power supply is used.
12. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether STO input diagnosis by TOFB output is performed or not. For details, refer to the Function column of [Pr. PF18] in section 5.2.6.
13. Follow the restrictions in section 2.7 when using this product at altitude exceeding 1000 m and up to 2000 m above sea level.

1.3.2 Integrated 3-axis servo amplifier

Model MR-J4W3-			222B	444B
Output	Rated voltage		3-phase 170 V AC	
	Rated current (each axis) [A]		1.5	2.8
Main circuit power supply input	Power supply /Frequency		3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz	
	Rated current (Note 9) [A]		4.3	7.8
	Permissible voltage fluctuation		3-phase or 1-phase 170 V AC to 264 V AC, 50 Hz/60 Hz	
	Permissible frequency fluctuation		Within ±5%	
	Power supply capacity [kVA]		Refer to section 10.2.	
	Inrush current [A]		Refer to section 10.5.	
Control circuit power supply input	Power supply /Frequency		1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz	
	Rated current [A]		0.4	
	Permissible voltage fluctuation		1-phase 170 V AC to 264 V AC	
	Permissible frequency fluctuation		Within ±5%	
	Power consumption [W]		55	
	Inrush current [A]		Refer to section 10.5.	
Interface power supply	Voltage/Frequency		24 V DC ± 10%	
	Power supply capacity		0.45 A (Note 1)	
Control method			Sine-wave PWM control, current control method	
Capacitor regeneration	Reusable regenerative energy (Note 2) [J]		21	30
	Moment of inertia J equivalent to the permissible charging amount (Note 3) [× 10^{-4} kg • m^2]		4.26	6.08
	Mass equivalent to the permissible charging amount (Note 4) [kg]	LM-H3	4.7	6.7
		LM-K2 LM-U2	10.5	15.0
Built-in regenerative resistance [W]			30	100
Dynamic brake			Built-in	
SSCNET III/H command communication cycle (Note 7)			0.222 ms (Note 8), 0.444 ms, 0.888 ms	
Communication function			USB: Connect a personal computer (MR Configurator2 compatible)	
Encoder output pulse			Not compatible	
Analog monitor			None	
Fully closed loop control			Not compatible	
Scale measurement function			Not compatible	
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, and error excessive protection	

Model MR-J4W3-			222B	444B
Functional safety			STO (IEC/EN 61800-5-2) (Note 6)	
Safety performance	Standards certified by CB (Note 10)		EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL3, EN 61800-5-2	
	Response performance		8 ms or less (STO input off → energy shut off)	
	Test pulse input (STO) (Note 5)		Test pulse interval: 1 Hz to 25 Hz Test pulse off time: Up to 1 ms	
	Mean time to dangerous failure (MTTFd)		MTTFd ≥ 100 [years] (314a)	
	Diagnosis converge (DC)		DC = Medium, 97.6 [%]	
	Average probability of dangerous failures per hour (PFH)		6.4×10^{-9} [1/h]	
Compliance with global standards	CE marking		LVD: EN 61800-5-1 EMC: EN 61800-3 MD: EN ISO 13849-1, EN 61800-5-2, EN 62061	
	UL standard		UL 508C	
Structure (IP rating)			Force cooling, open (IP20)	
Close mounting			Possible	
Environment	Ambient temperature	Operation	0 °C to 55 °C (non-freezing)	
		Storage	-20 °C to 65 °C (non-freezing)	
	Ambient humidity	Operation	5 %RH to 90 %RH (non-condensing)	
		Storage		
	Ambience		Indoors (no direct sunlight), free from corrosive gas, flammable gas, oil mist, dust, and dirt	
	Altitude		2000 m or less above sea level (Note 11)	
	Vibration		5.9 m/s^2 or less at 10 Hz to 55 Hz (directions of X, Y and Z axes)	
Mass [kg]			1.9	

Note 1. 0.45 A is the value applicable when all I/O signals are used. The current capacity can be decreased by reducing the number of I/O points.

2. Reusable regenerative energy corresponds to energy generated under the following conditions.
   Rotary servo motor: Regenerative energy is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to stop.
   Linear servo motor: Regenerative energy is generated when the machine, whose mass is equivalent to the permissible charging amount, decelerates from the maximum speed to stop.
   Direct drive motor: Regenerative energy is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to stop.
3. Moment of inertia when the machine decelerates from the rated speed to stop
   Moment of inertia for three axes when three motors decelerate simultaneously
   Moment of inertia for each axis when multiple motors do not decelerate simultaneously
   The values also apply to the direct drive motor.
4. Mass when the machine decelerates from the maximum speed to stop
   The primary-side (coil) mass is included.
   Mass for three axes when three motors decelerate simultaneously
   Mass for each axis when multiple motors do not decelerate simultaneously
5. Test pulse is a signal which instantaneously turns off a signal to the servo amplifier at a constant period for external circuit to self-diagnose.
6. STO is common for all axes.
7. The command communication cycle depends on the controller specifications and the number of axes connected.
8. Servo amplifier with software version A3 or later is compatible with the command communication cycle of 0.222 ms. However, note that the following functions are not available when 0.222 ms is used: auto tuning (real time, one-touch, and vibration suppression control), adaptive filter II, vibration tough drive, and power monitoring.
9. This value is applicable when a 3-phase power supply is used.
10. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether STO input diagnosis by TOFB output is performed or not. For details, refer to the Function column of [Pr. PF18] in section 5.2.6.
11. Follow the restrictions in section 2.7 when using this product at altitude exceeding 1000 m and up to 2000 m above sea level.

1.3.3 Combinations of servo amplifiers and servo motors

(1) MR-J4W2-_B servo amplifier

Servo amplifier	Rotary servo motor					Linear servo motor (primary side)	Direct drive motor
	HG-KR	HG-MR	HG-SR	HG-UR	HG-JR		
MR-J4W2-22B	053 13 23	053 13 23				LM-U2PAB-05M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20 TM-RG2M002C30 (Note 1) TM-RU2M002C30 (Note 1) TM-RG2M004E30 (Note 1) TM-RU2M004E30 (Note 1)
MR-J4W2-44B	053 13 23 43	053 13 23 43				LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-K2P1A-01M-2SS1 LM-U2PAB-05M-0SS0 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20 TM-RFM004C20 TM-RG2M002C30 (Note 1) TM-RU2M002C30 (Note 1) TM-RG2M004E30 (Note 1, 2) TM-RU2M004E30 (Note 1, 2) TM-RG2M009G30 (Note 1) TM-RU2M009G30 (Note 1)
MR-J4W2-77B	43 73	43 73	51 52	72	53 73	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-H3P3B-24P-CSS0 LM-H3P3C-36P-CSS0 LM-H3P7A-24P-ASS0 LM-K2P1A-01M-2SS1 LM-K2P2A-02M-1SS1 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBD-15M-1SS0 LM-U2PBF-22M-1SS0	TM-RFM004C20 TM-RFM006C20 TM-RFM006E20 TM-RFM012E20 TM-RFM012G20 TM-RFM040J10
MR-J4W2-1010B	43 73	43 73	51 81 52 102	72	53 (Note 3) 73 103	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-H3P3B-24P-CSS0 LM-H3P3C-36P-CSS0 LM-H3P7A-24P-ASS0 LM-K2P1A-01M-2SS1 LM-K2P2A-02M-1SS1 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBD-15M-1SS0 LM-U2PBF-22M-1SS0	TM-RFM004C20 TM-RFM006C20 TM-RFM006E20 TM-RFM012E20 TM-RFM018E20 TM-RFM012G20 TM-RFM040J10

Note 1. This is available with servo amplifiers with software version C8 or later.

2. This combination increases the maximum torque of the servo motor to 400%.

3. The combination increases the rated torque and the maximum torque.

(2) MR-J4W3-_B servo amplifier

Servo amplifier	Rotary servo motor		Linear servo motor (primary side)	Direct drive motor
	HG-KR	HG-MR		
MR-J4W3-222B	053 13 23	053 13 23	LM-U2PAB-05M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20 TM-RG2M002C30 (Note 1) TM-RU2M002C30 (Note 1) TM-RG2M004E30 (Note 1) TM-RU2M004E30 (Note 1)
MR-J4W3-444B	053 13 23 43	053 13 23 43	LM-H3P2A-07P-BSS0 LM-H3P3A-12P-CSS0 LM-K2P1A-01M-2SS1 LM-U2PAB-05M-0SS0 LM-U2PAD-10M-0SS0 LM-U2PAF-15M-0SS0 LM-U2PBB-07M-1SS0	TM-RFM002C20 TM-RFM004C20 TM-RG2M002C30 (Note 1) TM-RU2M002C30 (Note 1) TM-RG2M004E30 (Note 1, 2) TM-RU2M004E30 (Note 1, 2) TM-RG2M009G30 (Note 1) TM-RU2M009G30 (Note 1)

Note 1. This is available with servo amplifiers with software version C8 or later.

2. This combination increases the maximum torque of the servo motor to 400%.

1.4 Function list

The following table lists the functions of this servo. For details of the functions, refer to the reference field.

Function	Description	Detailed explanation
Model adaptive control	This realizes a high response and stable control following the ideal model. The two-degrees-of-freedom-model model adaptive control enables you to set a response to the command and response to the disturbance separately. Additionally, this function can be disabled. Refer to section 7.5 for disabling this function. This is used by servo amplifiers with software version B4 or later. Check the software version with MR Configurator2.	
Position control mode	This servo amplifier is used as a position control servo.	
Speed control mode	This servo amplifier is used as a speed control servo.	
Torque control mode	This servo amplifier is used as a torque control servo.	
High-resolution encoder	High-resolution encoder of 4194304 pulses/rev is used as the encoder of the rotary servo motor compatible with the MELSERVO-J4 series.	
Absolute position detection system	Merely setting a home position once makes home position return unnecessary at every power-on.	Chapter 12
Gain switching function	Using an input device or gain switching conditions (including the servo motor speed) switches gains.	Section 7.2
Advanced vibration suppression control II	This function suppresses vibration at the arm end or residual vibration of the machine.	Section 7.1.5
Machine resonance suppression filter	The machine resonance suppression filter is a filter function (notch filter) which decreases the gain of the specific frequency to suppress the resonance of the mechanical system.	Section 7.1.1
Shaft resonance suppression filter	When a load is mounted to the servo motor shaft, resonance by shaft torsion during driving may generate a mechanical vibration at high frequency. The shaft resonance suppression filter suppresses the vibration.	Section 7.1.3
Adaptive filter II	Servo amplifier detects mechanical resonance and sets filter characteristics automatically to suppress mechanical vibration.	Section 7.1.2
Low-pass filter	Suppresses high-frequency resonance which occurs as servo system response is increased.	Section 7.1.4
Machine analyzer function	Analyzes the frequency characteristic of the mechanical system by simply connecting an MR Configurator2 installed personal computer and servo amplifier. MR Configurator2 is necessary for this function.	
Robust filter	This function provides better disturbance response in case low response level that load to motor inertia ratio is high for such as roll send axes.	[Pr. PE41]
Slight vibration suppression control	Suppresses vibration of ±1 pulse produced at a servo motor stop.	[Pr. PB24]
Auto tuning	Automatically adjusts the gain to optimum value if load applied to the servo motor shaft varies.	Chapter 6
Regenerative option	Used when the built-in regenerative resistor of the servo amplifier does not have sufficient regenerative capability for the regenerative power generated.	Section 11.2
Alarm history clear	Alarm history is cleared.	[Pr. PC21]
Output signal selection (Device settings)	The pins that output the output devices, including ALM (Malfunction) and INP (In-position), can be assigned to certain pins of the CN3 connectors.	[Pr. PD07] to [Pr. PD09]
Output signal (DO) forced output	Output signal can be forced on/off independently of the servo status. Use this function for output signal wiring check and others.	Section 4.5.1 (1) (d)
Test operation mode	Jog operation, positioning operation, motor-less operation, DO forced output, and program operation MR Configurator2 is necessary for this function.	Section 4.5
MR Configurator2	Using a personal computer, you can perform the parameter setting, test operation, monitoring, and others.	Section 11.4
Linear servo system	Linear servo system can be configured using a linear servo motor and linear encoder.	Chapter 14
Direct drive servo system	Direct drive servo system can be configured to drive a direct drive motor.	Chapter 15
One-touch tuning	One click on a certain button on MR Configurator2 adjusts the gains of the servo amplifier. MR Configurator2 is necessary for this function.	Section 6.2

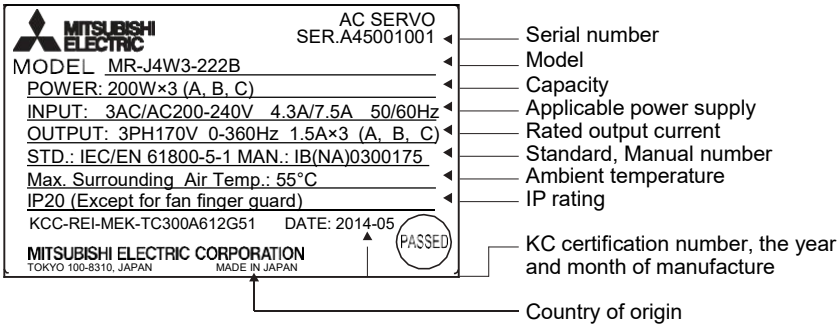
Function	Description	Detailed explanation
SEMI-F47 function (Note)	Enables to avoid triggering [AL. 10 Undervoltage] using the electrical energy charged in the capacitor in case that an instantaneous power failure occurs during operation. Use a 3-phase for the input power supply of the servo amplifier. Using a 1-phase 200 V AC for the input power supply will not comply with the SEMI-F47 standard.	[Pr. PA20] [Pr. PE25] Section 7.4
Tough drive function	This function makes the equipment continue operating even under the condition that an alarm occurs. The tough drive function includes two types: the vibration tough drive and the instantaneous power failure tough drive.	Section 7.3
Drive recorder function	This function continuously monitors the servo status and records the status transition before and after an alarm for a fixed period of time. You can check the recorded data on the drive recorder window on MR Configurator2 by clicking the "Graph" button. However, the drive recorder will not operate on the following conditions. 1. You are using the graph function of MR Configurator2. 2. You are using the machine analyzer function. 3. [Pr. PF21] is set to "-1". 4. The controller is not connected (except the test operation mode). 5. An alarm related to the controller is occurring.	[Pr. PA23]
STO function	This function is a functional safety that complies with IEC/EN 61800-5-2. You can create a safety system for the equipment easily.	Chapter 13
Servo amplifier life diagnosis function	You can check the cumulative energization time and the number of on/off times of the inrush relay. Before the parts of the servo amplifier, including a capacitor and relay, malfunction, this function is useful for finding out the time for their replacement. MR Configurator2 is necessary for this function.	
Power monitoring function	This function calculates the power running and the regenerative power from the data, including the speed and current, in the servo amplifier. MR Configurator2 can display the data, including the power consumption. Since the servo amplifier sends data to a servo system controller, you can analyze the data and display the data on a display with the SSCNET III/H system.	
Machine diagnostic function	From the data in the servo amplifier, this function estimates the friction and vibrational component of the drive system in the equipment and recognizes an error in the machine parts, including a ball screw and bearing. MR Configurator2 is necessary for this function.	
Fully closed loop system	Fully closed system can be configured using the load-side encoder. (not available with the MR-J4 3-axis servo amplifiers) This is used with servo amplifiers with software version A3 or later. Check the software version with MR Configurator2.	Chapter 16
Scale measurement function	The function transmits position information of a scale measurement encoder to the controller by connecting the scale measurement encoder in semi closed loop control. Used by servo amplifiers with software version A8 or later. (not available with the MR-J4 3-axis servo amplifiers)	Section 17.2
J3 compatibility mode	This amplifier has "J3 compatibility mode" which compatible with the previous MR-J3-B series. Refer to section 17.1 for software versions.	Section 17.1
Continuous operation to torque control mode	This enables to smoothly switch the mode from position control mode/speed control mode to torque control mode without stopping. This also enables to decrease load to the machine and high quality molding without rapid changes in speed or torque. For details of the continuous operation to torque control mode, refer to the manuals for servo system controllers.	[Pr. PB03] Servo system controller manuals

Note. For servo system controllers which are available with this, contact your local sales office.

1.5 Model designation

(1) Rating plate

The following shows an example of rating plate for explanation of each item.



Note. Production year and month of the servo amplifier are indicated in a serial number on the rating plate.
The year and month of manufacture are indicated by the last one digit of the year and 1 to 9, X (10), Y (11), Z (12).
For September 2011, the Serial No. is like, "SERIAL: _ 19_____ ".

(2) Model

The following describes what each block of a model name indicates. Not all combinations of the symbols are available.

MR - J4W2 - 22B - ED

Series

Number of axes

Symbol	Number of axes
W2	2
W3	3

SSCNETIII/H interface

Rated output

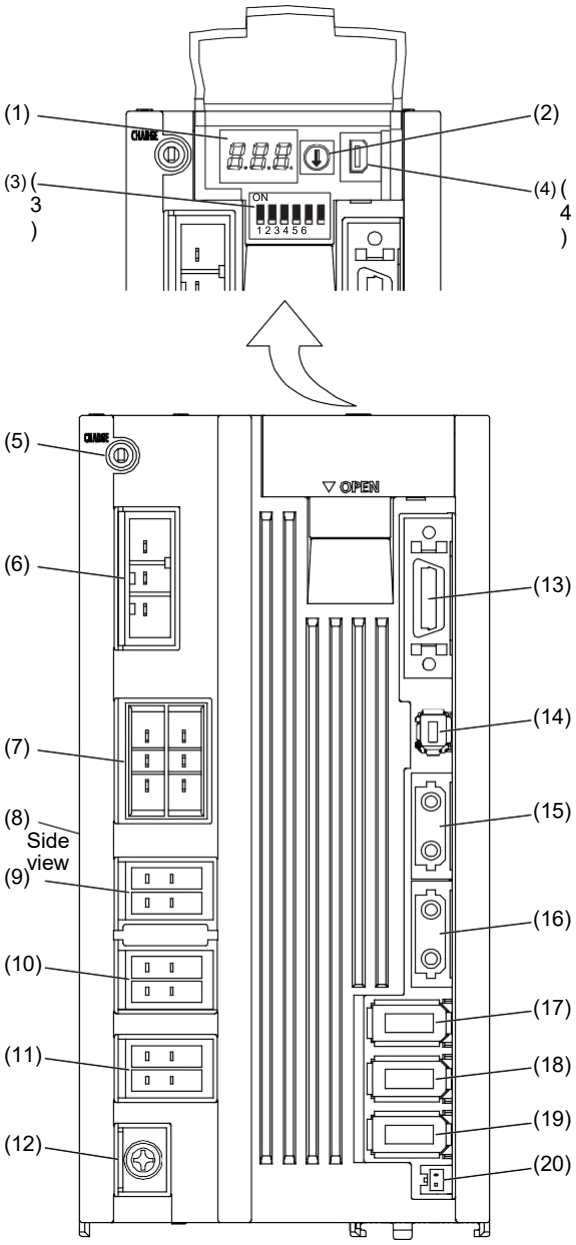
Symbol	Rated output [kW]		
	A-axis	B-axis	C-axis
22	0.2	0.2	
44	0.4	0.4	
77	0.75	0.75	
1010	1	1	
222	0.2	0.2	0.2
444	0.4	0.4	0.4

Special specifications

Symbol	Special specifications
None	Standard
-ED	Without a dynamic brake (Note 1)
-EB	MR-J4W_-_B_ with a special coating specification (3C2) (Note 2)

Note 1. Refer to App. 12.1 for details.
2. Type with a specially-coated servo amplifier board (IEC 60721-3-3 Class 3C2). Refer to app. 12.2 for details.

1.6 Parts identification



No.	Name/Application	Detailed explanation
(1)	Display The 3-digit, 7-segment LED shows the servo status and the alarm number.	Section 4.3
(2)	Axis selection rotary switch (SW1) Used to set the axis No. of servo amplifier.	
(3)	Control axis setting switch (SW2) The test operation switch, the disabling control axis switch, and the auxiliary axis number setting switch are available.	
(4)	USB communication connector (CN5) Connect with the personal computer.	Section 11.4
(5)	Charge lamp Lit to indicate that the main circuit is charged. While this lamp is lit, do not reconnect the cables.	
(6)	Main circuit power connector (CNP1) Connect the input power supply.	Section 3.1 Section 3.3
(7)	Control circuit power connector (CNP2) Connect the control circuit power supply or regenerative option.	
(8)	Rating plate	Section 1.5
(9)	A-axis servo motor power connector (CNP3A) Connect the A-axis servo motor.	Section 3.1 Section 3.3
(10)	B-axis servo motor power connector (CNP3B) Connect the B-axis servo motor.	
(11)	C-axis servo motor power connector (CNP3C) (Note 1) Connect the C-axis servo motor.	
(12)	Protective earth (PE) terminal	Section 3.11
(13)	I/O signal connector (CN3) Used to connect digital I/O signals.	Section 3.2 Section 3.4
(14)	STO input signal connector (CN8) Used to connect MR-J3-D05 safety logic unit and external safety relay.	Chapter 13
(15)	SSCNET III cable connector (CN1A) Used to connect the servo system controller or the previous axis servo amplifier.	Section 3.2 Section 3.4
(16)	SSCNET III cable connector (CN1B) Used to connect the next axis servo amplifier. For the final axis, put a cap.	
(17) (Note 2)	A-axis encoder connector (CN2A) Used to connect the A-axis servo motor encoder or external encoder.	Section 3.4 "Servo Motor Instruction Manual (Vol. 3)" "Linear Encoder Instruction Manual"
(18) (Note 2)	B-axis encoder connector (CN2B) Used to connect the B-axis servo motor encoder or external encoder.	
(19) (Note 2)	C-axis encoder connector (CN2C) (Note 1) Used to connect the C-axis servo motor encoder or linear encoder.	
(20)	Battery connector (CN4) Used to connect the battery unit for absolute position data backup.	Section 11.3 Chapter 12

Note 1. This figure shows the MR-J4 3-axis servo amplifier.
2. "External encoder" is a term for linear encoder used in the linear servo system, load-side encoder used in the fully closed loop system, and scale measurement encoder used with the scale measurement function in this manual.