Changes for the Better

MITSUBISHI ELECTRIC

SERVO AMPLIFIERS & MOTORS

MELSERVO-J2-Super

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance managememt systems)

MELSOFT

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ISO 14001 JACO UKAS ENVIRONMENTAL MANAGEMENT 051

BVQI ISO 9001 UKAS QUALITY MANAGEMENT 008

Servo Amplifier Series and Servo Motor Models

1. Flexible specifications corresponding to users' needs

Servo amplifier type (Note 9)		Interface						Control mode					Setup S/W	Model	Power supply spec.	Capacity (kW) (Note 1)	Compatible motor series						
		Pulse train	Analog	DIO	SSCNET	RS-422 multi-drop	CC-Link	Position	Speed	Torque	Positioning function	Fully closed loop control compatible					HC-KFS	HC-MFS	HC-SFS	HC-LFS	HC-RFS	HA-LFS	HC-UFS
MR-J2S	**General-purpose interface MR-J2S-□A** 	●	●	●		●		●	●	●		○ (Note 3)	●	MR-J2S-□A	3-phase 200VAC	0.05 to 37	●	●	●	●	●	●	●
														MR-J2S-□A1	1-phase 100VAC	0.05 to 0.4	●	●					●
														MR-J2S-□A4	3-phase 400VAC	0.5 to 55			●			●	
	SSCNET, high-speed serial bus compatible MR-J2S-□B 			●	●			●				○ (Note 3)	●	MR-J2S-□B	3-phase 200VAC	0.05 to 37	●	●	●	●	●	●	●
														MR-J2S-□B1	1-phase 100VAC	0.05 to 0.4	●	●					●
														MR-J2S-□B4	3-phase 400VAC	0.5 to 55			●			●	
	With built-in positioning function MR-J2S-□CP 	● (Note 4)	● (Note 8)	●		●	○ (Note 7)				●		●	MR-J2S-□CP	3-phase 200VAC	0.05 to 7	●	●	●	●	●	●	●
														MR-J2S-□CP1	1-phase 100VAC	0.05 to 0.4	●	●					●
	With built-in program operation function MR-J2S-□CL 	● (Note 4)	● (Note 8)	●		●					●		●	MR-J2S-□CL	3-phase 200VAC	0.05 to 7	●	●	●	●	●	●	●
														MR-J2S-□CL1	1-phase 100VAC	0.05 to 0.4	●	●					●
MR-J2M (Multi-axis servo amplifier)	**General-purpose interface MR-J2M-A** (Note 5) 	● Max. 8 slots		●				●					●	• MR-J2M-P8A • MR-J2M-□DU • MR-J2M-BU□	3-phase 200VAC	0.05 to 0.75	●	●					●
	High speed serial bus, SSCNET compatible MR-J2M-B (Note 5) 			● (Note 6)	● Max. 8 slots			●					●	• MR-J2M-P8B • MR-J2M-□DU • MR-J2M-BU□	3-phase 200VAC	0.05 to 0.75	●	●					●

Notes: 1. The capacity selection software (MRZJW3-MOTSZ111E) can be obtained for free. Contact Mitsubishi for details.
2. ● indicates compliance with standard parts. ○ indicates compliance with special parts.
3. For further details of the fully closed loop control compatible servo amplifier, refer to "Fully Closed Loop Control Compatible INSTRUCTION MANUAL".
4. Use the manual pulse generator (MR-HDP01).
5. For further details of MR-J2M, refer to "MELSERVO-J2M Series SERVO AMPLIFIER INSTRUCTION MANUAL".
6. The expansion IO unit (MR-J2M-D01) is required.
7. Compatible with MR-J2S-□CP-S084.
8. This ● indicates "Override" and "Analog torque limit" command.
9. Actual product availability may vary according to region.

Motor series (Note 8)		Rated speed (maximum speed) (r/min)	Rated output (kW)	Servo motor type	Overseas standards		Protection level (Note 2)	Feature	Application examples
				With electro-magnetic brake (B)	EN	UL cUL			
Small capacity series	**HC-KFS series** 	3000 (4500)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	●	●	IP55 Excluding the shaft-through portion and connector (IP65 Note 3)	**Low inertia** Perfect for general industrial machines. Ultra-high velocity motors, 6000 or 10000r/min, have been prepared.	• Belt drive • Robots • Mounters • Sewing machines • X-Y tables • Food processing machines • Semiconductor manufacturing devices • Knitting and embroidery machines
		6000 (6000)	1 type 0.4	—	●	●	IP55 Excluding the shaft-through portion and connector		
		10000 (10000)	1 type 0.4	—	●	●			
	HC-MFS series 	3000 (4500)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	●	●	IP55 Excluding the shaft-through portion and connector (IP65 Note 3)	**Ultra-low inertia** Well suited for high-frequency operation.	• Inserters • Mounters
Medium capacity series	**HC-SFS series** 	1000 (1500 : 0.85kW, 1200 : 1.2~3kW)	4 types 0.85, 1.2, 2.0, 3.0	●	●	●	IP65 (IP67)	**Medium inertia** Three models, from low to high-speed, are available for various applications.	• Conveyor machines • Robots • X-Y tables
		2000 (3000 : 0.5~1.5kW, 2500 : 2, 3.5kW, 2000 : 5, 7kW)	14 types 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0	●	●	●	IP65 (IP67)		
		3000 (3000)	5 types 0.5, 1.0, 1.5, 2.0, 3.5	●	●	●	IP65 (IP67)		
	HC-LFS series 	2000 (3000)	5 types 0.5, 1.0, 1.5, 2.0, 3.0	●	●	●	IP65 (IP67)	**Low inertia** Perfect for general industrial machines.	• Roll feeders • Loaders and unloaders • High-frequency conveyor machines
	HC-RFS series 	3000 (4500)	5 types 1.0, 1.5, 2.0, 3.5, 5.0	●	●	●	IP65 (IP67)	**Ultra-low inertia** Well suited for high-frequency operation.	• Ultra-high-frequency conveyor machines
Medium/Large capacity series	**HA-LFS series** 	1000 (1200)	16 types 6.0, 8.0, 12, 15, 20, 25, 30, 37 6.0, 8.0, 12, 15, 20, 25 (Note 7) 30, 37	● (For only 6.0kW to 12kW)	●	●	IP44	**Low inertia** Three models, from low to medium-speed, are available for various applications. As standard, 30kW and larger capacities are compatible with flange mounting or leg mounting. (Note 6)	• Injection molding machines • Semiconductor manufacturing devices • Large conveyor machines
		1500 (2000)	14 types 7.0 (special-order), 11, 15, 22, 30, 37 7.0 (special-order), 11, 15, 22, 30, 37, 45, 50	● (For only 7.0kW to 15kW)	●	●	IP44		
		2000 (2000)	14 types 5.0, 7.0, 11, 15, 22, 30, 37 11, 15, 22, 30, 37, 45, 55	● (For only 11kW to 22kW)	●	●	IP44 IP65 for HA-LFS502 or HA-LFS702		
Flat Small/Medium capacity series	**HC-UFS series** 	2000 (3000 : 0.75~2kW, 2500 : 3.5, 5kW)	5 types 0.75, 1.5, 2.0, 3.5, 5.0	●	●	●	IP65 (IP67)	**Flat type** The flat design makes this unit well suited for situations where the installation space is restricted.	• Robots • Food processing machines
		3000 (4500)	4 types 0.1, 0.2, 0.4, 0.75	●	●	●	IP65 Excluding the connector (Note 4)		

Notes: 1. A ● mark shows production range.
2. Compliance is possible with special products for items inside ( ) of the protection level. Consult Mitsubishi for details.
3. Motor capacity 50W is excluded.
4. IP65-compliant product (HC-UFS□-S1) including connector components have been prepared.
5. Shaded entries are for 400V type.
6. Some motors from 15 to 25kW capacities can be foot-mount style. Refer to "Motor Dimensions" shown in this catalog.
7. The HA-LFS 1000r/min 400V 6.0 to 12kW, 20kW and 25kW capacities are special-order products. Contact Mitsubishi for details on the delivery schedule.
8. Actual product availability may vary according to region.

Super Performance with MELSERVO-J2-Super

2. High Functionality, High Performance

High-resolution Encoder 131072p/rev (17bit)

- The inclusion of a high-resolution encoder ensures high performance and stability at low speeds.
- Motor sizes are the same as previous products and wiring is compatible.

High-performance CPU Incorporated for Improved Response

- The application of a high-performance CPU has enhanced response significantly. Speed loop frequency response is improved to 550Hz or more.
  The MR-J2-Super series are the best choice for use in high-speed positioning applications.

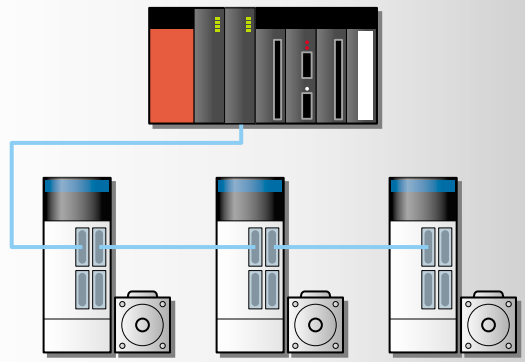
Absolute encoder is Standard Equipment

- The absolute positioning method, which does not require home position return, can be used by adding a battery to the servo amplifier. The servo motor does not need to be replaced.

SSCNET, high-speed serial bus compatible: B type

- A completely synchronized system can be made using SSCNET utilizing high-speed serial communication with cycle times of up to 0.888ms between controller and amplifier. Such a system will provide high levels of reliability with high levels of performance.
- As the SSCNET bus system is used to connect the Servo system together, the consolidated management features such as Servo amplifier parameter settings and data gathering are all present in the motion controller.
- A dedicated cable is used for the SSCNET system that simply connects the amplifiers and controllers. This simple connection method reduces wiring time and also helps prevent noise (due to the serial data transfer when using SSCNET).
- The command frequency is not limited even when using the high resolution encoders standard on the MELSERVO-J2-Super series products.
- SSCNET is a completely synchronized network, so synchronized control and synchronized starting for advanced interpolation etc. can all be carried out.
- An absolute system can be made by simply adding a battery to the Servo amplifier.
- More than 1,000,000 SSCNET amplifier units of this highly reliable network are in use.

● **Wiring is reduced, and trouble caused by incorrect wiring is prevented.**



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3. Optimum Tuning

Easy tuning

Model Adaptive Control/ Advanced Real-time Auto-tuning

The load inertia moment (machine system's ideal model) is automatically estimated by the auto-tuning function.
Stable control is carried out following the ideal model estimated by the model adaptive control.

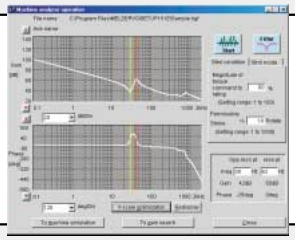
A simple parameter change allows gain settings to change, tuning the Servo

High performance tuning :Perfect Tuning using Personal Computer and MR configurator (Setup Software)

● When machine resonates

Machine Analysis Function

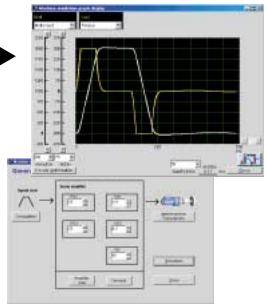
The servo motor is automatically oscillated, and the machine system's frequency characteristics are analyzed. The "Machine Resonance Suppression Filter" can be set easily based on the result.



● When thinking about changing motors
● When thinking about changing command patterns

Machine Simulation Function

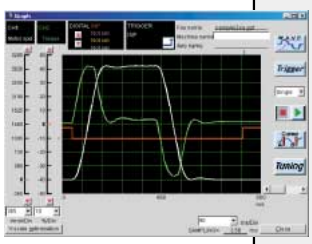
The performance can be confirmed without actually replacing the motor. The results of the machine analysis function can be read in, and the response in the machine system can be simulated.



● To see the motor state

Monitor/Diagnostic Function

The graph function to display the motor state, such as the motor's speed and torque, and functions to diagnose the motor state at an alarm occurance are provided.



Contents

Note: The cables and connectors are sold separately.
The motor power supply connector is different for each motor, so take care when ordering.

Model Configurations

■For servo amplifier 100V/200V

MR-J2S-10A1-□

Mitsubishi general-purpose AC servo amplifier MELSERVO-J2-Super Series

A : General-purpose interface
B : SSCNET
CP: Positioning function built-in (Note)
CL: Program operation function built-in (Note)
Note: The MR-J2S-□CP type and CL type are compatible with the 0.05 to 7kW capacity motors.

Special product

Symbol	Power supply
None	3-phase 200VAC or 1-phase 230VAC (Note1)
1	1-phase 100VAC (Note2)

Notes: 1. The 1-phase 230VAC is available only for the MR-J2S-70□ or smaller servo amplifiers.
2. Only for MR-J2S-40□ or smaller servo amplifiers.

- **Conforms to following standards: EN, UL, cUL**
- **A converter unit (MR-HP30KA) is required for the 30kW or larger amplifier.**

List of compatible motors

Symbol	HC-KFS	HC-MFS	HC-SFS	HC-LFS	HC-RFS	HA-LFS	HC-UFS
10	053, 13	053, 13	—	—	—	—	13
20	23	23	—	—	—	—	23
40	43	43	—	—	—	—	43
60	—	—	52, 53	52	—	—	—
70	73, 46, 410	73	—	—	—	—	72, 73
100	—	—	81, 102, 103	102	—	—	—
200	—	—	121, 201, 152, 202, 153, 203	152	103, 153	—	152
350	—	—	301, 352, 353	202	203	—	202
500	—	—	502	302	353, 503	502	352, 502
700	—	—	702	—	—	601, 701M, 702	—
11K	—	—	—	—	—	801, 12K1, 11K1M, 11K2	—
15K	—	—	—	—	—	15K1, 15K1M, 15K2	—
22K	—	—	—	—	—	20K1, 25K1, 22K1M, 22K2	—
30K	—	—	—	—	—	30K1, 30K1M, 30K2	—
37K	—	—	—	—	—	37K1, 37K1M, 37K2	—

Note: There are some motors that cannot be connected depending on the amplifier's software version. Refer to the servo motor specifications in this catalog.

■For servo amplifier 400V

MR-J2S-30KA4-□

Mitsubishi general-purpose AC servo amplifier MELSERVO-J2-Super Series

A: General-purpose interface
B: SSCNET

3-phase 400VAC

Special product

- **Conforms to following standards: EN, UL, cUL**
- **A converter unit (MR-HP55KA4) is required for the 30kW or larger amplifier.**

List of compatible motors

Symbol	HC-SFS	HA-LFS
60	524	—
100	1024	—
200	1524, 2024	—
350	3524	—
500	5024	—
700	7024	6014, 701M4
11K	—	8014, 12K14, 11K1M4, 11K24
15K	—	15K14, 15K1M4, 15K24
22K	—	20K14, 22K1M4, 22K24
30K	—	25K14, 30K14, 30K1M4, 30K24
37K	—	37K14, 37K1M4, 37K24
45K	—	45K1M4, 45K24
55K	—	50K1M4, 55K24

Note: There are some motors that cannot be connected depending on the amplifier's software version. Refer to the servo motor specifications in this catalog.

■For servo motor 200V

HC-MFS 05 3 B □

Symbol	Motor series
HC-KFS	Low inertia, small capacity
HC-MFS	Ultra-low inertia, small capacity
HC-SFS	Medium inertia, medium capacity
HC-LFS	Low inertia, medium capacity
HC-RFS	Ultra-low inertia, medium capacity
HA-LFS	Low inertia, medium-large capacity
HC-UFS	Flat model, small-medium capacity

Symbol	Rated output (kW)
05	0.05
1 to 8	0.1 to 0.85
10 to 80	1.0 to 8.0
11K to 37K	11.0 to 37.0

Symbol	Rated speed (r/min)
1	1000
1M	1500
2	2000
3	3000
6	6000
10	10000

Symbol	Electromagnetic brake
None	None
B	Installed

Note: Refer to "Electromagnetic brake specifications" in this catalog for the compatible models and detailed specifications.

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way or with key (Note)
D	D-cut (Note)

Note: Refer to "Special shaft end specifications" in this catalog for the compatible models and detailed specifications.

● **Conforms to following standards: EN, UL, cUL**

■For servo motor 400V

HA-LFS 30K 2 4 B □

Symbol	Motor series
HC-SFS	Medium inertia, medium capacity
HA-LFS	Low inertia, medium-large capacity

400VAC type

Symbol	Rated output (kW)
5	0.5
10 to 80	1.0 to 8.0
11K to 55K	11.0 to 55.0

Symbol	Rated speed (r/min)
1	1000
1M	1500
2	2000

Note: The HA-LFS1000r/min 6.0 to 12kW, 20kW, 25kW and HA-LFS 1500r/min 7.0kW motors are special-order products.

Symbol	Electromagnetic brake
None	None
B	Installed

Note: Refer to "Electromagnetic brake specifications" in this catalog for the compatible models and detailed specifications.

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way (Note)

Note: Refer to "Special shaft end specifications" in this catalog for the compatible models and detailed specifications.

● **Conforms to following standards: EN, UL, cUL**

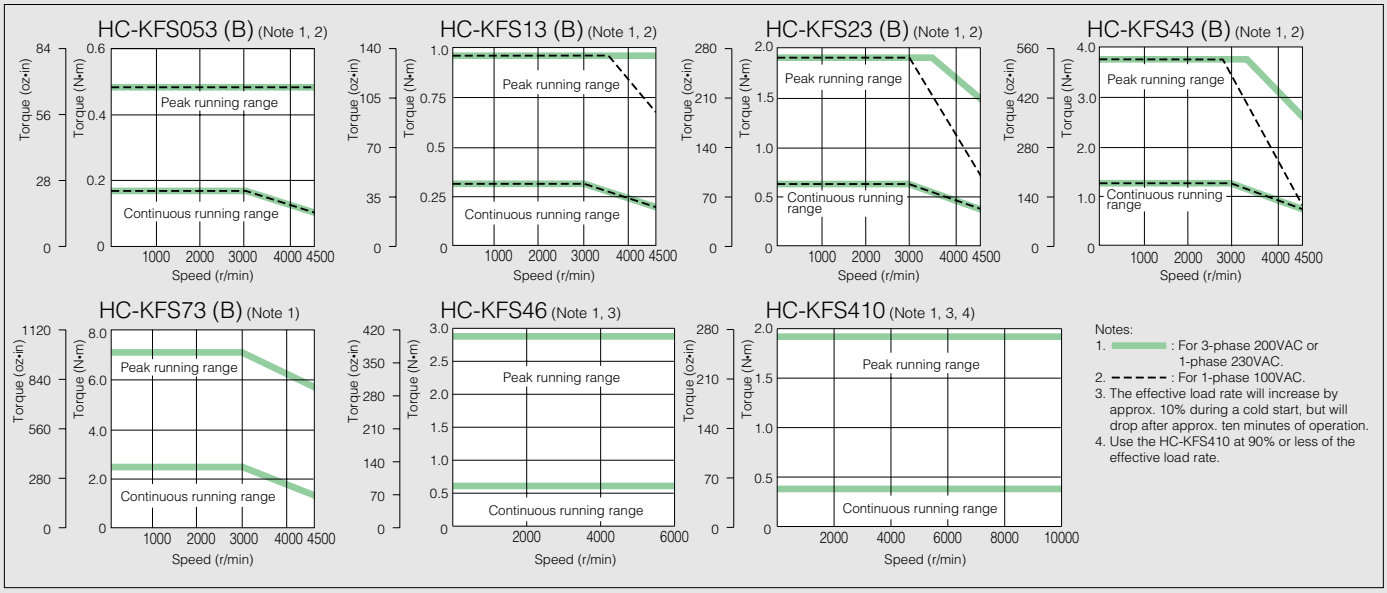
Specifications and Characteristics

HC-KFS series servo motor specifications

Servo motor series			HC-KFS series (Low inertia, small capacity)					HC-KFS Ultra-high velocity series (Low inertia, small capacity)	
Models / Specifications		Servo motor model HC-KFS	053 (B)	13 (B)	23 (B)	43 (B)	73 (B)	46	410
		Servo-amp model (Note 9) MR-J2S-	10A (1)/B (1)/CP (1)/CL (1)		20A (1)/B (1)/CP (1)/CL (1)	40A (1)/B (1)/CP (1)/CL (1)	70A/B/CP/CL(Note 10)	70A/B/CP/CL-U005	70A/B/CP/CL-U006
Servo motor	Power facility capacity (Note 2) (kVA)		0.3	0.3	0.5	0.9	1.3	0.9	0.9
	Continuous running duty	Rated output (W)	50	100	200	400	750	400	
		Rated torque (N·m [oz·in])	0.16 (22.7)	0.32 (45.3)	0.64 (90.6)	1.3 (184.1)	2.4 (339.8)	0.64 (90.6)	0.38 (53.8)
	Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (134.5)	1.9 (269.0)	3.8 (538.1)	7.2 (1019.5)	2.87 (406.4)	1.91 (270.5)
	Rated speed (r/min)		3000					6000	10000
	Maximum speed (r/min)		4500					6000	10000
	Permissible instantaneous speed (r/min)		5175					6900	11500
	Power rate at continuous rated torque (kW/s)		4.78	12.1	9.65	24.2	37.7	6.4	3.1
	Rated current (A)		0.83	0.71	1.1	2.3	5.8	2.9	2.9
	Maximum current (A)		2.5	2.2	3.4	6.9	18.6	12.9	14.5
	Regenerative braking frequency (times/min) (Note 3, 4)	With no options	(Note 5)	(Note 5)	(Note 5)	220	190	110	55
		MR-RB032 (30W)	(Note 5)	(Note 5)	(Note 5)	660	280	160	80
		MR-RB12 (100W)	—	—	(Note 5)	2200	940	550	275
		MR-RB32 (300W)	—	—	—	—	2800	1650	825
	Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	0.053 (0.29)	0.084 (0.459)	0.42 (2.296)	0.67 (3.663)	1.51 (8.255)	0.64 (3.499)	0.47 (2.569)
		With electromagnetic brake	0.056 (0.306)	0.087 (0.476)	0.47 (2.569)	0.72 (3.936)	1.635 (8.938)	—	—
	Recommended load/motor inertia moment ratio		15 times the servo motor's inertia moment max. (Note 6)						
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		—						
	Structure		Totally enclosed non ventilated (protection level: IP55) (Note 1, 7)						
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)						
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust						
		Elevation/vibration (Note 8)	1000m (3280ft) or less above sea level; X: 49m/s^2 Y: 49m/s^2					1000m (3280ft) or less above sea level; X, Y: 19.6m/s^2	
	Mass (kg [lb])	Standard	0.4 (0.88)	0.53 (1.17)	0.99 (2.18)	1.45 (3.19)	3.0 (6.61)	1.5 (3.30)	1.5 (3.30)
		With electromagnetic brake	0.75 (1.65)	0.89 (1.96)	1.6 (3.53)	2.1 (4.63)	4.0 (8.81)	—	—

Notes: 1. If used in location such as actual site of machinery where oil or water may contact the product, special specifications apply, contact Mitsubishi.
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
4. The regenerative braking frequency of the 600W and smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
5. There are no limits on regeneration frequency as long as the effective torque is within the rated torque range. However, the load/motor of inertia moment ratio must be 15 times or less.
6. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
7. The shaft-through portion and connector for cable terminal are excluded.
8. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
9. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
10. The amplifier software version compatible with the HC-KFS series 750W is as follows.
A type:Version A4 or above B type:Version A3 or above

HC-KFS series servo motor torque characteristics



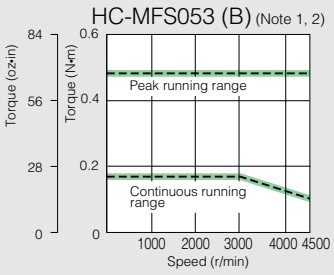
Notes:
1. ——— : For 3-phase 200VAC or 1-phase 230VAC.
2. - - - - - : For 1-phase 100VAC.
3. The effective load rate will increase by approx. 10% during a cold start, but will drop after approx. ten minutes of operation.
4. Use the HC-KFS410 at 90% or less of the effective load rate.

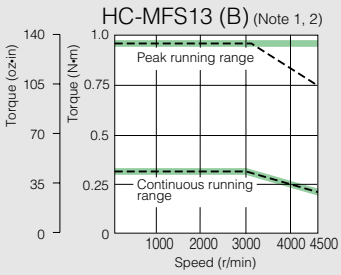
HC-MFS series servo motor specifications

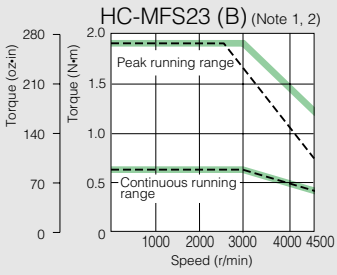
Servo motor series			HC-MFS series (Ultra-low inertia, small capacity)				
Models / Specifications		Servo motor model HC-MFS	053 (B)	13 (B)	23 (B)	43 (B)	73 (B)
		Servo-amp model (Note 9) MR-J2S-	10A (1)/B (1)/CP (1)/CL (1)		20A (1)/B (1)/CP (1)/CL (1)	40A (1)/B (1)/CP (1)/CL (1)	70A/B/CP/CL
Servo motor	Power facility capacity (Note 2) (kVA)		0.3	0.3	0.5	0.9	1.3
	Continuous running duty	Rated output (W)	50	100	200	400	750
		Rated torque (N·m [oz·in])	0.16 (22.7)	0.32 (45.3)	0.64 (90.6)	1.3 (184.1)	2.4 (339.8)
	Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (134.5)	1.9 (269.0)	3.8 (538.1)	7.2 (1019.5)
	Rated speed (r/min)		3000				
	Maximum speed (r/min)		4500				
	Permissible instantaneous speed (r/min)		5175				
	Power rate at continuous rated torque (kW/s)		13.47	34.13	46.02	116.55	94.43
	Rated current (A)		0.85		1.5	2.8	5.1
	Maximum current (A)		2.6		5.0	9.0	18
	Regenerative braking frequency (times/min) (Note 3, 4)	With no options	(Note 5)	(Note 5)	(Note 5)	1010	400
		MR-RB032 (30W)	(Note 5)	(Note 5)	(Note 5)	3000	600
		MR-RB12 (100W)	—	—	(Note 5)	(Note 5)	2400
		MR-RB32 (300W)	—	—	—	—	(Note 5)
	Moment of inertia J ($\times 10^{-4}$ kg·m^2) [J (oz·in^2)]	Standard	0.019 (0.104)	0.03 (0.164)	0.088 (0.481)	0.143 (0.782)	0.6 (3.28)
		With electromagnetic brake	0.022 (0.12)	0.032 (0.175)	0.136 (0.743)	0.191 (1.044)	0.725 (3.963)
	Recommended load/motor inertia moment ratio		30 times the servo motor's inertia moment max. (Note 6)				
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)				
	Attachments		—				
	Structure		Totally enclosed non ventilated (protection level: IP55) (Note 1, 7)				
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)				
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)				
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust				
		Elevation/vibration (Note 8)	1000m (3280ft) or less above sea level; X, Y: 49 m/s^2				
	Mass (kg [lb])	Standard	0.4 (0.88)	0.53 (1.17)	0.99 (2.18)	1.45 (3.19)	3.0 (6.61)
		With electromagnetic brake	0.75 (1.65)	0.89 (1.96)	1.6 (3.53)	2.1 (4.63)	4.0 (8.81)

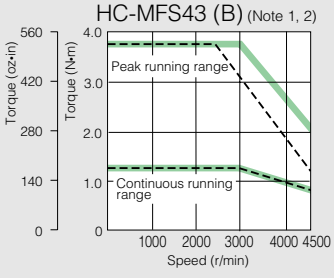
Notes: 1. If used in location such as actual site of machinery where oil or water may contact the product, special specifications apply, contact Mitsubishi.
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
4. The regenerative braking frequency of the 600W and smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
5. There are no limits on regeneration frequency as long as the effective torque is within the rated torque range. However, the load/motor of inertia moment ratio must be 30 times or less.
6. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
7. The shaft-through portion and connector for cable terminal are excluded.
8. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
9. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).

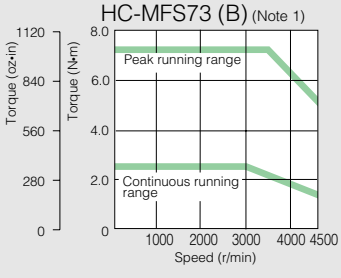
HC-MFS series servo motor torque characteristics











Notes:
1. ——— : For 3-phase 200VAC or 1-phase 230VAC.
2. - - - - - : For 1-phase 100VAC.

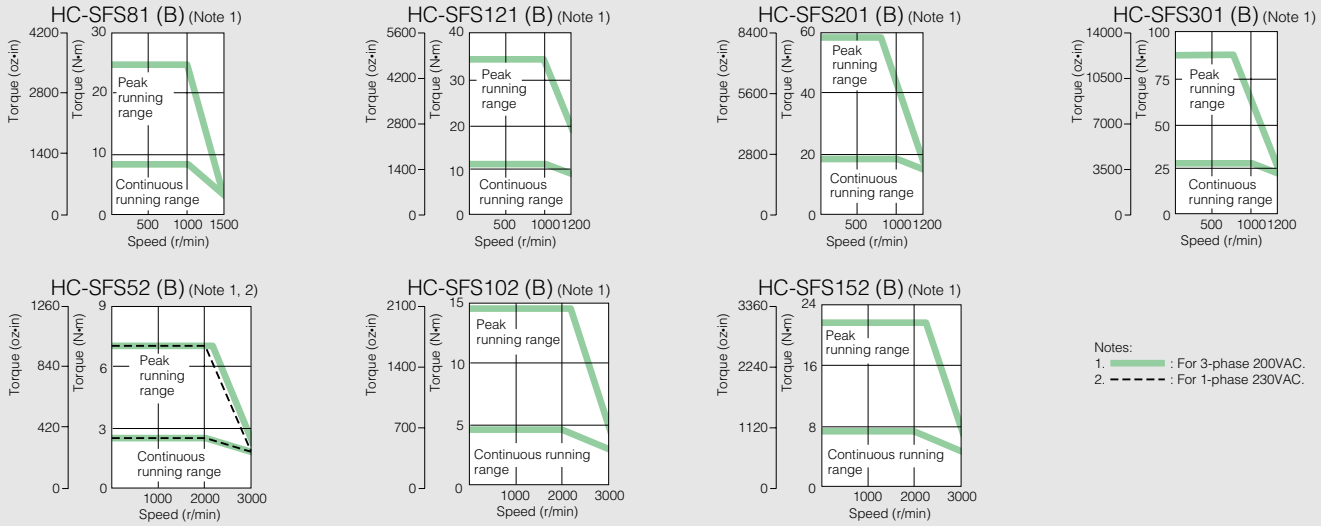
Specifications and Characteristics

HC-SFS series servo motor specifications (200VAC type)

Servo motor series			HC-SFS1000 r/min series (Medium inertia, medium capacity)				HC-SFS2000 r/min series		
Models / Specifications	Servo motor model HC-SFS		81(B)	121(B)	201(B)	301(B)	52(B)	102(B)	152(B)
	Servo-amp model (Note 7) MR-J2S-		100A/B/CP/CL (Note 8)	200A/B/CP/CL (Note 8)		350A/B/CP/CL (Note 8)	60A/B/CP/CL	100A/B/CP/CL	200A/B/CP/CL
Servo motor	Power facility capacity (Note 1) (kVA)		1.5	2.1	3.5	4.8	1.0	1.7	2.5
	Continuous running duty	Rated output (kW)	0.85	1.2	2.0	3.0	0.5	1.0	1.5
		Rated torque (N·m [oz·in])	8.12 (1149.8)	11.5 (1628.4)	19.1 (2704.6)	28.6 (4049.8)	2.39 (338.4)	4.78 (676.8)	7.16 (1013.9)
	Maximum torque (N·m [oz·in])		24.4 (3455.0)	34.4 (4871.0)	57.3 (8113.7)	85.9 (12163.4)	7.16 (1013.9)	14.4 (2039.0)	21.6 (3058.6)
	Rated speed (r/min)		1000				2000		
	Maximum speed (r/min)		1500	1200			3000		
	Permissible instantaneous speed (r/min)		1725	1380			3450		
	Power rate at continuous rated torque (kW/s)		32.9	30.9	44.5	81.3	8.7	16.7	25.6
	Rated current (A)		5.1	7.1	9.6	16	3.2	6	9
	Maximum current (A)		15.3	21.3	28.8	48	9.6	18	27
	Regenerative braking frequency (times/min) (Note 2, 3)	With no options	140	240	100	84	56	54	136
		MR-RB032 (30W)	220	—	—	—	165	80	—
		MR-RB12 (100W)	740	—	—	—	560	270	—
		MR-RB30 (300W)	—	730	330	250	—	—	408
		MR-RB31 (300W)	—	—	—	—	—	—	—
		MR-RB32 (300W)	2220	—	—	—	—	810	—
		MR-RB50 (500W) (Note 6)	—	1216	550	430	—	—	680
		MR-RB51 (500W) (Note 6)	—	—	—	—	—	—	—
	Moment of inertia J (×10^{-4}kg·m^2) [J (oz·in^2)]	Standard	20.0 (109)	42.5 (232)	82.0 (448)	101 (552)	6.6 (36.1)	13.7 (74.9)	20.0 (109)
		With electromagnetic brake	22.0 (120)	52.5 (287)	92.0 (503)	111 (607)	8.6 (47.0)	15.7 (85.8)	22.0 (120)
	Recommended load/motor inertia moment ratio		15 times the servo motor's inertia moment max. (Note 4)						
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		Oil seal						
	Structure		Totally enclosed non ventilated (protection level: IP65)						
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)						
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust						
		Elevation	1000m (3280ft) or less above sea level						
		Vibration (Note 5)	X,Y : 24.5m/s^2	X : 24.5m/s^2 Y : 49m/s^2		X : 24.5m/s^2 Y : 29.4m/s^2	X,Y : 24.5m/s^2		
	Mass (kg [lb])	Standard	9 (19.8)	12 (26.4)	19 (41.9)	23 (50.7)	5 (11.0)	7 (15.4)	9 (19.8)
		With electromagnetic brake	11 (24.2)	18 (39.7)	25 (55.1)	29 (63.9)	7 (15.4)	9 (19.8)	11 (24.2)

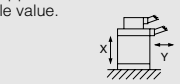
Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
3. The regenerative braking frequency of the 600W and smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
4. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.

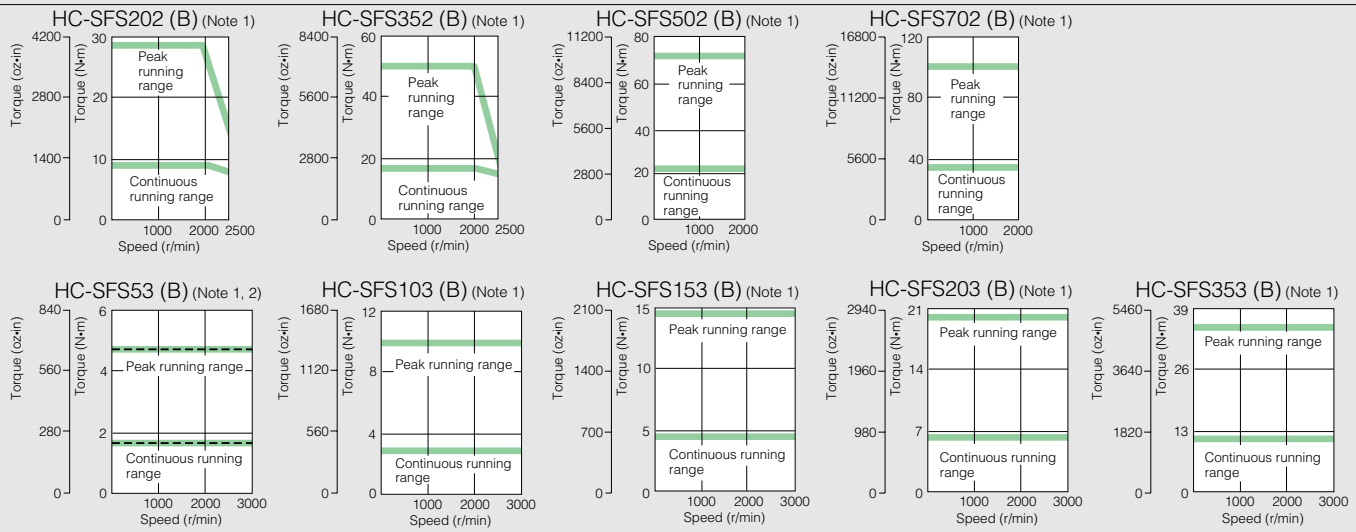
HC-SFS series servo motor torque characteristics (200VAC type)



(Medium inertia, medium capacity)				HC-SFS3000 r/min series (Medium inertia, medium capacity)				
202(B)	352(B)	502(B)	702(B)	53(B)	103(B)	153(B)	203(B)	353(B)
200A/B/CP/CL	350A/B/CP/CL	500A/B/CP/CL (Note 9)	700A/B/CP/CL (Note 9)	60A/B/CP/CL (Note 10)	100A/B/CP/CL (Note 10)	200A/B/CP/CL (Note 10)		350A/B/CP/CL (Note 10)
3.5	5.5	7.5	10.0	1.0	1.7	2.5	3.5	5.5
2.0	3.5	5.0	7.0	0.5	1.0	1.5	2.0	3.5
9.55 (1352.3)	16.7 (2364.7)	23.9 (3384.2)	33.4 (4729.4)	1.59 (225.1)	3.18 (450.3)	4.78 (676.8)	6.37 (902.0)	11.1 (1571.8)
28.5 (4035.6)	50.1 (7094.2)	71.6 (10138.6)	100 (14160)	4.77 (675.4)	9.55 (1352.3)	14.3 (2024.9)	19.1 (2704.6)	33.4 (4729.4)
2000				3000				
2500		2000		3000				
2875		2300		3450				
21.5	34.1	56.5	69.7	3.8	7.4	11.4	9.5	15.1
11	17	26	35	3.2	5.3	8.6	10.4	16.4
33	51	84	105	9.6	15.9	25.8	31.2	49.2
64	31	39	32	25	24	82	24	14
—	—	—	—	73	36	—	—	—
—	—	—	—	250	120	—	—	—
192	95	90	—	—	—	250	70	42
—	—	—	57	—	—	—	—	—
—	—	—	—	—	360	—	—	—
320	158	150	—	—	—	410	110	70
—	—	—	95	—	—	—	—	—
42.5 (232)	82.0 (448)	101(552)	160 (875)	6.6 (36.1)	13.7 (74.9)	20.0 (109)	42.5 (232)	82.0 (448)
52.5 (287)	92.0 (503)	111 (607)	170 (929)	8.6 (47.0)	15.7 (85.8)	22.0 (120)	52.5 (287)	92.0 (503)
15 times the servo motor's inertia moment max. (Note 4)								
17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)								
Oil seal								
Totally enclosed non ventilated (protection level: IP65)								
0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)								
80% RH max. (non condensing), storage: 90% RH max. (non condensing)								
Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust								
1000m (3280ft) or less above sea level								
X : 24.5m/s^2 Y : 49m/s^2		X : 24.5m/s^2 Y : 29.4m/s^2		X,Y : 24.5m/s^2			X : 24.5m/s^2 Y : 49m/s^2	
12 (26.4)	19 (41.9)	23 (50.7)	32 (70.5)	5 (11)	7 (15.4)	9 (19.8)	12 (26.4)	19 (41.9)
18 (39.7)	25 (55.1)	29 (63.9)	38 (83.7)	7 (15.4)	9 (19.8)	11 (24.2)	18 (39.7)	25 (55.1)

5. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
6. Install a cooling fan (approx. 1.0m^3/min, □92).
7. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
8. The amplifier software version compatible with the HC-SFS 1000 r/min series is as follows.
   A type:Version A1 or above
9. The amplifier software version compatible with the HC-SFS 2000 r/min series 5.0kW/7.0kW is as follows.
   A type:Version B0 or above B type:Version B0 or above
10. The amplifier software version compatible with the HC-SFS 3000 r/min series is as follows.
    A type:Version A1 or above



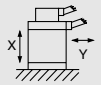


Specifications and Characteristics

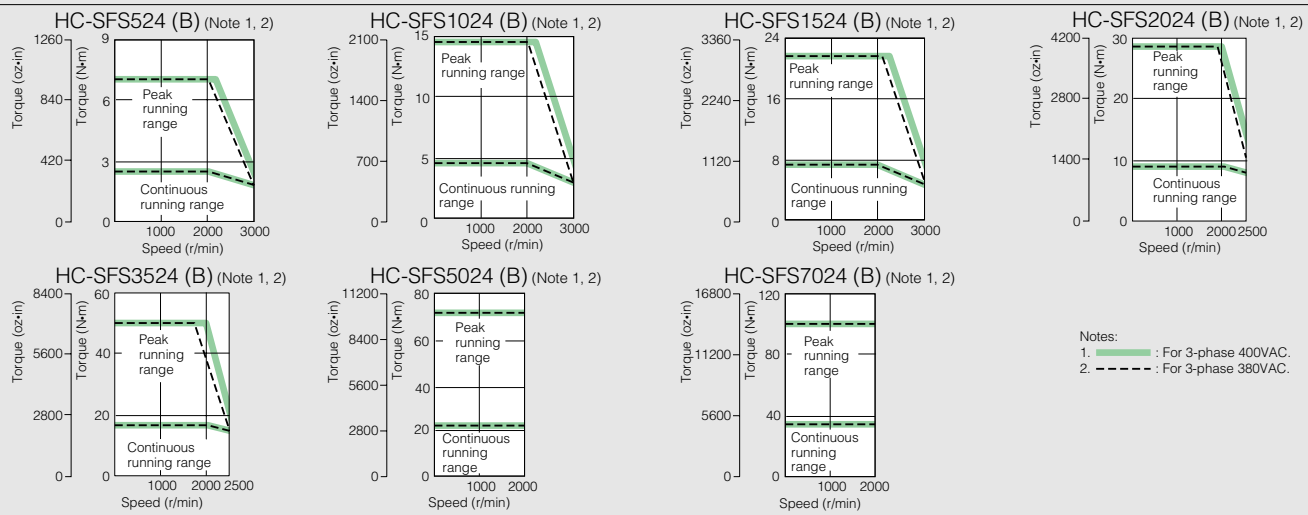
HC-SFS series servo motor specifications (400VAC type)

Servo motor series			HC-SFS2000 r/min series (Medium inertia, medium capacity)						
Models / Specifications		Servo motor model HC-SFS	524(B)	1024(B)	1524(B)	2024(B)	3524(B)	5024(B)	7024(B)
		Servo-amp model MR-J2S-	60A4/B4	100A4/B4	200A4/B4		350A4/B4	500A4/B4	700A4/B4
Servo motor	Power facility capacity (Note 1) (kVA)		1.0	1.7	2.5	3.5	5.5	7.5	10.0
	Continuous running duty	Rated output (kW)	0.5	1.0	1.5	2.0	3.5	5.0	7.0
		Rated torque (N·m [oz·in])	2.39 (338.4)	4.78 (676.8)	7.16 (1013.9)	9.55 (1352.3)	16.7 (2364.7)	23.9 (3384.2)	33.4 (4729.4)
	Maximum torque (N·m [oz·in])		7.16 (1013.9)	14.4 (2039.0)	21.6 (3058.6)	28.5 (4035.6)	50.1 (7094.2)	71.6 (10138.6)	100 (14160)
	Rated speed (r/min)		2000						
	Maximum speed (r/min)		3000			2500		2000	
	Permissible instantaneous speed (r/min)		3450			2875		2300	
	Power rate at continuous rated torque (kW/s)		8.7	16.7	25.6	21.5	34.1	56.5	69.7
	Rated current (A)		1.5	2.8	4.4	5.4	8.6	14	17
	Maximum current (A)		4.5	8.4	13.2	16.2	25.8	42	51
	Regenerative braking frequency (times/min) (Note 2, 3)	With no options	56	54	136	64	31	39	32
		MR-RB1L-4 (100W)	560	—	—	—	—	—	—
		MR-RB3M-4 (300W)	—	810	—	—	—	—	—
		MR-RB3H-4 (300W)	—	—	408	192	—	—	—
		MR-RB5H-4 (500W) (Note 6)	—	—	680	320	—	—	—
		MR-RB3G-4 (300W)	—	—	—	—	95	90	—
		MR-RB5G-4 (500W) (Note 6)	—	—	—	—	158	150	—
		MR-RB34-4 (300W)	—	—	—	—	—	—	57
		MR-RB54-4 (500W) (Note 6)	—	—	—	—	—	—	95
	Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	6.6 (36.1)	13.7 (74.9)	20.0 (109)	42.5 (232)	82.0 (448)	101 (552)	160 (875)
		With electromagnetic brake	8.6 (47.0)	15.7 (85.8)	22.0 (120)	52.5 (287)	92.0 (503)	111 (607)	170 (929)
	Recommended load/motor inertia moment ratio		15 times the servo motor's inertia moment max. (Note 4)						
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		Oil seal						
	Structure		Totally enclosed non ventilated (protection level: IP65)						
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)						
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust						
		Elevation	1000m (3280ft) or less above sea level						
		Vibration (Note 5)	X,Y : 24.5m/s^2			X : 24.5m/s^2 Y : 49m/s^2		X : 24.5m/s^2 Y : 29.4m/s^2	
	Mass (kg [lb])	Standard	5 (11.0)	7 (15.4)	9 (19.8)	12 (26.4)	19 (41.9)	23 (50.7)	32 (70.5)
		With electromagnetic brake	7 (15.4)	9 (19.8)	11 (24.2)	18 (39.7)	25 (55.1)	29 (63.9)	38 (83.7)

Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
3. The regenerative braking frequency of the 600W and smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
4. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
5. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
6. Install a cooling fan (approx. 1.0m^3/min, □92).



HC-SFS series servo motor torque characteristics (400VAC type)

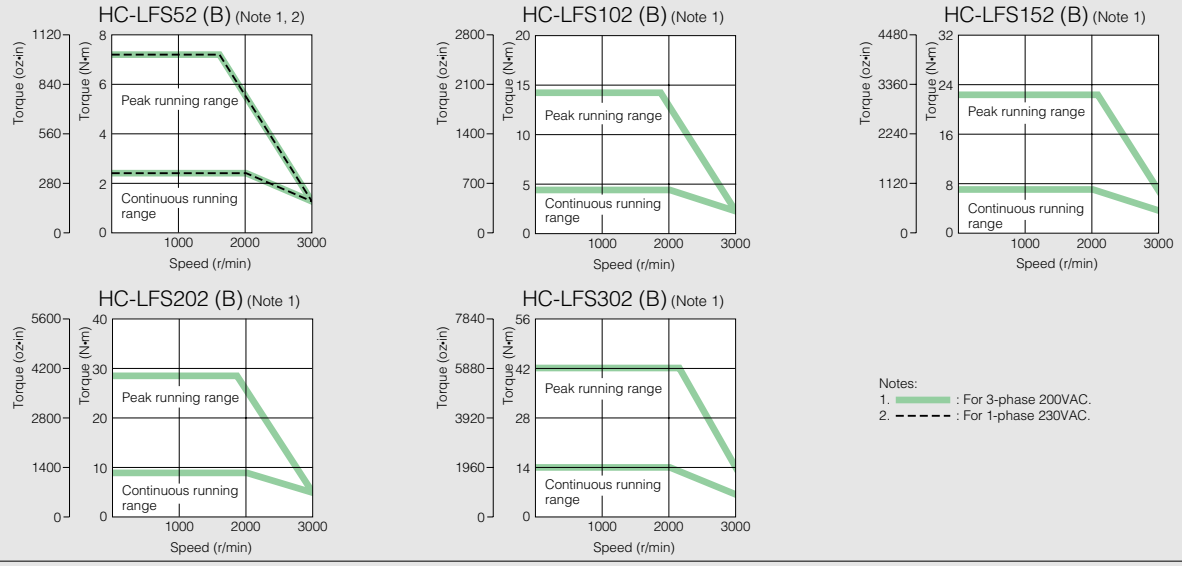


HC-LFS series servo motor specifications

Servo motor series			HC-LFS series (Low inertia, medium capacity)				
Specifications \ Models		Servo motor model HC-LFS	52(B)	102(B)	152(B)	202(B)	302(B)
		Servo-amp model (Note 7) MR-J2S-	60A/B/CP/CL (Note 8)	100A/B/CP/CL (Note 8)	200A/B/CP/CL (Note 8)	350A/B/CP/CL (Note 8)	500A/B/CP/CL (Note 8)
Servo motor	Power facility capacity (Note 1) (kVA)		1.0	1.7	2.5	3.5	4.8
	Continuous running duty	Rated output (kW)	0.5	1.0	1.5	2.0	3.0
		Rated torque (N·m [oz·in])	2.39 (338.4)	4.78 (676.8)	7.16 (1013.9)	9.55 (1352.3)	14.3 (2024.9)
	Maximum torque (N·m [oz·in])		7.16 (1013.9)	14.4 (2039.0)	21.6 (3058.6)	28.5 (4035.6)	42.9 (6074.6)
	Rated speed (r/min)		2000				
	Maximum speed (r/min)		3000				
	Permissible instantaneous speed (r/min)		3450				
	Power rate at continuous rated torque (kW/s)		17.9	49.7	80.1	41.5	56.8
	Rated current (A)		3.2	5.9	9.9	14	23
	Maximum current (A)		9.6	18	30	42	69
	Regenerative braking frequency (times/min) (Note 2, 3)	With no options	115	160	425	120	70
		MR-RB032 (30W)	340	235	—	—	—
		MR-RB12 (100W)	1150	800	—	—	—
		MR-RB30 (300W)	—	—	1270	370	215
		MR-RB32 (300W)	—	2410	—	—	—
		MR-RB50 (500W) (Note 6)	—	—	2120	615	355
	Moment of inertia J ($\times 10^{-4}$ kg·m^2) [J (oz·in^2)]	Standard	3.2 (17.5)	4.6 (25.1)	6.4 (35.0)	22 (120)	36 (197)
		With electromagnetic brake	5.2 (28.4)	6.6 (36.1)	8.4 (45.9)	32 (175)	46 (251)
	Recommended load/motor inertia moment ratio		10 times the servo motor's inertia moment max. (Note 4)				
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)				
	Attachments		Oil seal				
	Structure		Totally enclosed non ventilated (protection level: IP65)				
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)				
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)				
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust				
		Elevation/vibration (Note 5)	1000m (3280ft) or less above sea level/X: 9.8m/s^2 Y: 24.5m/s^2			1000m (3280ft) or less above sea level/X: 19.6m/s^2 Y: 49m/s^2	
	Mass (kg [lb])	Standard	6.5 (14.3)	8.0 (17.6)	10.0 (22.0)	21 (46.3)	28 (61.7)
		With electromagnetic brake	9.0 (19.8)	10.5 (23.1)	12.5 (27.5)	27 (59.5)	34 (74.9)

Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
3. The regenerative braking frequency of the 600W and smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
4. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
5. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
6. Install a cooling fan (approx. 1.0m^3/min, □92).
7. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
8. The amplifier software version compatible with the HC-LFS series is as follows. A type:Version B3 or above B type:Version B3 or above CP type:Version A2 or above

HC-LFS series servo motor torque characteristics



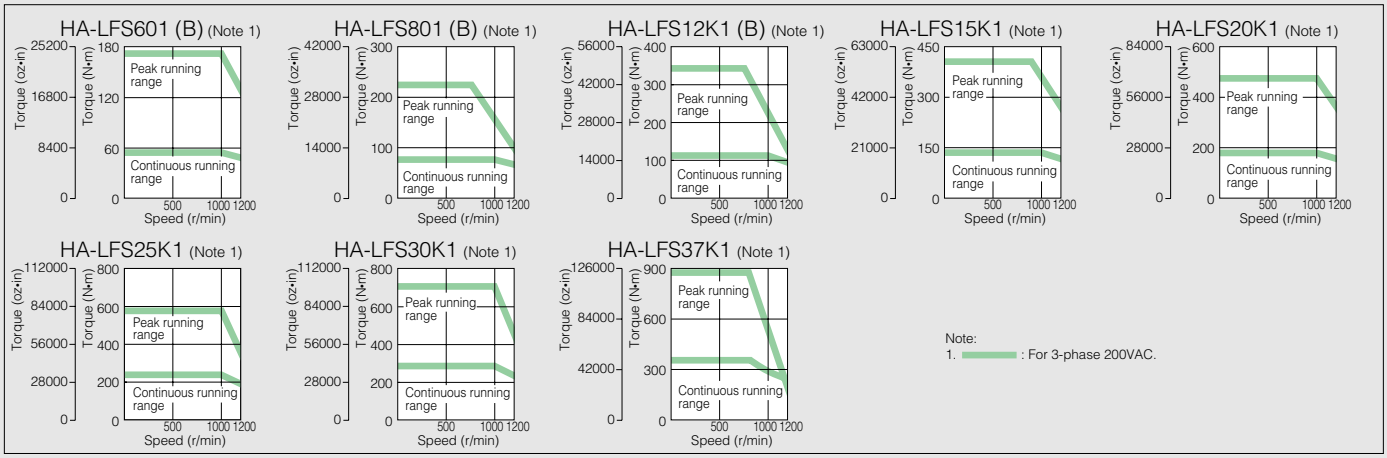
Specifications and Characteristics

HA-LFS 1000r/min series servo motor specifications (200VAC type)

Servo motor series			HA-LFS 1000r/min series (Low inertia, medium capacity to large capacity)							
Models / Specifications	Servo motor model HA-LFS		601 (B)	801 (B)	12K1 (B)	15K1	20K1	25K1	30K1	37K1 (Note 1)
	Servo-amp model MR-J2S-		700A/B/CP/CL -U058 (Note 8)	11KA/B (Note 10)		15KA/B (Note 10)	22KA/B (Note 10)		30KA/B (Note 10)	37KA/B-U039
	Converter unit model		—	—		—	—		MR-HP30KA	
Servo motor	Power facility capacity (Note 2) (kVA)		8.6	12	18	22	30	38	48	59
	Continuous running duty	Rated output (kW)	6.0	8.0	12	15	20	25	30	37 (75%ED)
		Rated torque (N·m [oz·in])	57.3 (8113.7)	76.4 (10818.2)	115 (16284)	143 (20248.8)	191 (27045.6)	239 (33842.4)	286 (40497.6)	353 (49984.8)
	Maximum torque (N·m [oz·in])		172 (24355.2)	229 (32426.4)	344 (48710.4)	415 (58764)	477 (67543.2)	597 (84535.2)	716 (101385.6)	883 (125032.8)
	Rated speed (r/min)		1000							
	Maximum speed (r/min)		1200							
	Permissible instantaneous speed (r/min)		1380							
	Power rate at continuous rated torque (kW/s)		313	265	445	373	561	528	626	668
	Rated current (A)		34	42	61	83	118	118	154	188
	Maximum current (A)		102	126	183	249	295	295	385	470
	Regenerative braking frequency (times/min) (Note 3)	With no options	158	—	—	—	—	—	—	—
		MR-RB31 (300W)	278	—	—	—	—	—	—	—
		MR-RB51 (500W) (Note 4)	464	—	—	—	—	—	—	—
		GRZG400-2Ω (4 units), MR-RB65 (800W) (Note 5)	—	354	264	—	—	—	—	—
		GRZG400-1Ω (5 units), MR-RB66 (1300W) (Note 5)	—	—	—	230	—	—	—	—
		GRZG400-0.8Ω (5 units), MR-RB67 (1300W) (Note 5)	—	—	—	—	195	117	—	—
		MR-RB139 (1300W)	—	—	—	—	—	—	97	68
		MR-RB137 (3900W)	—	—	—	—	—	—	290	203
		MR-RB34-4 (300W)	—	—	—	—	—	—	—	—
		MR-RB54-4 (500W)	—	—	—	—	—	—	—	—
		GRZG400-5Ω (4 units), MR-RB6B-4 (800W) (Note 5)	—	—	—	—	—	—	—	—
		GRZG400-2.5Ω (5 units), MR-RB60-4 (1300W) (Note 5)	—	—	—	—	—	—	—	—
		GRZG400-2Ω (5 units), MR-RB6K-4 (1300W) (Note 5)	—	—	—	—	—	—	—	—
		MR-RB136-4 (1300W)	—	—	—	—	—	—	—	—
		MR-RB138-4 (3900W)	—	—	—	—	—	—	—	—
	Moment of inertia J (×10^{-4}kg·m^2) [J (oz·in^2)]	Standard	105 (574.0)	220 (1202.7)	295 (1612.6)	550 (3006.6)	650 (3553.3)	1080 (5903.9)	1310 (7161.2)	1870 (10222.5)
		With electromagnetic brake	113 (617.7)	293 (1601.7)	369 (2017.2)	—	—	—	—	—
	Recommended load/motor inertia moment ratio		10 times the servo motor's inertia moment max. (Note 6)							
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)							
	Attachments		Oil seal							
	Structure		Totally enclosed ventilated (protection level: IP44)							
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)							
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)							
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust							
		Elevation	1000m (3280ft) or less above sea level							
		Vibration (Note 7)	X: 11.7m/s^2 Y: 29.4m/s^2			X: 9.8m/s^2 Y: 9.8m/s^2			X:9.8m/s^2	Y:9.8m/s^2
	Mass (kg [lb])	Standard	55 (121.2)	95 (209.3)	115 (253.4)	160 (352.5)	180 (396.6)	230 (506.7)	250 (550.8)	335 (738)
		With electromagnetic brake	70 (154.2)	126 (277.6)	146 (321.7)	—	—	—	—	—
Cooling fan	Power	Voltage, frequency	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 200 to 220VAC/50Hz 3-phase 200 to 230VAC/60Hz						
		Input (W)	42 (50Hz)/54 (60Hz)	32 (50Hz)/ 40 (60Hz)		45 (50Hz)/63 (60Hz)		120 (50Hz)/175 (60Hz)	120 (50Hz)/175 (60Hz)	
	Rated current (A)		0.21 (50Hz)/0.25 (60Hz)	0.30 (50Hz)/0.25 (60Hz)		0.32 (50Hz)/0.35 (60Hz)		0.65 (50Hz)/0.80 (60Hz)	0.65 (50Hz)/0.80 (60Hz)	

Notes: 1. Make sure that the effective torque is less than 75% of the 37kW capacity during the power factor improvement. Always use a DC reactor (MR-DCL37K).
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
4. Install a cooling fan (approx. 1.0m^3/min, □92).
5. The values apply when the parameter No.0 (for MR-J2S-A type) or No.2 (for MR-J2S-B type) is changed, and cooling fans (approx. 1.0m^3/min, □92 x 2 units) are installed. The GRZG400-□Ω is a standard accessory.
6. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.

HA-LFS 1000r/min series servo motor torque characteristics (200VAC type)



HA-LFS 1000r/min series servo motor specifications (400VAC type)

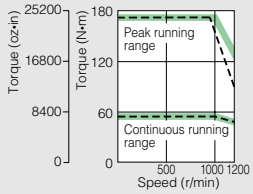
	HA-LFS 1000r/min series (Low inertia, medium capacity to large capacity)							
	6014 (B) (Special-order) (Note 9)	8014 (B) (Special-order) (Note 9)	12K14 (B) (Special-order) (Note 9)	15K14	20K14 (Special-order) (Note 9)	25K14 (Special-order) (Note 9)	30K14	37K14
	700A4/B4-U071 (Special-order) (Note 9)	11KA4/B4-U061 (Special-order) (Note 9)	11KA4/B4-U062 (Special-order) (Note 9)	15KA4/B4-U063	22KA4/B4-U064 (Special-order) (Note 9)	30KA4/B4-U065 (Special-order) (Note 9)	30KA4/B4 (Note 10)	37KA4/B4-U040
	—	—		—	—	MR-HP55KA4		
	8.6	12	18	22	30	38	48	59
	6.0	8.0	12	15	20	25	30	37
	57.3 (8113.7)	76.4 (10818.2)	115 (16284)	143 (20248.8)	191 (27045.6)	239 (33842.4)	286 (40497.6)	353 (49984.8)
	172 (24355.2)	229 (32426.4)	344 (48710.4)	415 (58764)	477 (67543.2)	597 (84535.2)	716 (101385.6)	883 (125032.8)
	1000							
	1200							
	1380							
	313	265	445	373	561	528	626	668
	17	20	30	40	55	70	77	95
	51	63	93	126	148	175	193	235
	158	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	278	—	—	—	—	—	—	—
	464	—	—	—	—	—	—	—
	—	354	264	—	—	—	—	—
	—	—	—	230	—	—	—	—
	—	—	—	—	195	—	—	—
	—	—	—	—	—	118	97	68
	—	—	—	—	—	354	290	203
	105 (574.0)	220 (1202.7)	295 (1612.6)	550 (3006.6)	650 (3553.3)	1080 (5903.9)	1310 (7161.2)	1870 (10222.5)
	113 (617.7)	293 (1601.7)	369 (2017.2)	—	—	—	—	—
	10 times the servo motor's inertia moment max. (Note 6)							
	17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)							
	Oil seal							
	Totally enclosed ventilated (protection level: IP44)							
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)							
	80% RH max. (non condensing), storage: 90% RH max. (non condensing)							
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust							
	1000m (3280ft) or less above sea level							
	X: 11.7m/s^2 Y: 29.4m/s^2			X: 9.8m/s^2 Y: 9.8m/s^2				
	55 (121.2)	95 (209.3)	115 (253.4)	160 (352.5)	180 (396.6)	230 (506.7)	250 (550.8)	335 (738)
	70 (154.2)	126 (277.6)	146 (321.7)	—	—	—	—	—
	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 380 to 420VAC 50/60Hz		3-phase 380 to 460VAC 50/60Hz				
	42 (50Hz)/54 (60Hz)	55 (50Hz)/75 (60Hz)		65 (50Hz)/85 (60Hz)		110 (50Hz)/150 (60Hz)		
	0.21 (50Hz)/0.25 (60Hz)	0.12 (50Hz)/0.11 (60Hz)		0.12 (50Hz)/0.14 (60Hz)		0.20 (50Hz)/0.22 (60Hz)		

7. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.

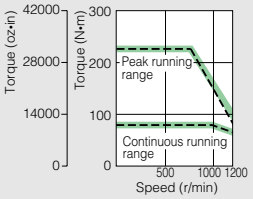
8. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
9. The servo amplifier software version corresponding to each servo motor differs, so contact your dealer for details on the servo amplifier type and the types of servo motor that are combined with the servo amplifier, and for information on the delivery schedule.
10. The amplifier software version compatible with the HA-LFS 1000 r/min series is as follows.
    - For 8kW, 12kW, 15kW or 20kW (200V)
      A type:Version A0 or above B type:Version A3 or above
    - For 25kW or 30kW (200V)
      A type:Version A2 or above B type:Version A5 or above
    - For 30kW (400V)
      A type:Version A0 or above B type:Version A3 or above

HA-LFS 1000r/min series servo motor torque characteristics (400VAC type)

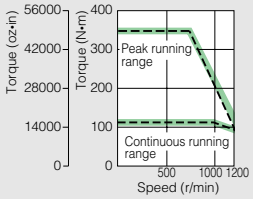
HA-LFS6014 (B) (Note 1, 2, 3)



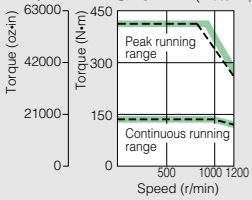
HA-LFS8014 (B) (Note 1, 2, 3)



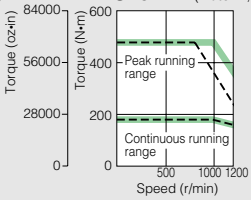
HA-LFS12K14 (B) (Note 1, 2, 3)



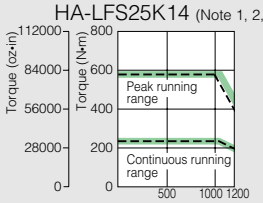
HA-LFS15K14 (Note 1, 2)



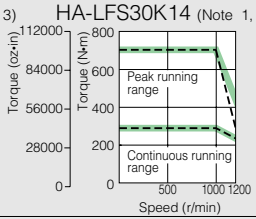
HA-LFS20K14 (Note 1, 2, 3)



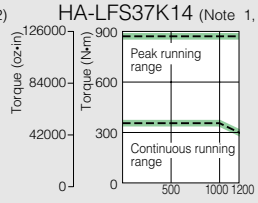
HA-LFS25K14 (Note 1, 2, 3)



HA-LFS30K14 (Note 1, 2)



HA-LFS37K14 (Note 1, 2)



Notes:
1. : For 3-phase 400VAC.
2. - - - - : For 3-phase 380VAC.
3. The torque characteristics are anticipated values.

Specifications and Characteristics

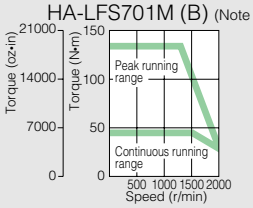
HA-LFS 1500r/min series servo motor specifications (200VAC type)

Servo motor series			HA-LFS 1500r/min series (Low inertia, medium capacity to large capacity)					
Specifications \ Models		Servo motor model HA-LFS	701M (B) (Special-order) (Note 9)	11K1M (B)	15K1M (B)	22K1M	30K1M	37K1M (Note 1)
		Servo-amp model MR-J2S-	700A/B/CP/CL-U059 (Special-order) (Note 8, 9)	11KA/B (Note 10)	15KA/B (Note 10)	22KA/B (Note 10)	30KA/B (Note 10)	37KA/B-U042
		Converter unit model	—	—	—	—	MR-HP30KA	
Servo motor	Power facility capacity (Note 2) (kVA)		10	16	22	33	48	59
	Continuous running duty	Rated output (kW)	7.0	11	15	22	30	37 (75% ED)
		Rated torque (N·m [oz·in])	44.6 (6315.4)	70.0 (9912)	95.5 (13522.8)	140 (19824)	191 (27045.6)	236 (33417.6)
	Maximum torque (N·m [oz·in])		134 (18974.4)	210 (29736)	286 (40497.6)	350 (49560)	477 (67543.2)	589 (83402.4)
	Rated speed (r/min)		1500					
	Maximum speed (r/min)		2000					
	Permissible instantaneous speed (r/min)		2300					
	Power rate at continuous rated torque (kW/s)		189	223	309	357	561	514
	Rated current (A)		37	65	87	126	174	202
	Maximum current (A)		111	195	261	315	435	505
	Regenerative braking frequency (times/min) (Note 3)	With no options	70	—	—	—	—	—
		MR-RB31 (300W)	124	—	—	—	—	—
		MR-RB51 (500W) (Note 4)	206	—	—	—	—	—
		GRZG400-2Ω (4 units), MR-RB65 (800W) (Note 5)	—	158	—	—	—	—
		GRZG400-1Ω (5 units), MR-RB66 (1300W) (Note 5)	—	—	191	—	—	—
		GRZG400-0.8Ω (5 units), MR-RB67 (1300W) (Note 5)	—	—	—	102	—	—
		MR-RB139 (1300W)	—	—	—	—	87	52
		MR-RB137 (3900W)	—	—	—	—	260	156
		MR-RB34-4 (300W)	—	—	—	—	—	—
		MR-RB54-4 (500W)	—	—	—	—	—	—
		GRZG400-5Ω (4 units), MR-RB6B-4 (800W) (Note 5)	—	—	—	—	—	—
		GRZG400-2.5Ω (5 units), MR-RB60-4 (1300W) (Note 5)	—	—	—	—	—	—
		GRZG400-2Ω (5 units), MR-RB6K-4 (1300W) (Note 5)	—	—	—	—	—	—
		MR-RB136-4 (1300W)	—	—	—	—	—	—
		MR-RB138-4 (3900W)	—	—	—	—	—	—
	Moment of inertia J (×10^{-4}kg·m^2) [J (oz·in^2)]	Standard	105 (574.0)	220 (1202.7)	295 (1612.6)	550 (3006.6)	650 (3553.3)	1080 (5903.9)
		With electromagnetic brake	113 (617.7)	293 (1601.7)	369 (2017.2)	—	—	—
	Recommended load/motor inertia moment ratio		10 times the servo motor's inertia moment max. (Note 6)					
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)					
	Attachments		Oil seal					
	Structure		Totally enclosed ventilated (protection level: IP44)					
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)					
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)					
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust					
		Elevation	1000m (3280ft) or less above sea level					
		Vibration (Note 7)	X: 11.7m/s^2 Y: 29.4m/s^2			X: 9.8m/s^2 Y: 9.8m/s^2		
	Mass (kg [lb])	Standard	55 (121.2)	95 (209.3)	115 (253.4)	160 (352.5)	180 (396.6)	230 (506.7)
		With electromagnetic brake	70 (154.2)	126 (277.6)	146 (321.7)	—	—	—
Cooling fan	Power	Voltage, frequency	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 200 to 220VAC/50Hz 3-phase 200 to 230VAC/60Hz				
		Input (W)	42 (50Hz)/54 (60Hz)	32 (50Hz)/40 (60Hz)		45 (50Hz)/63 (60Hz)		120 (50Hz)/175 (60Hz)
	Rated current (A)		0.21 (50Hz)/0.25 (60Hz)	0.30 (50Hz)/0.25 (60Hz)		0.32 (50Hz)/0.35 (60Hz)		0.65 (50Hz)/0.80 (60Hz)

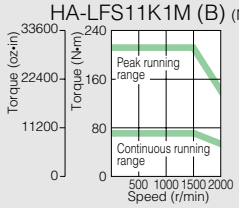
Notes: 1. Make sure that the effective torque is less than 75% of the 37kW capacity during the power factor improvement. Always use a DC reactor (MR-DCL37K).
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
4. Install a cooling fan (approx. 1.0m^3/min, □92).
5. The values apply when the parameter No.0 (for MR-J2S-A type) or No.2 (for MR-J2S-B type) is changed, and cooling fans (approx. 1.0m^3/min, □92 x 2 units) are installed. The GRZG400-□Ω is a standard accessory.
6. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.

HA-LFS 1500r/min series servo motor torque characteristics (200VAC type)

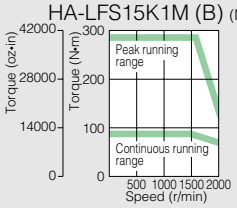
HA-LFS701M (B) (Note 1, 2)



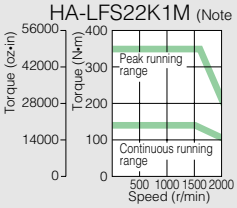
HA-LFS11K1M (B) (Note 1)



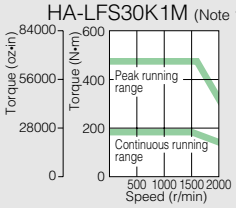
HA-LFS15K1M (B) (Note 1)



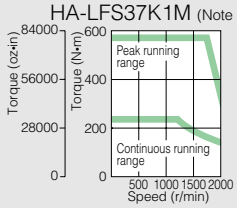
HA-LFS22K1M (Note 1)



HA-LFS30K1M (Note 1)



HA-LFS37K1M (Note 1)



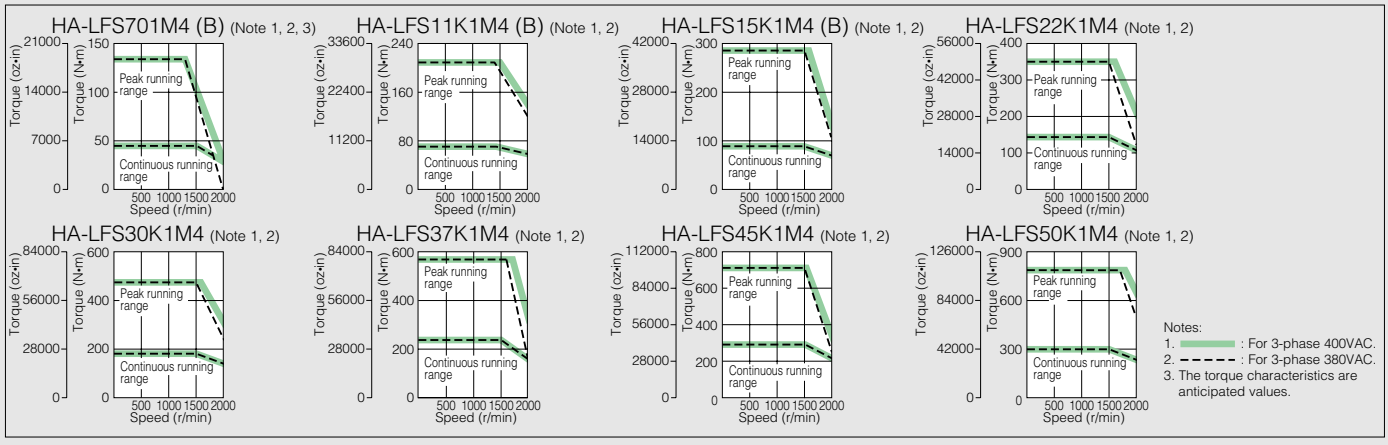
Notes:
1. ——— : For 3-phase 200VAC.
2. The torque characteristics are anticipated values.

HA-LFS 1500r/min series servo motor specifications (400VAC type)

	HA-LFS 1500r/min series (Low inertia, medium capacity to large capacity)							
	701M4 (B) (Special-order) (Note 9)	11K1M4 (B)	15K1M4 (B)	22K1M4	30K1M4	37K1M4	45K1M4	50K1M4
	700A4/B4-U073 (Special-order) (Note 9)	11KA4/B4 (Note 10)	15KA4/B4 (Note 10)	22KA4/B4 (Note 10)	30KA4/B4 (Note 10)	37KA4/B4 (Note 10)	45KA4/B4 (Note 10)	55KA4/B4 (Note 10)
	—	—	—	—	MR-HP55KA4			
	10	16	22	33	48	59	71	80
	7.0	11	15	22	30	37	45	50
	44.6 (6315.4)	70.0 (9912)	95.5 (13522.8)	140 (19824)	191 (27045.6)	236 (33417.6)	286 (40497.6)	318 (45028.8)
	134 (18974.4)	210 (29736)	286 (40497.6)	350 (49560)	477 (67543.2)	589 (83402.4)	716 (101385.6)	796 (112713.6)
	1500							
	2000							
	2300							
	189	223	309	357	561	514	626	542
	18	31	41	63	87	101	128	143
	54	99	132	158	218	253	320	358
	70	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—
	124	—	—	—	—	—	—	—
	206	—	—	—	—	—	—	—
	—	158	—	—	—	—	—	—
	—	—	191	—	—	—	—	—
	—	—	—	102	—	—	—	—
	—	—	—	—	87	52	43	30
	—	—	—	—	260	156	129	90
	105 (574.0)	220 (1202.7)	295 (1612.6)	550 (3006.6)	650 (3553.3)	1080 (5903.9)	1310 (7161.2)	1870 (10222.5)
	113 (617.7)	293 (1601.7)	369 (2017.2)	—	—	—	—	—
	10 times the servo motor's inertia moment max. (Note 6)							
	17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)							
	Oil seal							
	Totally enclosed ventilated (protection level: IP44)							
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)							
	80% RH max. (non condensing), storage: 90% RH max. (non condensing)							
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust							
	1000m (3280ft) or less above sea level							
	X: 11.7m/s^2 Y: 29.4m/s^2			X: 9.8m/s^2 Y: 9.8m/s^2				
	55 (121.2)	95 (209.3)	115 (253.4)	160 (352.5)	180 (396.6)	230 (506.7)	250 (550.8)	335 (738)
	70 (154.2)	126 (277.6)	146 (321.7)	—	—	—	—	—
	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 380 to 420VAC 50/60Hz		3-phase 380 to 460VAC 50/60Hz				
	42 (50Hz)/54 (60Hz)	55 (50Hz)/75 (60Hz)		65 (50Hz)/85 (60Hz)		110 (50Hz)/150 (60Hz)		
	0.21 (50Hz)/0.25 (60Hz)	0.12 (50Hz)/0.11 (60Hz)		0.12 (50Hz)/0.14 (60Hz)		0.20 (50Hz)/0.22 (60Hz)		

7. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
8. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
9. The servo amplifier software version corresponding to each servo motor differs, so contact your dealer for details on the servo amplifier type and the types of servo motor that are combined with the servo amplifier, and for information on the delivery schedule.
10. The amplifier software version compatible with the HA-LFS 1500 r/min series is as follows.
    - For 11kW, 15kW, 22kW or 30kW (200V)
      A type:Version A0 or above B type:Version A3 or above
    - For 11kW (400V)
      A type:Version A0 or above B type:Version A4 or above
    - For 15kW, 37kW or 50kW (400V)
      A type:Version A0 or above B type:Version A3 or above
    - For 22kW or 30kW (400V)
      A type:Version A2 or above B type:Version A5 or above
    - For 45kW (400V)
      A type:Version A1 or above B type:Version A4 or above

HA-LFS 1500r/min series servo motor torque characteristics (400VAC type)



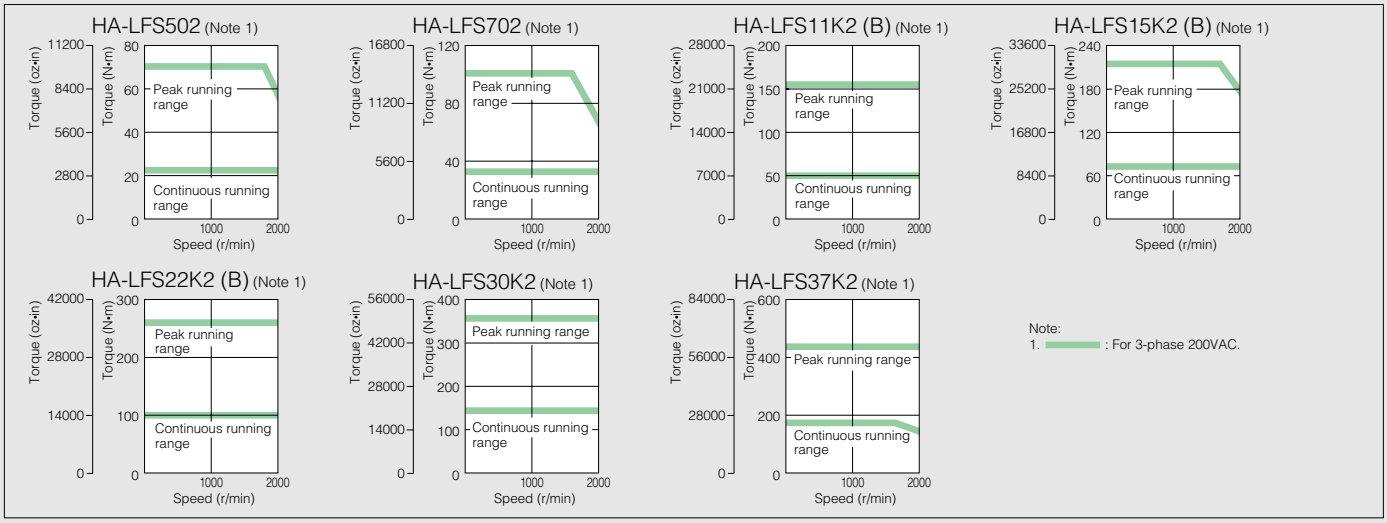
Specifications and Characteristics

HA-LFS 2000r/min series servo motor specifications (200VAC type)

Servo motor series			HA-LFS 2000r/min series (Low inertia, medium capacity to large capacity)						
Models / Specifications		Servo motor model HA-LFS	502	702	11K2 (B)	15K2 (B)	22K2 (B)	30K2	37K2 (Note1)
		Servo-amp model MR-J2S-	500A/B/CP/CL (Note 8, 9)	700A/B/CP/CL (Note 8, 9)	11KA/B (Note 9)	15KA/B (Note 9)	22KA/B (Note 9)	30KA/B (Note 9)	37KA/B (Note 9)
		Converter unit model	—	—	—	—	—	MR-HP30KA	
Servo motor	Power facility capacity (Note 2) (kVA)		7.5	10.0	16	22	33	48	59
	Continuous running duty	Rated output (kW)	5.0	7.0	11	15	22	30	37 (75%ED)
		Rated torque (N·m [oz·in])	23.9 (3384.2)	33.4 (4729.4)	52.5 (7434)	71.6 (10138.6)	105 (14868)	143 (20248.8)	177 (25063.2)
	Maximum torque (N·m [oz·in])		71.6 (10138.6)	100 (14160)	158 (22372.8)	215 (30444)	263 (37240.8)	358 (50692.8)	442 (62587.2)
	Rated speed (r/min)		2000						
	Maximum speed (r/min)		2000						
	Permissible instantaneous speed (r/min)		2300						
	Power rate at continuous rated torque (kW/s)		77.2	118	263	233	374	373	480
	Rated current (A)		25	34	63	77	112	166	204
	Maximum current (A)		75	102	189	231	280	415	510
	Regenerative braking frequency (times/min) (Note 3)	With no options	50	50	—	—	—	—	—
		MR-RB30 (300W)	120	—	—	—	—	—	—
		MR-RB31 (300W)	—	95	—	—	—	—	—
		MR-RB50 (500W) (Note 4)	200	—	—	—	—	—	—
		MR-RB51 (500W) (Note 4)	—	160	—	—	—	—	—
		GRZG400-2Ω (4 units), MR-RB65 (800W) (Note 5)	—	—	186	—	—	—	—
		GRZG400-1Ω (5 units), MR-RB66 (1300W) (Note 5)	—	—	—	144	—	—	—
		GRZG400-0.8Ω (5 units), MR-RB67 (1300W) (Note 5)	—	—	—	—	107	—	—
		MR-RB139 (1300W)	—	—	—	—	—	58	49
		MR-RB137 (3900W)	—	—	—	—	—	174	147
		GRZG400-5Ω (4 units), MR-RB6B-4 (800W) (Note 5)	—	—	—	—	—	—	—
		GRZG400-2.5Ω (5 units), MR-RB60-4 (1300W) (Note 5)	—	—	—	—	—	—	—
		GRZG400-2Ω (5 units), MR-RB6K-4 (1300W) (Note 5)	—	—	—	—	—	—	—
		MR-RB136-4 (1300W)	—	—	—	—	—	—	—
		MR-RB138-4 (3900W)	—	—	—	—	—	—	—
	Moment of inertia J (×10⁻⁴kg·m²) [J (oz·in²)]	Standard	74.0 (404.5)	94.2 (515.0)	105 (574.0)	220 (1202.7)	295 (1612.6)	550 (3006.6)	650 (3553.3)
		With electromagnetic brake	—	—	113 (617.7)	293 (1601.7)	369 (2017.2)	—	—
	Recommended load/motor inertia moment ratio		10 times the servo motor's inertia moment max. (Note 6)						
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Attachments		Oil seal						
	Structure		Totally enclosed non ventilated (protection level: IP65)		Totally enclosed ventilated (protection level: IP44)				
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)						
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust						
		Elevation	1000m (3280ft) or less above sea level						
		Vibration (Note 7)	X : 11.7m/s² Y : 29.4m/s²					X : 9.8m/s² Y : 9.8m/s²	
	Mass (kg [lb])	Standard	28 (61.7)	35 (77.1)	55 (121.2)	95 (209.3)	115 (253.4)	160 (352.5)	180 (396.6)
		With electromagnetic brake	—	—	70 (154.2)	126 (277.6)	146 (321.7)	—	—
Cooling fan	Power	Voltage, frequency	—	—	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 200 to 220VAC/50Hz 3-phase 200 to 230VAC/60Hz			
		Input (W)	—	—	42 (50Hz)/54 (60Hz)	32 (50Hz)/40 (60Hz)		45 (50Hz)/63 (60Hz)	
	Rated current (A)		—	—	0.21 (50Hz)/0.25 (60Hz)	0.30 (50Hz)/0.25 (60Hz)		0.32 (50Hz)/0.35 (60Hz)	

Notes: 1. Make sure that the effective torque is less than 75% of the 37kW capacity during the power factor improvement. Always use a DC reactor (MR-DCL37K).
2. The power facility capacity varies depending on the power supply's impedance.
3. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
4. Install a cooling fan (approx. 1.0m³/min, □92).

HA-LFS 2000r/min series servo motor torque characteristics (200VAC type)



HA-LFS 2000r/min series servo motor specifications (400VAC type)

	HA-LFS 2000r/min series (Low inertia, medium capacity to large capacity)						
	11K24 (B)	15K24 (B)	22K24 (B)	30K24	37K24	45K24	55K24
	11KA4/B4 (Note 9)	15KA4/B4 (Note 9)	22KA4/B4 (Note 9)	30KA4/B4 (Note 9)	37KA4/B4 (Note 9)	45KA4/B4 (Note 9)	55KA4/B4 (Note 9)
	—	—	—	MR-HP55KA4			
	16	22	33	48	59	71	87
	11	15	22	30	37	45	55
	52.5 (7434)	71.6 (10138.6)	105 (14868)	143 (20248.8)	177 (25063.2)	215 (30444)	263 (37240.8)
	158 (22372.8)	215 (30444)	263 (37240.8)	358 (50692.8)	442 (62587.2)	537 (76039.2)	657 (93031.2)
	2000						
	2000						
	2300						
	263	233	374	373	480	427	526
	32	40	57	83	102	131	143
	96	117	140	208	255	328	358
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
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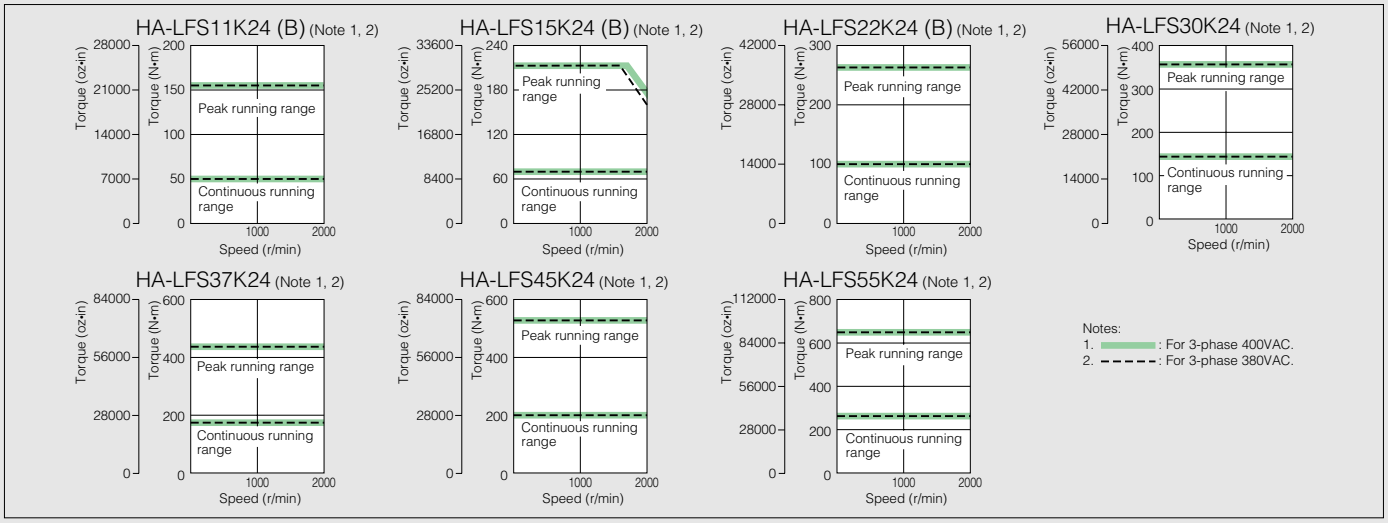
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
	186	—	—	—	—	—	—
	—	144	—	—	—	—	—
	—	—	107	—	—	—	—
	—	—	—	58	49	30	24
	—	—	—	174	147	89	73
	105 (574.0)	220 (1202.7)	295 (1612.6)	550 (3006.6)	650 (3553.3)	1080 (5903.9)	1310 (7161.2)
	113 (617.7)	293 (1601.7)	369 (2017.2)	—	—	—	—
	10 times the servo motor's inertia moment max. (Note 6)						
	17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)						
	Oil seal						
	Totally enclosed ventilated (protection level: IP44)						
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
	80% RH max. (non condensing), storage: 90% RH max. (non condensing)						
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust						
	1000m (3280ft) or less above sea level						
	X : 11.7m/s^2 Y : 29.4m/s^2			X : 9.8m/s^2 Y : 9.8m/s^2			
	55 (121.2)	95 (209.3)	115 (253.4)	160 (352.5)	180 (396.6)	230 (506.7)	250 (550.8)
	70 (154.2)	126 (277.6)	146 (321.7)	—	—	—	—
	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 380 to 420VAC 50/60Hz		3-phase 380 to 460VAC 50/60Hz			
	42 (50Hz)/54 (60Hz)	55 (50Hz)/75 (60Hz)		65 (50Hz)/85 (60Hz)		110 (50Hz)/150 (60Hz)	
	0.21 (50Hz)/0.25 (60Hz)	0.12 (50Hz)/0.11 (60Hz)		0.12 (50Hz)/0.14 (60Hz)		0.20 (50Hz) /0.22 (60Hz)	

5. The values apply when the parameter No. 0 (for MR-J2S-A type) or No. 2 (for MR-J2S-B type) is changed, and cooling fans (approx. 1.0m^3/min, □92 x 2 units) are installed. The GRZG400-□Ω is a standard accessory.
6. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
7. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
8. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
9. The amplifier software version compatible with the HA-LFS 2000 r/min series is as follows.
   - For 5kW or 7kW (200V)
     A type:Version B0 or above B type:Version B0 or above
   - For 15kW (400V)
     A type:Version A3 or above B type:Version A6 or above
   - Other than the motor described in the left side
     A type:Version A0 or above B type:Version A3 or above

HA-LFS 2000r/min series servo motor torque characteristics (400VAC type)



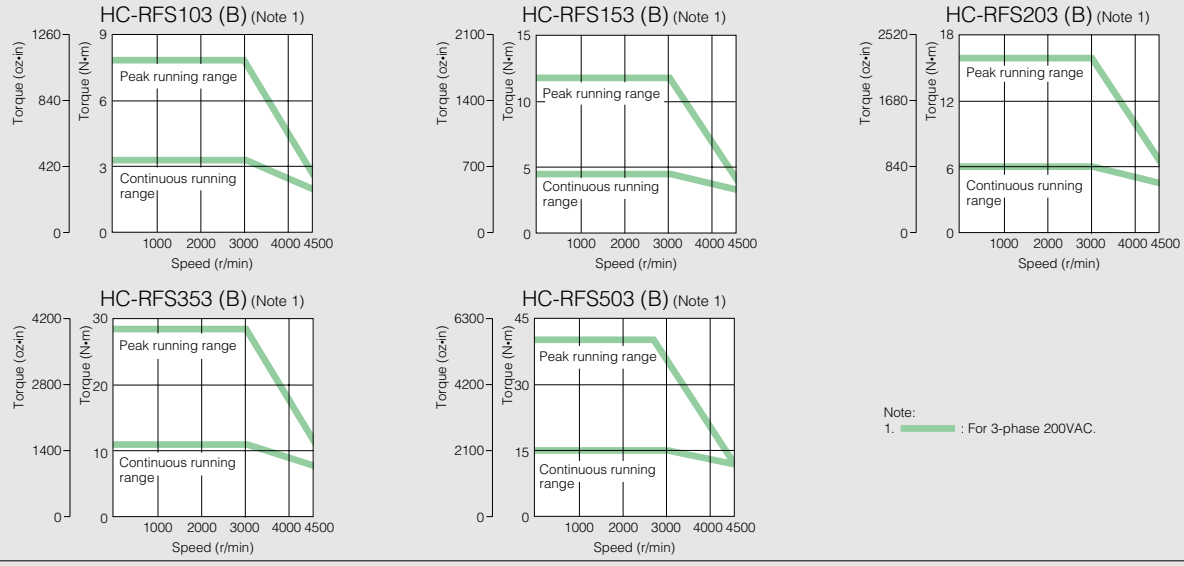
Specifications and Characteristics

HC-RFS series servo motor specifications

Servo motor series			HC-RFS series (Ultra-low inertia, medium capacity)				
Specifications \ Models		Servo motor model HC-RFS	103 (B)	153 (B)	203 (B)	353 (B)	503 (B)
		Servo-amp model MR-J2S- (Note 6)	200A/B/CP/CL		350A/B/CP/CL	500A/B/CP/CL (Note 7)	
Servo motor	Power facility capacity (Note 1) (kVA)		1.7	2.5	3.5	5.5	7.5
	Continuous running duty	Rated output (kW)	1.0	1.5	2.0	3.5	5.0
		Rated torque (N·m [oz·in])	3.18 (450.3)	4.78 (676.8)	6.37 (902.1)	11.1 (1571.8)	15.9 (2251.4)
	Maximum torque (N·m [oz·in])		7.95 (1125.7)	11.9 (1685.0)	15.9 (2251.4)	27.9 (3950.6)	39.7 (5621.5)
	Rated speed (r/min)		3000				
	Maximum speed (r/min)		4500				
	Permissible instantaneous speed (r/min)		5175				
	Power rate at continuous rated torque (kW/s)		67.4	120	176	150	211
	Rated current (A)		6.1	8.8	14	23	28
	Maximum current (A)		18.4	23.4	37	58	70
	Regenerative braking frequency (times/min) (Note 2)	With no options	1090	860	710	174	125
		MR-RB30 (300W)	3270	2580	2130	401	288
		MR-RB50 (500W) (Note 5)	5450	4300	3550	669	479
	Moment of inertia J ($\times 10^{-4}$ kg·m^2) [J (oz·in^2)]	Standard	1.5 (8.2)	1.9 (10.4)	2.3 (12.6)	8.6 (47.0)	12.0 (65.6)
		With electromagnetic brake	1.85 (10.1)	2.25 (12.3)	2.65 (14.5)	11.8 (64.5)	15.5 (84.7)
	Recommended load/motor inertia moment ratio		5 times the servo motor's inertia moment max. (Note 3)				
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)				
	Attachments		Oil seal				
	Structure		Totally enclosed non ventilated (protection level: IP65)				
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)				
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)				
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust				
		Elevation/vibration (Note 4)	1000m (3280ft) or less above sea level; X: 24.5 m/s^2, Y: 24.5 m/s^2				
	Mass (kg [lb])	Standard	3.9 (8.6)	5.0 (11.0)	6.2 (13.7)	12 (26.4)	17 (37.5)
		With electromagnetic brake	6.0 (13.2)	7.0 (15.4)	8.3 (18.3)	15 (33.0)	21 (46.3)

Notes:1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
3. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
4. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
5. Install a cooling fan (approx. 1.0m^3/min, □92).
6. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
7. The amplifier software version compatible with the HC-RFS series 3.5kW/5.0kW is as follows.
A type:Version B0 or above B type:Version B0 or above

HC-RFS series servo motor torque characteristics

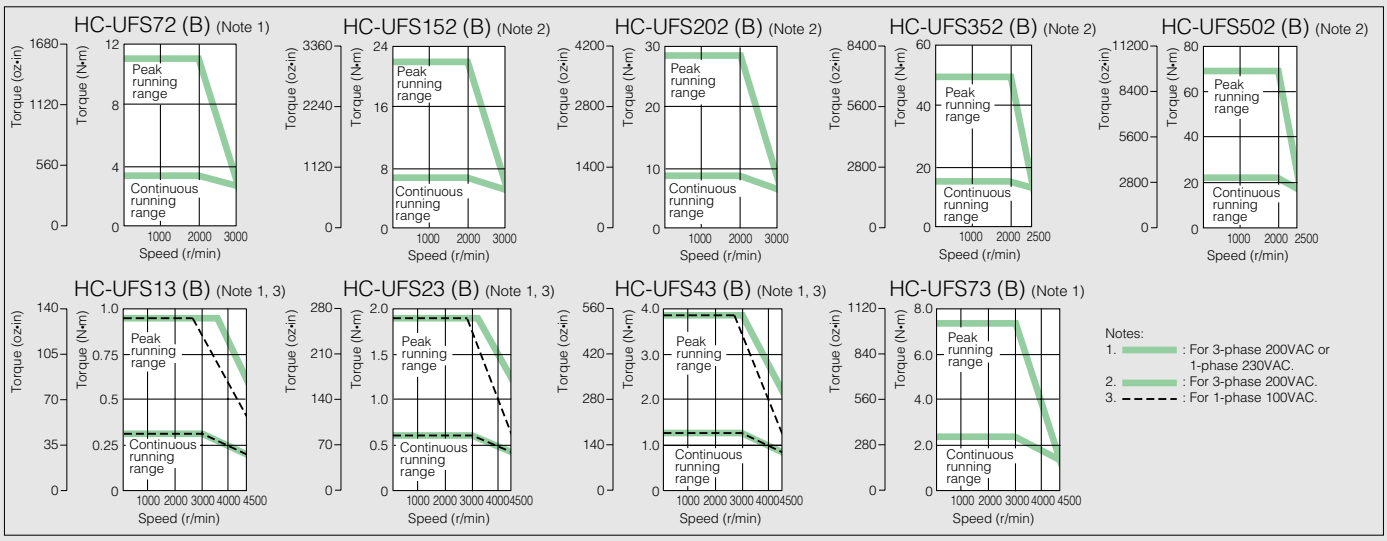


HC-UFS series servo motor specifications

Servo motor series			HC-UFS 2000r/min series (Flat model, medium capacity)					HC-UFS 3000r/min series (Flat model, small capacity)			
Models / Specifications		Servo motor model HC-UFS	72 (B)	152 (B)	202 (B)	352 (B)	502 (B)	13 (B)	23 (B)	43 (B)	73 (B)
		Servo-amp model MR-J2S- (Note 9)	70A/B/CP/CL	200A/B/CP/CL	350A/B/CP/CL	500A/B/CP/CL (Note 10)		10A (1)/B (1)/ CP (1)/CL (1)	20A (1)/B (1)/ CP (1)/CL (1)	40A (1)/B (1)/ CP (1)/CL (1)	70A/B/CP/CL
Servo motor	Power facility capacity (Note 1) (kVA)		1.3	2.5	3.5	5.5	7.5	0.3	0.5	0.9	1.3
	Continuous running duty	Rated output (kW)	0.75	1.5	2.0	3.5	5.0	0.1	0.2	0.4	0.75
		Rated torque (N·m [oz·in])	3.58 (506.9)	7.16 (1013.8)	9.55 (1352.3)	16.7 (2364.7)	23.9 (3384.2)	0.32 (45.3)	0.64 (90.6)	1.3 (184.1)	2.4 (339.8)
	Maximum torque (N·m [oz·in])		10.7 (1515.1)	21.6 (3058.6)	28.5 (4035.6)	50.1 (7094.2)	71.6 (10138.6)	0.95 (134.5)	1.9 (269.0)	3.8 (538.1)	7.2 (1019.5)
	Rated speed (r/min)		2000					3000			
	Maximum speed (r/min)		3000			2500		4500			
	Permissible instantaneous speed (r/min)		3450			2875		5175			
	Power rate at continuous rated torque (kW/s)		12.3	23.2	23.9	36.5	49.6	15.5	19.2	47.7	9.76
	Rated current (A)		5.4	9.7	14	23	28	0.76	1.5	2.8	4.3
	Maximum current (A)		16.2	29.1	42	69	84	2.5	4.95	9.24	12.9
	Regenerative braking frequency (times/min) (Note 2, 3)	With no options	53	124	68	44	31	(Note 4)	(Note 4)	410	41
		MR-RB032 (30W)	79	—	—	—	—	(Note 4)	(Note 4)	1230	62
		MR-RB12 (100W)	264	—	—	—	—	—	(Note 4)	4100	206
		MR-RB30 (300W)	—	372	203	102	72	—	—	—	—
		MR-RB32 (300W)	791	—	—	—	—	—	—	—	618
		MR-RB50 (500W) (Note 8)	—	620	338	169	119	—	—	—	—
	Moment of inertia J ($\times10^{-4}$ kg·m^2) [J (oz·in^2)]	Standard	10.4 (56.9)	22.1 (120.8)	38.2 (208.8)	76.5 (418.2)	115 (628.7)	0.066 (0.361)	0.241 (1.317)	0.365 (1.995)	5.90 (32.3)
		With electromagnetic brake	12.4 (67.8)	24.1 (131.7)	46.8 (255.8)	85.1 (465.2)	123.6 (675.7)	0.074 (0.405)	0.323 (1.766)	0.447 (2.444)	6.10 (33.3)
	Recommended load/motor inertia moment ratio		15 times the servo motor's inertia moment max. (Note 5)								
	Speed/position detector		17-bit encoder (Resolution per encoder/servo motor rotation: 131072 p/rev)								
	Attachments		Oil seal								
	Structure		Totally enclosed non ventilated (protection level: IP65)					Totally enclosed non ventilated (protection level: IP65) (Note 6)			
	Environment	Ambient temperature	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)								
		Ambient humidity	80% RH max. (non condensing), storage: 90% RH max. (non condensing)								
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust								
		Elevation	1000m (3280ft) or less above sea level								
		Vibration (Note 7)	X, Y: 24.5m/s^2		X: 24.5m/s^2, Y: 49m/s^2			X, Y: 49m/s^2			
	Mass (kg [lb])	Standard	8 (17.6)	11 (24.2)	16 (35.3)	20 (44.1)	24 (52.9)	0.8 (1.76)	1.5 (3.30)	1.7 (3.75)	5.0 (11.02)
		With electromagnetic brake	10 (22.0)	13 (28.6)	22 (48.5)	26 (57.3)	30 (66.1)	1.2 (2.64)	2.2 (4.85)	2.4 (5.29)	6.2 (13.66)

Notes:
1. The power facility capacity varies depending on the power supply's impedance.
2. The regenerative brake frequency shows the permissible frequency for decelerating the motor without a load from rated speed to a stop. When a load is connected, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated speed is exceeded, the regenerative brake frequency is inversely proportional to the square of (Operating speed/rated speed). When the operating speed varies with the frequency or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating and do not exceed the permissible value.
3. The regenerative braking frequency of the 600W and smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
4. There are no limits on regeneration frequency as long as the effective torque is within the rated torque range.
5. Contact Mitsubishi if the load/motor of inertia moment ratio exceeds the value in the table.
6. Connector for cable terminal are excluded. However, IP65-compliant products (HC-UFS□-S1) including connector components have been prepared.
7. The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when a motor stops, so please maintain vibration to approximately one-half of the allowable value.
8. Install a cooling fan (approx. 1.0m^3/min, □92).
9. MR-J2S-□CP (1)-S084 is also compatible. The compatible motor is the same as the MR-J2S-□CP (1).
10. The amplifier software version compatible with the HC-UFS 2000 r/min series 3.5kW/5.0kW is as follows.
A type:Version B0 or above B type:Version B0 or above

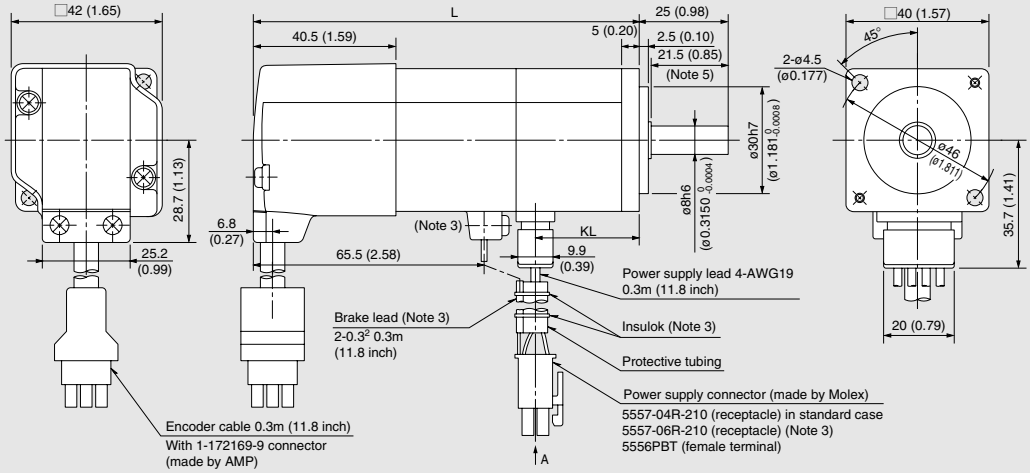
HC-UFS series servo motor torque characteristics



Motor Dimensions

Unit: mm (inch)

●HC-KFS053 (B), HC-KFS13 (B)
●HC-MFS053 (B), HC-MFS13 (B)



Standard Power supply connector pin assignment

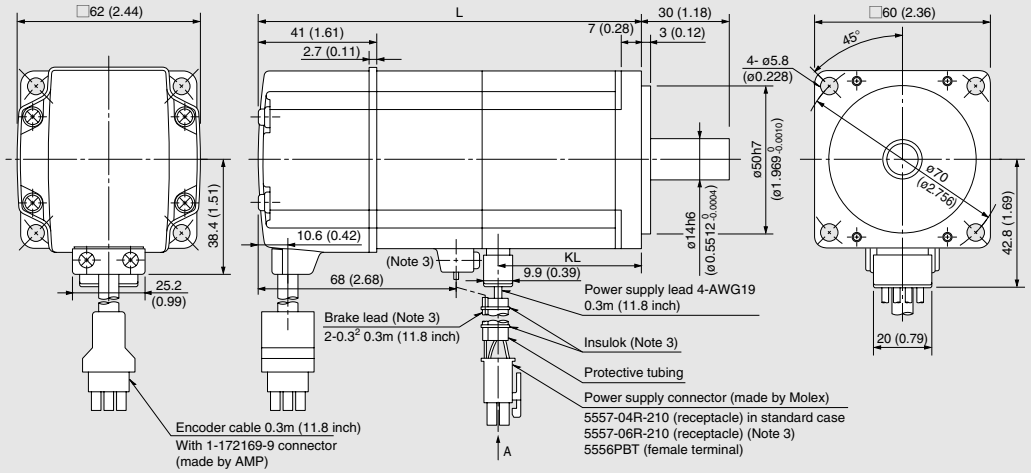
Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

with Brake Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth
5	B1
6	B2

Model	Variable dimensions	
	L	KL
HC-KFS053 (B) HC-MFS053 (B)	81.5 (3.21) <109.5 (4.31)>	29.5 (1.16)
HC-KFS13 (B) HC-MFS13 (B)	96.5 (3.80) <124.5 (4.90)>	44.5 (1.75)

●HC-KFS23 (B), HC-KFS43 (B)
●HC-MFS23 (B), HC-MFS43 (B)



Standard Power supply connector pin assignment

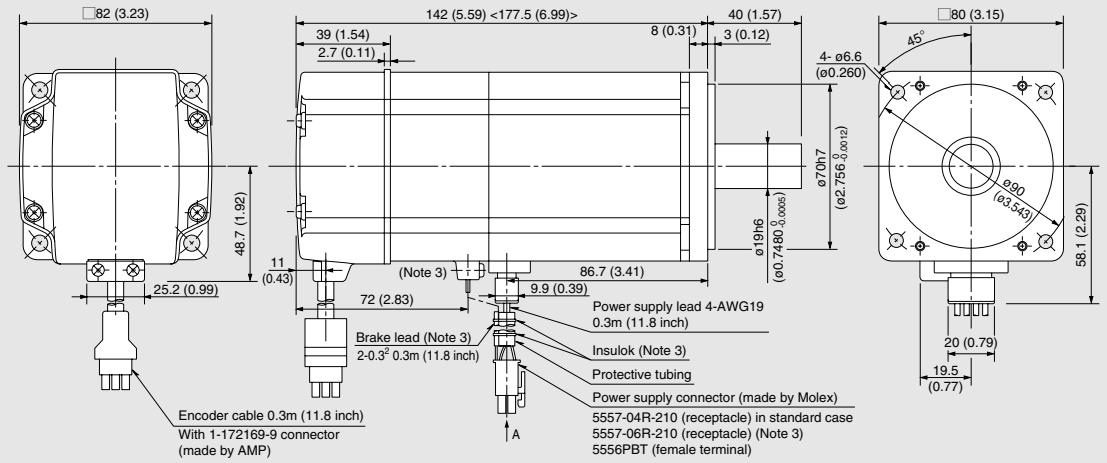
Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

with Brake Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth
5	B1
6	B2

Model	Variable dimensions	
	L	KL
HC-KFS23 (B) HC-MFS23 (B)	99.5 (3.92) <131.5 (5.18)>	49.1 (1.93)
HC-KFS43 (B) HC-MFS43 (B)	124.5 (4.90) <156.5 (6.16)>	72.1 (2.84)

●HC-KFS73 (B), HC-MFS73 (B)



Standard Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

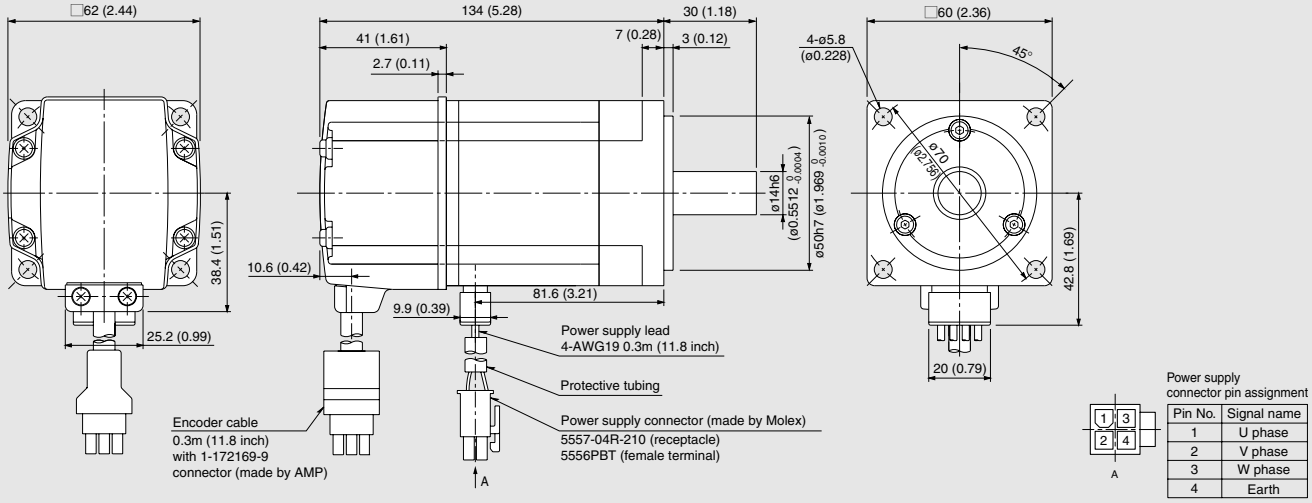
with Brake Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth
5	B1
6	B2

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.
5. For HC-KFS053 (B) and KFS13 (B).

● HC-KFS46

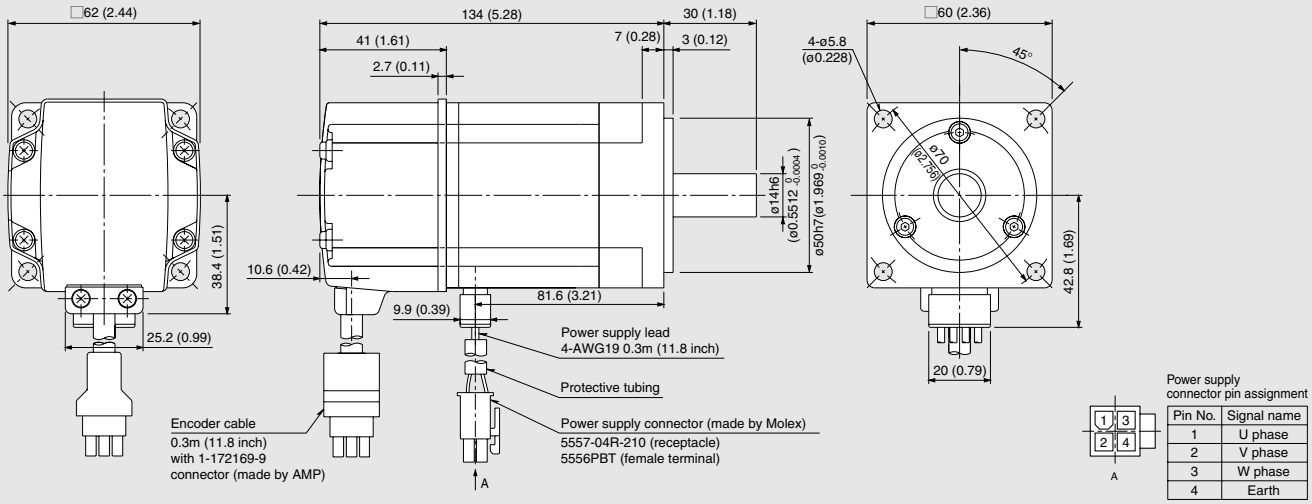
Unit: mm (inch)



Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

● HC-KFS410



Power supply connector pin assignment

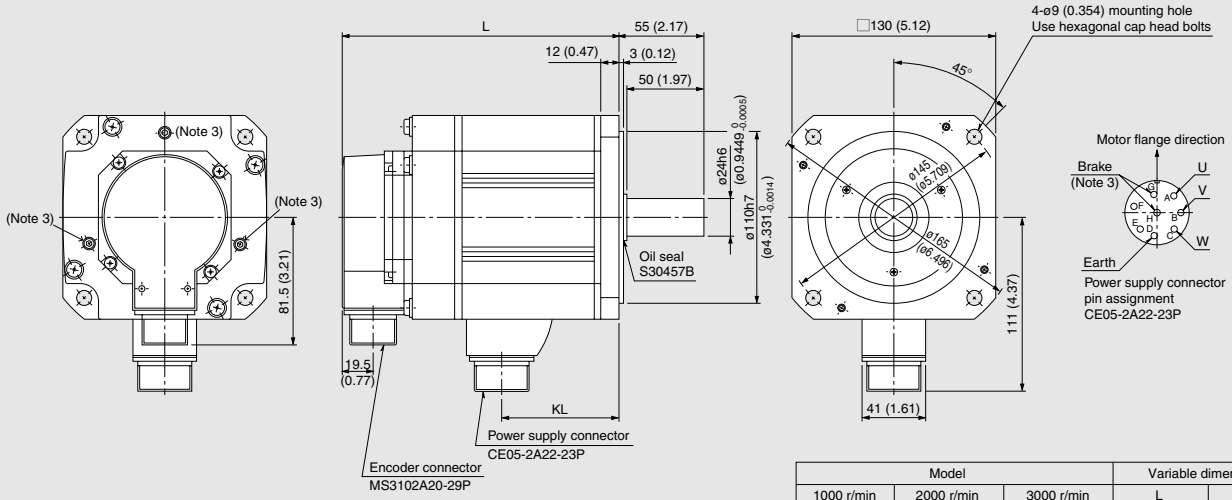
Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

Notes:
1. Use a friction coupling to fasten a load.
2. For dimensions where there is no tolerance listed, use general tolerance.

Motor Dimensions

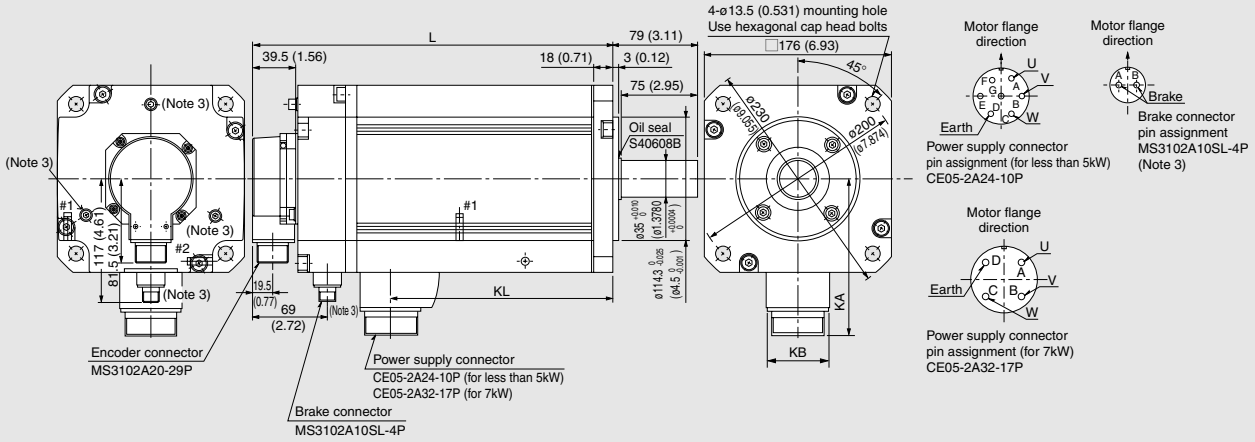
Unit: mm (inch)

- HC-SFS81 (B)
- HC-SFS52 (B), HC-SFS102 (B), HC-SFS152 (B), HC-SFS524 (B), HC-SFS1024 (B), HC-SFS1524 (B)
- HC-SFS53 (B), HC-SFS103 (B), HC-SFS153 (B)



Model			Variable dimensions	
1000 r/min	2000 r/min	3000 r/min	L	KL
—	HC-SFS52 (B) HC-SFS524 (B)	HC-SFS53 (B)	120 (4.72) <153 (6.02)>	51.5 (2.03)
—	HC-SFS102 (B) HC-SFS1024 (B)	HC-SFS103 (B)	145 (5.71) <178 (7.01)>	76.5 (3.01)
HC-SFS81 (B)	HC-SFS152 (B) HC-SFS1524 (B)	HC-SFS153 (B)	170 (6.69) <203 (7.99)>	101.5 (4.00)

- HC-SFS121 (B), HC-SFS201 (B), HC-SFS301 (B)
- HC-SFS202 (B), HC-SFS352 (B), HC-SFS502 (B), HC-SFS702 (B), HC-SFS2024 (B), HC-SFS3524 (B), HC-SFS5024 (B), HC-SFS7024 (B)
- HC-SFS203 (B), HC-SFS353 (B)



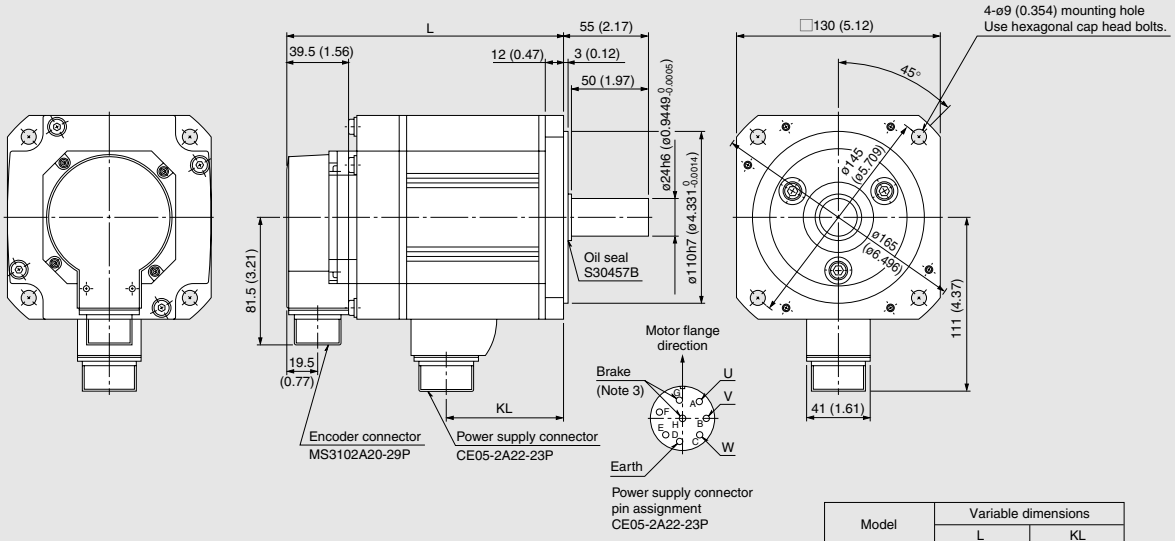
#1 and #2 are screw holes for hanging bolt. (M8)
Only HC-SFS702 (4) (B) has screw holes for hanging bolt.

Model			Variable dimensions			
1000 r/min	2000 r/min	3000 r/min	L	KL	KA	KB
HC-SFS121 (B)	HC-SFS202 (B) HC-SFS2024 (B)	HC-SFS203 (B)	145 (5.71) <193 (7.60)>	68.5 (2.70)	142 (5.59)	46 (1.81)
HC-SFS201 (B)	HC-SFS352 (B) HC-SFS3524 (B)	HC-SFS353 (B)	187 (7.36) <235 (9.25)>	110.5 (4.35)	142 (5.59)	46 (1.81)
HC-SFS301 (B)	HC-SFS502 (B) HC-SFS5024 (B)	—	208 (8.19) <256 (10.08)>	131.5 (5.18)	142 (5.59)	46 (1.81)
—	HC-SFS702 (B) HC-SFS7024 (B)	—	292 (11.50) <340 (13.39)>	210.5 (8.29)	150 (5.91)	58 (2.28)

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.

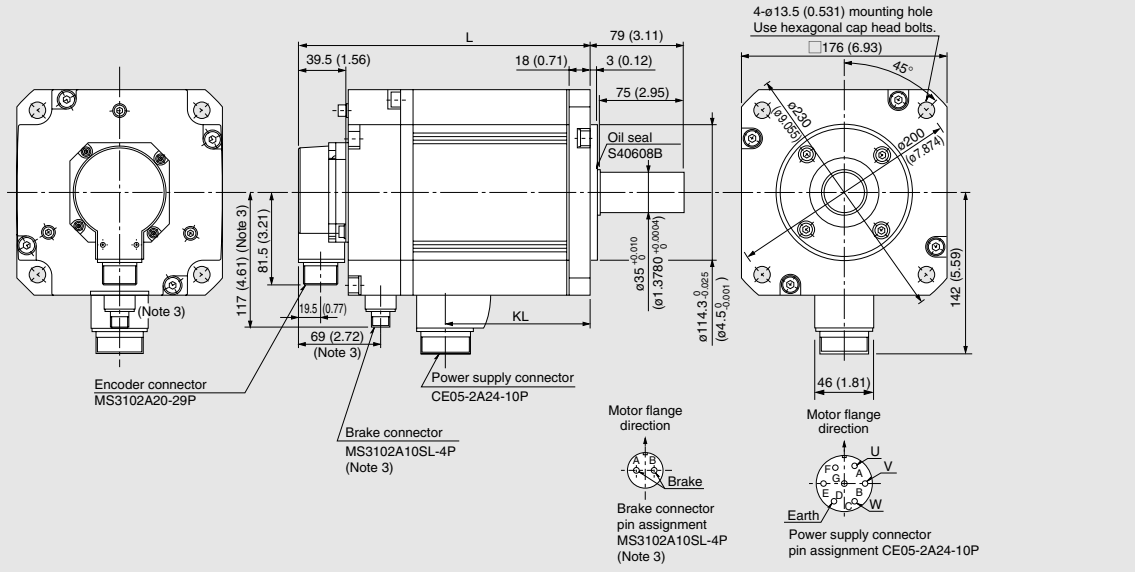
● HC-LFS52 (B), HC-LFS102 (B), HC-LFS152 (B)

Unit: mm (inch)



Model	Variable dimensions	
	L	KL
HC-LFS52 (B)	145.5 (5.73) <178.5 (7.03)>	77 (3.03)
HC-LFS102 (B)	165.5 (6.52) <198.5 (7.81)>	97 (3.82)
HC-LFS152 (B)	193 (7.6) <226 (8.9)>	124.5 (4.9)

● HC-LFS202 (B), HC-LFS302 (B)



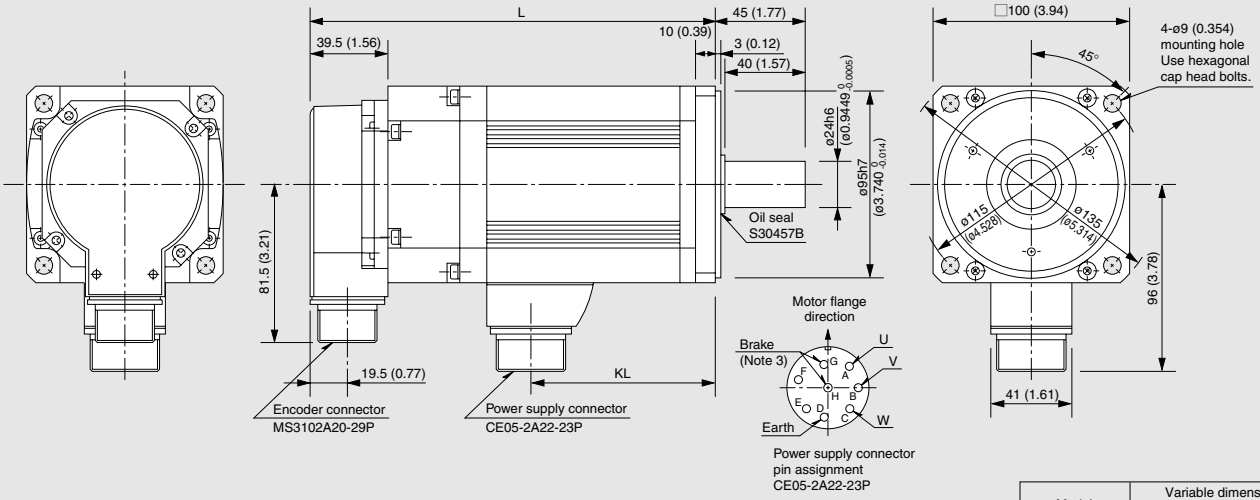
Model	Variable dimensions	
	L	KL
HC-LFS202 (B)	200 (7.87) <248 (9.76)>	123.5 (4.86)
HC-LFS302 (B)	250 (9.84) <298 (11.73)>	173.5 (6.83)

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.

Motor Dimensions

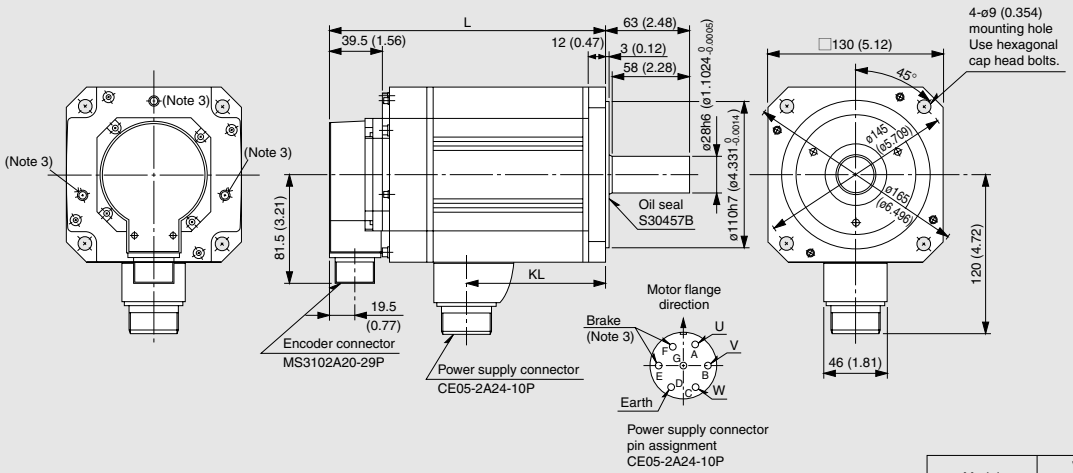
● HC-RFS103 (B), HC-RFS153 (B), HC-RFS203 (B)

Unit: mm (inch)



Model	Variable dimensions	
	L	KL
HC-RFS103 (B)	147 (5.79) <185 (7.28)>	71 (2.80)
HC-RFS153 (B)	172 (6.77) <210 (8.27)>	96 (3.78)
HC-RFS203 (B)	197 (7.76) <235 (9.25)>	121 (4.76)

● HC-RFS353 (B), HC-RFS503 (B)

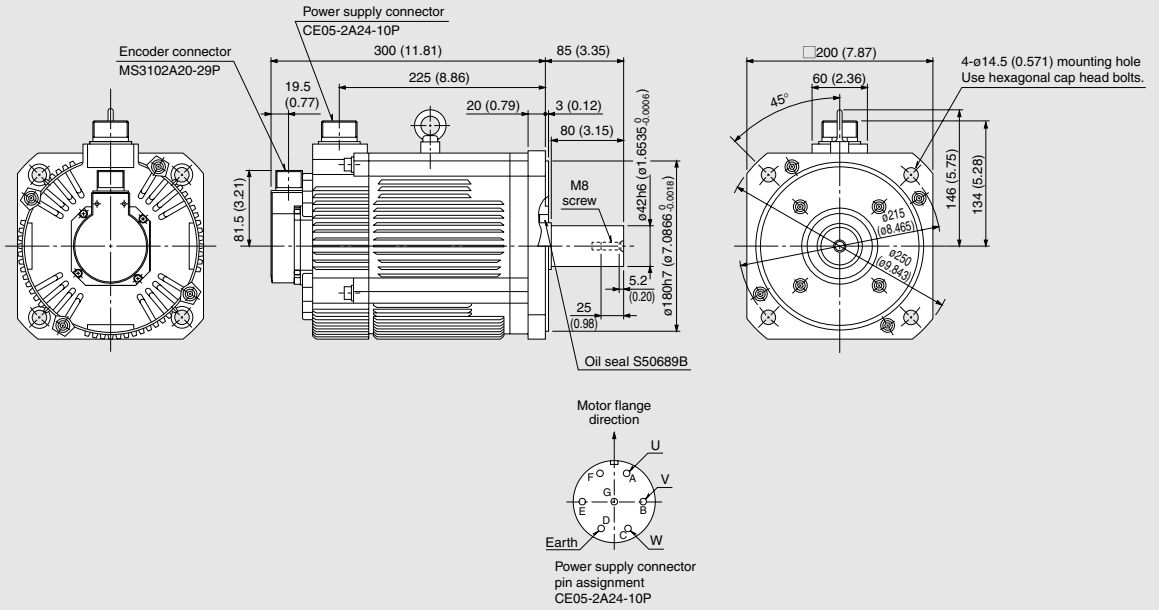


Model	Variable dimensions	
	L	KL
HC-RFS353 (B)	217 (8.54) <254 (10.00)>	148 (5.83)
HC-RFS503 (B)	274 (10.79) <311 (12.24)>	205 (8.07)

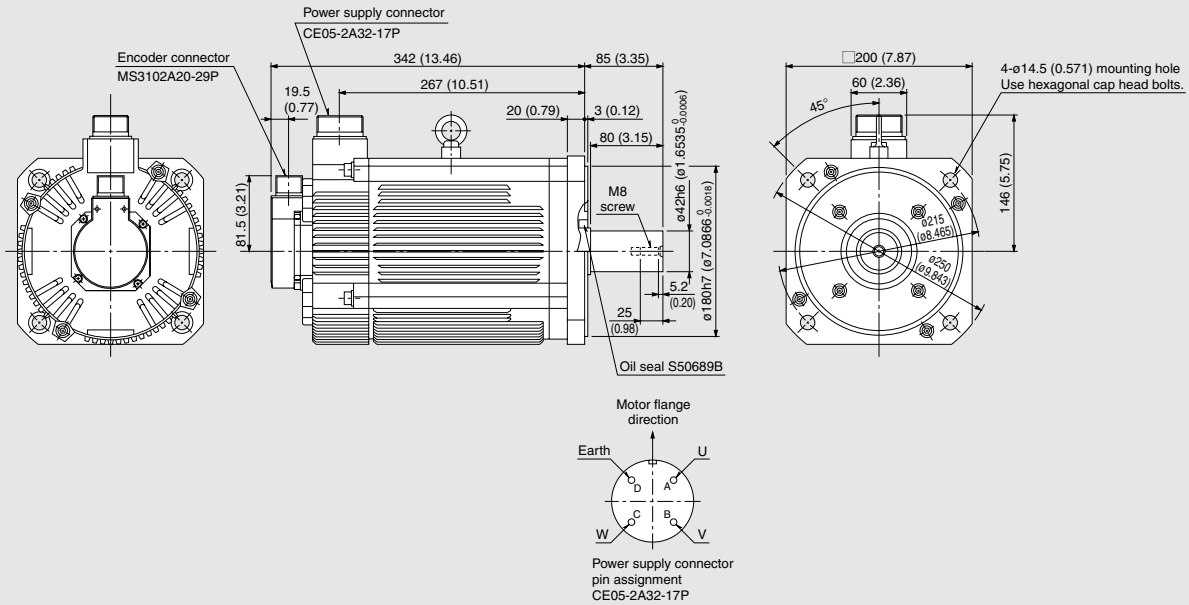
Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.

● HA-LFS502

Unit: mm (inch)



● HA-LFS702

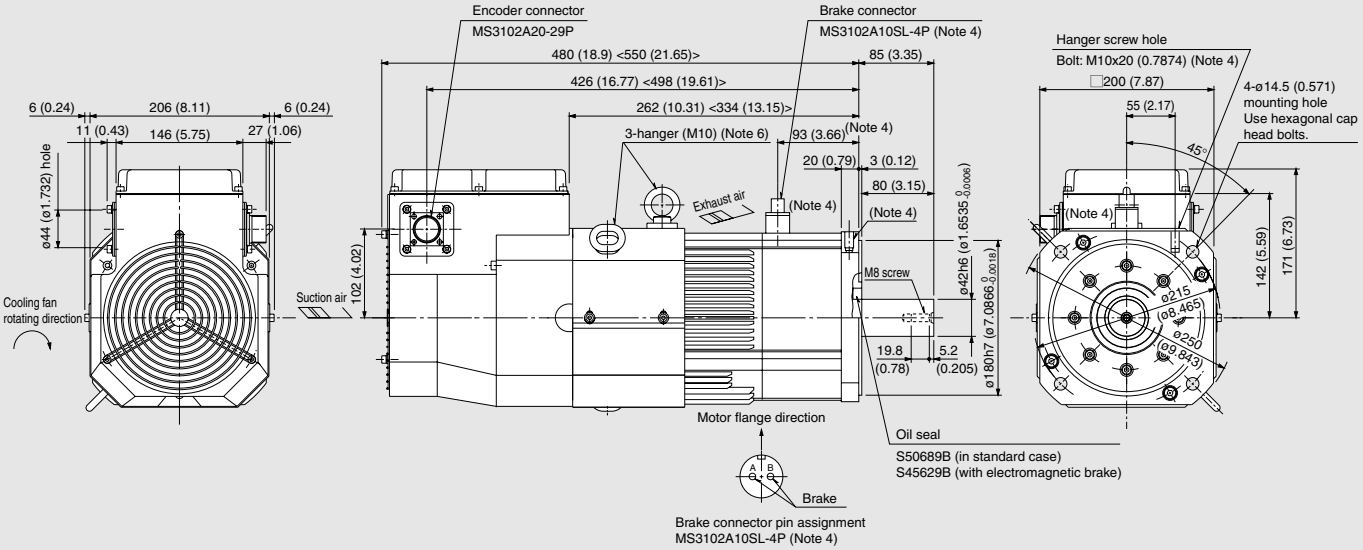


Notes:
1. Use a friction coupling to fasten a load.
2. For dimensions where there is no tolerance listed, use general tolerance.

Motor Dimensions

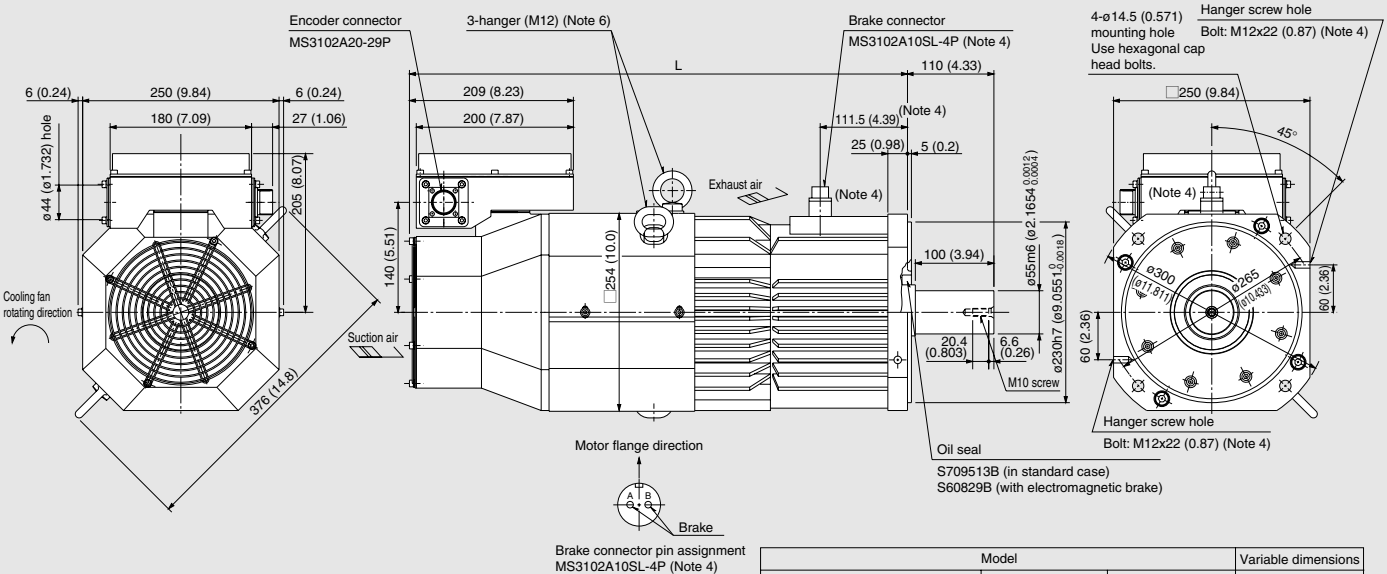
Unit: mm (inch)

- HA-LFS601 (B), HA-LFS6014 (B) (special-order) (Note 7)
- HA-LFS701M (B) (special-order) (Note 7), HA-LFS701M4 (B) (special-order) (Note 7)
- HA-LFS11K2 (B), HA-LFS11K24 (B)



* When the motor is used without a hanger, plug the thread hole with a bolt of M10×20 (0.7874) or less.

- HA-LFS801 (B), HA-LFS12K1 (B), HA-LFS8014 (B) (special-order) (Note 7), HA-LFS12K14 (B) (special-order) (Note 7)
- HA-LFS11K1M (B), HA-LFS15K1M (B), HA-LFS11K1M4 (B), HA-LFS15K1M4 (B)
- HA-LFS15K2 (B), HA-LFS22K2 (B), HA-LFS15K24 (B), HA-LFS22K24 (B)



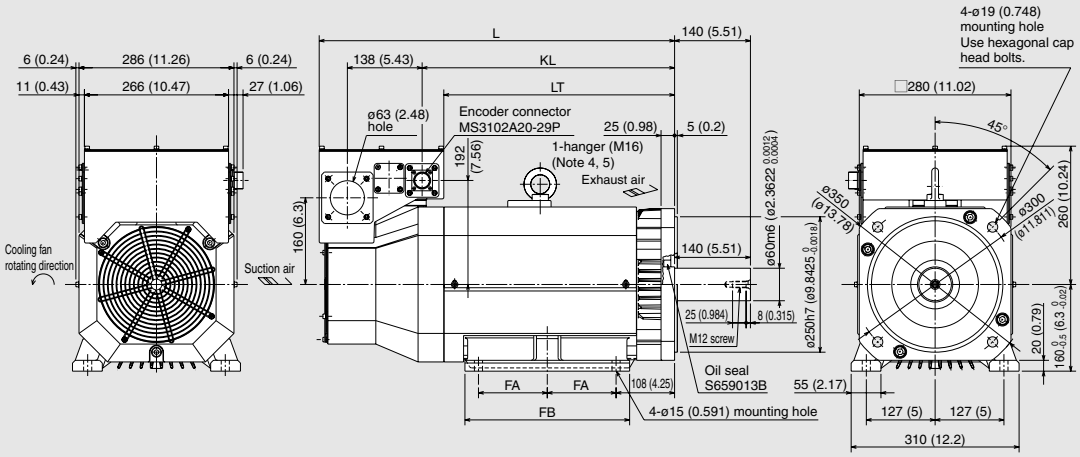
Model			Variable dimensions
1000r/min	1500r/min	2000r/min	L
HA-LFS801 (B) HA-LFS8014 (B) (special-order)	HA-LFS11K1M (B) HA-LFS11K1M4 (B)	HA-LFS15K2 (B) HA-LFS15K24 (B)	495 (19.49) <610 (24.02)>
HA-LFS12K1 (B) HA-LFS12K14 (B) (special-order)	HA-LFS15K1M (B) HA-LFS15K1M4 (B)	HA-LFS22K2 (B) HA-LFS22K24 (B)	555 (21.85) <670 (26.38)>

* When the motor is used without a hanger, plug the thread hole with a bolt of M12x20 (0.7874) or less.

Notes:
1. Use a friction coupling to fasten a load.
2. For dimensions where there is no tolerance listed, use general tolerance.
3. Dimensions inside < > are for the models with electromagnetic brake.
4. Only for the models with electromagnetic brake.
5. Leave a clearance of at least 100mm (3.94 inch) between the motor's suction side and wall.
6. Make sure that oil, water and dust, etc., will not enter the motor from the lead-in hole.
7. The motors are special-order products. Contact Mitsubishi for details on the servo amplifier type and the types of servo motors that are combined with the servo amplifier, and for information on the delivery schedule.

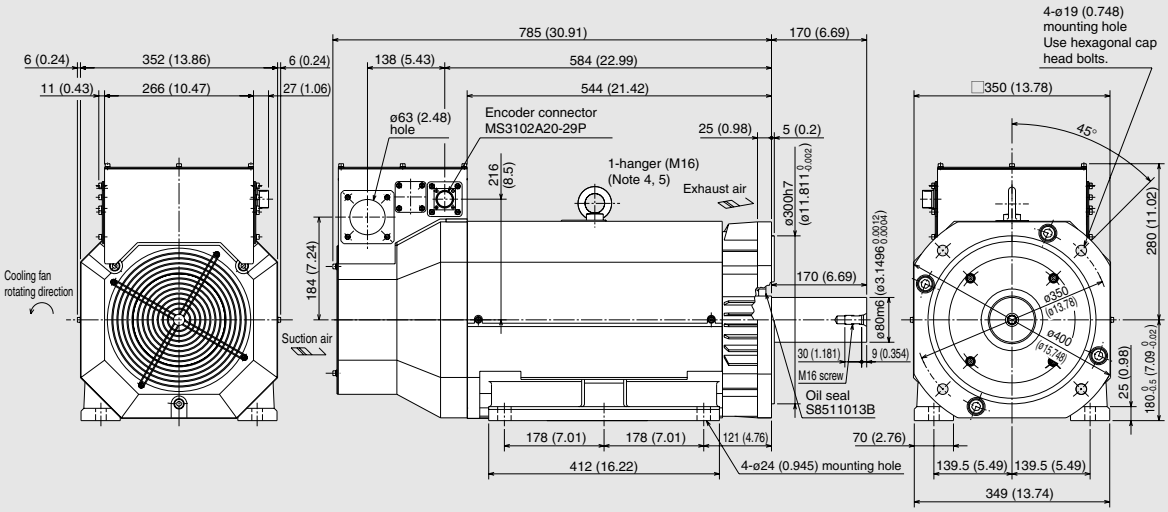
● HA-LFS30K1M
● HA-LFS30K2, HA-LFS37K2

Unit: mm (inch)



Model		Variable dimensions				
1500r/min	2000r/min	L	LT	KL	FA	FB
—	HA-LFS30K2	615 (24.21)	381 (15)	421 (16.57)	105 (4.13)	260 (10.24)
HA-LFS30K1M	HA-LFS37K2	660 (25.98)	426 (16.77)	466 (18.35)	127 (5)	304 (11.97)

● HA-LFS37K1, HA-LFS37K14
● HA-LFS50K1M4

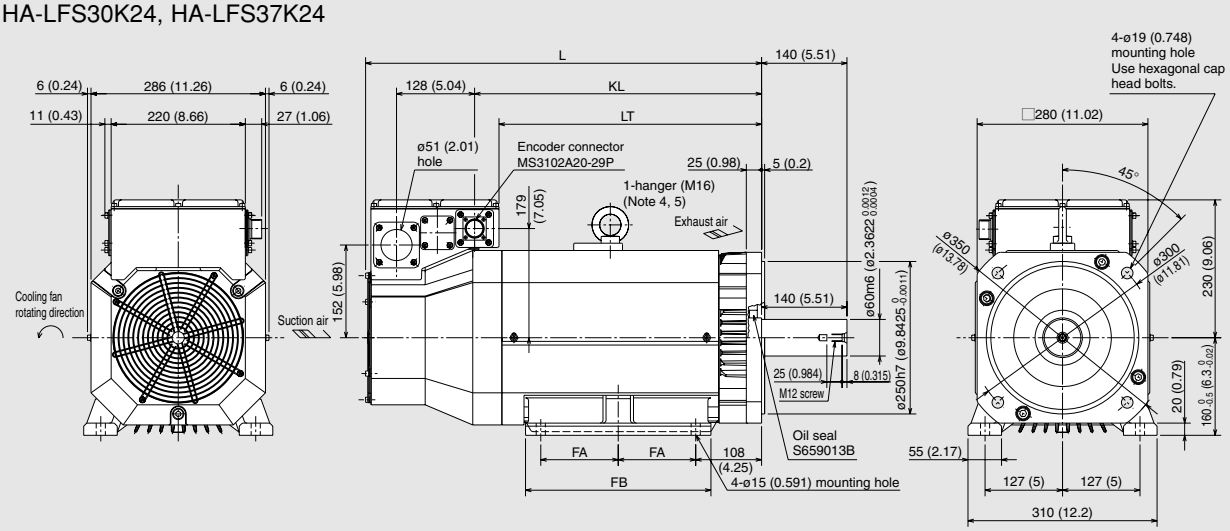


Notes:
1. Use a friction coupling to fasten a load.
2. For dimensions where there is no tolerance listed, use general tolerance.
3. Leave a clearance of at least 150mm (5.91 inch) between the motor's suction side and wall.
4. When the motor is used without a hanger, plug the threaded hole with a bolt of M16x20 (0.7874) or less.
5. Make sure that oil, water and dust, etc., will not enter the motor from the lead-in hole.

Motor Dimensions

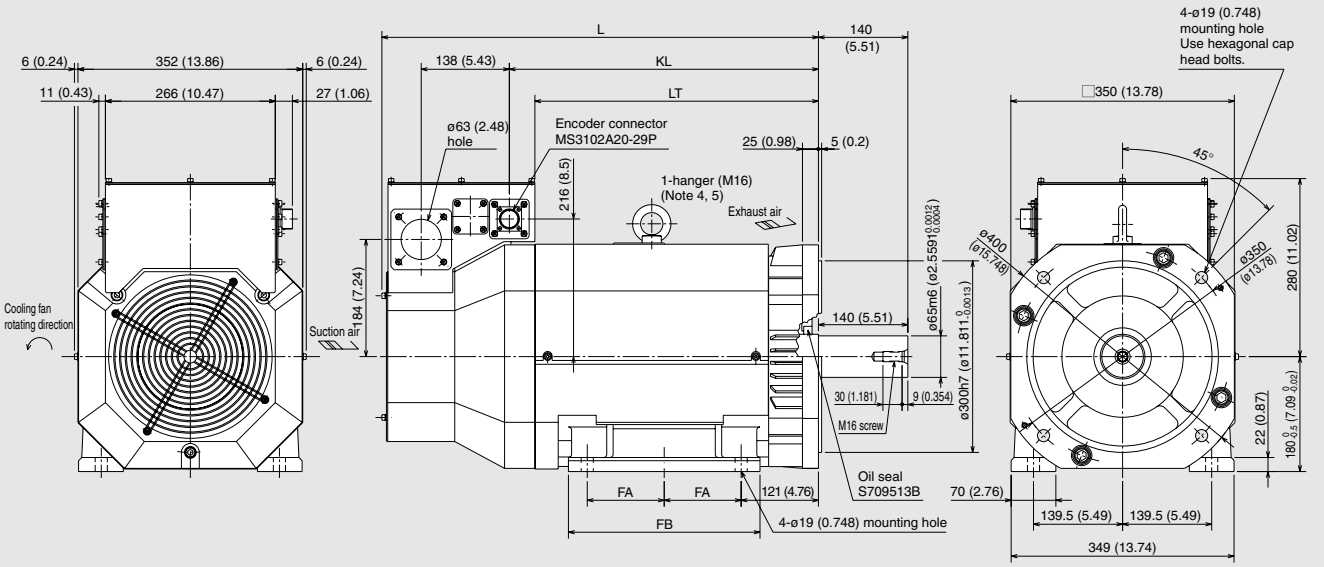
● HA-LFS15K1, HA-LFS20K1, HA-LFS15K14, HA-LFS20K14 (special-order) (Note 6)
● HA-LFS22K1M, HA-LFS22K1M4, HA-LFS30K1M4
● HA-LFS30K24, HA-LFS37K24

Unit: mm (inch)



Model			Variable dimensions				
1000r/min	1500r/min	2000r/min	L	LT	KL	FA	FB
HA-LFS15K1 HA-LFS15K14	HA-LFS22K1M HA-LFS22K1M4	HA-LFS30K24	605 (23.82)	386 (15.2)	426 (16.77)	105 (4.13)	260 (10.24)
HA-LFS20K1 HA-LFS20K14 (special-order)	HA-LFS30K1M4	HA-LFS37K24	650 (25.59)	431 (16.97)	471 (18.54)	127 (5)	304 (11.97)

● HA-LFS25K1, HA-LFS30K1, HA-LFS25K14 (special-order) (Note 6), HA-LFS30K14
● HA-LFS37K1M, HA-LFS37K1M4, HA-LFS45K1M4
● HA-LFS45K24, HA-LFS55K24

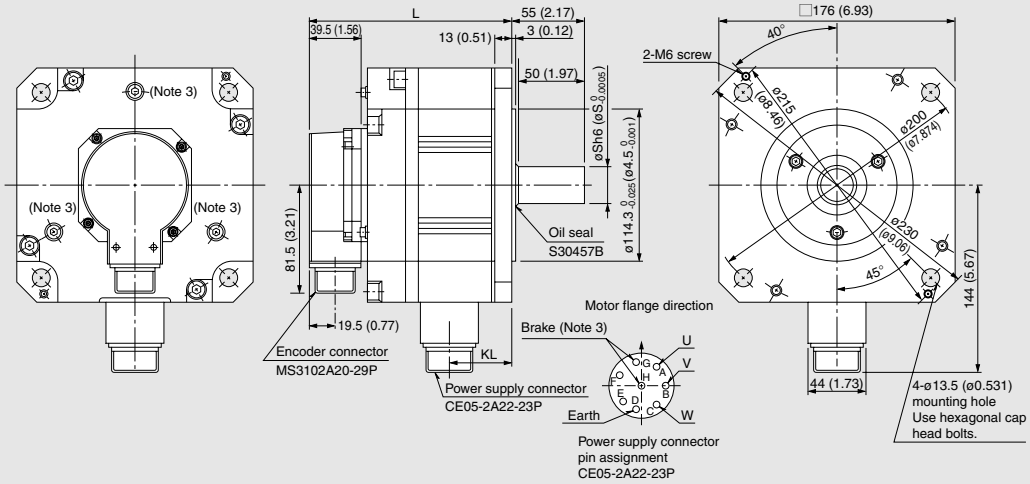


Model			Variable dimensions				
1000r/min	1500r/min	2000r/min	L	LT	KL	FA	FB
HA-LFS25K1 HA-LFS25K14 (special-order)	HA-LFS37K1M HA-LFS37K1M4	HA-LFS45K24	640 (25.2)	399 (15.71)	439 (17.28)	101.5 (4)	262 (10.31)
HA-LFS30K1 HA-LFS30K14	HA-LFS45K1M4	HA-LFS55K24	685 (26.97)	444 (17.48)	484 (19.06)	120.5 (4.74)	300 (11.81)

Notes:
1. Use a friction coupling to fasten a load.
2. For dimensions where there is no tolerance listed, use general tolerance.
3. Leave a clearance of at least 150mm (5.91 inch) between the motor's suction side and wall.
4. When the motor is used without a hanger, plug the threaded hole with a bolt of M16x20 (0.7874) or less.
5. Make sure that oil, water and dust, etc., will not enter the motor from the lead-in hole.
6. The motors are special-order products. Contact Mitsubishi for details on the servo amplifier type and the types of servo motors that are combined with the servo amplifier, and for information on the delivery schedule.

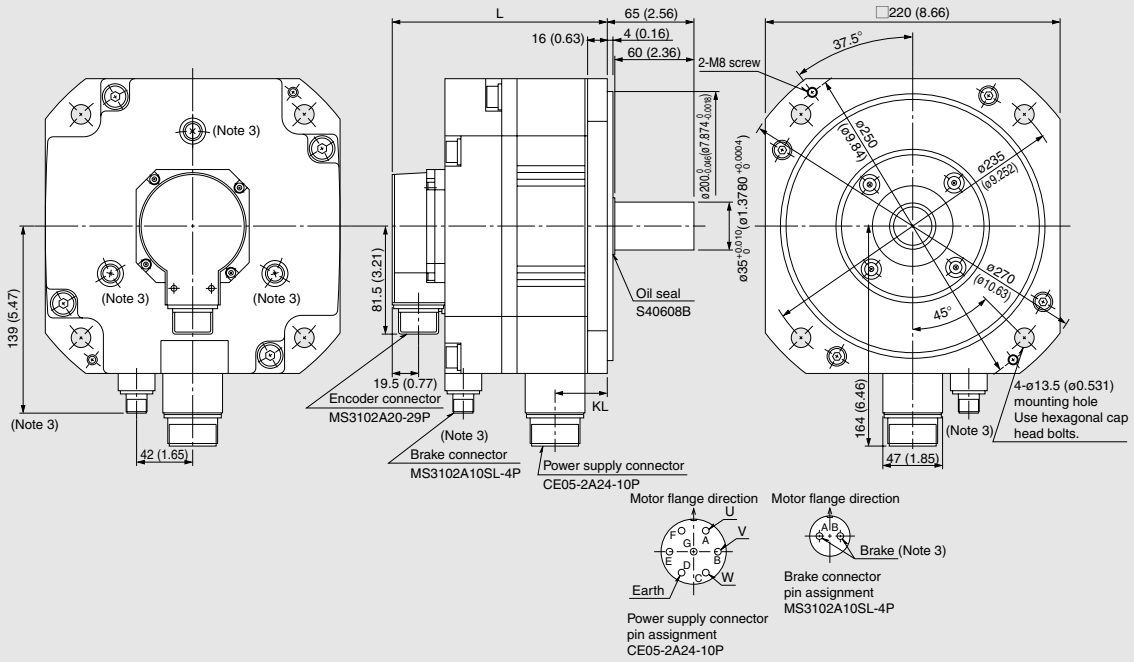
● HC-UFS72 (B), HC-UFS152 (B)

Unit: mm (inch)



Model	Variable dimensions		
	L	KL	S
HC-UFS72 (B)	110.5 (4.35) <144 (5.67)>	38 (1.50)	22 (0.8661)
HC-UFS152 (B)	120 (4.72) <153.5 (6.04)>	47.5 (1.87)	28 (1.1024)

● HC-UFS202 (B), HC-UFS352 (B), HC-UFS502 (B)



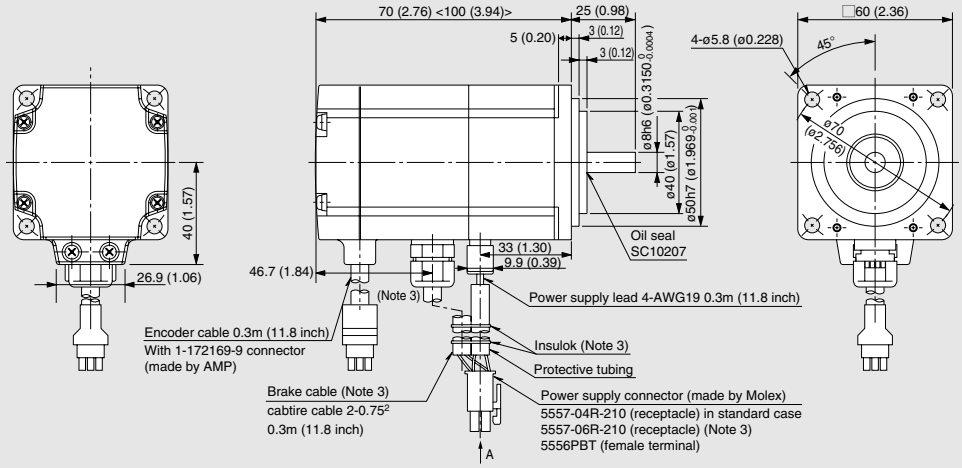
Model	Variable dimensions	
	L	KL
HC-UFS202 (B)	118 (4.65) <161 (6.34)>	42.5 (1.67)
HC-UFS352 (B)	142 (5.59) <185 (7.28)>	66.5 (2.62)
HC-UFS502 (B)	166 (6.54) <209 (8.23)>	90.5 (3.56)

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.

Motor Dimensions

● HC-UFS13 (B)

Unit: mm (inch)



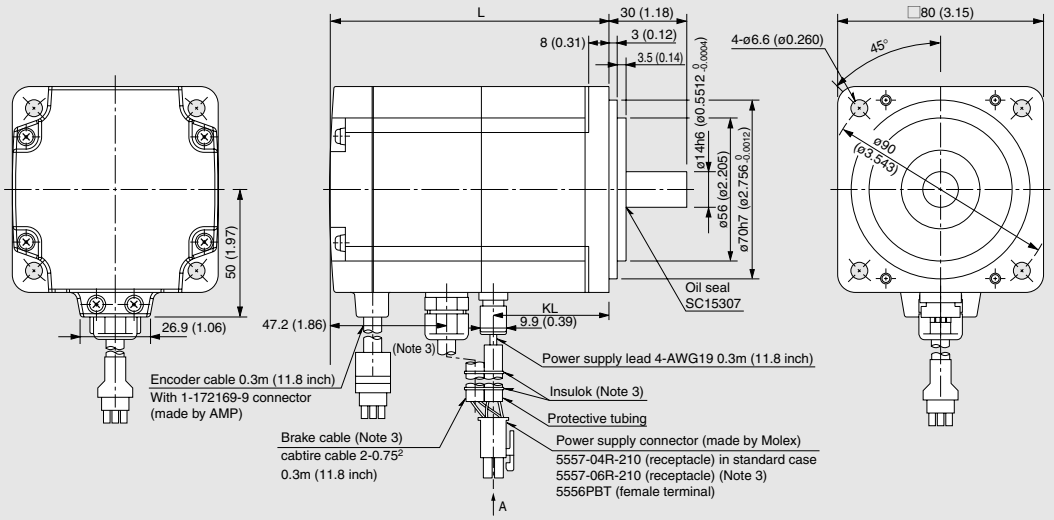
Standard Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

with Brake Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth
5	B1
6	B2

● HC-UFS23 (B), HC-UFS43 (B)



Standard Power supply connector pin assignment

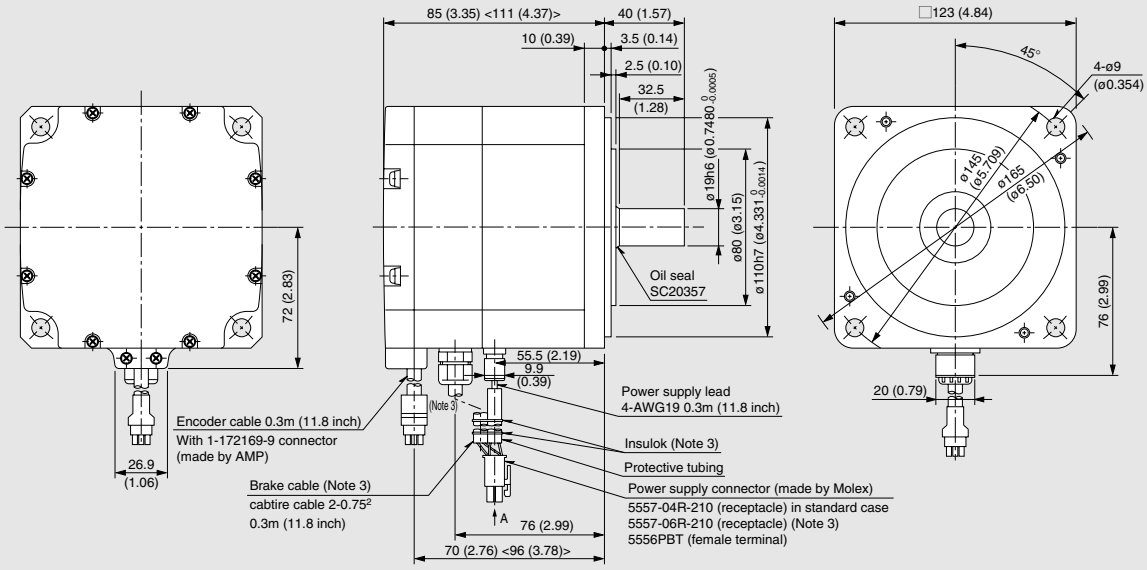
Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

with Brake Power supply connector pin assignment

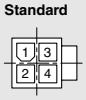
Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth
5	B1
6	B2

Model	Variable dimensions	
	L	KL
HC-UFS23 (B)	77 (3.03) <111 (4.37)>	43.8 (1.72)
HC-UFS43 (B)	92 (3.62) <126 (4.96)>	58.8 (2.31)

● HC-UFS73 (B)



Standard Power supply connector pin assignment



Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth

with Brake Power supply connector pin assignment

Pin No.	Signal name
1	U phase
2	V phase
3	W phase
4	Earth
5	B1
6	B2

Notes:
1. Use a friction coupling to fasten a load.
2. Dimensions inside < > are for the models with electromagnetic brake.
3. Only for the models with electromagnetic brake.
4. For dimensions where there is no tolerance listed, use general tolerance.

Special Specifications

Special shaft end specifications

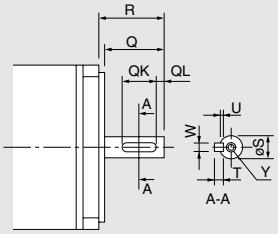
Motors with the following specifications are available.

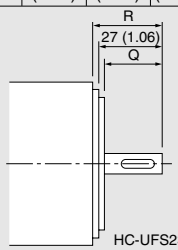
HC-KFS, HC-MFS, HC-UFS 3000r/min series

● With key (200, 400, 750W)

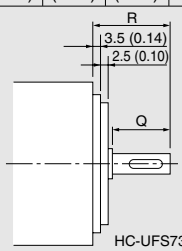
Motor model	Capacity (W)	Variable dimensions								
		T	S	R	Q	W	QK	QL	U	Y
HC-KFS□K (Note 4) HC-MFS□K	200, 400	5 (0.197)	14h6 (0.5512 $^{0}_{-0.0004}$)	30 (1.18)	27 (1.06)	5 (0.197)	20 (0.79)	3 (0.12)	3 (0.12)	M4 screw Depth: 15mm (0.591 inch)
	750	6 (0.236)	19h6 (0.7480 $^{0}_{-0.0005}$)	40 (1.57)	37 (1.46)	6 (0.236)	25 (0.98)	5 (0.20)	3.5 (0.14)	M5 screw Depth: 20mm (0.787 inch)
HC-UFS□K	200, 400	5 (0.197)	14h6 (0.5512 $^{0}_{-0.0004}$)	30 (1.18)	23.5 (0.93)	5 (0.197)	20 (0.79)	3 (0.12)	3 (0.12)	M4 screw Depth: 15mm (0.591 inch)
	750	6 (0.236)	19h6 (0.7480 $^{0}_{-0.0005}$)	40 (1.57)	32.5 (1.28)	6 (0.236)	25 (0.98)	5 (0.20)	3.5 (0.14)	M5 screw Depth: 20mm (0.787 inch)

(Note 1)





HC-UFS23, 43



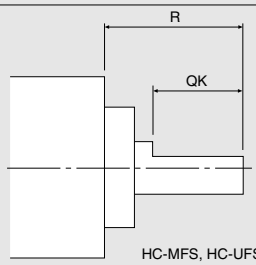
HC-UFS73

Unit: mm (inch)

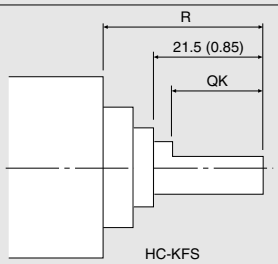
● D-cut (50, 100W)

Motor model	Capacity (W)	Variable dimensions	
		R	QK
HC-KFS□D HC-MFS□D	50, 100	25 (0.98)	20.5 (0.81)
HC-UFS□D	100	25 (0.98)	17.5 (0.69)

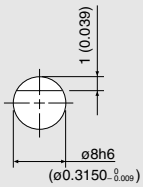
(Note 1)



HC-MFS, HC-UFS



HC-KFS



Unit: mm (inch)

HC-SFS, HC-LFS, HC-RFS, HC-UFS 2000r/min, HA-LFS series

● Key way

Motor model	Capacity (kW)	Variable dimensions									Fig.
		S	R	Q	W	QK	QL	U	r	Y	
HC-SFS□K HC-LFS□K (Note 3)	0.5 to 1.5	24h6 (0.9449 $^{0}_{-0.0005}$)	55 (2.17)	50 (1.97)	8 $^{0}_{-0.036}$ (0.315 $^{0}_{-0.001}$)	36 (1.42)	5 (0.20)	4 $^{+0.2}_{0}$ (0.16 $^{+0.008}_{0}$)	4 (0.16)	M8 screw Depth: 20mm (0.787 inch)	A
	2.0 to 7.0	35 $^{+0.01}_{0}$ (1.3780 $^{+0.0004}_{0}$)	79 (3.11)	75 (2.95)	10 $^{0}_{-0.036}$ (0.394 $^{0}_{-0.001}$)	55 (2.17)	5 (0.20)	5 $^{+0.2}_{0}$ (0.20 $^{+0.008}_{0}$)	5 (0.20)		
HC-RFS□K	1.0, 1.5, 2.0	24h6 (0.9449 $^{0}_{-0.0005}$)	45 (1.77)	40 (1.57)	8 $^{0}_{-0.036}$ (0.315 $^{0}_{-0.001}$)	25 (0.98)	5 (0.20)	4 $^{+0.2}_{0}$ (0.16 $^{+0.008}_{0}$)	4 (0.16)		
	3.5, 5.0	28h6 (1.1024 $^{0}_{-0.0005}$)	63 (2.48)	58 (2.28)	8 $^{0}_{-0.036}$ (0.315 $^{0}_{-0.001}$)	45 (1.77)	5 (0.20)	4 $^{+0.2}_{0}$ (0.16 $^{+0.008}_{0}$)	4 (0.16)		
HC-UFS□K	0.75	22h6 (0.8661 $^{0}_{-0.0005}$)	55 (2.17)	50 (1.97)	6 $^{0}_{-0.036}$ (0.236 $^{0}_{-0.001}$)	42 (1.65)	3 (0.12)	3.5 $^{+0.1}_{0}$ (0.14 $^{+0.004}_{0}$)	3 (0.12)		
	1.5	28h6 (1.1024 $^{0}_{-0.0005}$)	55 (2.17)	50 (1.97)	8 $^{0}_{-0.036}$ (0.315 $^{0}_{-0.001}$)	45 (1.77)	5 (0.20)	4 $^{+0.2}_{0}$ (0.16 $^{+0.008}_{0}$)	4 (0.16)		
	2.0, 3.5, 5.0	35 $^{+0.01}_{0}$ (1.3780 $^{+0.0004}_{0}$)	65 (2.56)	60 (2.36)	10 $^{0}_{-0.036}$ (0.394 $^{0}_{-0.001}$)	50 (1.97)	5 (0.20)	5 $^{+0.2}_{0}$ (0.20 $^{+0.008}_{0}$)	5 (0.20)		

(Note 1, 2)

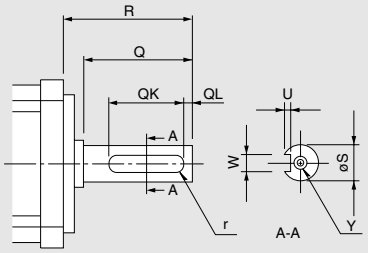


Fig. A

Motor series	Model (HA-LFS□K)	Variable dimensions									Fig.
		S	R	Q	W	QK	QL	U	r	Y	
HA-LFS	601, 6014 (Note 5) 701M (Note 5), 701M4 (Note 5), 502, 702, 11K2, 11K24	42h6 (1.6535 $^{0}_{-0.0006}$)	85 (3.35)	80 (3.15)	12 $^{0}_{-0.04}$ (0.47 $^{0}_{-0.002}$)	70 (2.76)	5 (0.2)	5 $^{+0.2}_{0}$ (0.2 $^{+0.008}_{0}$)	6 (0.24)	Same as standard motor's straight shaft.	A
	801, 12K1, 8014 (Note 5), 12K14 (Note 5), 11K1M, 15K1M, 11K1M4, 15K1M4, 15K2, 22K2, 15K24, 22K24	55m6 (2.1654 $^{0.0012}_{0.0004}$)	110 (4.33)	100 (3.94)	16 $^{0}_{-0.04}$ (0.63 $^{0}_{-0.002}$)	90 (3.54)	5 (0.2)	6 $^{+0.2}_{0}$ (0.24 $^{+0.008}_{0}$)	8 (0.31)		
	15K1, 20K1, 15K14, 20K14(Note 5), 22K1M, 30K1M, 22K1M4, 30K1M4, 30K2, 37K2, 30K24, 37K24	60m6 (2.3622 $^{0.0012}_{0.0004}$)	140 (5.51)	140 (5.51)	18 $^{0}_{-0.04}$ (0.71 $^{0}_{-0.002}$)	128 (5.04)	6 (0.24)	7 $^{+0.2}_{0}$ (0.28 $^{+0.008}_{0}$)	9 (0.35)		B
	25K1, 30K1, 25K14 (Note 5), 30K14, 37K1M, 37K1M4, 45K1M4, 45K24, 55K24	65m6 (2.5591 $^{0.0012}_{0.0004}$)	140 (5.51)	140 (5.51)	18 $^{0}_{-0.04}$ (0.71 $^{0}_{-0.002}$)	128 (5.04)	6 (0.24)	7 $^{+0.2}_{0}$ (0.28 $^{+0.008}_{0}$)	9 (0.35)		
	37K1, 37K14, 50K1M4	80m6 (3.1496 $^{0.0012}_{0.0004}$)	170 (6.69)	170 (6.69)	22 $^{0}_{-0.04}$ (0.87 $^{0}_{-0.002}$)	147 (5.79)	11 (0.43)	9 $^{+0.2}_{0}$ (0.35 $^{+0.008}_{0}$)	11 (0.43)		

(Note 1, 2)

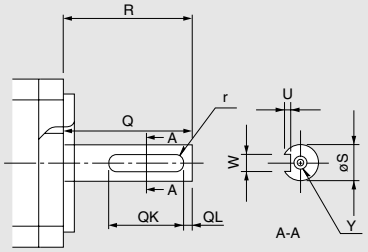


Fig. B

Unit: mm (inch)

Notes:
1. Cannot be used in applications that involve high frequency. Loose keys may damage the motor shaft - voiding motor warranty.
2. Keys are not installed. Keys are installed by the user.
3. The HC-SFS121 is the same as the lower row (2.0 to 7.0kW).
4. The HC-KFS46 and HC-KFS410 servo motors are compatible with the keyway specifications. The dimensions are the same for the HC-KFS23K and HC-KFS43K.
5. The motors are special-order products. Contact Mitsubishi for details on the delivery schedule.

Special Specifications

Electromagnetic brake specifications

Motor model		HC-KFS, MFS					HC-SFS 1000r/min			
		053B	13B	23B	43B	73B	81B	121B	201B	301B
Type		Spring-action safety brake					Spring-action safety brake			
Rated voltage		24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%			
Static friction torque	(N·m)	0.32	0.32	1.3	1.3	2.4	8.3	43.1	43.1	43.1
	(oz·in)	45.3	45.3	184	184	340	1176	6103	6103	6103
Power consumption (W) at 20°C (68°F)		6.3	6.3	7.9	7.9	9	19	34	34	34
Permissible braking work	(J)/time	5.6	5.6	22	22	64	400	4500	4500	4500
	(oz·in)/time	793.6	793.6	3117.6	3117.6	9069.3	56683.3	637687.1	637687.1	637687.1
	(J)/hour	56	56	220	220	640	4000	45000	45000	45000
	(oz·in)/hour	7936	7936	31176	31176	90693	566833	6376871	6376871	6376871
Brake life (Note 1) (Braking work per braking action)	Times	20000 (4J)	20000 (4J)	20000 (15J)	20000 (15J)	20000 (32J)	20000 (200J)	20000 (1000J)	20000 (1000J)	20000 (1000J)

Motor model		HC-SFS 2000r/min													
		52B	102B	152B	202B	352B	502B	702B	524B	1024B	1524B	2024B	3524B	5024B	7024B
Type		Spring-action safety brake							Spring-action safety brake						
Rated voltage		24VDC $^{0}_{-10}$%							24VDC $^{0}_{-10}$%						
Static friction torque	(N·m)	8.3	8.3	8.3	43.1	43.1	43.1	43.1	8.3	8.3	8.3	43.1	43.1	43.1	43.1
	(oz·in)	1176	1176	1176	6103	6103	6103	6103	1176	1176	1176	6103	6103	6103	6103
Power consumption (W) at 20°C (68°F)		19	19	19	34	34	34	34	19	19	19	34	34	34	34
Permissible braking work	(J)/time	400	400	400	4500	4500	4500	4500	400	400	400	4500	4500	4500	4500
	(oz·in)/time	56683.3	56683.3	56683.3	637687.1	637687.1	637687.1	637687.1	56683.3	56683.3	56683.3	637687.1	637687.1	637687.1	637687.1
	(J)/hour	4000	4000	4000	45000	45000	45000	45000	4000	4000	4000	45000	45000	45000	45000
	(oz·in)/hour	566833	566833	566833	6376871	6376871	6376871	6376871	566833	566833	566833	6376871	6376871	6376871	6376871
Brake life (Note 1) (Braking work per braking action)	Times	20000 (200J)	20000 (200J)	20000 (200J)	20000 (1000J)	20000 (1000J)	20000 (1000J)	20000 (1000J)	20000 (200J)	20000 (200J)	20000 (200J)	20000 (1000J)	20000 (1000J)	20000 (1000J)	20000 (1000J)

Motor model		HC-SFS 3000r/min					HC-LFS					HC-RFS				
		53B	103B	153B	203B	353B	52B	102B	152B	202B	302B	103B	153B	203B	353B	503B
Type		Spring-action safety brake					Spring-action safety brake					Spring-action safety brake				
Rated voltage		24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%				
Static friction torque	(N·m)	8.3	8.3	8.3	43.1	43.1	8.3	8.3	8.3	43.1	**43.1**	6.8	6.8	6.8	16.7	16.7
	(oz·in)	1176	1176	1176	6103	6103	1176	1176	1176	6103	6103	964	964	964	2365	2365
Power consumption (W) at 20°C (68°F)		19	19	19	34	34	19	19	19	34	34	19	19	19	23	23
Permissible braking work	(J)/time	400	400	400	4500	4500	400	400	400	4500	4500	400	400	400	400	400
	(oz·in)/time	56683.3	56683.3	56683.3	637687.1	637687.1	56683.3	56683.3	56683.3	637687.1	637687.1	56683.3	56683.3	56683.3	56683.3	56683.3
	(J)/hour	4000	4000	4000	45000	45000	4000	4000	4000	45000	45000	4000	4000	4000	4000	4000
	(oz·in)/hour	566833	566833	566833	6376871	6376871	566833	566833	566833	6376871	6376871	566833	566833	566833	566833	566833
Brake life (Note 1) (Braking work per braking action)	Times	20000 (200J)	20000 (200J)	20000 (200J)	20000 (1000J)	20000 (1000J)	20000 (200J)	20000 (200J)	20000 (200J)	20000 (1000J)	20000 (1000J)	20000 (200J)	20000 (200J)	20000 (200J)	20000 (200J)	20000 (200J)

Motor model		HA-LFS 1000r/min						HA-LFS 1500r/min					
		601B	801B	12K1B	6014B (Note 3)	8014B (Note 3)	12K14B (Note 3)	701MB (Note 3)	11K1MB	15K1MB	701M4B (Note 3)	11K1M4B	15K1M4B
Type		Spring-action safety brake						Spring-action safety brake					
Rated voltage		24VDC $^{0}_{-10}$%						24VDC $^{0}_{-10}$%					
Static friction torque	(N·m)	82	160.5	160.5	82	160.5	160.5	82	160.5	160.5	82	160.5	160.5
	(oz·in)	11618	22741	22741	11618	22741	22741	11618	22741	22741	11618	22741	22741
Power consumption (W) at 20°C (68°F)		30	46	46	30	46	46	30	46	46	30	46	46
Permissible braking work	(J)/time	3000	5000	5000	3000	5000	5000	3000	5000	5000	3000	5000	5000
	(oz·in)/time	425058	708430	708430	425058	708430	708430	425058	708430	708430	425058	708430	708430
	(J)/hour	30000	50000	50000	30000	50000	50000	30000	50000	50000	30000	50000	50000
	(oz·in)/hour	4250580	7084300	7084300	4250580	7084300	7084300	4250580	7084300	7084300	4250580	7084300	7084300
Brake life (Note 1) (Braking work per braking action)	Times	20000 (1000J)	20000 (3000J)	20000 (3000J)	20000 (1000J)	20000 (3000J)	20000 (3000J)	20000 (1000J)	20000 (3000J)	20000 (3000J)	20000 (1000J)	20000 (3000J)	20000 (3000J)

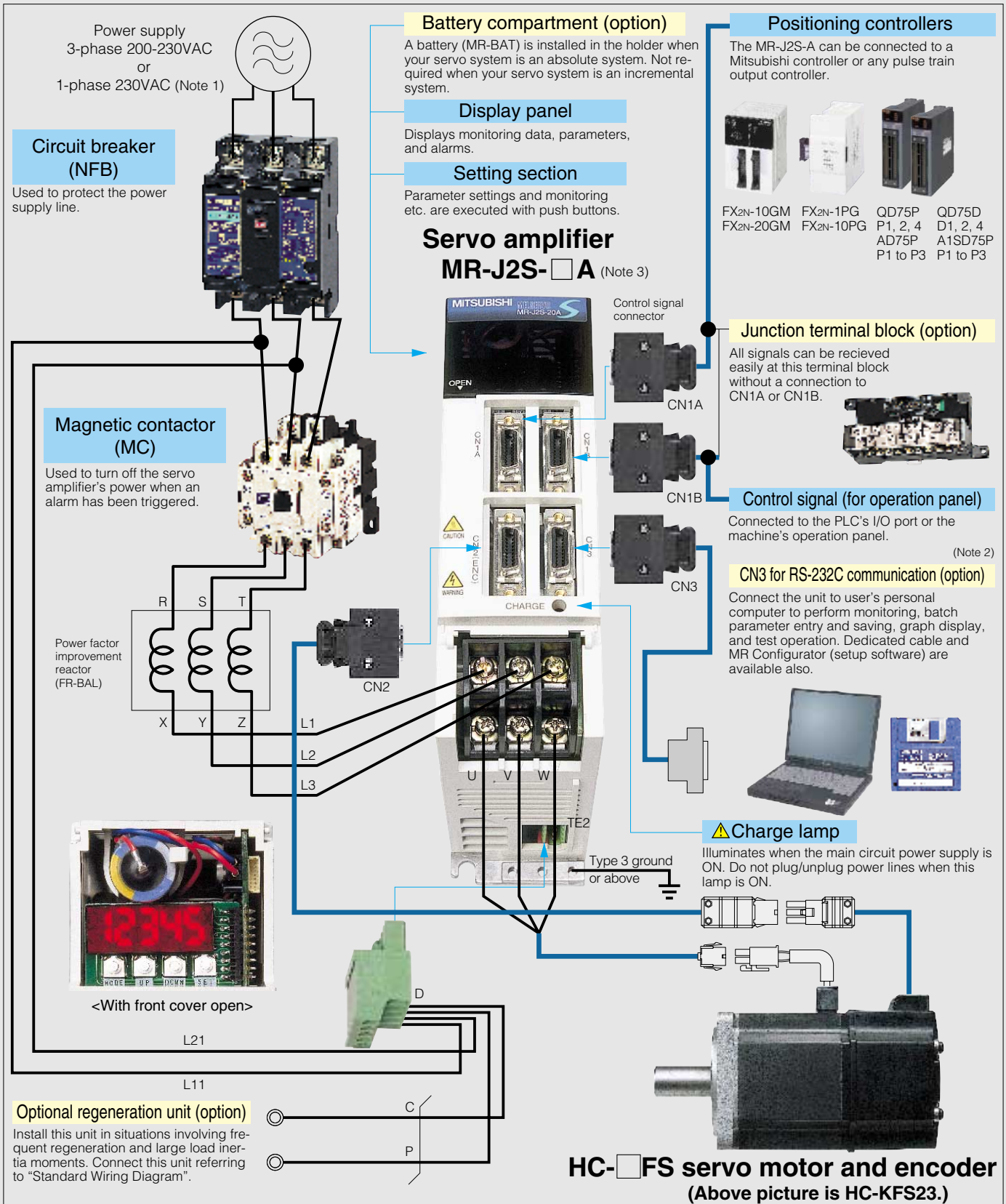
Motor model		HA-LFS2000r/min						HC-UFS 2000r/min					HC-UFS 3000r/min			
		11K2B	15K2B	22K2B	11K24B	15K24B	22K24B	72B	152B	202B	352B	502B	13B	23B	43B	73B
Type		Spring-action safety brake						Spring-action safety brake					Spring-action safety brake			
Rated voltage		24VDC $^{0}_{-10}$%						24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%			
Static friction torque	(N·m)	82	160.5	160.5	82	160.5	160.5	8.3	8.3	43.1	43.1	43.1	0.32	1.3	1.3	2.4
	(oz·in)	11618	22741	22741	11618	22741	22741	1176	1176	6103	6103	6103	45.3	184	184	340
Power consumption (W) at 20°C (68°F)		30	46	46	30	46	46	19	19	34	34	34	6.3	7.9	7.9	10
Permissible braking work	(J)/time	3000	5000	5000	3000	5000	5000	400	400	4500	4500	4500	5.6	22	22	64
	(oz·in)/time	425058	708430	708430	425058	708430	708430	56683.3	56683.3	637687.1	637687.1	637687.1	793.6	3117.6	3117.6	9069.3
	(J)/hour	30000	50000	50000	30000	50000	50000	4000	4000	45000	45000	45000	56	220	220	640
	(oz·in)/hour	4250580	7084300	7084300	4250580	7084300	7084300	566833	566833	6376871	6376871	6376871	7936	31176	31176	90693
Brake life (Note 1) (Braking work per braking action)	Times	20000 (1000J)	20000 (3000J)	20000 (3000J)	20000 (1000J)	20000 (3000J)	20000 (3000J)	20000 (200J)	20000 (200J)	20000 (1000J)	20000 (1000J)	20000 (1000J)	20000 (4J)	20000 (15J)	20000 (15J)	20000 (32J)

Notes:
1. The brake gap cannot be adjusted. The brake life shows the time until the readjustment is needed.
2. The electromagnetic brake is for holding. It cannot be used for braking applications.
3. The motors are special-order products. Contact Mitsubishi for details on the delivery schedule.

Peripheral Equipment (MR-J2S-□A)

Connections with peripheral equipment

Peripheral equipment is connected to MR-J2S-A as described below.
Connectors, options, and other necessary equipment are available so that users can set up MR-J2S-A easily and begin using it right away.



Notes: 1. If a 1-phase power supply (230VAC) is used, please connect it to terminals L1 and L2. Nothing should be connected to L3.
2. RS-232C and RS-422 are mutually-exclusive features. RS-422 communication is possible with parameter switching.
The RS-422 communication cable can be made by using the optional CN1 connector (MR-J2CN1).
3. The connections with the peripheral devices shown above apply for the MR-J2S-350A or smaller. Connect the MR-J2S-500A or larger and the MR-J2S-60A4 (400V type) or larger as shown in the standard connection diagram.

Servo Amplifier Specifications

MR-J2S-A (100V/200V) type

Servo amplifier model MR-J2S-			10A	20A	40A	60A	70A (-U□)	100A	200A	350A	500A	700A (-U□)	11KA	15KA	22KA	30KA	37KA (-U□)	10A1	20A1	40A1
Converter unit model			—													MR-HP30KA		—		
Servo amplifier	Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz															1-phase 100 to 120VAC 50/60Hz		
		Permissible voltage fluctuation	1-phase 170 to 253VAC															1-phase 85 to 127VAC		
		Permissible frequency fluctuation	±5% max.															±5% max.		
		Power consumption (W)	50															50		
	Main circuit power supply	Voltage/frequency (Note 1)	3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz (Note 2)					3-phase 200 to 230VAC 50/60Hz (Note 2)								The servo amplifier's main circuit power is supplied from the converter unit.		1-phase 100 to 120VAC 50/60Hz (Note 2)		
		Permissible voltage fluctuation	3-phase 200 to 230VAC: 170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC										1-phase 85 to 127VAC		
		Permissible frequency fluctuation	±5% max.															±5% max.		
	Control system		Sine-wave PWM control/current control system																	
	Dynamic brake		Built-in (Note 3)										External option					Built-in (Note 3)		
	Safety features		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection																	
	Position control mode	Maximum input pulse frequency	500kpps (when using differential receiver), 200 kpps (when using open collector)																	
		Positioning feedback pulse	Resolution per encoder/servo motor rotation: 131072 p/rev																	
		Command pulse multiple	Electronic gear A/B multiple, A: 1 to 65535 or 131072, B: 1 to 65535 1/50 < A/B < 500																	
		Positioning complete width setting	0 to ±10000 pulses (command pulse unit)																	
		Excess error	±2.5 rotations																	
		Torque limit	Set by parameters or external analog input (0 to +10VDC, max. torque)																	
	Speed control mode	Speed control range	Analog speed command 1:2000, internal speed command 1:5000																	
		Analog speed command input	0 to ±10VDC/rated speed (Note 4)																	
		Speed fluctuation rate	±0.01% max. (load fluctuation 0 to 100%) 0% (power fluctuation ±10%) ±0.2% max. (ambient temperature 25°C±10°C [77°F±50°F]), when using analog speed command																	
		Torque limit	Set by parameters or external analog input (0 to +10VDC, max. torque)																	
	Torque control mode	Analog torque command input	0 to ±8VDC max. torque (input impedance 10 to 12kΩ)																	
		Speed limit	Set by parameters or external analog input (0 to ±10VDC, rated speed)																	
	Structure		Self-cooling open (IP00)					Fan cooling open (IP00)										Self-cooling open (IP00)		
	Environment	Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)																	
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)																	
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust																	
		Elevation	1000m (3280ft) or less above sea level																	
		Vibration	5.9m/s^2 max.																	
	Mass (kg [lb])		0.7 (1.5)	0.7 (1.5)	1.1 (2.4)	1.1 (2.4)	1.7 (3.7)	1.7 (3.7)	2.0 (4.4)	2.0 (4.4)	4.9 (10.8)	7.2 (15.9)	15 (33)	16 (35.3)	20 (44.1)	47 (103.5)	47 (103.5)	0.7 (1.5)	0.7 (1.5)	1.1 (2.4)
Converter unit	Main circuit power supply	Voltage/frequency (Note 1)	—													3-phase 200 to 230VAC 50/60Hz (Note 2)		—		
		Permissible voltage fluctuation	—													3-phase 170 to 253VAC 50/60Hz		—		
		Permissible frequency fluctuation	—													±5% max.		—		
	Control circuit power supply	Voltage/frequency	—													1-phase 200 to 230VAC 50/60Hz		—		
		Permissible voltage fluctuation	—													1-phase 170 to 253VAC 50/60Hz		—		
		Permissible frequency fluctuation	—													±5% max.		—		
		Power consumption (W)	—													50		—		
	Mass (kg [lb])		—													22 (48.5)		—		

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics applied when the servo amplifier is combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.
3. For products without a dynamic brake (MR-J2S-□A-ED or MR-J2S-□A1-ED), special compliance is possible.
4. It is possible to change the speed in 10V using the parameter No.25.

MR-J2S-A (400V) type

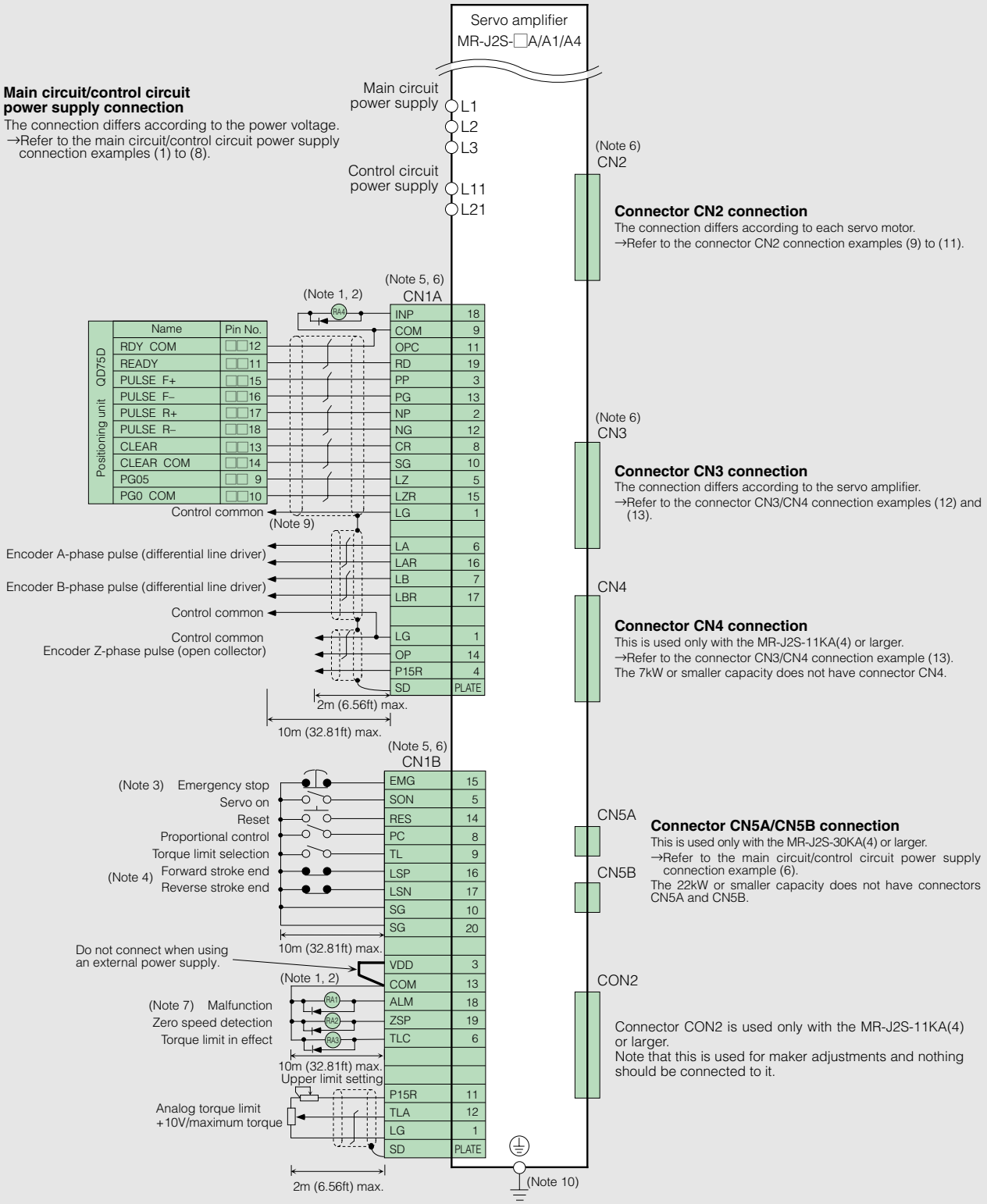
Servo amplifier model MR-J2S-			60A4	100A4	200A4	350A4	500A4	700A4 (-U□)	11KA4 (-U□)	15KA4 (-U□)	22KA4 (-U□)	30KA4 (-U□)	37KA4 (-U□)	45KA4	55KA4
Converter unit model			—									MR-HP55KA4			
Servo amplifier	Control circuit power supply	Voltage/frequency	24VDC						1-phase 380 to 480VAC 50/60Hz						
		Permissible voltage fluctuation	20.4 to 27.6VDC						1-phase 323 to 528VAC						
		Permissible frequency fluctuation	—						±5% max.						
		Power consumption (W)	25						50						
	Main circuit power supply	Voltage/frequency (Note 1)	3-phase 380 to 480VAC 50/60Hz (Note 2)									The servo amplifier's main circuit power is supplied from the converter unit.			
		Permissible voltage fluctuation	3-phase 323 to 528VAC												
		Permissible frequency fluctuation	±5% max.												
	Control system		Sine-wave PWM control/current control system												
	Dynamic brake		Built-in						External option						
	Safety features		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection												
	Position control mode	Maximum input pulse frequency	500kpps (when using differential receiver), 200 kpps (when using open collector)												
		Positioning feedback pulse	Resolution per encoder/servo motor rotation: 131072 p/rev												
		Command pulse multiple	Electronic gear A/B multiple, A: 1 to 65535 or 131072, B: 1 to 65535 1/50 < A/B < 500												
		Positioning complete width setting	0 to ±10000 pulses (command pulse unit)												
		Excess error	±2.5 rotations												
		Torque limit	Set by parameters or external analog input (0 to +10VDC, max. torque)												
	Speed control mode	Speed control range	Analog speed command 1:2000, internal speed command 1:5000												
		Analog speed command input	0 to ±10VDC/rated speed (Note 3)												
		Speed fluctuation rate	±0.01% max. (load fluctuation 0 to 100%) 0% (power fluctuation ±10%) ±0.2% max. (ambient temperature 25°C±10°C [77°F±50°F]), when using analog speed command												
		Torque limit	Set by parameters or external analog input (0 to +10VDC, max. torque)												
	Torque control mode	Analog torque command input	0 to ±8VDC max. torque (input impedance 10 to 12kΩ)												
		Speed limit	Set by parameters or external analog input (0 to ±10VDC, rated speed)												
	Structure		Self-cooling, open (IP00)	Fan cooling, open (IP00) (Note 4)											
	Environment	Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)												
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)												
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust												
		Elevation	1000m (3280ft) or less above sea level												
		Vibration	5.9m/s² max.												
	Mass (kg [lb])		2.1 (4.6)	2.2 (4.8)	2.2 (4.8)	5 (11)	5 (11)	7.2 (15.9)	15 (33)	16 (35.3)	20 (44.1)	36 (79.3)	47 (103.5)	47 (103.5)	47 (103.5)
Converter unit	Main circuit power supply	Voltage/frequency (Note 1)	—									3-phase 380 to 480VAC 50/60Hz (Note 2)			
		Permissible voltage fluctuation	—									3-phase 323 to 528VAC 50/60Hz			
		Permissible frequency fluctuation	—									±5% max.			
	Control circuit power supply	Voltage/frequency	—									1-phase 380 to 480VAC 50/60Hz			
		Permissible voltage fluctuation	—									1-phase 323 to 528VAC 50/60Hz			
		Permissible frequency fluctuation	—									±5% max.			
		Power consumption (W)	—									50			
	Mass (kg [lb])		—									22 (48.5)			

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics applied when the servo amplifier is combined with a servo motor, refer to “servo motor torque characteristics” in this catalog.
3. It is possible to change the speed in 10V using the parameter No.25.
4. For the structure of MR-J2S-60A4, “Self-cooling, open (IP00)” is applied.

Standard Wiring Diagram

MR-J2S-□A (1)/MR-J2S-□A (4) type: Position control operation

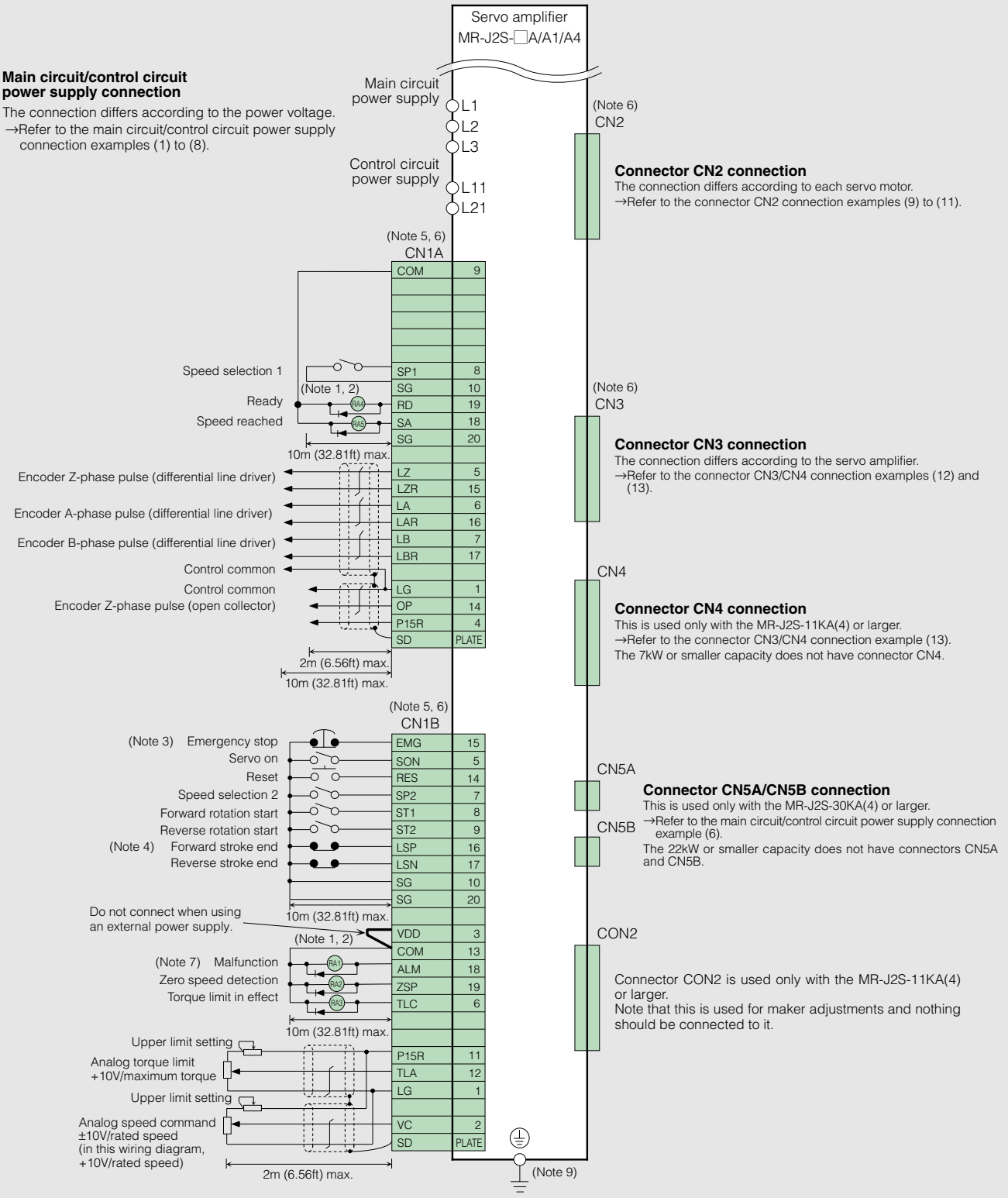
● Connection to QD75D (position servo, incremental)



Notes:
1. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
2. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
3. EMG (emergency stop) contact (normally closed contact) must be installed. If it is not installed, operation will be impossible.
4. LSP and LSN contacts must be closed for normal operation. If they are not closed, the commands will not be accepted.
5. Signals with the same name are connected inside.
6. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
7. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
8. Connect the shield wire securely to the plate inside the connector (ground plate).
9. This connection is not necessary for QD75D of the positioning unit. Note that the connection between LG and Control common terminal is recommended to increase noise resistance depending on the positioning unit being used.
10. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

MR-J2S-□A (1)/MR-J2S-□A (4) type: Speed control operation

● Connection

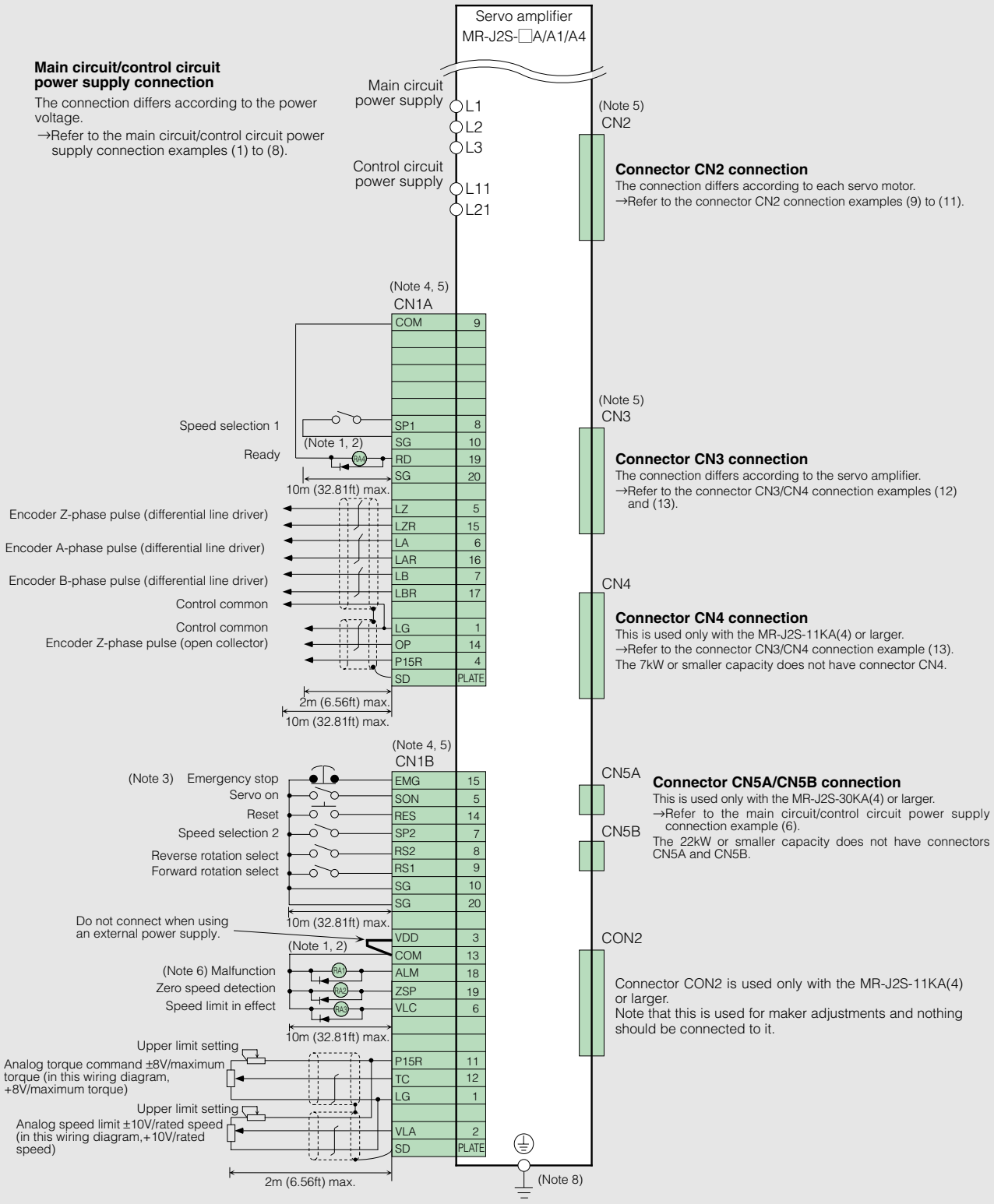


Notes:
1. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
2. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
3. EMG (emergency stop) contact (normally closed contact) must be installed. If it is not installed, operation will be impossible.
4. LSP and LSN contacts must be closed for normal operation. If they are not closed, the commands will not be accepted.
5. Signals with the same name are connected inside.
6. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
7. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
8. Connect the shield wire securely to the plate inside the connector (ground plate).
9. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

Standard Wiring Diagram

MR-J2S-□A (1)/MR-J2S-□A (4) type: Torque control operation

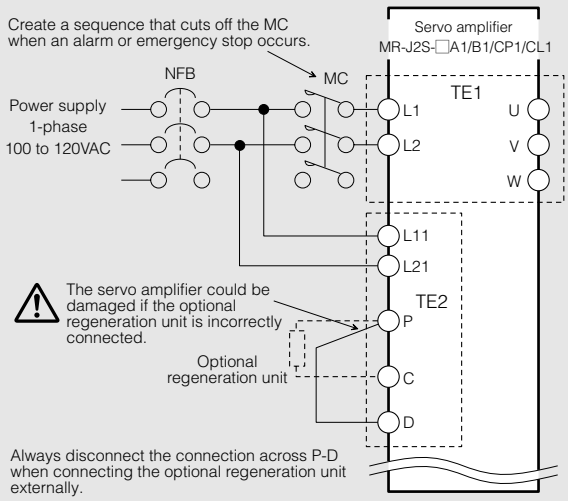
● Connection



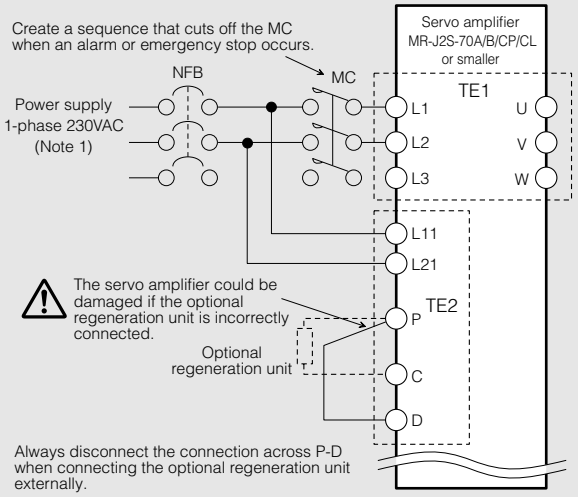
Notes:
1. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
2. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
3. EMG (emergency stop) contact (normally closed contact) must be installed. If it is not installed, operation will be impossible.
4. Signals with the same name are connected inside.
5. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
6. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
7. Connect the shield wire securely to the plate inside the connector (ground plate).
8. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

Main circuit/control circuit power supply connection examples

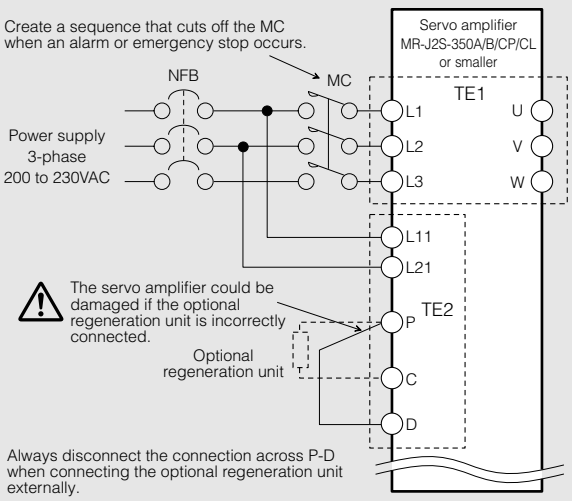
(1) 1-phase 100V



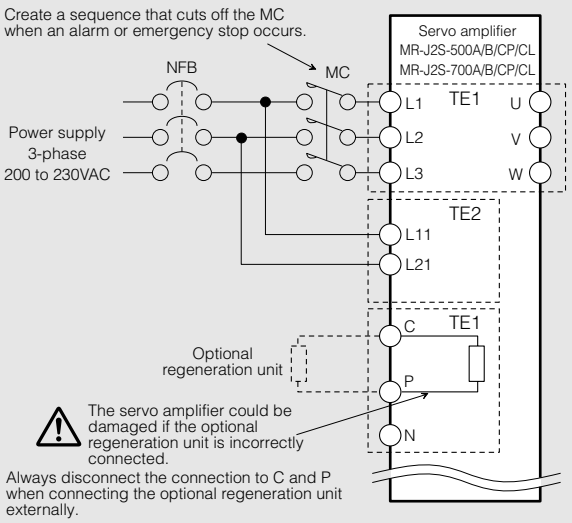
(2) 1-phase 230V



(3) 3-phase 200V 3.5kW or smaller



(4) 3-phase 200V 5, 7kW

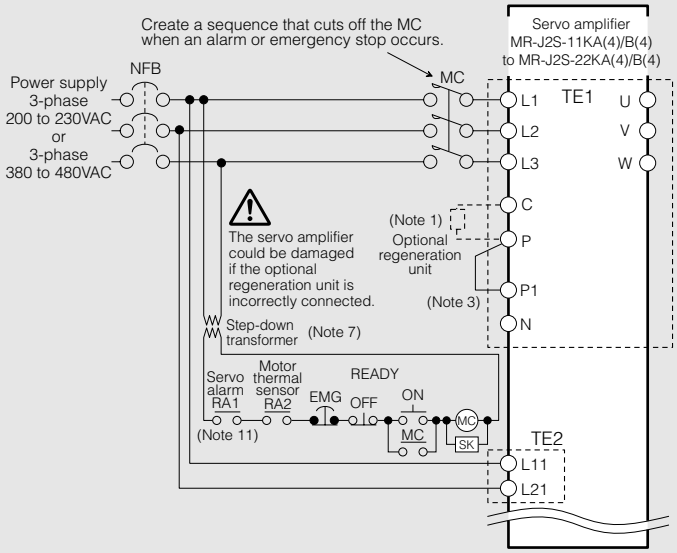


Note:
1. When using the 1-phase 230VAC, connect the power supply to the L1 and L2 terminals, and do not connect anything to L3. The 1-phase 230VAC power supply can be used with the MR-J2S-70A/B/CP/CL or smaller servo amplifier.

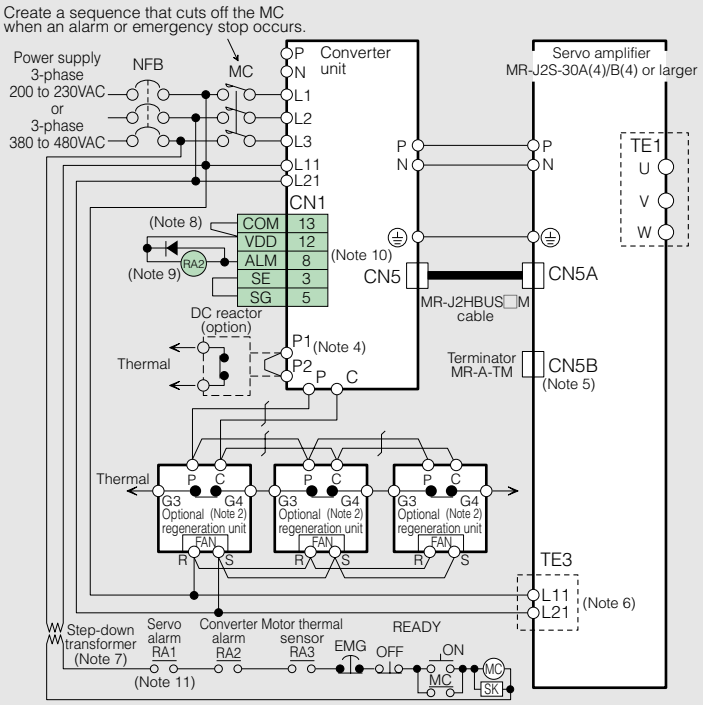
Standard Wiring Diagram

Main circuit/control circuit power supply connection examples

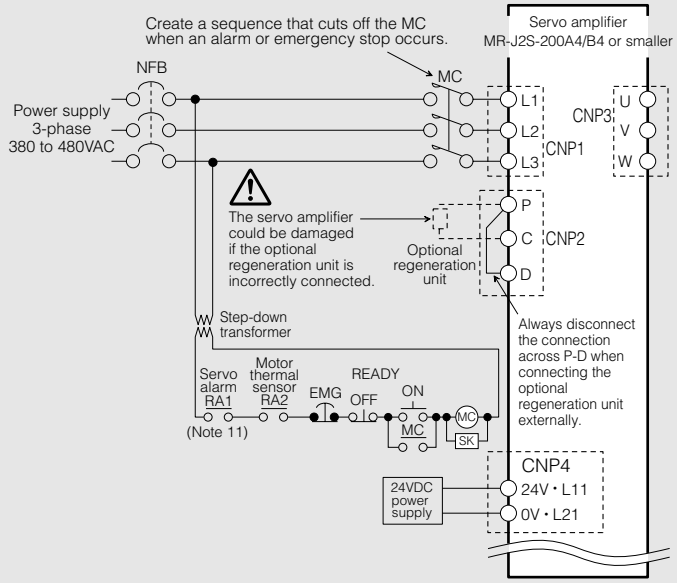
(5) 3-phase 200V and 3-phase 400V 11 to 22kW



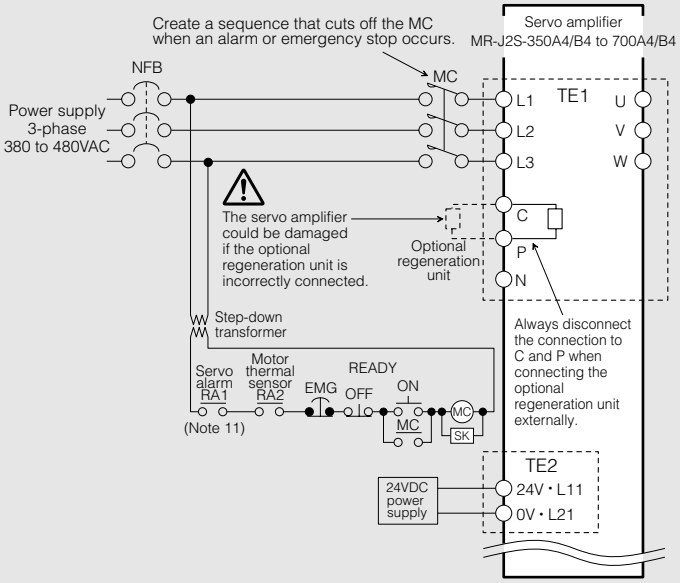
(6) 3-phase 200V and 3-phase 400V 30kW or larger



(7) 3-phase 400V 2kW or smaller



(8) 3-phase 400V 3.5 to 7kW

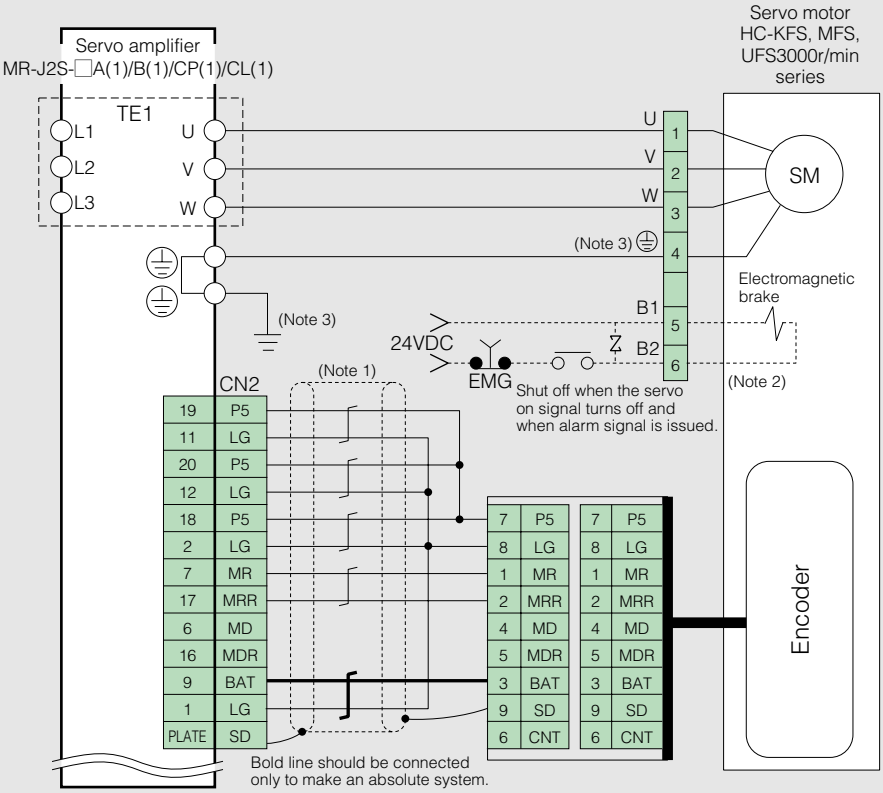


Notes:

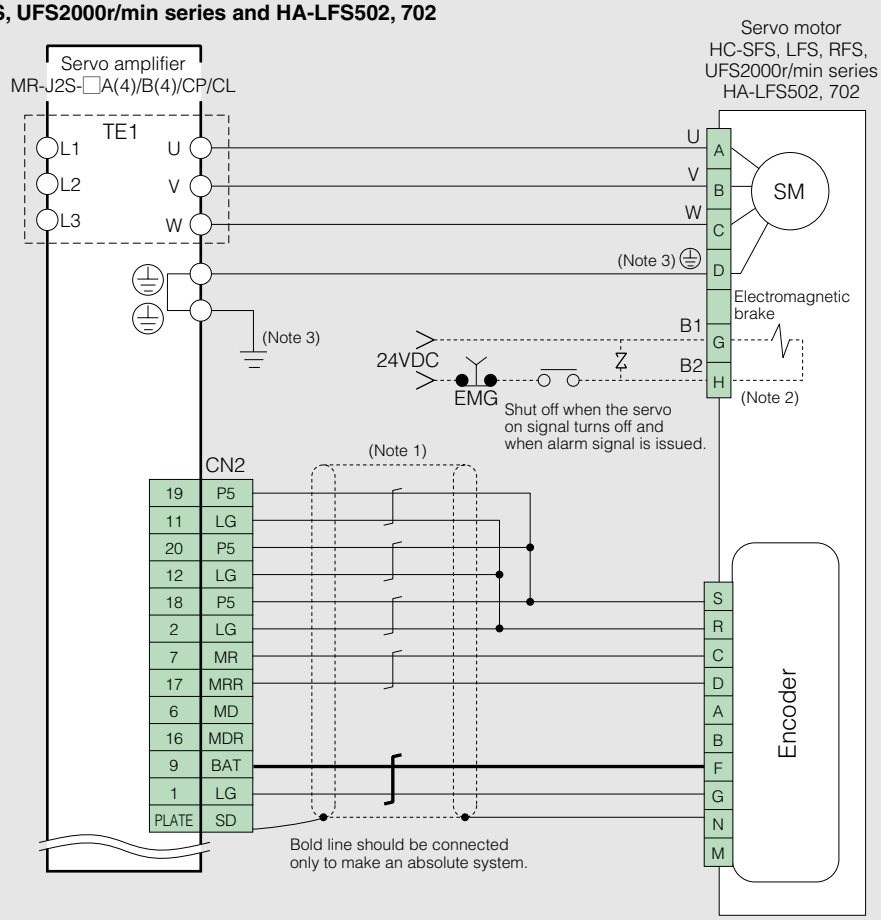
1. The 11kW or larger capacity does not have a built-in regenerative resistor.
2. This is for the MR-RB137 (for 200V) and MR-RB138-4 (for 400V). For the MR-RB137 and MR-RB138-4, one set contains three units (tolerable wattage 3900W).
3. Remove the short bar across P-P1 when using the DC reactor. Do not remove the short bar when using the optional regeneration unit.
4. Remove the short bar across P1-P2 when using the DC reactor. Do not remove the short bar when using the optional regeneration unit.
5. Always connect the terminator (MR-A-TM) to CN5B.
6. The phases of the power supply connected to L11 and L21 on the converter unit and servo amplifier must always match the phases connected to L1 and L2. An incorrect connection could damage the servo amplifier.
7. This is for the 400V. The 200V does not require a step-down transformer.
8. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
9. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
10. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
11. Create a sequence that cuts off the MC when a servo alarm occurs. Use the "Malfunction" output for the MR-J2S-A type, CP type or CL type.

Connector CN2 connection examples

(9) HC-KFS, MFS, UFS3000r/min series



(10) HC-SFS, LFS, RFS, UFS2000r/min series and HA-LFS502, 702

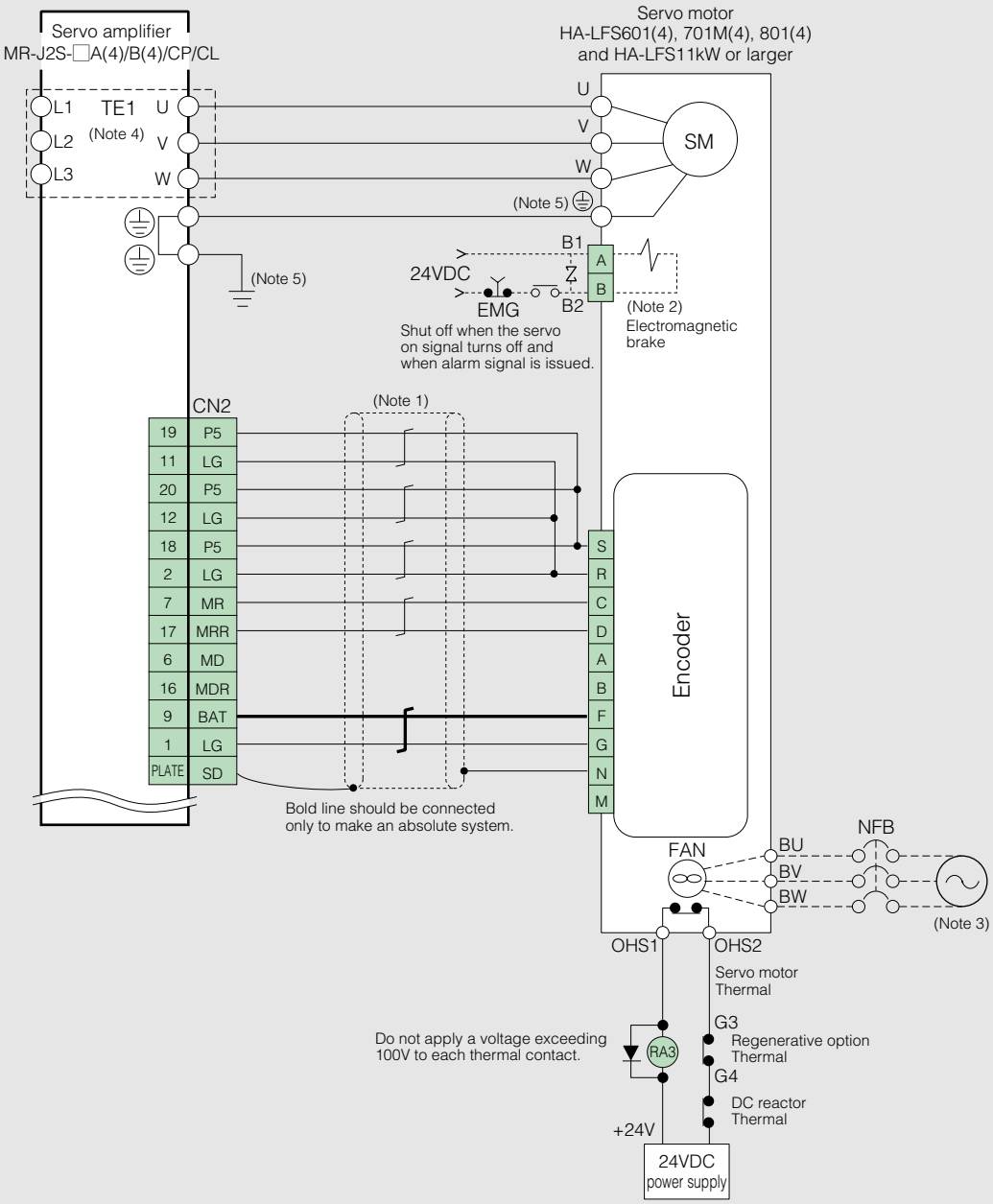


Notes:
1. Refer to "MR-J2S SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
2. This is for the motor with an electromagnetic brake. The polarity of the power supply connected to the electromagnetic brake is irrelevant.
   A separate connector from the motor power supply connector is prepared as an electromagnetic brake connector for the HC-SFS121B to 301B, 202(4)B to 702(4)B, 203B, 353B, HC-LFS202B, 302B, HC-UFS202B to 502B motors.
3. For grounding, connect the ground wire to the control box's protection ground terminal via the servo amplifier's protection ground (PE) terminal.

Standard Wiring Diagram

Connector CN2 connection examples

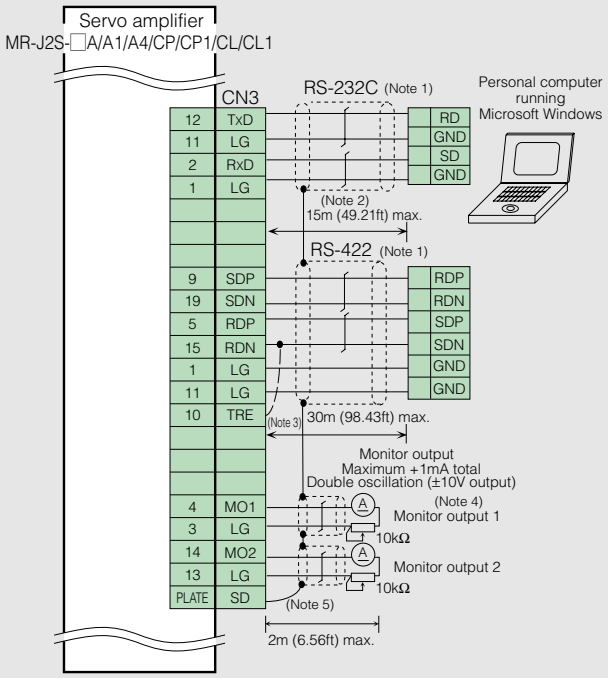
(11) HA-LFS601(4), 701M(4), 801(4) and HA-LFS11kW or larger



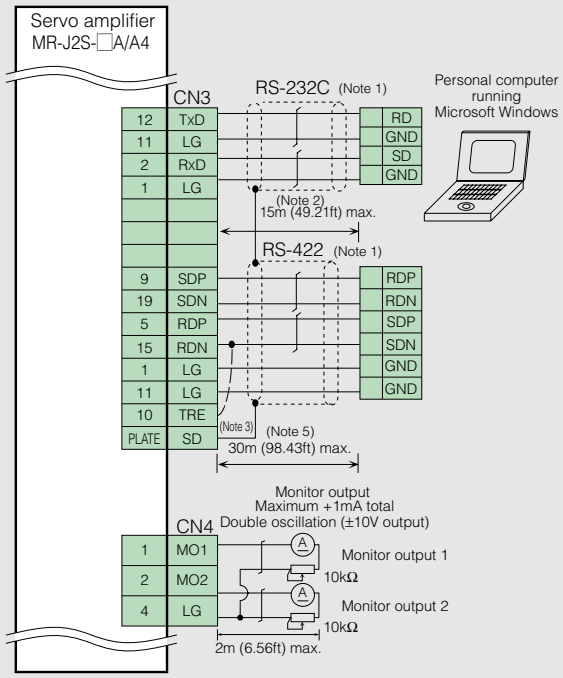
Notes:
1. Refer to "MR-J2S SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
2. This is for the motor with an electromagnetic brake. The polarity of the power supply connected to the electromagnetic brake is irrelevant.
   A separate connector from the motor power is prepared as an electromagnetic brake connector.
3. Always supply power to the fan terminal. The power supply differs according to the motor. Refer to "Cooling fan power supply" section under the Servo motor Specifications in this catalog, and supply the required power.
4. For the MR-J2S-30KA(4)/B(4) or larger, the terminal L1, L2 and L3 are attached to the converter unit.
5. For grounding, connect the ground wire to the control box's protection ground terminal via the servo amplifier's protection ground (PE) terminal.

Connector CN3/CN4 connection examples

(12) MR-J2S-700A (4)/CP/CL or smaller



(13) MR-J2S-11KA (4) or larger

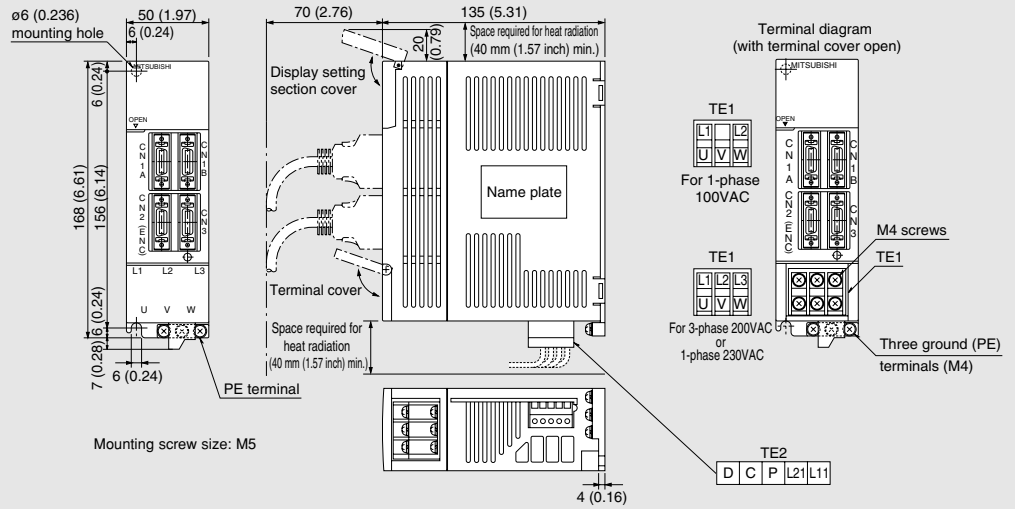


Notes:
1. RS-232C and RS-422 are mutually-exclusive features.
2. Always use a shielded multicore cable up to a maximum of 15m (49.21ft) in a low noise environment. However, if the RS-232C communication is set up with a baud rate of more than 38400bps, keep the cable length to within 3m (9.84ft).
3. In the final axis, connect between TRE and RDN.
4. Use the maintenance relay card (MR-J2CN3TM) when connecting the analog monitor output 1 (MO1), analog monitor output 2 (MO2) and a personal computer.
5. Connect the shield wire securely to the plate inside the connector (ground plate).

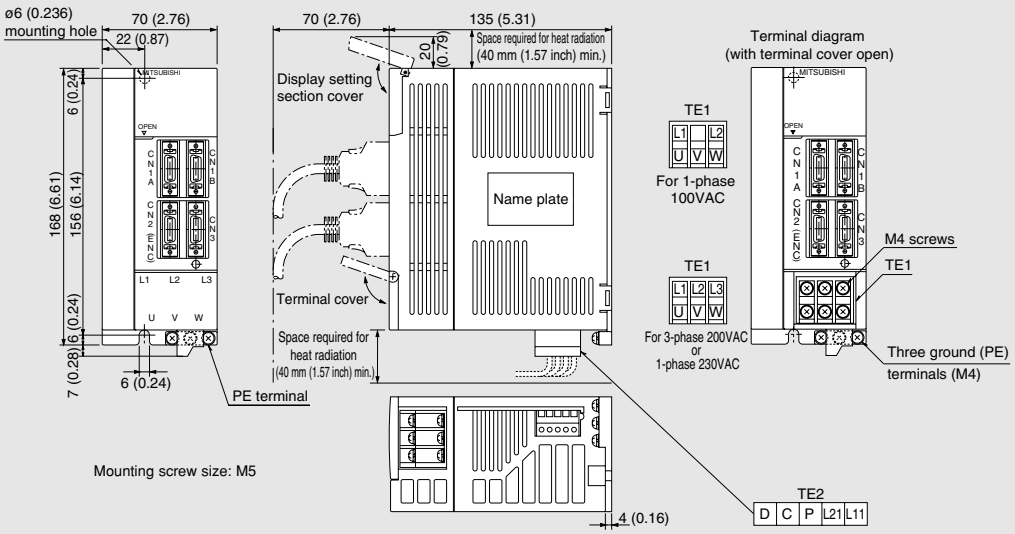
Amplifier Dimensions

●MR-J2S-10A/B/CP/CL, 20A/B/CP/CL, 10A1/B1/CP1/CL1, 20A1/B1/CP1/CL1 (Note 1)

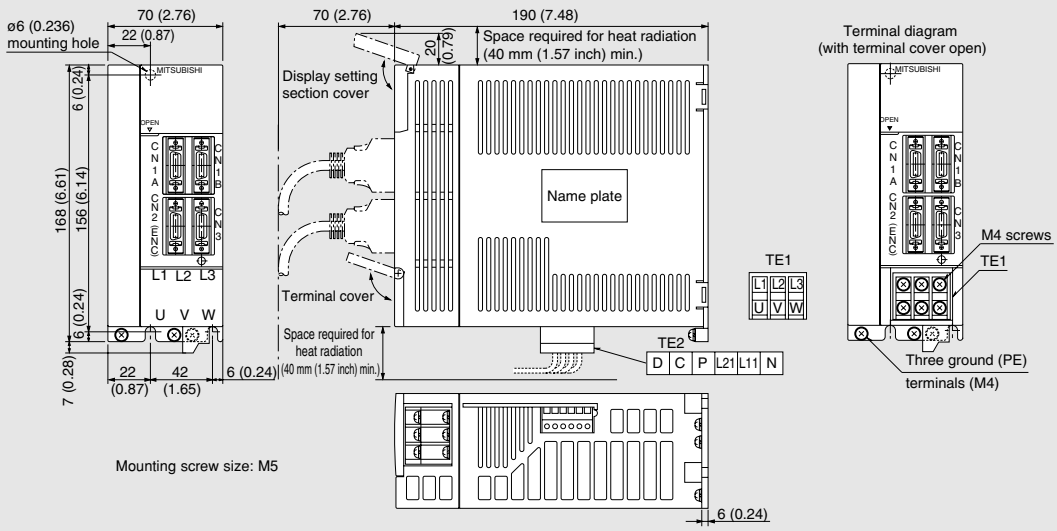
Unit: mm (inch)



●MR-J2S-40A/B/CP/CL, 60A/B/CP/CL, 40A1/B1/CP1/CL1 (Note 1)



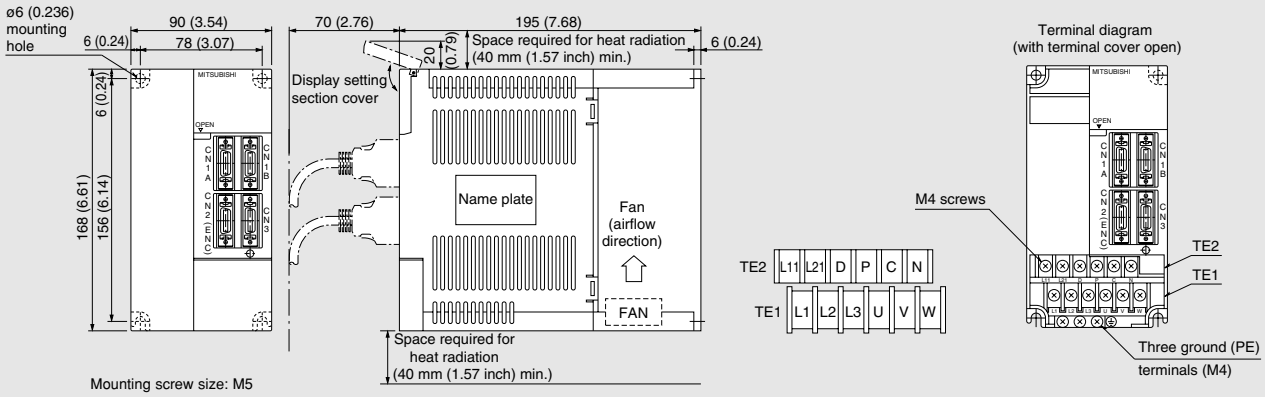
●MR-J2S-70A/B/CP/CL (-U□), 100A/B/CP/CL (Note 1)



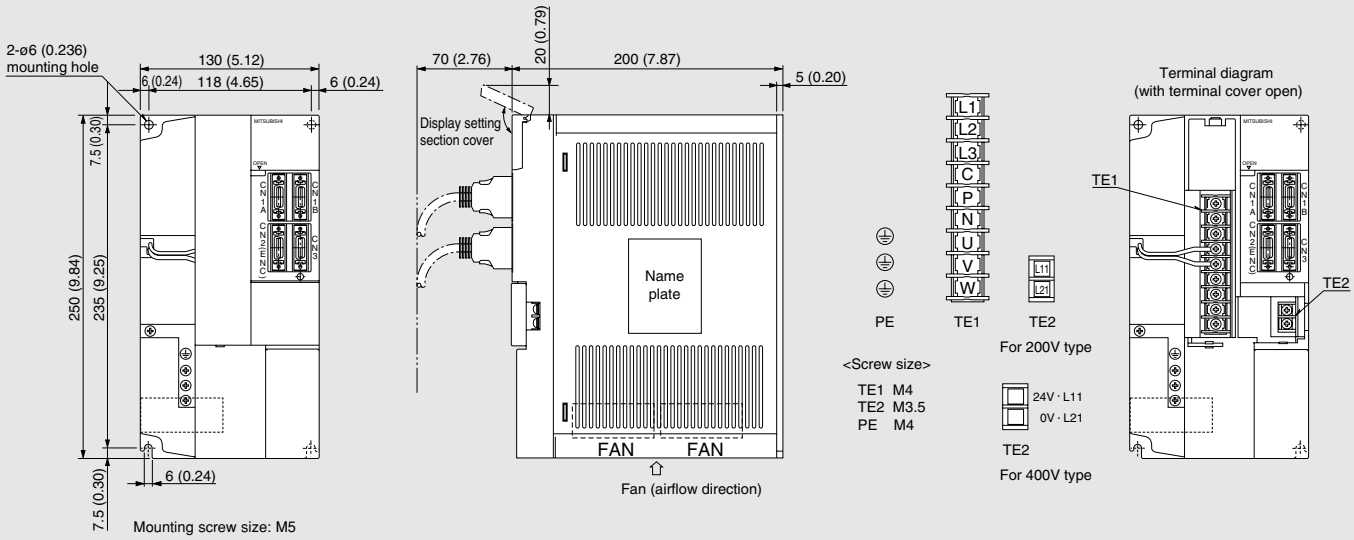
Note:
1. The outline drawings for the MR-J2S-□CP(1)-S084 are the same as the MR-J2S-□CP (1).

●MR-J2S-200A/B/CP/CL, 350A/B/CP/CL (Note 1)

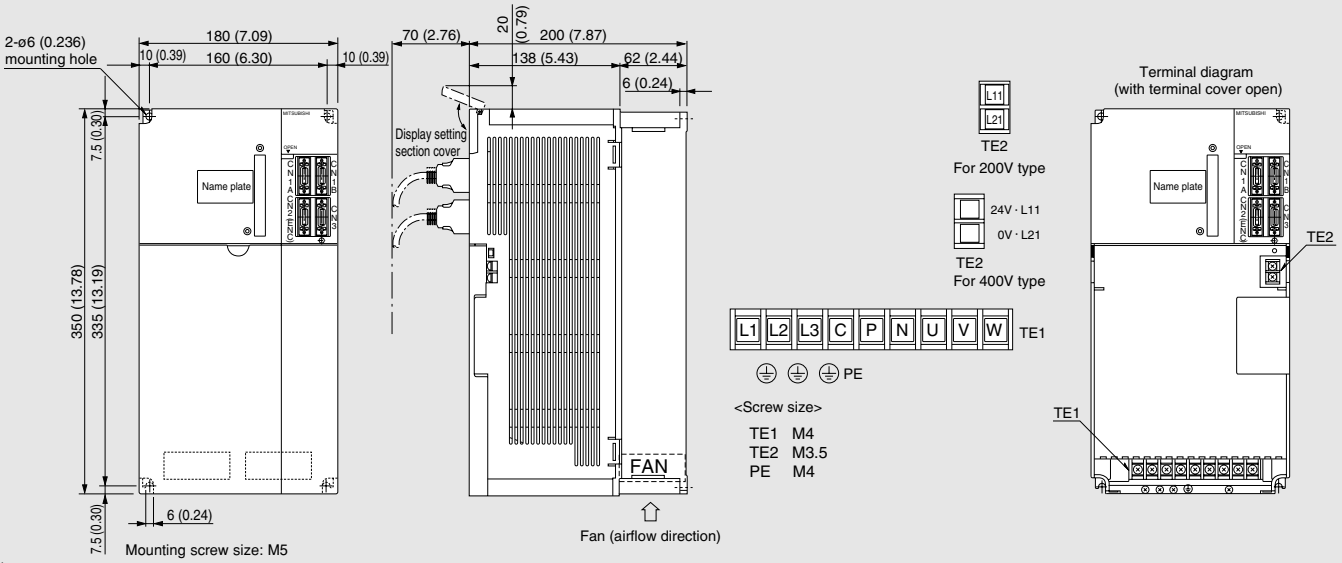
Unit: mm (inch)



●MR-J2S-500A/B/CP/CL (Note 1), 350A4/B4, 500A4/B4



●MR-J2S-700A/B/CP/CL (Note 1), 700A4/B4

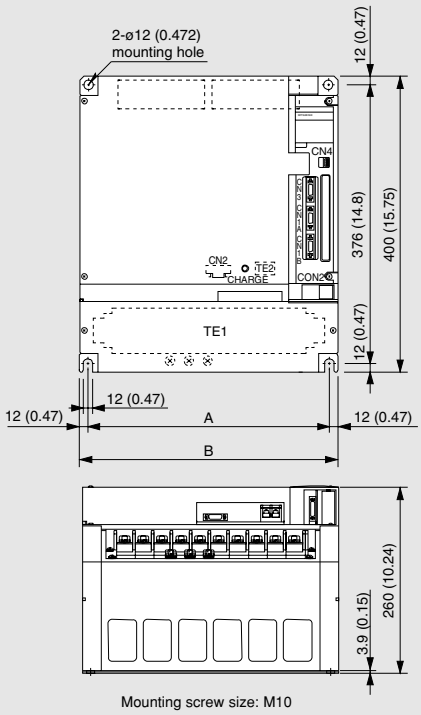


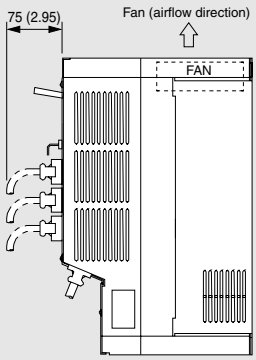
Note:
1. The outline drawings for the MR-J2S-□CP(1)-S084 are the same as the MR-J2S-□CP (1).

Amplifier Dimensions

●MR-J2S-11KA/B, 15KA/B, 22KA/B, 11KA4/B4, 15KA4/B4, 22KA4/B4

Unit: mm (inch)





Mounting screw size: M10

TE1

L1	L2	L3	U	V	W	P1	P	C	N

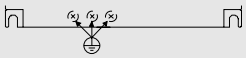
Screw size: M6 (For MR-J2S-11KA (4)/B (4) or MR-J2S-15KA (4)/B (4))
Screw size: M8 (For MR-J2S-22KA (4)/B (4))

TE2

L11	L21

Screw size: M4

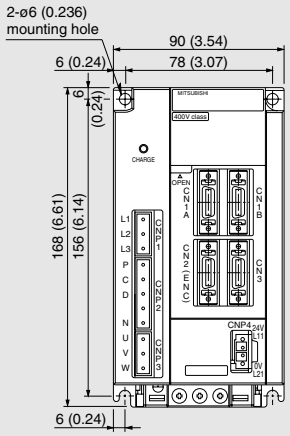
PE terminals



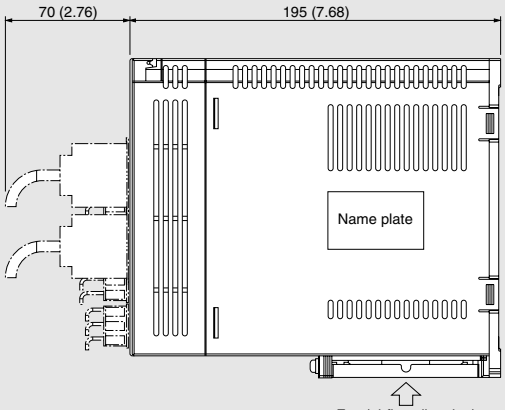
Screw size: M6 (For MR-J2S-11KA (4)/B (4) or MR-J2S-15KA (4)/B (4))
Screw size: M8 (For MR-J2S-22KA (4)/B (4))

Model	Variable dimensions	
	A	B
MR-J2S-11KA/B MR-J2S-15KA/B MR-J2S-11KA4/B4 MR-J2S-15KA4/B4	236 (9.29)	260 (10.24)
MR-J2S-22KA/B MR-J2S-22KA4/B4	326 (12.83)	350 (13.78)

●MR-J2S-60A4/B4, 100A4/B4, 200A4/B4



Mounting screw size: M5



CNP1

L1
L2
L3

CNP2

P
C
D
N

CNP3

U
V
W

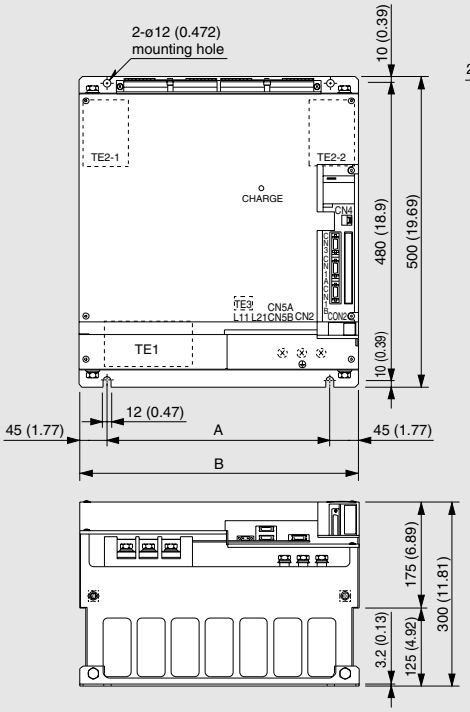
CNP4

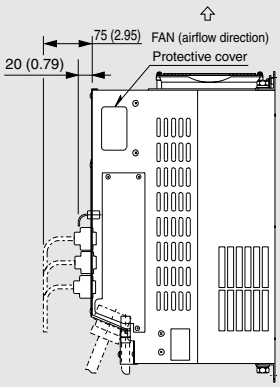
24V · L11
0V · L21

Note: The connector CNP1, CNP2, CNP3 and CNP4 are supplied with the amplifier.

●MR-J2S-30KA/B, 37KA/B, 30KA4/B4~55KA4/B4

Unit: mm (inch)





Mounting screw size: M10

TE1

U	V	W

Screw size: M10

TE3

L11	L21

Screw size: M3

TE2-1
TE2-2

P
N

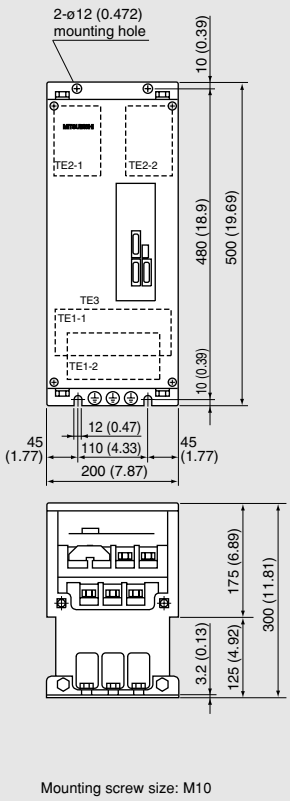
Screw size: M10

⏚ Screw size: M10

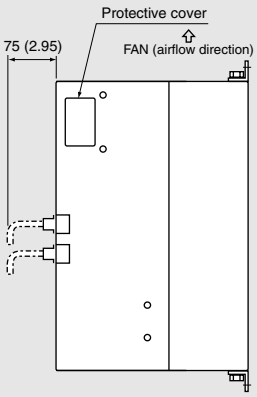
Model	Variable dimensions	
	A	B
MR-J2S-30KA4/B4	290 (11.42)	380 (14.96)
MR-J2S-30KA/B MR-J2S-37KA/B MR-J2S-37KA4/B4 MR-J2S-45KA4/B4 MR-J2S-55KA4/B4	360 (14.17)	450 (17.72)

●Converter unit MR-HP30KA, MR-HP55KA4

Unit: mm (inch)



Mounting screw size: M10



TE1-1

P1	P2	P	C

Screw size: M10

TE1-2

L1	L2	L3

Screw size: M10

TE2-1
TE2-2

P
N

Screw size: M10

TE3

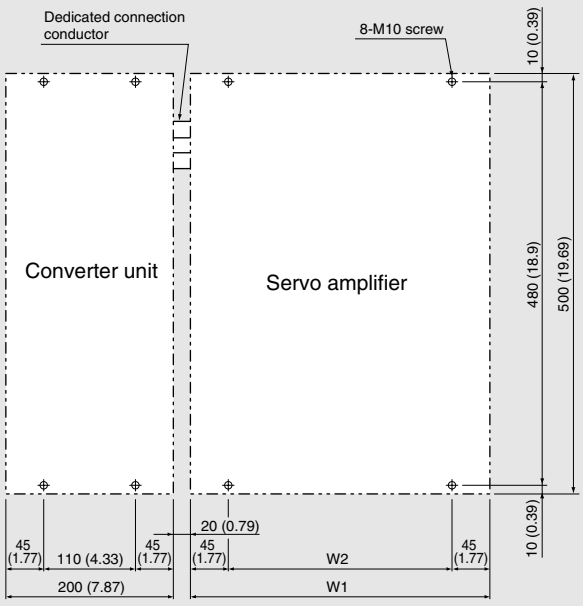
L11	L21

Screw size: M3

⏚ Screw size: M10

●Mounting dimensions

Unit: mm (inch)



Servo amplifier model	Variable dimensions	
	W1	W2
MR-J2S-30KA4/B4	380 (14.96)	290 (11.42)
MR-J2S-30KA/B, 37KA/B MR-J2S-37KA4/B4, 45KA4/B4 MR-J2S-55KA4/B4	450 (17.72)	360 (14.17)

Peripheral Equipment (MR-J2S-□B)

Connections with peripheral equipment

Peripheral equipment is connected to MR-J2S-B as described below.
Connectors, cables, options, and other necessary equipment are available so that users can set up MR-J2S-B easily and begin using it right away. Through its SSCNET-compatible one-touch connections, MR-J2S-B series reduce the number of wires and the chances of wiring errors.

Motion controllers

A171SH Max. 4-axis control
A172SH Max. 8-axis control
A173UH Max. 32-axis control

A273UH Max. 32-axis control

Q172 Max. 8-axis control
Q173 Max. 32-axis control

Positioning controllers

AD75M Max. 3-axis control
A1SD75M Max. 3-axis control
QD75M Max. 4-axis control

Controllers for the SSCNET are shown at left. Choose the unit that fits the size of your system.

Connector

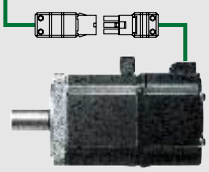
SSCNET

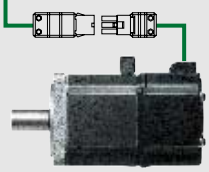
<With front cover open>

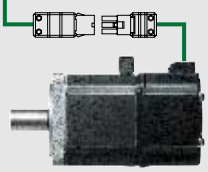
Servo amplifier MR-J2S-□B

CN1A
CN1B
CN2
CN3

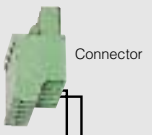
CN1A
CN1B







Connector



Servo motor

C
P

Optional regeneration unit (option)

Install this unit in situations involving frequent regeneration and large load inertia. Connect this unit referring to "Standard Wiring Diagram".

⚠Charge lamp

Illuminates when the main circuit power supply is ON. Do not plug/unplug power lines when this lamp is ON.

Personal computer

Battery compartment (option)

A battery (MR-BAT) is installed in the holder when your servo system is an absolute system.

Display panel

Displays servo amplifier status and alarm numbers.

Axis setting section

Used to select an axis.

Terminal connector (option)

CN1B for connecting SSCNET (Next)

Connects the next axis servo amplifier or terminal connector (MR-A-TM).

CN1A for connecting SSCNET (Previous)

Connects the controller for the SSCNET or the previous axis servo amplifier.

CN3 for RS-232C communication (option)

Connect the unit to user's personal computer to monitor conditions, display graphs, and perform test operation. MR Configurator (setup software) and dedicated cable are available also.

Note: Refer to page 34 for the connection with the peripheral device with the MR-J2S-350B or smaller.
Connect the MR-J2S-500B or larger and the MR-J2S-60B4 (400V type) or larger as shown in the standard connection diagram.

Servo Amplifier Specifications

MR-J2S-B (100V/200V) type

Servo amplifier model MR-J2S-			10B	20B	40B	60B	70B (-U□)	100B	200B	350B	500B	700B (-U□)	11KB	15KB	22KB	30KB	37KB (-U□)	10B1	20B1	40B1
Converter unit model			—													MR-HP30KA		—		
Servo amplifier	Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz															1-phase 100 to 120VAC 50/60Hz		
		Permissible voltage fluctuation	1-phase 170 to 253VAC															1-phase 85 to 127VAC		
		Permissible frequency fluctuation	±5% max.															±5% max.		
		Power consumption (W)	50															50		
	Main circuit power supply	Voltage/frequency (Note 1)	3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz (Note 2)					3-phase 200 to 230VAC 50/60Hz (Note 2)								The servo amplifier's main circuit power is supplied from the converter unit.		1-phase 100 to 120VAC 50/60Hz (Note 2)		
		Permissible voltage fluctuation	3-phase 200 to 230VAC:170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC										1-phase 85 to 127VAC		
		Permissible frequency fluctuation	±5% max.															±5% max.		
	Control system		Sine-wave PWM control/current control system																	
	Dynamic brake		Built-in (Note 3)										External option					Built-in (Note 3)		
	Safety features		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection																	
	Maximum command input at the position control		Approximately 10Mpps																	
	Structure		Self-cooling, open (IP00)						Fan cooling, open (IP00)									Self-cooling, open (IP00)		
	Environment	Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)																	
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)																	
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust																	
		Elevation	1000m (3280ft) or less above sea level																	
		Vibration	5.9m/s^2 max.																	
	Mass (kg [lb])		0.7 (1.5)	0.7 (1.5)	1.1 (2.4)	1.1 (2.4)	1.7 (3.7)	1.7 (3.7)	2.0 (4.4)	2.0 (4.4)	4.9 (10.8)	7.2 (15.9)	15 (33)	16 (35.3)	20 (44.1)	47 (103.5)	47 (103.5)	0.7 (1.5)	0.7 (1.5)	1.1 (2.4)
Converter unit	Main circuit power supply	Voltage/frequency (Note 1)	—													3-phase 200 to 230VAC 50/60Hz (Note 2)		—		
		Permissible voltage fluctuation	—													3-phase 170 to 253VAC 50/60Hz		—		
		Permissible frequency fluctuation	—													±5% max.		—		
	Control circuit power supply	Voltage/frequency	—													1-phase 200 to 230VAC 50/60Hz		—		
		Permissible voltage fluctuation	—													1-phase 170 to 253VAC 50/60Hz		—		
		Permissible frequency fluctuation	—													±5% max.		—		
		Power consumption (W)	—													50		—		
	Mass (kg [lb])		—													22 (48.5)		—		

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics when combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.
3. For products without a dynamic brake (MR-J2S-□B-ED or MR-J2S-□B1-ED), special compliance is possible.

Servo Amplifier Specifications

MR-J2S-B (400V) type

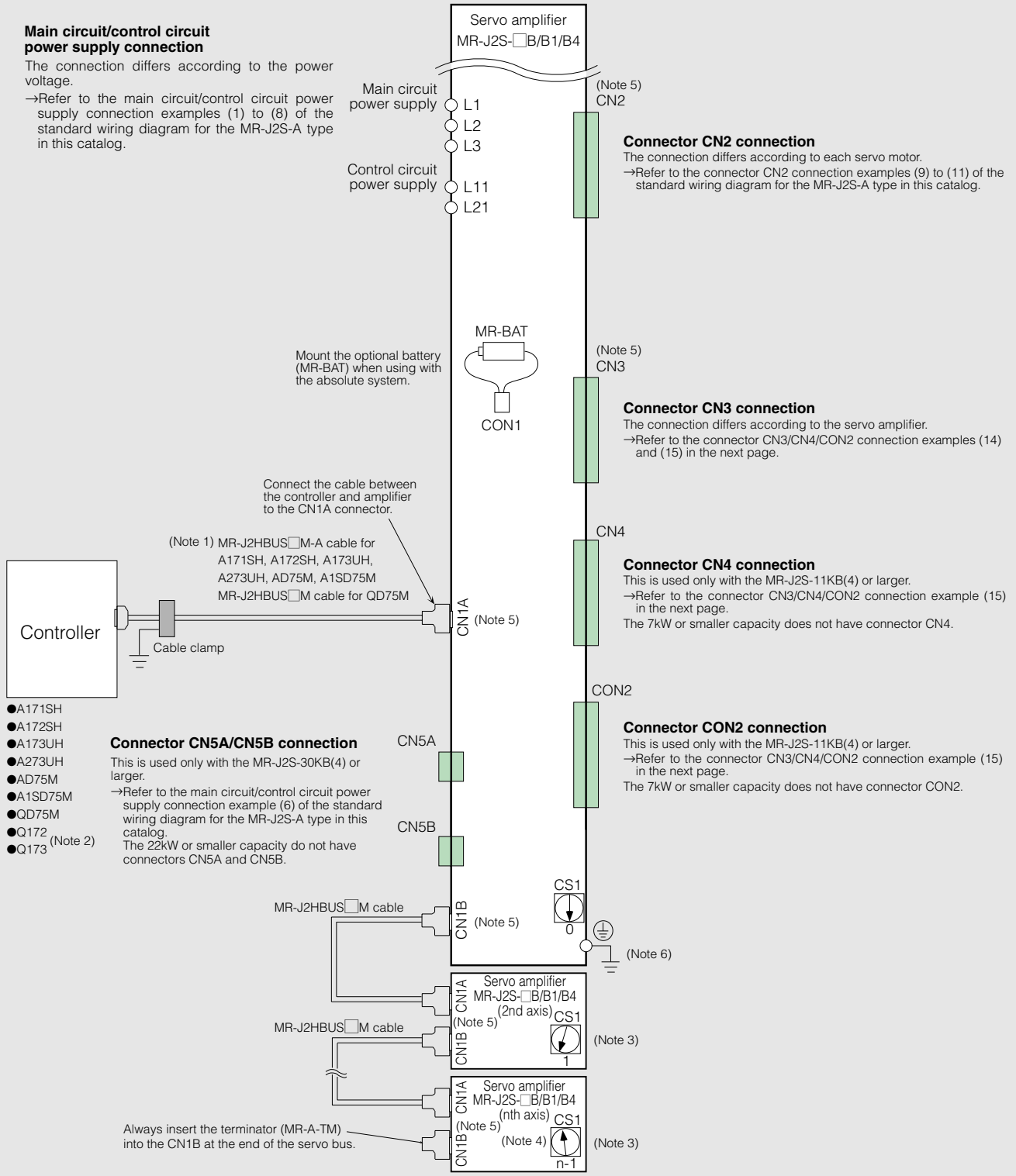
Servo amplifier model MR-J2S-			60B4	100B4	200B4	350B4	500B4	700B4 (-U□)	11KB4 (-U□)	15KB4 (-U□)	22KB4 (-U□)	30KB4 (-U□)	37KB4 (-U□)	45KB4	55KB4
Converter unit model			—									MR-HP55KA4			
Servo amplifier	Control circuit power supply	Voltage/frequency	24VDC						1-phase 380 to 480VAC 50/60Hz						
		Permissible voltage fluctuation	20.4 to 27.6VDC						1-phase 323 to 528VAC						
		Permissible frequency fluctuation	—						±5% max.						
		Power consumption (W)	25						50						
	Main circuit power supply	Voltage/frequency (Note 1)	3-phase 380 to 480VAC 50/60Hz (Note 2)									The servo amplifier's main circuit power is supplied from the converter unit.			
		Permissible voltage fluctuation	3-phase 323 to 528VAC												
		Permissible frequency fluctuation	±5% max.												
	Control system		Sine-wave PWM control/current control system												
	Dynamic brake		Built-in						External option						
	Safety features		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection												
	Maximum command input at the position control		Approximately 10Mpps												
	Structure		Self-cooling, open (IP00)	Fan cooling, open (IP00)											
	Environment	Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)												
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)												
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust												
		Elevation	1000m (3280ft) or less above sea level												
		Vibration	5.9m/s^2 max.												
	Mass (kg [lb])		2.1 (4.6)	2.2 (4.8)	2.2 (4.8)	5 (11)	5 (11)	7.2 (15.9)	15 (33)	16 (35.3)	20 (44.1)	36 (79.3)	47 (103.5)	47 (103.5)	47 (103.5)
Converter unit	Main circuit power supply	Voltage/frequency (Note 1)	—									3-phase 380 to 480VAC 50/60Hz (Note 2)			
		Permissible voltage fluctuation	—									3-phase 323 to 528VAC 50/60Hz			
		Permissible frequency fluctuation	—									±5% max.			
	Control circuit power supply	Voltage/frequency	—									1-phase 380 to 480VAC 50/60Hz			
		Permissible voltage fluctuation	—									1-phase 323 to 528VAC 50/60Hz			
		Permissible frequency fluctuation	—									±5% max.			
		Power consumption (W)	—									50			
	Mass (kg [lb])		—									22 (48.5)			

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics when combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.

Standard Wiring Diagram

MR-J2S-□B (1)/MR-J2S-□B (4) type

● Connection

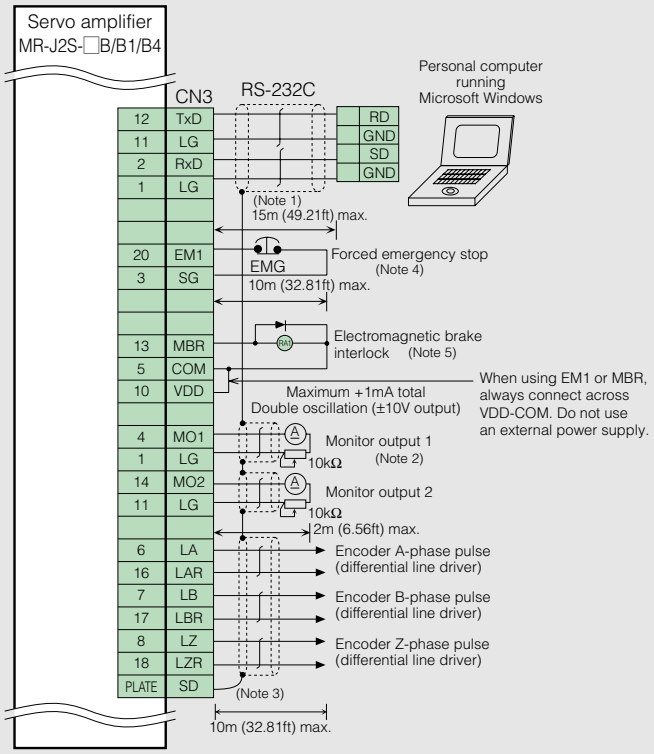


Notes:
1. The total length of the MR-J2HBUS□M-A and MR-J2HBUS□M cable must be kept to within 30m (98.43ft). Using a cable clamp or data line filter (three or four connected in serial) near the connector lead-out port is recommended to increase noise resistance.
2. Refer to "MOTION CONTROLLER Q SERIES (L(NA)03014)" for details on the cable connected between Q172/Q173 and the amplifier.
3. The motor side connections for the second and following axes are omitted from the above diagram.
4. Up to eight axes (n=1 to 8) can be connected. The MR-H□BN type servo can also be connected to the same bus. (Note that the cable differs in this case.)
5. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
6. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

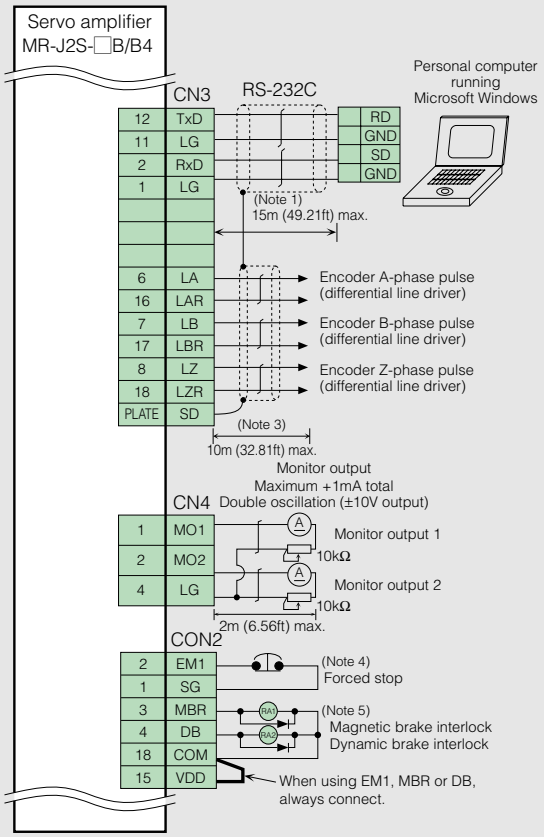
Standard Wiring Diagram

Connector CN3/CN4/CON2 connection examples

(14) MR-J2S-700B(4) or smaller



(15) MR-J2S-11KB(4) or larger



Notes:
1. Always use a shielded multicore cable up to a maximum of 15m (49.21ft) in a low noise environment. However, if the RS-232C communication is set up with a baud rate of more than 38400bps, keep the cable length to within 3m (9.84ft).
2. Use the maintenance relay card (MR-J2CN3TM) when connecting the analog monitor output 1 (MO1), analog monitor output 2 (MO2) and a personal computer.
3. Connect the shield wire securely to the plate inside the connector (ground plate).
4. Independent forced emergency stop for each servo amplifier of each axis. Use this as necessary when AD75M, A1SD75M, QD75M, Q172 or Q173 is connected. Do not use this when A171SH, A172SH, A173UH or A273UH is connected. When not used, please cancel forced emergency stop input with the parameter No.23, or short-circuit EM1-SG in the connector. Please execute overall system emergency stop on controller's side.
5. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output.

Features/System Configuration (MR-J2S-□CP)

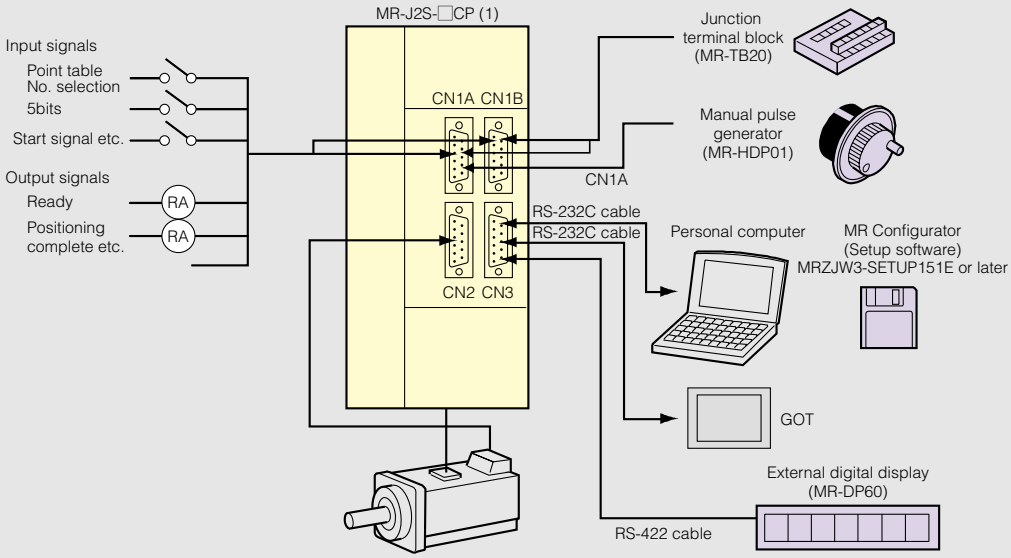
Features

- **Settings such as position data (target positions), motor speed, and acceleration/deceleration times can be set in a point table with the feel of parameters.**
- **You can position using DI/O easily.**
- **Allows multi-drop operation (up to 32 axes) using RS-422 serial communications.**

System configuration

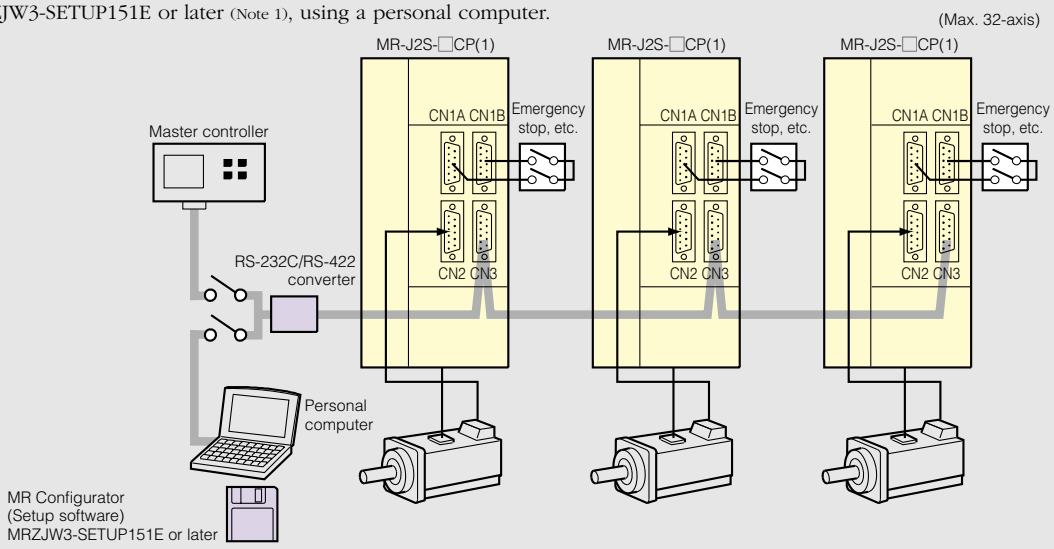
Simple positioning using DI/O

Positioning operation is executed using built in digital I/O while monitoring with a personal computer.



Serial communication operation by RS-422

Connecting servo amplifiers in the multi-drop configuration to perform positioning operation.
Each servo amplifier can be started from the master controller. The RS-422 protocol communication specifications have been released, so the user can create a program. The monitor and parameter settings can be made with the MR Configurator (setup software), MRZJW3-SETUP151E or later (Note 1), using a personal computer.

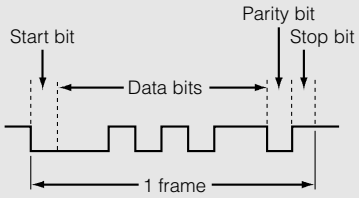


Note:1. The external digital display (MR-DP60) cannot be used for serial communication operation based on RS-422 or RS-232C.

Communications specifications

The RS-422 (RS-232C) specifications are as follows.

- Baud rate : 9600, 19200, 38400 or 57600 asynchronous.
- Transfer code : 1 start bit, 8 data bits, 1 parity bit, 1 stop bit.
- Transfer protocol : Character system, half-duplex communication.



Peripheral Equipment (MR-J2S-□CP)

Connections with peripheral equipment

Peripheral equipment is connected to the MR-J2S-CP as described below.
Connectors, options, and other necessary equipment are available so that users can set up the MR-J2S-CP easily and begin using it right away.

Power supply
3-phase 200-230VAC
or
1-phase 230VAC (Note 1)

Circuit breaker (NFB)
Used to protect the power supply line.

Magnetic contactor (MC)
Used to turn off the servo amplifier's power when an alarm has been triggered.

Power factor improvement reactor (FR-BAL)

R S T
X Y Z
L1
L2
L3
L11
L21

Battery compartment (option)
A battery (MR-BAT) is installed in the holder when your servo system is an absolute system. Not required when your servo system is an incremental system.

Display panel
Displays monitoring data, parameters, and alarms.

Setting section
Parameter settings and monitoring etc. are executed with push buttons.

Servo amplifier MR-J2S-□CP (Note 4)

Control signal connector
CN1A
CN1B
CN2
CN3
CHARGE
U V W
TE2
D
C
P

Control signal (option)
Junction terminal block (MR-TB20)
All signals can be recieved easily at this terminal block without a connection to CN1A or CN1B.

(Note 3)
Manual pulse generator (MR-HDP01)

(Note 2)
CN3 for RS-232C communication (option)
MR Configurator (Setup software)
MRZJW3-SETUP 151E or later

The cable "MR-CPCATCBL3M" is required.

(Note 2)
CN3 for RS-422 communication (option)
External digital display (MR-DP60)

⚠Charge lamp
Illuminates when the main circuit power supply is ON. Do not plug/unplug power lines when this lamp is ON.

Type 3 ground or above

<With front cover open>

Optional regeneration unit (option)
Install this unit in situations involving frequent regeneration and large load inertia moments. Connect this unit referring to "Standard Wiring Diagram".

HC-□FS servo motor and encoder
(Above picture is HC-KFS23.)

Notes: 1. If a 1-phase power supply (230VAC) is used, please connect it to terminals L1 and L2. Nothing should be connected to L3.
2. RS-232C and RS-422 are mutually-exclusive features. RS-422 communication is possible with parameter switching.
The RS-422 communication cable can be made by using the optional CN1 connector (MR-J2CN1).
3. The manual pulse generator cable can be made by using the optional CN1 connector (MR-J2CN1).
4. The connection with the peripheral devices shown above is for the MR-J2S-350CP or smaller. Connect the MR-J2S-500CP or larger as shown in the standard connection diagram.

Servo Amplifier Specifications

MR-J2S-CP type

Servo amplifier model MR-J2S-			10CP	20CP	40CP	60CP	70CP (-U□)	100CP	200CP	350CP	500CP	700CP (-U□)	10CP1	20CP1	40CP1
Power supply		Voltage/frequency (Note 1)	3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz (Note 2)					3-phase 200 to 230VAC 50/60Hz (Note 2)					1-phase 100 to 120VAC 50/60Hz (Note 2)		
		Permissible voltage fluctuation	3-phase 200 to 230VAC: 170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC					1-phase 85 to 127VAC		
		Permissible frequency fluctuation	±5% max.												
Control system			Sine-wave PWM control/current control system												
Dynamic brake			Built-in (Note 3)												
Safety features			Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection												
Command method	Input point table number	Operating specification	Positions according to the specification of the point table No. (31 points)												
		Input positioning command	Set in point table. Feed length for 1 point settable between ±1μm and ±999.999mm.												
		Input speed command	Set in point table. Acceleration/deceleration time constant is set in point table. S-pattern acceleration/deceleration time constant is set by parameter 14.												
		System	Signed absolute value command system, increment value command system, signed absolute value command/incremental value command specification system.												
	Input position data	Operating specification	Positioning by RS-422 (RS-232C) communication data.												
		Input positioning command	Setting by RS-422 (RS-232C) communication. Feed length for 1 point settable between ±1μm and ±999.999mm.												
		Input speed command	Setting by RS-422 (RS-232C) communication. Acceleration/deceleration time constant also set by RS-422 (RS-232C) communication. S-pattern acceleration/deceleration time constant is set by parameter 14.												
		System	Signed absolute value command system, increment value command system, signed absolute value command/incremental value command specification system.												
Operating mode	Automatic operation mode	Point table	Point table number input and position data input system. Each positioning operation based on position and speed commands.												
		Automatic continuous operation	Speed changing operation (2 to 31 speeds), automatic continuous positioning operation (2 to 31 points)												
	Manual operation mode	JOG	Inches upon contact input or RS-422 (RS-232C) communication based on speed commands set by a parameter.												
		Manual pulse generator	Manual feed by manual pulse generator. Command pulse ratio: Selectable ×1, ×10, or ×100 by the parameter.												
	Manual home position return mode	Dog system	Returns to home position upon Z phase pulse count after passing through near-point dog. Selectable direction for return to home position, settable home position shift and settable home position address. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Count system	Returns to home position upon sensor pulse count after touching near-point dog. Selectable direction for return to home position, settable home position shift and settable home position address. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Data set system	Returns to home position without dog. Set any position as the home position using manual operation or the like. Settable home position address.												
		Impact system	Returns to home position upon hitting end of stroke. Selectable direction for return to home position. Settable home position address.												
		Ignore home (Servo-on position as home position)	Uses position where the servo on signal (SON) becomes ON as home position. Settable home position address.												
		Dog system rear end reference	Returns to home position with respect to the rear end of a near-point dog. Selectable direction for return to home position, settable home position address and settable home position shift. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Count system front end reference	Returns to home position with respect to the front end of a near-point dog. Selectable direction for return to home position, settable home position address and settable home position shift. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Dog cradle system	Returns to home position with respect to the front end of a near-point dog by the first Z-phase pulse. Selectable direction for return to home position, settable home position address and settable home position shift. Automatic retreat on dog back to home position and automatic stroke retreat function.												
Structure			Self-cooling, open (IP00)						Fan cooling, open (IP00)				Self-cooling, open (IP00)		
Environment		Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)												
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)												
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust												
		Elevation/vibration	1000m (3280ft) or less above sea level/5.9m/s^2 max.												
Mass (kg [lb])			0.7 (1.5)	0.7 (1.5)	1.1 (2.4)	1.1 (2.4)	1.7 (3.7)	1.7 (3.7)	2.0 (4.4)	2.0 (4.4)	4.9 (10.8)	7.2 (15.9)	0.7 (1.5)	0.7 (1.5)	1.1 (2.4)

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics when combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.
3. For products without a dynamic brake (MR-J2S-□CP-ED or MR-J2S-□CP1-ED), special compliance is possible.

Command Method

MR-J2S-CP (built-in positioning function) command method

The following two types of command methods are available.

Input point table number	Operating specification	Positions according to the specification of the point table No. (31 points)
	Input positioning command	Set in point table. Feed length for 1 point settable between ±1μm and ±999.999mm.
	Input speed command	Set in point table. Acceleration/deceleration time is set in point table. S-curve acceleration/deceleration constant is set by parameter 14.
	System	Signed absolute value command system, increment value command system, signed absolute value command/incremental value command specification system.
Input position data	Operating specification	Positioning by RS-422 (RS-232C) communication data.
	Input positioning command	Setting by RS-422 (RS-232C) communication. Feed length for 1 point settable between ±1μm and ±999.999mm.
	Input speed command	Setting by RS-422 (RS-232C) communication. Acceleration/deceleration time also set by RS-422 (RS-232C) communication. S-curve acceleration/deceleration constant is set by parameter 14.
	System	Signed absolute value command system, increment value command system, signed absolute value command/incremental value command specification system.

Point table: The following three types of point tables are available.

(1) Absolute value command method: The axis moves to the address (absolute value) based on the home position.

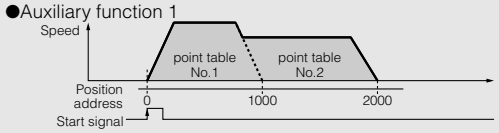
Item	Setting range	Unit	Description
Position data	–999999 to 999999	$\times10^{STM}$μm	Sets the address. STM is the ratio to the data.
Servo motor speed	0 to permissible	r/min	Sets the command speed for the servo motor used for positioning.
Acceleration time constant	0 to 20000	ms	Sets the acceleration time constant.
Deceleration time constant	0 to 20000	ms	Sets the deceleration time constant.
Dwell time	0 to 20000	ms	Runs the next point table after the set dwell time.
Auxiliary function	0 to 1	—	0: Positions and stops (waits for start signal). 1: Continues operation for the next point table without stopping.

(Example of setting (1) point table data)

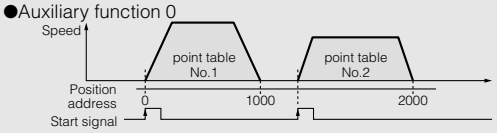
Point table No.	Position data	Servo motor speed	Acceler-ation time constant	Deceler-ation time constant	Dwell time	Auxiliary function
1	1000	2000	200	200	0	1
2	2000	1600	100	100	0	0
:	:	:	:	:	:	:
31	-1000	3000	100	100	0	0

If the point table No.1's auxiliary function is 1, continuous positioning is carried out based on the point table as shown in the "●Auxiliary function 1" below.
If the point table No.1's auxiliary function is 0, a start signal must be issued as shown in "●Auxiliary function 0" below.

●Auxiliary function 1



●Auxiliary function 0



(2) Incremental value command method: The axis moves from the current value according to the set position data

Item	Setting range	Unit	Description
Position data	0 to 999999	$\times10^{STM}$μm	Set the movement amount.
Servo motor speed	0 to permissible	r/min	Sets the command speed for the servo motor used for positioning.
Acceleration time constant	0 to 20000	ms	Sets the acceleration time constant.
Deceleration time constant	0 to 20000	ms	Sets the deceleration time constant.
Dwell time	0 to 20000	ms	Runs the next point table after the set dwell time.
Auxiliary function	0 to 1	—	0: Positions and stops (waits for start signal). 1: Continues operation for the next point table without stopping.

(Example of setting (2) point table data)

Point table No.	Position data	Servo motor speed	Acceler-ation time constant	Deceler-ation time constant	Dwell time	Auxiliary function
1	1000	2000	200	200	0	1
2	1000	1600	100	100	0	0
:	:	:	:	:	:	:
31	500	3000	100	100	0	0

If the point table No.1's auxiliary function is 1, continuous positioning is carried out based on the point table as shown in the "●Auxiliary function 1" above.
If the point table No.1's auxiliary function is 0, a start signal must be issued as shown in "●Auxiliary function 0" above.

(3) Absolute value command/incremental command designation method: The absolute value and incremental value are designated with the point table.

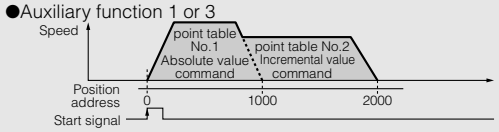
Item	Setting range	Unit	Description
Position data	–999999 to 999999	$\times10^{STM}$μm	• **Using as the absolute value command method** Sets the address. STM is the ratio to the data. • **Using as the incremental value command method** Set the movement amount. STM is the ratio to the data.
Servo motor speed	0 to permissible	r/min	Sets the command speed for the servo motor used for positioning.
Acceleration time constant	0 to 20000	ms	Sets the acceleration time constant.
Deceleration time constant	0 to 20000	ms	Sets the deceleration time constant.
Dwell time	0 to 20000	ms	Runs the next point table after the set dwell time.
Auxiliary function	0 to 3	—	• **Using as the absolute value command method** 0: Positions and stops (waits for start signal). 1: Continues operation for the next point table without stopping. • **Using as the incremental value command method** 2: Positions and stops (waits for start signal). 3: Continues operation for the next point table without stopping.

(Example of setting (3) point table data)

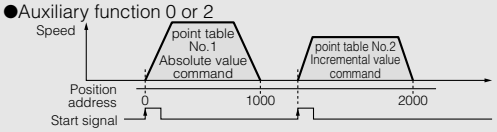
Point table No.	Position data	Servo motor speed	Acceler-ation time constant	Deceler-ation time constant	Dwell time	Auxiliary function
1	1000	2000	200	200	0	1
2	1000	1600	100	100	0	2
:	:	:	:	:	:	:
31	3000	3000	100	100	0	2

If the point table No.1's auxiliary function is 1 or 3, continuous positioning is carried out based on the point table as shown in the "●Auxiliary function 1 or 3" below.
If the point table No.1's auxiliary function is 0 or 2, a start signal must be issued as shown in "●Auxiliary function 0 or 2" below.

●Auxiliary function 1 or 3



●Auxiliary function 0 or 2

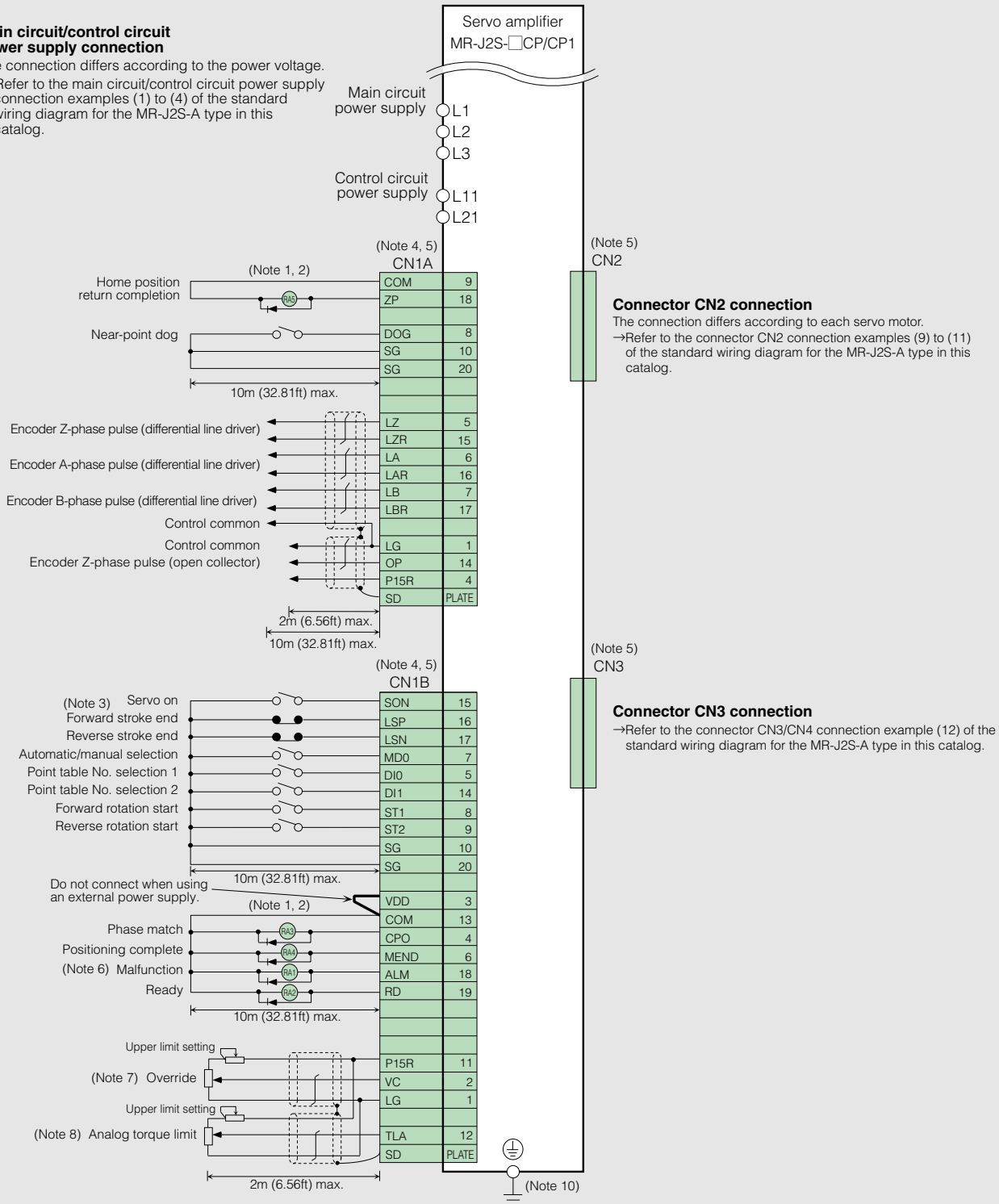


Standard Wiring Diagram

MR-J2S-□CP (1) type

● Connection

Main circuit/control circuit power supply connection
The connection differs according to the power voltage.
→Refer to the main circuit/control circuit power supply connection examples (1) to (4) of the standard wiring diagram for the MR-J2S-A type in this catalog.



Notes:
1. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
2. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
3. LSP and LSN contacts must be closed for normal operation. If they are not closed, the commands will not be accepted.
4. Signals with the same name are connected inside.
5. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
6. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
7. If using the override (VC), make the override selection (OVR) device available.
8. If using the analog torque limit (TLA), make the external torque limit selection (TL) device available.
9. Connect the shield wire securely to the plate inside the connector (ground plate).
10. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

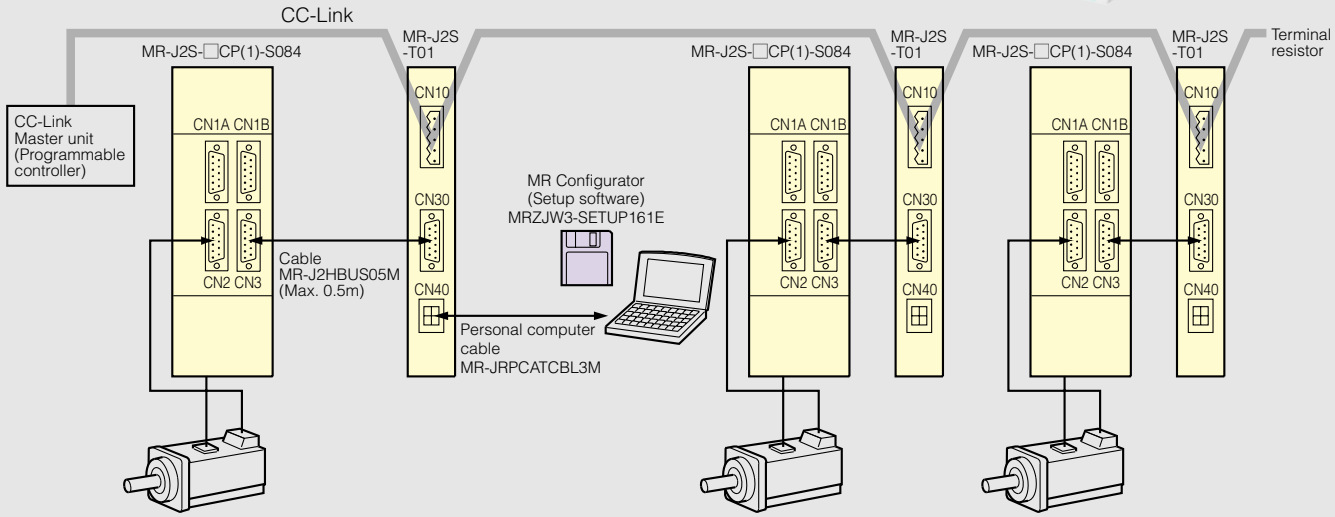
Features/Specifications (MR-J2S-□CP-S084)

By using the CC-Link compatible servo amplifier "MR-J2S-□CP-SO84" and interface unit "MR-J2S-TO1", positioning can be carried out just with simple point table settings. The AC servo can be used as the field network's drive source.

Features

- **Using the servo amplifier with built-in positioning function, the position data and speed data, etc. can be set via the CC-Link.**
- **Starting, stopping and monitor displays can also be communicated via CC-Link.**
- **Serial communication reduces wiring.**
- **An AC servo distributed control system can be easily structured.**

System configuration



Specifications (MR-J2S-CP-S084)

Servo amplifier model MR-J2S-		10CP -S084	20CP -S084	40CP -S084	60CP -S084	70CP -S084 (-U□)	100CP -S084	200CP -S084	350CP -S084	500CP -S084	700CP -S084 (-U□)	10CP1 -S084	20CP1 -S084	40CP1 -S084
Power supply	Voltage/frequency (Note 1)	3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz (Note 2)					3-phase 200 to 230VAC 50/60Hz (Note 2)					1-phase 100 to 120VAC 50/60Hz (Note 2)		
	Permissible voltage fluctuation	3-phase 200 to 230VAC: 170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC					1-phase 85 to 127VAC		
	Permissible frequency fluctuation	±5% max.												
Control system		Sine-wave PWM control/current control system												
Dynamic brake		Built-in												
Safety features		Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection												
Structure		Self-cooling, open (IP00)						Fan cooling, open (IP00)				Self-cooling, open (IP00)		
Environment	Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)												
	Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)												
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust												
	Elevation	1000m (3280ft) or less above sea level												
	Vibration	5.9m/s^2 max.												
Mass (kg [lb])		0.7 (1.5)	0.7 (1.5)	1.1 (2.4)	1.1 (2.4)	1.7 (3.7)	1.7 (3.7)	2.0 (4.4)	2.0 (4.4)	4.9 (10.8)	7.2 (15.9)	0.7 (1.5)	0.7 (1.5)	1.1 (2.4)

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics when combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.

Specifications (MR-J2S-T01)

The CC-Link interface unit is compatible only with the MR-J2S-CP-S084 type.

CC-Link interface unit model			MR-J2S-T01				
Power supply			5VDC supplied from servo amplifier				
CC-Link	Compatible CC-Link version		Ver. 1.10				
	Compatible servo amplifier		MR-J2S-□CP (1)-S084				
	Communication speed		10M/5M/2.5M/625K/156Kbps				
	Communication method		Broadcast poling method				
	Synchronization method		Frame synchronization method				
	Coding method		NRZI				
	Transmission path format		Bus format (EIA RS-485 compliant)				
	Error control method		CRC ($X^{16}+X^{12}+X^5+1$)				
	Transmission format		HDLC compliant				
	Remote station number		1 to 64				
	Connection cable		Shielded 3-core twisted pair cable				
	Cable length	Communication speed	156Kbps	625Kbps	2.5Mbps	5Mbps	10Mbps
		Maximum cable total length	1200m (3937.01ft)	900m (2952.76ft)	400m (1312.34ft)	160m (524.93ft)	100m (328.08ft)
		Inter-station cable length	Max. 0.2m (0.66ft)				
	Number of connected units		Maximum 42 units only with remote device station (when occupying one station/unit), (maximum 32 units when occupying two stations/unit), use with other devices possible				
Safety features			CC-Link error				
Environment		Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)				
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)				
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust				
		Elevation	1000m (3280ft) or less above sea level				
		Vibration	5.9m/s^2 max.				
Mass (kg [lb])			0.3 (0.66)				

Positioning function

(1) Operation mode: Positioning with three command methods

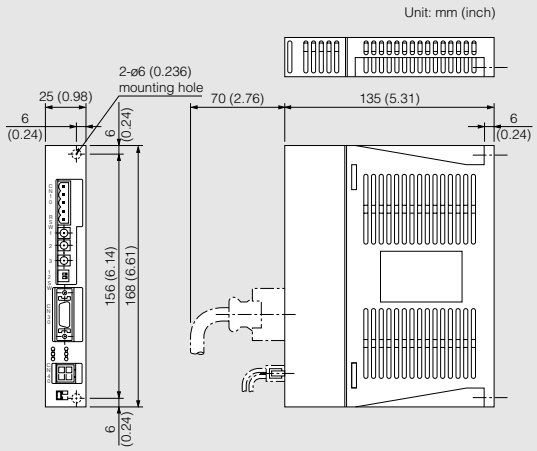
- Input point table number:
  Positioning is executed by designating the point table number. Refer to the previous page "MR-J2S-CP (built-in positioning function) command method" for details.
- Positioning command, speed and acceleration/deceleration time constant point table number command:
  The position data is set via the CC-Link. Positioning is executed based on the designated point table number's motor speed, acceleration time constant and deceleration time constant.
- Position and speed command:
  The position data and motor speed are set via the CC-Link. Positioning is executed based on the acceleration time constant and deceleration time constant set in point table number 1.

(2) Manual home position return mode

The home position return includes the "dog system", "count system", "data set system", "impact system", "ignore home position (servo ON position as home position)", "dog system rear end reference", "count system front end reference" and "dog cradle system".
Refer to the previous page "MR-J2S-CP type Servo Amplifier Specifications" for details.

CC-Link interface unit dimensions

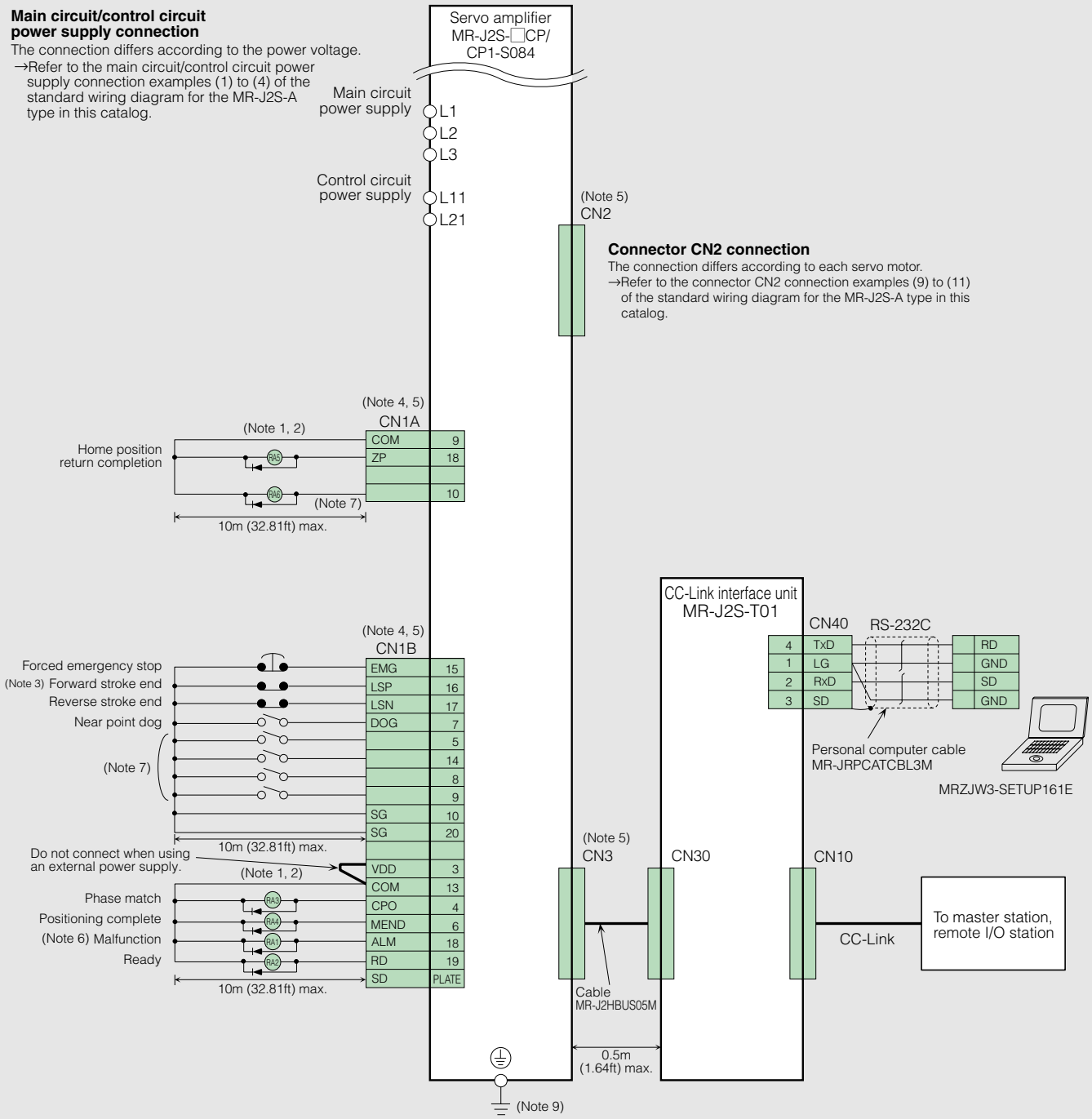
● **MR-J2S-T01**



Standard Wiring Diagram

MR-J2S-□CP (1)-S084 type

● Connection



Notes:
1. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
2. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
3. LSP and LSN contacts must be closed for normal operation. If they are not closed, the commands will not be accepted.
4. Signals with the same name are connected inside.
5. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
6. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
7. The signals are not assigned in the default state.
8. Connect the shield wire securely to the plate inside the connector (ground plate).
9. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

Features/System Configuration (MR-J2S-□CL)

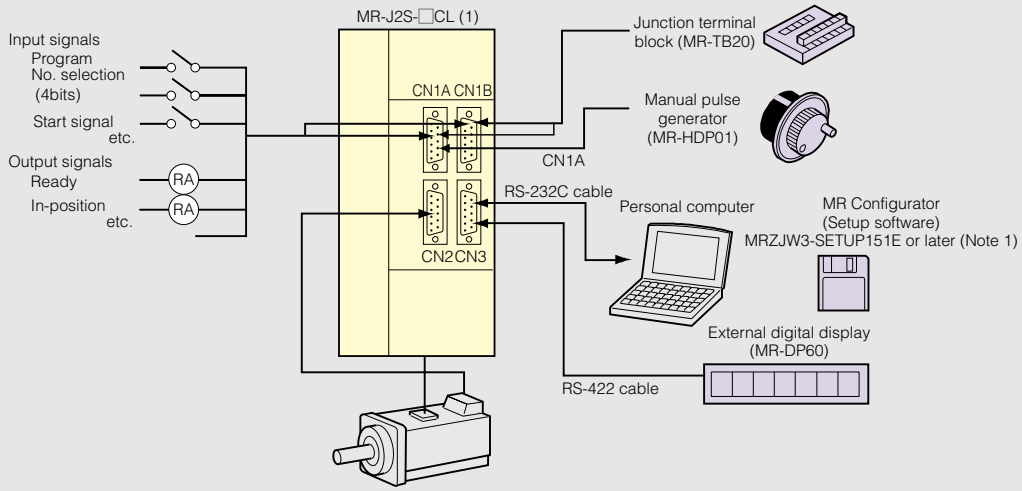
Features

- **Positioning operation is performed in accordance to the program created by the user.**
- **Up to 16 programs or 120 steps per axis can be created.**
- **Multi-drop operation can be performed for up to 32 axes by serial communication.**
- **This product has advanced functions such as the high-level real-time auto tuning, machine resonance suppression filter, adaptive vibration suppression control, and machine analysis. Use the MR Configurator (setup software), MRZJW3-SETUP151E version E1 or later.**
- **By simply fitting the battery, you can configure an absolute system (linear axis compatibility).**

System configuration

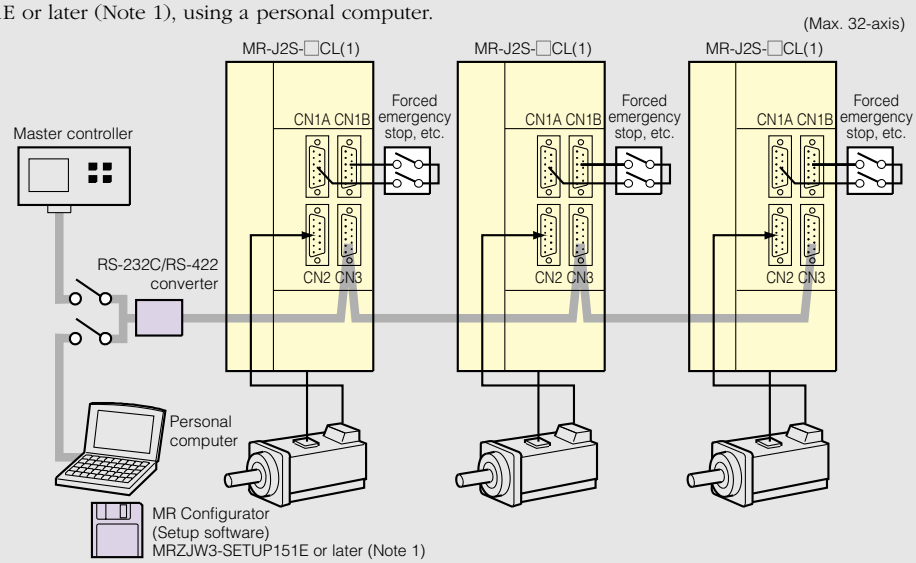
Simple positioning using DI/O

Positioning operation is executed using built in digital I/O while monitoring with a personal computer.



Serial communication operation by RS-422

Connecting servo amplifiers in the multi-drop configuration to perform positioning operation.
Each servo amplifier can be started from the master controller. The RS-422 protocol communication specifications have been released, so the user can create a program. The monitor and parameter settings can be made with the MR Configurator (setup software), MRZJW3-SETUP151E or later (Note 1), using a personal computer.

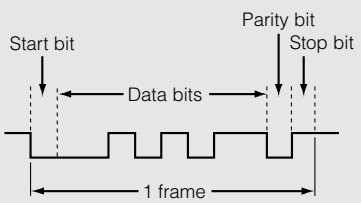


Notes: 1. MR-J2S-□CL(1) is compatible with the MRZJW3-SETUP151E software version E1.
2. The external digital display (MR-DP60) cannot be used for serial communication operation based on RS-422 or RS-232C.

Communications specifications

The RS-422 (RS-232C) specifications are as follows.

- Baud rate : 9600, 19200, 38400 or 57600 asynchronous.
- Transfer code : 1 start bit, 8 data bits, 1 parity bit, 1 stop bit.
- Transfer protocol : Character system, half-duplex communication.



Peripheral Equipment (MR-J2S-□CL)

Connections with peripheral equipment

Peripheral equipment is connected to the MR-J2S-CL as described below.
Connectors, options, and other necessary equipment are available so that users can set up the MR-J2S-CL easily and begin using it right away.

Power supply
3-phase 200-230VAC
or
1-phase 230VAC (Note 1)

Circuit breaker (NFB)
Used to protect the power supply line.

Magnetic contactor (MC)
Used to turn off the servo amplifier's power when an alarm has been triggered.

Power factor improvement reactor (FR-BAL)

R S T
X Y Z
L1
L2
L3
L11
L21

Battery compartment (option)
A battery (MR-BAT) is installed in the holder when your servo system is an absolute system. Not required when your servo system is an incremental system.

Display panel
Displays monitoring data, parameters, and alarms.

Setting section
Parameter settings and monitoring etc. are executed with push buttons.

Servo amplifier MR-J2S-□CL (Note 4)

Control signal connector

CN1A
CN1B
CN2
CN3

CHARGE

U V W
TE2

Type 3 ground or above

⚠Charge lamp
Illuminates when the main circuit power supply is ON. Do not plug/unplug power lines when this lamp is ON.

<With front cover open>

D
C
P

Optional regeneration unit (option)
Install this unit in situations involving frequent regeneration and large load inertia moments. Connect this unit referring to "Standard Wiring Diagram".

Control signal (option)

Junction terminal block (MR-TB20)
All signals can be recieved easily at this terminal block without a connection to CN1A or CN1B.

(Note 3)
Manual pulse generator (MR-HDP01)

(Note 2)
CN3 for RS-232C communication (option)
MR Configurator (Setup software)
MRZJW3-SETUP151E software version E1 or later

(Note 2)
CN3 for RS-422 communication (option)

External digital display (MR-DP60)

HC-□FS servo motor and encoder
(Above picture is HC-KFS23.)

Notes: 1. If a 1-phase power supply (230VAC) is used, please connect it to terminals L1 and L2. Nothing should be connected to L3.
2. RS-232C and RS-422 are mutually-exclusive features. RS-422 communication is possible with parameter switching.
The RS-422 communication cable can be made by using the optional CN1 connector (MR-J2CN1).
3. The manual pulse generator cable can be made by using the optional CN1 connector (MR-J2CN1).
4. The connection with the peripheral devices shown above is for the MR-J2S-350CL or smaller. Connect the MR-J2S-500CL or larger as shown in the standard connection diagram.

Servo Amplifier Specifications

MR-J2S-CL type

Servo amplifier model MR-J2S-			10CL	20CL	40CL	60CL	70CL (-U□)	100CL	200CL	350CL	500CL	700CL (-U□)	10CL1	20CL1	40CL1
Power supply		Voltage/frequency (Note 1)	3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz (Note 2)					3-phase 200 to 230VAC 50/60Hz (Note 2)					1-phase 100 to 120VAC 50/60Hz (Note 2)		
		Permissible voltage fluctuation	3-phase 200 to 230VAC: 170 to 253VAC 1-phase 230VAC: 207 to 253VAC					3-phase 170 to 253VAC					1-phase 85 to 127VAC		
		Permissible frequency fluctuation	±5% max.												
Control system			Sine-wave PWM control/current control system												
Dynamic brake			Built-in (Note 3)												
Safety features			Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection												
Command method	Program	Operating specification	Program language (programmed by the setup software) Program capacity: 120 steps												
		Input positioning command	Set by the program language One-point feed length setting range: ±1 (μm) to ±999.999 (mm)												
		Input speed command	A servo motor speed, acceleration and deceleration time constants, and S-pattern acceleration and deceleration time constants are set by the program language. The S-pattern acceleration and deceleration time constants can be set by parameter No. 14 as well.												
		System	Signed absolute value command system, and signed incremental value command system												
Operating mode	Program operation mode		Depends on the setting of the program language												
	Manual operation mode	JOG	Inches upon contact input or RS-422 (RS-232C) communication based on speed commands set by a parameter.												
		Manual pulse generator	Manual feed by manual pulse generator. Command pulse ratio: Selectable ×1, ×10, or ×100 by the parameter.												
	Manual home position return mode	Dog system	Returns to home position upon Z phase pulse count after passing through near-point dog. Selectable direction for return to home position, settable home position shift and settable home position address. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Count system	Returns to home position upon sensor pulse count after touching near-point dog. Selectable direction for return to home position, settable home position shift and settable home position address. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Data set system	Returns to home position without dog. Set any position as the home position using manual operation or the like. Settable home position address.												
		Impact system	Returns to home position upon hitting end of stroke. Selectable direction for return to home position. Settable home position address.												
		Ignore home (Servo-on position as home position)	Uses position where the servo on signal (SON) becomes ON as home position. Settable home position address.												
		Dog system rear end reference	Returns to home position with respect to the rear end of a near-point dog. Selectable direction for return to home position, settable home position address and settable home position shift. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Count system front end reference	Returns to home position with respect to the front end of a near-point dog. Selectable direction for return to home position, settable home position address and settable home position shift. Automatic retreat on dog back to home position and automatic stroke retreat function.												
		Dog cradle system	Returns to home position with respect to the front end of a near-point dog by the first Z-phase pulse. Selectable direction for return to home position, settable home position address and settable home position shift. Automatic retreat on dog back to home position and automatic stroke retreat function.												
Other functions			Absolute position detection, backlash correction, overtravel protection by the external limit switch, software stroke limit, override by external analog control												
Structure			Self-cooling, open (IP00)						Fan cooling, open (IP00)				Self-cooling, open (IP00)		
Environment		Ambient temperature	0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing)												
		Ambient humidity	90% RH max. (non condensing), storage: 90% RH max. (non condensing)												
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, or dust												
		Elevation	1000m (3280ft) or less above sea level												
		Vibration	5.9m/s² max.												
Mass (kg [lb])			0.7 (1.5)	0.7 (1.5)	1.1 (2.4)	1.1 (2.4)	1.7 (3.7)	1.7 (3.7)	2.0 (4.4)	2.0 (4.4)	4.9 (10.8)	7.2 (15.9)	0.7 (1.5)	0.7 (1.5)	1.1 (2.4)

Notes: 1. Rated output and rated speed of the servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The torque drops when the power supply voltage is less than specified.
2. For torque characteristics when combined with a servo motor, refer to "servo motor torque characteristics" in this catalog.
3. For products without a dynamic brake (MR-J2S-□CL-ED or MR-J2S-□CL1-ED), special compliance is possible.

Command List

Program Operation

Position data, servo motor speed, acceleration and deceleration time constants and so on are created as programs beforehand. Positioning operation is performed by selecting the created programs and executing them.

Command list

Command	Name	Setting	Setting range	Unit	Indirect specification (Note 7)	Description
SPN (Note 1)	Motor speed	SPN (setting)	0 to instantaneous permissible speed	r/min	○	Sets the command speed of the servo motor for positioning. The setting value must not exceed the instantaneous permissible speed of the servo motor used.
STA (Note 2)	Acceleration time constant	STA (setting)	0 to 20000	ms	○	Sets the acceleration time constant.
STB (Note 2)	Deceleration time constant	STB (setting)	0 to 20000	ms	○	Sets the deceleration time constant.
STC (Note 2)	Acceleration and deceleration time constants	STC (setting)	0 to 20000	ms	○	Sets the acceleration and deceleration time constants.
STD (Note 2)	S-pattern acceleration and deceleration time constants	STD (setting)	0 to 100	ms	○	Sets the S-pattern acceleration and deceleration time constants.
MOV	Absolute value move command	MOV (setting)	–999999 to 999999	×10^{STM} (Note 6) µm	○	Moves the set value as an absolute value.
MOVA	Absolute value continuous move command	MOVA (setting)	–999999 to 999999	×10^{STM} (Note 6) µm	○	Moves the set value continuously as an absolute value. Be sure to use this command together with the [MOV] command.
MOVI	Incremental value move command	MOVI (setting)	–999999 to 999999	×10^{STM} (Note 6) µm	○	Moves the set value as an incremental value.
MOVIA	Incremental value continuous move command	MOVIA (setting)	–999999 to 999999	×10^{STM} µm	○	Moves the set value continuously as an incremental value. Be sure to use this command together with the [MOVI] command.
SYNC (Note 3)	Waiting for external signal to switch on	SYNC (setting)	1 to 3	—	—	Stops the next step until the program input 1 (PI1) to program input 3 (PI3) are turned ON after the synchronous output (SOUT) command is output.
OUTON (Note 3, 4)	External signal ON output	OUTON (setting)	1 to 3	—	—	Turns ON the program output 1 (OUT1) to program output 3 (OUT3). This signal can be turned OFF after a setup time has elapsed, by setting an ON time with the parameters No. 74 to 76.
OUTOF (Note 3)	External signal OFF output	OUTOF (setting)	1 to 3	—	—	Turns OFF the program output 1 (OUT1) to program output 3 (OUT3), which were turned ON by the [OUTON] command.
TRIP (Note 3)	Absolute value passage point specification	TRIP (setting)	–999999 to 999999	×10^{STM} (Note 6) µm	—	When the motor passes through the current position set by user, the next step is executed.
TRIPI (Note 3)	Incremental value passage point specification	TRIPI (setting)	–999999 to 999999	×10^{STM} (Note 6) µm	—	While the motor moves by the [MOVI] command or [MOVIA] command, if the motor has moved for the moving distance set by the [TRIPI] command since the [MOVI] command or [MOVIA] command is performed, the next step is executed. Be sure to write the [TRIPI] command after the [MOVI] command or [MOVIA] command.
ITP (Note 3, 5)	Interrupt positioning	ITP (setting)	0 to 999999	×10^{STM} (Note 6) µm	—	When the interrupt signal is ON, the motor moves for the distance set by this command, and it stops. Use this command after the [SYNC] command in combination.
COUNT (Note 3)	External pulse count	COUNT (setting)	–999999 to 999999	pulse	—	When the value of the pulse counter exceeds the count value set in the [COUNT] command, the next step is executed. Setting [COUNT (0)] clears the pulse counter to zero.
FOR NEXT	Step repeat command	FOR (setting) NEXT	0, 1 to 10000	times	—	The steps, enclosed with the [FOR (setting value)] command and the [NEXT] command, are repeated for the number of times set beforehand. If zero is set, the steps are repeated unlimitedly.
LPOS (Note 3)	Current position latch	LPOS	—	—	—	The current position is latched by the rising edge of the input device "current position latch input (LPS)". The latched current position data can be read by a communication command.
TIM	Dwell	TIM (setting)	1 to 2000	×10ms	○	The next step is waited until the time set beforehand has elapsed.
ZRT	Home position return	ZRT	—	—	—	A manual home position return is executed.
TIMES	Program count instruction	TIMES (setting)	0, 1 to 10000	times	○	Put the [TIMES (setting value)] command on the top of the program to set the number of times of program execution. If zero is set, the program is repeated unlimitedly.
STOP	Program stop	STOP	—	—	—	The program being executed is stopped. Be sure to write this command in the final line.

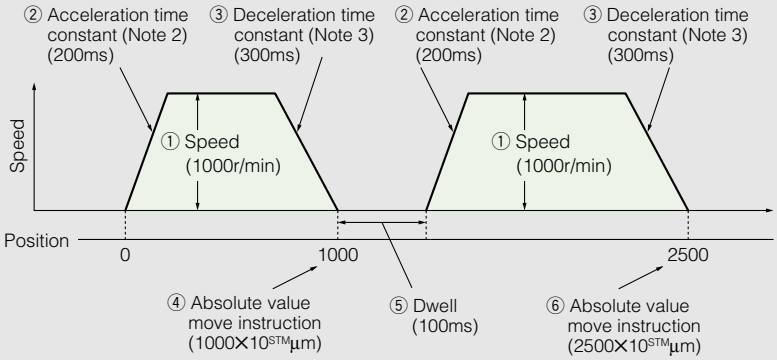
Notes: 1. The [SPN] command is valid when the [MOV], [MOVA], [MOVI], or [MOVIA] command is executed.
2. The [STA], [STB], [STC], and [STD] commands are valid when the [MOV] or [MOVI] command is executed.
3. The [SYNC], [OUTON], [OUTOF], [TRIP], [TRIPI], [ITP], [COUNT] and [LPOS] commands are valid even while an instruction is output.
4. If the ON time is set by the parameters No. 74 to 76, the next command is executed after the set time has elapsed.
5. If the remaining distance is the setting value or less, the servo motor is not running, or the servo motor is decelerating, the [ITP] command is skipped and control goes to the next step.
6. STM is magnification to data.
7. General-purpose registers (R1 to R4 and D1 to D4) can be specified to the command setting values.
8. For the content of each command, be sure to confirm "MR-J2S-□CL SERVO AMPLIFIER INSTRUCTION MANUAL."

Program examples

<Example 1>

Two types of operation, with which the servo motor speed, acceleration time constant, and deceleration time constant are the same and the move instruction is different, are executed.

Program	Description
SPN (1000)	Servo motor speed 1000 (r/min) ····· ①
STA (200)	Acceleration time constant 200 (ms) ····· ②
STB (300)	Deceleration time constant 300 (ms) ····· ③
MOV (1000)	Absolute value move instruction 1000 (×10^{STM}μm) ····· ④ (Note 1)
TIM (10)	Dwell 100 (ms) ····· ⑤
MOV (2500)	Absolute value move instruction 2500 (×10^{STM}μm) ····· ⑥
STOP	Program stop

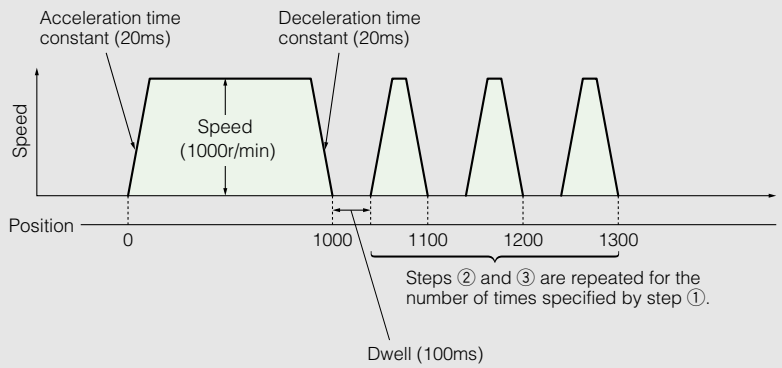


Notes:
1. The values set as steps ①, ②, and ③ are valid as long as they are not set again.
2. The setting value is the time elapsing from the stop of the servo motor to the rated speed.
3. The setting value is the time elapsing from the rated speed to the stop of the servo motor.

<Example 2>

The steps enclosed with the [FOR (setting value)] command and the [NEXT] command are repeated for the number of times set beforehand.

Program	Description
SPN (1000)	Servo motor speed 1000 (r/min)
STC (20)	Acceleration and deceleration time constants 20 (ms)
MOV (1000)	Absolute value move instruction 1000 (×10^{STM}μm)
TIM (10)	Dwell 100 (ms)
FOR (3)	Step repeat command start 3 (times) ····· ①
MOVI (100)	Incremental value move instruction 100 (×10^{STM}μm) ····· ②
TIM (10)	Dwell 100 (ms) ····· ③
NEXT	Step repeat command end
STOP	Program stop

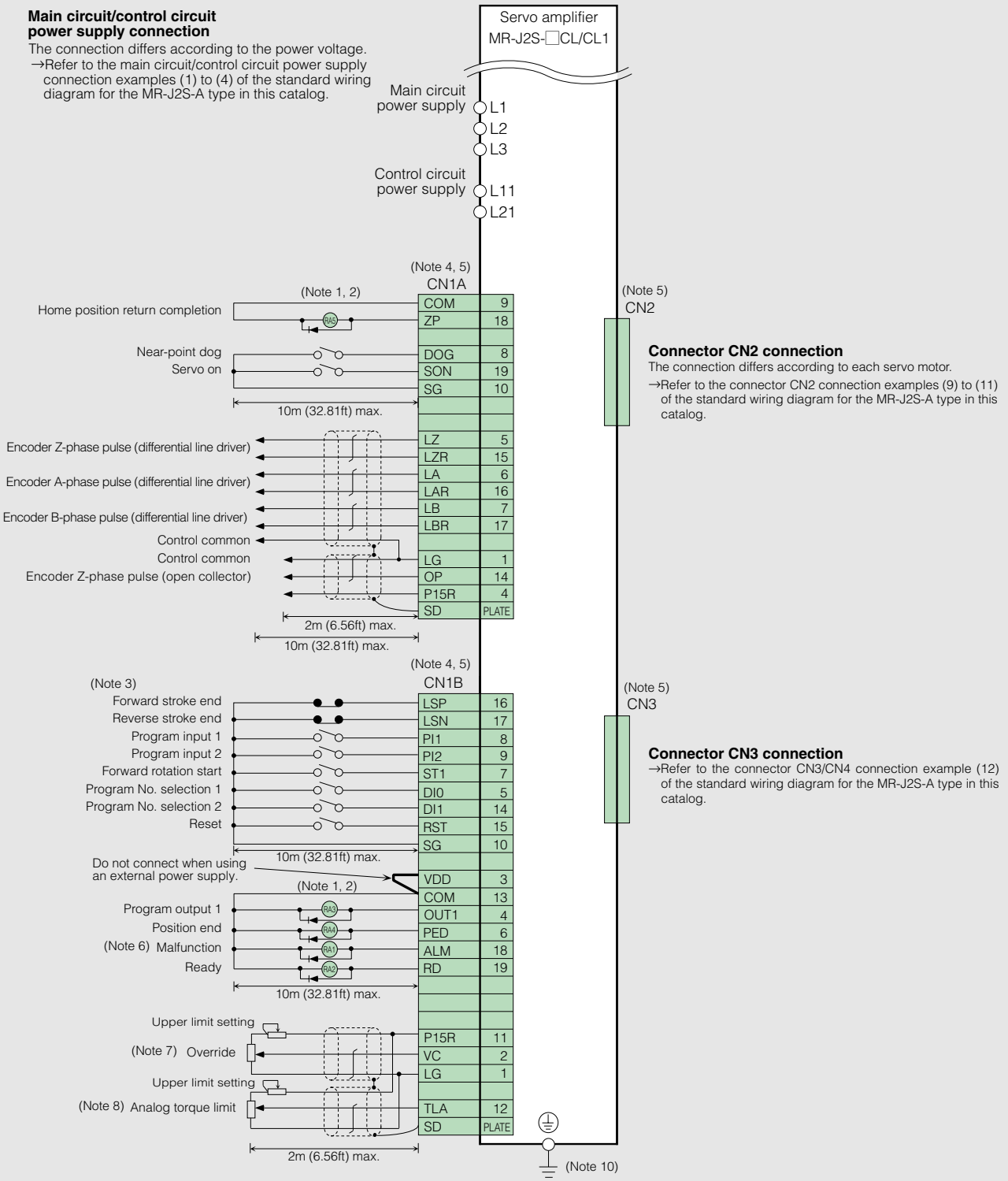


Standard Wiring Diagram

MR-J2S-□CL (1) type

● Connection

Main circuit/control circuit power supply connection
The connection differs according to the power voltage.
→Refer to the main circuit/control circuit power supply connection examples (1) to (4) of the standard wiring diagram for the MR-J2S-A type in this catalog.



Notes:
1. Do not reverse the diode's direction. Connecting it backwards could cause the amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
2. Make sure that the sum of current flowing to external relays does not exceed 80mA. If it exceeds 80mA, supply interface power from an external source.
3. LSP and LSN contacts must be closed for normal operation. If they are not closed, the commands will not be accepted.
4. Signals with the same name are connected inside.
5. CN1A, CN1B, CN2 and CN3 are all the same shape. Connecting them wrong can cause damage.
6. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
7. If using the override (VC), make the override selection (OVR) device available.
8. If using the analog torque limit (TLA), make the external torque limit selection (TL) device available.
9. Connect the shield wire securely to the plate inside the connector (ground plate).
10. Always connect the servo amplifier protection ground (PE) (for preventing shocks) to the control box's protection ground (PE).

Options

● Dynamic brake

When using a 11kW or larger servo amplifier, use these dynamic brakes if the servo motor must be suddenly stopped during a power failure or when the protection circuit functions.

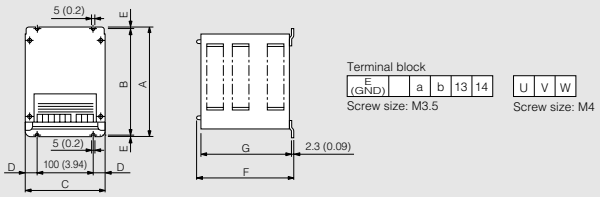
Model	Servo amplifier	Dimensions
DBU-11K	MR-J2S-11KA/B	A
DBU-15K	MR-J2S-15KA/B	
DBU-22K	MR-J2S-22KA/B	
DBU-11K-4	MR-J2S-11KA4/B4	B
DBU-22K-4	MR-J2S-15KA4/B4 MR-J2S-22KA4/B4	

Model	Servo amplifier	Dimensions
DBU-37K	MR-J2S-30KA/B MR-J2S-37KA/B	C
DBU-55K-4	MR-J2S-30KA4/B4 MR-J2S-37KA4/B4 MR-J2S-45KA4/B4 MR-J2S-55KA4/B4	

External dimensions

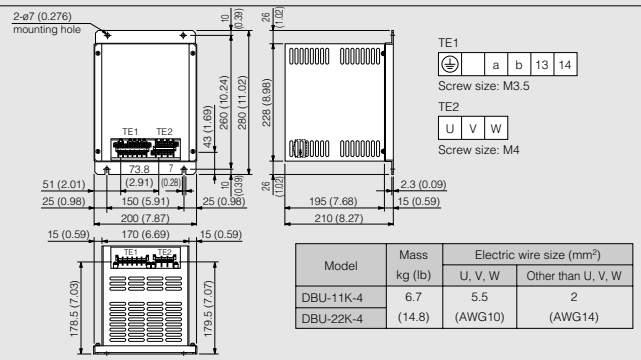
Unit: mm (inch)

A



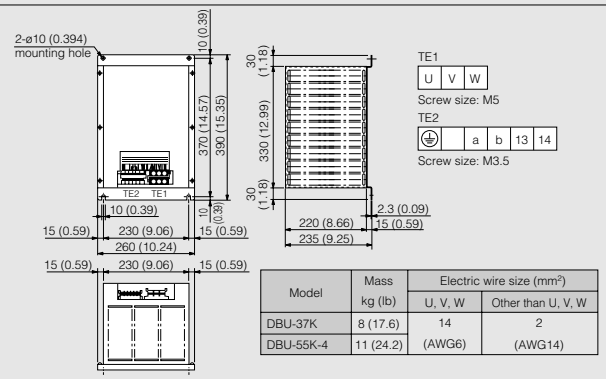
Model	A	B	C	D	E	F	G	Mass kg (lb)	Electric wire size (mm²)
DBU-11K	200 (7.87)	190 (7.48)	140 (5.51)	20 (0.79)	5 (0.2)	170 (6.69)	163.5 (6.44)	2 (4.4)	5.5 (AWG10)
DBU-15K DBU-22K	250 (9.84)	238 (9.37)	150 (5.91)	25 (0.98)	6 (0.24)	235 (9.25)	228 (8.98)	6 (13.2)	5.5 (AWG10)

B



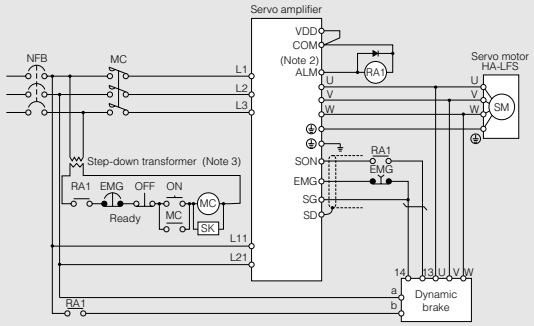
Model	Mass kg (lb)	Electric wire size (mm²)	
		U, V, W	Other than U, V, W
DBU-11K-4 DBU-22K-4	6.7 (14.8)	5.5 (AWG10)	2 (AWG14)

C

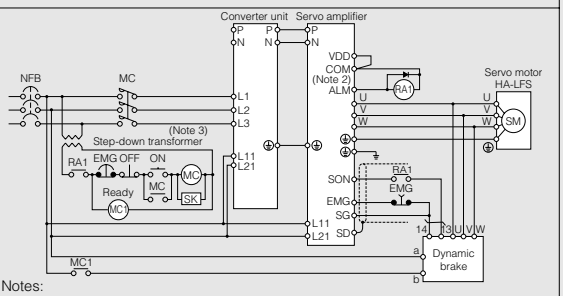


Model	Mass kg (lb)	Electric wire size (mm²)	
		U, V, W	Other than U, V, W
DBU-37K	8 (17.6)	14 (AWG6)	2 (AWG14)
DBU-55K-4	11 (24.2)		

Connections



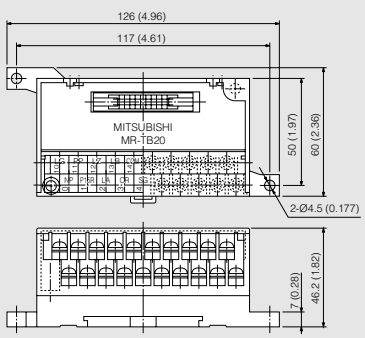
Notes:
1. The above connection diagram applies only to the MR-J2S-A type. Refer to "MR-J2S-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the MR-J2S-B type.
2. When using the dynamic brake, change the parameter No.1 (for MR-J2S-A type). Refer to "MR-J2S-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. This is for the 400V. The 200V does not require a step-down transformer.



Notes:
1. The above connection diagram applies only to the MR-J2S-A type. Refer to "MR-J2S-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the MR-J2S-B type.
2. When using the dynamic brake, change the parameter No.1 (for MR-J2S-A type). Refer to "MR-J2S-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. This is for the 400V. The 200V does not require a step-down transformer.

● Junction terminal block (MR-TB20)

All signals can be recieved with this junction terminal block without a connection to CN1.



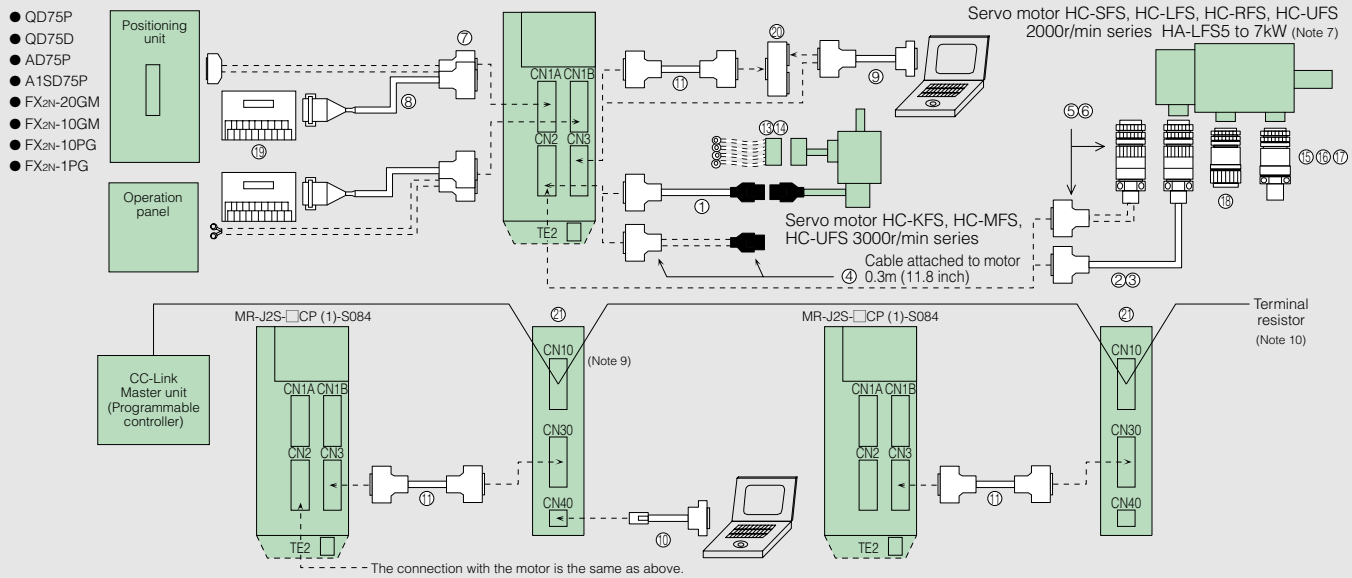
Terminal block screw size: M3.5
Compatible wire: 2mm² max. (AWG14)
Crimping terminal width: 7.2mm (0.283 inch) max.

Unit: mm (inch)

Options

● Cables and connectors (for MR-J2S-700A (4)/CP/CL or smaller)

Optional cables and connectors are shown in the diagram below.

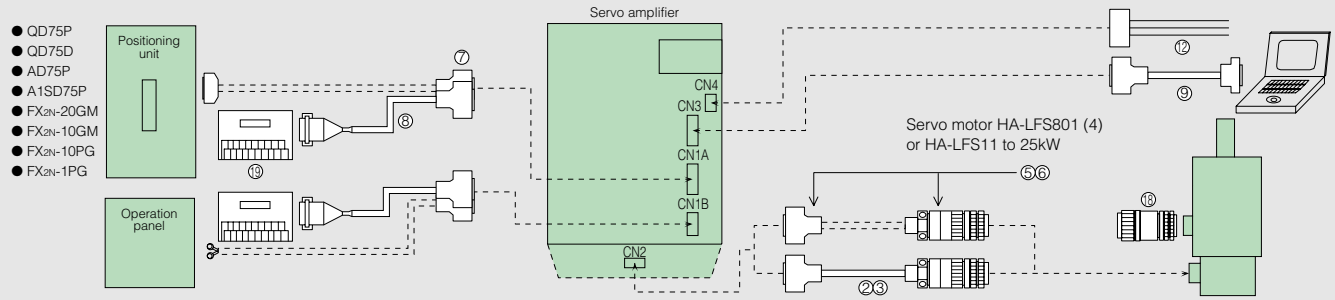


		Item	Model	Protection level	Description
Select one for use with CN2	①	Encoder cable for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor	MR-JCCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1)	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Junction connector (made by AMP) 1-172161-9 (black connector housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by TOA ELECTRIC INDUSTRIAL) Encoder
			MR-JCCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43ft) (Note 1)	IP20	
	②	(Note 4) Encoder cable for HC-SFS, HC-LFS, HC-RFS, HC-UFS 2000r/min series, HA-LFS series motor	MR-JHSCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1)	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug) Encoder
			MR-JHSCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43ft) (Note 1)	IP20	
	③		MR-ENCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1, 6)	IP65 IP67	Backshell (made by DDK) CE02-20BS-S Plug (made by DDK) MS3106A20-29S (D190) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Cable clamp (made by DDK) CE3057-12A-3 (D265)
	④	Encoder connector set for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor	MR-J2CNM	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Junction connector (made by AMP) 1-172161-9 (black connector housing) (Note 2) 170359-1 (connector pin) MTI-0002 (cable clamp, made by TOA ELECTRIC INDUSTRIAL)
	⑤	Encoder connector set for HC-SFS, HC-LFS, HC-RFS, HC-UFS 2000r/min series, HA-LFS series motor	MR-J2CNS	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug)
	⑥		MR-ENCNS	IP65 IP67	Plug (made by DDK) MS3106A20-29S (D190) Backshell (straight) (made by DDK) CE02-20BS-S Cable clamp (made by DDK) CE3057-12A-3 (D265) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
For CN1A, CN1B	⑦	CN1 connector	MR-J2CN1 (Note 5)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
	⑧	Junction terminal block cable	MR-J2TBL□M □=cable length 0.5, 1m (1.64, 3.28ft)	—	Junction terminal block-side connector (Hirose Electric) HIF3BA-20D-2.54R (connector) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)

Notes:
1. -H and -L indicate bending life. -H products have a long bending life.
2. AMP 172161-1 (white) can be used for the connector housing. For connector pins, 170363-1 (bulk) can be used.
3. The model listed in the table is the soldered model. The model for press bonding is 10120-6000EL (connector) and 10320-3210-000 (shell kit).
4. MR-JHSCBL□M-H and -L are not IP65 compliant.
5. Use the MR-J2CN1 connector when the RS-422 communication cable is supplied by the customer.
6. The encoder cable is not oil-resistant.
7. The HA-LFS601, 6014, 701M and 701M4 do not have a connector type motor power supply. Use only ②, ③, ⑤, ⑥ or ⑱.
8. Use a 0.5m (1.64ft) or shorter cable between the amplifier and CC-Link interface unit.
9. The CN10 connector is enclosed with the unit. The user must manufacture the CC-Link cable with the enclosed CN10 connector.
10. Use the terminator enclosed with the CC-Link master unit.

● Cables and connectors (for MR-J2S-11KA (4) to MR-J2S-22KA (4))

Optional cables and connectors are shown in the diagram below.

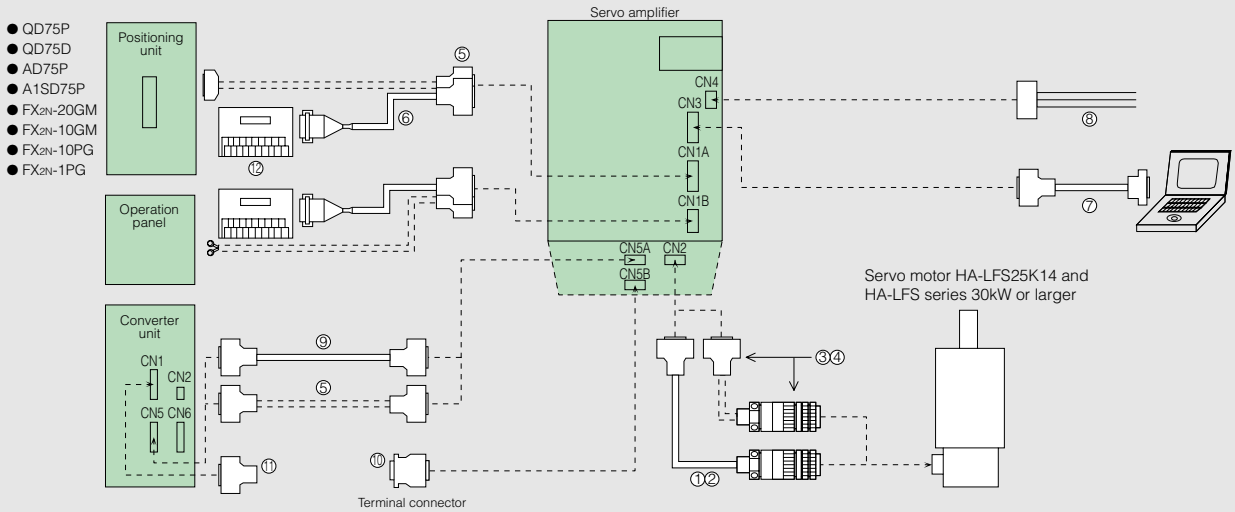


		Item	Model	Protection level	Description
For CN3	⑨	Personal computer communication cable	MR-CPCATCBL3M Cable length 3m (9.84ft)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Personal computer-side connector (made by Japan Aviation Electronics Industry) DE-9SF-N (connector) DE-C1-J6-S6 (case)
	⑩	Personal computer communication cable	MR-JRPCATCBL3M Cable length 3m (9.84ft)	—	Amplifier-side connector (made by Molex) 5557-04R-210 (connector) 5556 (terminal) Personal computer-side connector (made by Japan Aviation Electronics Industry) DE-9SF-N (connector) DE-C1-J6-S6 (case)
	⑪	Maintenance junction card cable Amplifier to CC-Link interface unit cable	MR-J2HBUS□M □=cable length 0.5, 1, 5m (1.64, 3.28, 16.40ft) (Note 8)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Maintenance junction card connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
For CN4	⑫	CN4 cable	MR-H3CBL1M Cable length 1m (3.28ft)	—	Amplifier-side connector (made by AMP) 171822-4 (housing) Note: Use with the 11kW or larger analog monitor output.
Select one for use with motor power supply	⑬	Power supply connector set for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor	MR-PWCNK1	IP20	Plug (made by Molex) 5559-04P-210 male terminal (made by Molex) 5558PBT3L (for AWG16)
	⑭	Power supply connector set for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor with electromagnetic brake	MR-PWCNK2	IP20	Plug (made by Molex) 5559-06P-210 male terminal (made by Molex) 5558PBT3L (for AWG16)
	⑮	Power supply connector set for HC-SFS81 HC-SFS52, 102, 152, 524, 1024, 1524 HC-SFS53, 103, 153 HC-LFS52, 102, 152 HC-RFS103, 153, 203 HC-UFS72, 152	MR-PWCNS1 (Straight type)	IP65 IP67	Plug (straight) (made by DDK) CE05-6A22-23SD-B-BSS Cable clamp (made by DDK) CE3057-12A-2 (D265)
	⑯	Power supply connector set for HC-SFS121, 201, 301 HC-SFS202, 352, 502, 2024, 3524, 5024 HC-SFS203, 353 HC-LFS202, 302 HC-RFS353, 503 HA-LFS502 HC-UFS202, 352, 502	MR-PWCNS2 (Straight type)	IP65 IP67	Plug (straight) (made by DDK) CE05-6A24-10SD-B-BSS Cable clamp (made by DDK) CE3057-16A-2 (D265)
	⑰	Power supply connector set for HC-SFS702, 7024 HA-LFS702	MR-PWCNS3 (Straight type)	IP65 IP67	Plug (straight) (made by DDK) CE05-6A32-17SD-B-BSS Cable clamp (made by DDK) CE3057-20A-1 (D265)
For brake	⑱	Brake connector set for HC-SFS121B, 201B, 301B HC-SFS202B, 352B, 502B, 702B, 2024B, 3524B, 5024B, 7024B HC-SFS203B, 353B HC-LFS202B, 302B HA-LFS601B, 801B, 12K1B, 6014B, 8014B, 12K14B HA-LFS701MB, 11K1MB, 15K1MB, 701M4B, 11K1M4B, 15K1M4B HA-LFS11K2B, 15K2B, 22K2B, 11K24B, 15K24B, 22K24B HC-UFS202B, 352B, 502B	MR-BKCN (Straight type)	IP65 IP67	Plug (made by DDK) MS3106A10SL-4S (D190) Cable connector (straight) (made by Daiwa Dengyo) YSO10-5 to 8
	⑲	Junction terminal block	MR-TB20	—	
	⑳	Maintenance junction card	MR-J2CN3TM	—	This is required when using the personal computer and analog monitor output simultaneously. Note: This cannot be used with the 11kW or larger capacities.
	㉑	CC-Link interface unit	MR-J2S-T01	—	Compatible only with the MR-J2S-□CP (1) -S084.

Options

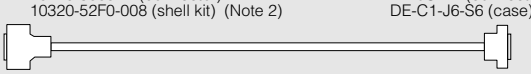
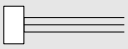
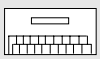
● Cables and connectors (for MR-J2S-30KA (4) or larger)

Optional cables and connectors are shown in the diagram below.



Item			Model	Protection level	Description
Select one for use with CN2	①	Encoder cable for HA-LFS series motor (Note 3)	MR-JHSCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1)	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug) Encoder
			MR-JHSCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43ft) (Note 1)	IP20	
	②		MR-ENCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1, 5)	IP65 IP67	Backshell (made by DDK) CE02-20BS-S Plug (made by DDK) MS3106A20-29S (D190) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Cable clamp (made by DDK) CE3057-12A-3 (D265)
	③	Encoder connector set for HA-LFS series motor	MR-J2CNS	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug)
	④		MR-ENCNS	IP65 IP67	Plug (made by DDK) MS3106A20-29S (D190) Backshell (straight) (made by DDK) CE02-20BS-S Cable clamp (made by DDK) CE3057-12A-3 (D265) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)
For CN1A, CN1B, CN5A, converter unit	⑤	CN1 connector CN5 connector	MR-J2CN1 (Note4)	—	Converter unit-side connector or amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)
	⑥	Junction terminal block cable	MR-J2TBL□M □=cable length 0.5, 1m (1.64, 3.28ft)	—	Junction terminal block-side connector (Hirose Electric) HIF3BA-20D-2.54R (connector) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)

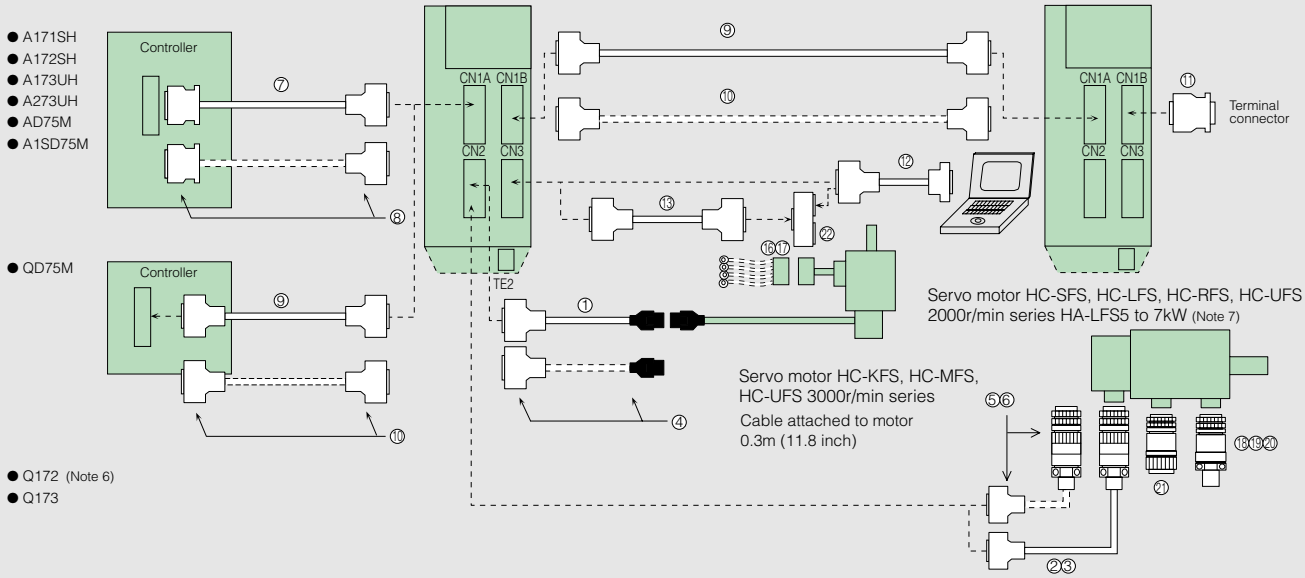
Notes: 1. -H and -L indicate bending life. -H products have a long bending life.
2. The model listed in the table is the soldered model. The model for press bonding is 10120-6000EL (connector) and 10320-3210-000 (shell kit).
3. MR-JHSCBL□M-H and -L are not IP65 compliant.
4. Use the MR-J2CN1 connector when the RS-422 communication cable is supplied by the customer.
5. The encoder cable is not oil-resistant.
6. Keep the CN5 cable length to 1m (3.28ft) or shorter.

Item			Model	Protection level	Description
For CN3	⑦	Personal computer communication cable	MR-CPCATCBL3M Cable length 3m (9.84ft)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Personal computer-side connector (made by Japan Aviation Electronics Industry) DE-9SF-N (connector) DE-C1-J6-S6 (case) 
For CN4	⑧	CN4 cable	MR-H3CBL1M Cable length 1m (3.28ft)	—	Amplifier-side connector (AMP) 171822-4 (housing) 
For CN5A	⑨	CN5 cable	MR-J2HBUS□M □=cable length 0.5, 1m (1.64, 3.28ft) (Note 6)	—	Converter unit-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) 
For CN5B	⑩	Terminal connector	MR-A-TM	—	 Terminal connector
For converter unit	⑪	CN1 connector for converter unit	MR-HP4CN1	—	 Converter unit-side connector (made by 3M, or an equivalent product) 10114-3000VE (connector) 10314-52F0-008 (shell kit)
	⑫	Junction terminal block	MR-TB20	—	

Options

● Cables and connectors (for MR-J2S-700B (4) or smaller)

Optional cables and connectors are shown in the diagram below.

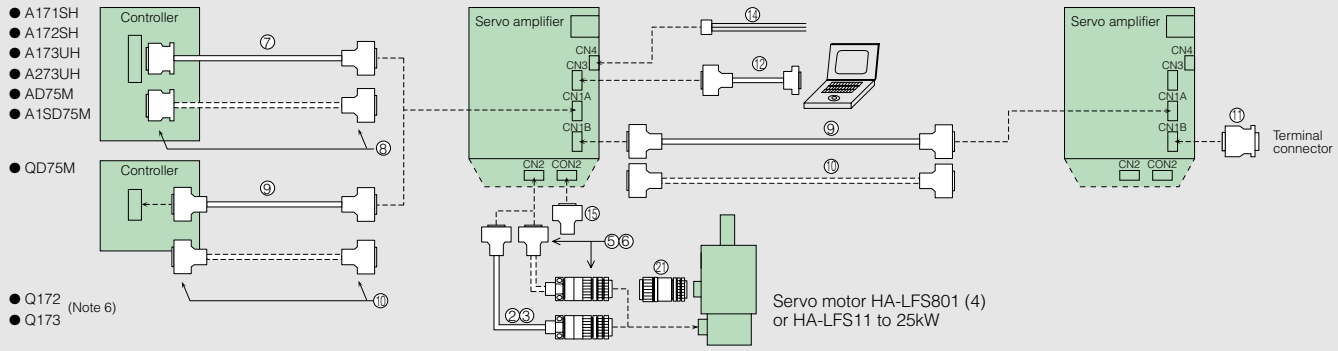


		Item	Model	Protection level	Description
Select one for use with CN2	①	Encoder cable for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor	MR-JCCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1)	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) — Junction connector (made by AMP) 1-172161-9 (black connector housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by TOA ELECTRIC INDUSTRIAL) — Encoder
			MR-JCCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43ft) (Note 1)	IP20	
	②	Encoder cable for HC-SFS, HC-LFS, HC-RFS, HC-UFS 2000r/min series, HA-LFS series motor (Note 4)	MR-JHSCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1)	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) — Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug) — Encoder
			MR-JHSCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43ft) (Note 1)	IP20	
	③		MR-ENCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1, 5)	IP65 IP67	Backshell (made by DDK) CE02-20BS-S — Plug (made by DDK) MS3106A20-29S (D190) — Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) — Cable clamp (made by DDK) CE3057-12A-3 (D265)
	④	Encoder connector set for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor	MR-J2CNM	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) — Junction connector (made by AMP) 1-172161-9 (black connector housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by TOA ELECTRIC INDUSTRIAL) (Note 2)
	⑤	Encoder connector set for HC-SFS, HC-LFS, HC-RFS, HC-UFS 2000r/min series, HA-LFS series motor	MR-J2CNS	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) — Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug)
	⑥		MR-ENCNS	IP65 IP67	Plug (made by DDK) MS3106A20-29S (D190) — Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) — Backshell (straight) (made by DDK) CE02-20BS-S — Cable clamp (made by DDK) CE3057-12A-3 (D265)
For CN1A	⑦	Controller to amplifier bus cable	MR-J2HBUS□M-A □=cable length 0.5, 1, 5m (1.64, 3.28, 16.40ft)	—	Controller-side connector (made by HONDA TSUSHIN KOGYO) PCR-S20FS (connector) PCR-LS20LA1 (case) — Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
	⑧	For controller to amplifier connector set	MR-J2CN1-A	—	Controller-side connector (made by HONDA TSUSHIN KOGYO) PCR-S20FS (connector) PCR-LS20LA1 (case) — Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)

Notes: 1. -H and -L indicate bending life. -H products have a long bending life.
2. AMP 172161-1 (white) can be used for the connector housing. For connector pins, 170363-1 (bulk) can be used.
3. The model listed in the table is the soldered model. The model for press bonding is 10120-6000EL (connector) and 10320-3210-000 (shell kit).
4. MR-JHSCBL□M-H and -L are not IP65 compliant.
5. The encoder cable is not oil-resistant.
6. Refer to "MOTION CONTROLLER Q SERIES (L(NA)03014)" for the Q172 and Q173.
7. The HA-LFS601, 6014, 701M and 701M4 do not have a connector type motor power supply. Use only ②, ③, ⑤, ⑥ or ㉑.

● Cables and connectors (for MR-J2S-11KB (4) to MR-J2S-22KB (4))

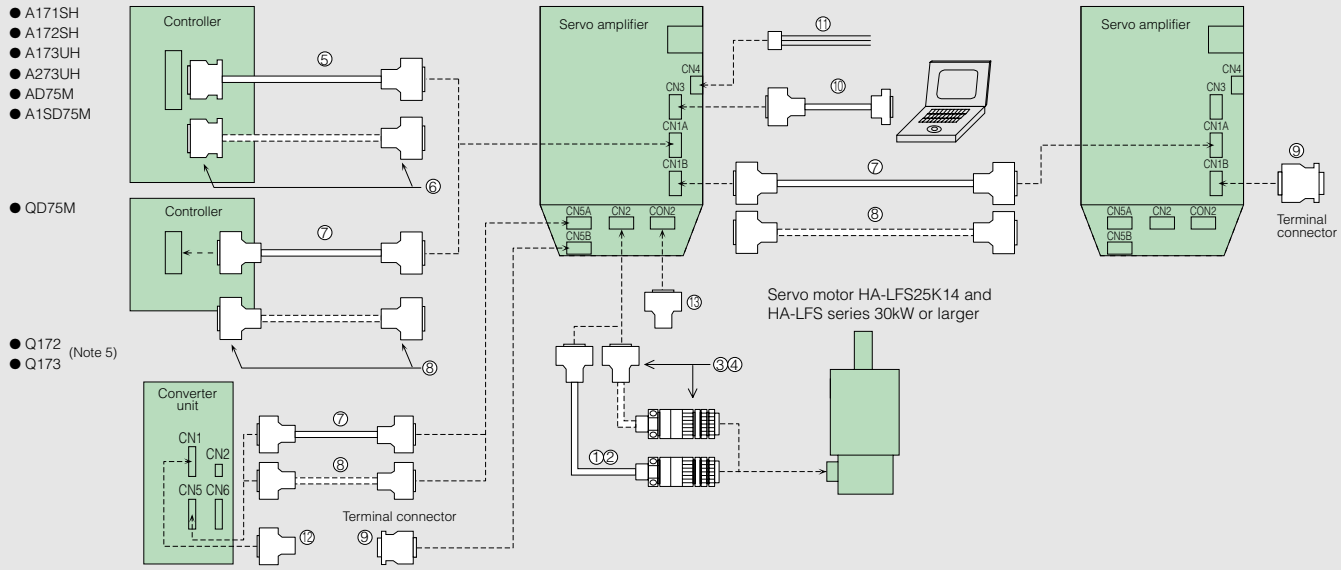
Optional cables and connectors are shown in the diagram below.



		Item	Model	Protection level	Description
For CN1A, CN1B	⑨	Controller to amplifier cable Amplifier to amplifier bus cable	MR-J2HBUS□M □=cable length 0.5, 1, 5m (1.64, 3.28, 16.40ft)	—	Connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
	⑩	Connector for controller or CN1	MR-J2CN1	—	For controller to amplifier connector set or for amplifier to amplifier connector set (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
For CN1B	⑪	Terminal connector	MR-A-TM	—	
For CN3	⑫	Personal computer communication cable	MR-CPCATCBL3M Cable length 3m (9.84ft)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Personal computer-side connector (made by Japan Aviation Electronics Industry) DE-9SF-N (connector) DE-C1-J6-S6 (case)
	⑬	Maintenance junction card cable	MR-J2HBUS□M □=cable length 0.5, 1, 5m (1.64, 3.28, 16.40ft)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3) Maintenance junction card connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 3)
For CN4	⑭	CN4 cable	MR-H3CBL1M Cable length 1m (3.28ft)	—	Amplifier-side connector (made by AMP) 171822-4 (housing) Note: Use with the 11kW or larger analog monitor output.
For CON2	⑮	CON2 connector	MR-J2CMP2	—	Amplifier-side connector (made by 3M, or an equivalent product) 10126-3000VE (connector) 10326-52F0-008 (shell kit)
Select one for use with motor power supply	⑯	Power supply connector set for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor	MR-PWCNK1	IP20	Plug (made by Molex) 5559-04P-210 Male terminal (made by Molex) 5558PBT3L (for AWG16)
	⑰	Power supply connector set for HC-KFS, HC-MFS, HC-UFS 3000r/min series motor with electromagnetic brake	MR-PWCNK2	IP20	Plug (made by Molex) 5559-06P-210 Male terminal (made by Molex) 5558PBT3L (for AWG16)
	⑱	Power supply connector set for HC-SFS81 HC-SFS52, 102, 152, 524, 1024, 1524 HC-SFS53, 103, 153 HC-LFS52, 102, 152 HC-RFS103, 153, 203 HC-UFS72, 152	MR-PWCNS1 (Straight type)	IP65 IP67	Plug (straight) (made by DDK) CE05-6A22-23SD-B-BSS Cable clamp (made by DDK) CE3057-12A-1 (D265)
	⑲	Power supply connector set for HC-SFS121, 201, 301 HC-SFS202, 352, 502, 2024, 3524, 5024 HC-SFS203, 353 HC-LFS202, 302 HC-RFS353, 503 HA-LFS502 HC-UFS202, 352, 502	MR-PWCNS2 (Straight type)	IP65 IP67	Plug (straight) (made by DDK) CE05-6A24-10SD-B-BSS Cable clamp (made by DDK) CE3057-16A-2 (D265)
	⑳	Power supply connector set for HC-SFS702, 7024 HA-LFS702	MR-PWCNS3 (Straight type)	IP65 IP67	Plug (straight) (made by DDK) CE05-6A32-17SD-B-BSS Cable clamp (made by DDK) CE3057-20A-1 (D265)
For brake	㉑	Brake connector set for HC-SFS121B, 201B, 301B HC-SFS202B, 352B, 502B, 702B, 2024B, 3524B, 5024B, 7024B HC-SFS203B, 353B HC-LFS202B, 302B HA-LFS601B, 801B, 12K1B, 6014B, 8014B, 12K14B HA-LFS701MB, 11K1MB, 15K1MB, 701M4B, 11K1M4B, 15K1M4B HA-LFS11K2B, 15K2B, 22K2B, 11K24B, 15K24B, 22K24B HC-UFS202B, 352B, 502B	MR-BKCN (Straight type)	IP65 IP67	Plug (made by DDK) MS3106A10SL-4S (D190) Cable connector (straight) (made by Daiwa Dengyo) YSO10-5 to 8
	㉒	Maintenance junction card	MR-J2CN3TM	—	This is required when using the personal computer and analog monitor output simultaneously. Note: The functions are restricted for the 11kW or larger. Refer to "MR-J2S-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

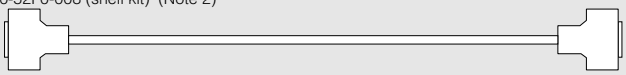
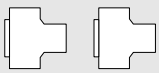
● Cables and connectors (for MR-J2S-30KB (4) or larger)

Optional cables and connectors are shown in the diagram below.



Item			Model	Protection level	Description
Select one for use with CN2	①	Encoder cable for HA-LFS series motor (Note 3)	MR-JHSCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1)	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug) Encoder
			MR-JHSCBL□M-L □=cable length 2, 5, 10, 20, 30m (6.56, 16.40, 32.81, 65.62, 98.43ft) (Note 1)	IP20	
	②		MR-ENCBL□M-H □=cable length 2, 5, 10, 20, 30, 50m (6.56, 16.40, 32.81, 65.62, 98.43, 164.04ft) (Note 1, 4)	IP65 IP67	Backshell (made by DDK) CE02-20BS-S Plug (made by DDK) MS3106A20-29S (D190) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Cable clamp (made by DDK) CE3057-12A-3 (D265)
	③	Encoder connector set for HA-LFS series motor	MR-J2CNS	IP20	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Encoder connector (made by DDK) MS3057-12A (cable clamp) MS3106B20-29S (straight plug)
	④		MR-ENCNS	IP65 IP67	Plug (made by DDK) MS3106A20-29S (D190) Backshell (straight) (made by DDK) CE02-20BS-S Cable clamp (made by DDK) CE3057-12A-3 (D265) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)
For CN1A	⑤	Controller to amplifier bus cable	MR-J2HBUS□M-A □=cable length 0.5, 1, 5m (1.64, 3.28, 16.40ft)	—	Controller-side connector (made by HONDA TSUSHIN KOGYO) PCR-S20FS (connector) PCR-LS20LA1 (case) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)
	⑥	For controller to amplifier connector set	MR-J2CN1-A	—	Controller-side connector (made by HONDA TSUSHIN KOGYO) PCR-S20FS (connector) PCR-LS20LA1 (case) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)

Notes: 1. -H and -L indicate bending life. -H products have a long bending life.
2. The model listed in the table is the soldered model. The model for press bonding is 10120-6000EL (connector) and 10320-3210-000 (shell kit).
3. MR-JHSCBL□M-H and -L are not IP65 compliant.
4. The encoder cable is not oil-resistant.
5. Refer to "MOTION CONTROLLER Q SERIES (L(NA)03014)" for the Q172 and Q173.
6. Keep the CN5 cable length to 1m (3.28ft) or shorter.

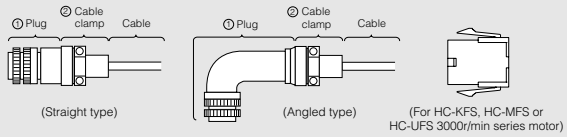
Item			Model	Protection level	Description
For CN1A, CN1B, CN5A, converter unit	⑦	Controller to amplifier cable Amplifier to amplifier bus cable CN5 cable	MR-J2HBUS□M □=cable length 0.5, 1, 5m (1.64, 3.28, 16.40ft) (Note 6)	—	Controller-side connector, amplifier-side connector or converter unit-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) 
	⑧	Connector for controller, CN1 or CN5	MR-J2CN1	—	 Controller-side connector, amplifier-side connector or converter unit-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2)
For CN1B, CN5B	⑨	Terminal connector	MR-A-TM	—	 Terminal connector
For CN3	⑩	Personal computer communication cable	MR-CPCATCBL3M Cable length 3m (9.84ft)	—	Amplifier-side connector (made by 3M, or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 2) Personal computer-side connector (made by Japan Aviation Electronics Industry) DE-9SF-N (connector) DE-C1-J6-S6 (case) 
For CN4	⑪	CN4 cable	MR-H3CBL1M Cable length 1m (3.28ft)	—	Amplifier-side connector (AMP) 171822-4 (housing) 
For converter unit	⑫	CN1 connector for converter unit	MR-HP4CN1	—	 Converter unit-side connector (made by 3M, or an equivalent product) 10114-3000VE (connector) 10314-52F0-008 (shell kit)
For CON2	⑬	CON2 connector	MR-J2CMP2	—	 Amplifier-side connector (made by 3M, or an equivalent product) 10126-3000VE (connector) 10326-52F0-008 (shell kit)

Ordering Information for Customers

Ordering information for customers

● Servo motor power supply connectors

The motors are not provided with power supply connectors. Order from previous pages, or choose from among the following recommended products. To order the following recommended products, contact the relevant manufacturer directly.



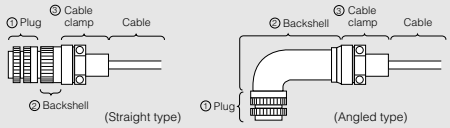
Motor model	Application	① Plug (made by DDK)		② Cable clamp (made by DDK)	
		Type	Model	Cable diameter mm (inch)	Model
HC-SFS81 HC-SFS52, 102, 152, 524, 1024, 1524 HC-SFS53, 103, 153 HC-LFS52, 102, 152 HC-RFS103, 153, 203 HC-UFS72, 152	IP65, IP67 EN standards	Straight	CE05-6A22-23SD-B-BSS	9.5 to 13 (0.374 to 0.512)	CE3057-12A-2 (D265)
				12.5 to 16 (0.492 to 0.630)	CE3057-12A-1 (D265)
		Angled	CE05-8A22-23SD-B-BAS	9.5 to 13 (0.374 to 0.512)	CE3057-12A-2 (D265)
				12.5 to 16 (0.492 to 0.630)	CE3057-12A-1 (D265)
	(Note) General environment	Straight	MS3106B22-23S	15.9 (0.626) (Inner diameter of bushing)	MS3057-12A
		Angled	MS3108B22-23S		MS3057-12A
HC-SFS121, 201, 301 HC-SFS202, 352, 502, 2024, 3524, 5024 HC-SFS203, 353 HC-LFS202, 302 HC-RFS353, 503 HA-LFS502 HC-UFS202, 352, 502	IP65, IP67 EN standards	Straight	CE05-6A24-10SD-B-BSS	13 to 15.5 (0.512 to 0.610)	CE3057-16A-2 (D265)
				15 to 19.1 (0.591 to 0.752)	CE3057-16A-1 (D265)
		Angled	CE05-8A24-10SD-B-BAS	13 to 15.5 (0.512 to 0.610)	CE3057-16A-2 (D265)
				15 to 19.1 (0.591 to 0.752)	CE3057-16A-1 (D265)
	(Note) General environment	Straight	MS3106B24-10S	15.9 (0.626), 19.1 (0.752) (Inner diameter of bushing)	MS3057-16A
		Angled	MS3108B24-10S		MS3057-16A
HC-SFS702, 7024 HA-LFS702	IP65, IP67 EN standards	Straight	CE05-6A32-17SD-B-BSS	22 to 23.8 (0.866 to 0.937)	CE3057-20A-1 (D265)
		Angled	CE05-8A32-17SD-B-BAS	22 to 23.8 (0.866 to 0.937)	CE3057-20A-1 (D265)
	(Note) General environment	Straight	MS3106B32-17S	19.1 (0.752), 23.8 (0.937) (Inner diameter of bushing)	MS3057-20A
		Angled	MS3108B32-17S		MS3057-20A

Note: Not compliant with EN standards.

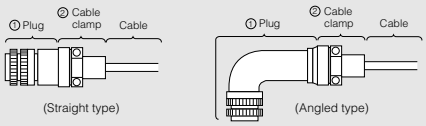
Motor model	Application	(made by Molex)	
HC-KFS, HC-MFS series HC-UFS 3000r/min series	General environment EN standards	without Brake	Plug 5559-04P-210 male terminal 5558PBT3L (AWG16)
		with Brake	Plug 5559-06P-210 male terminal 5558PBT3L (AWG16)

● Encoder connectors

The following motors are not provided with encoder connectors. Order from previous pages, or choose from among the following recommended products. To order the following recommended products, contact the relevant manufacturer directly.



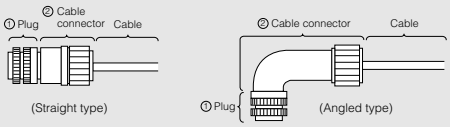
Motor model	Application	① Plug (made by DDK)	② Backshell (made by DDK)		③ Cable clamp (made by DDK)	
			Type	Model	Cable diameter mm (inch)	Model
HC-SFS, HC-LFS, HC-RFS, HA-LFS series HC-UFS 2000r/min series	IP65, IP67	MS3106A20-29S (D190)	Straight	CE02-20BS-S	6.8 to 10 (0.268 to 0.394)	CE3057-12A-3 (D265)
			Angled	CE-20BA-S		



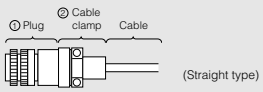
Motor model	Application	① Plug (made by DDK)		② Cable clamp (made by DDK)	
		Type	Model	Cable diameter mm (inch)	Model
HC-SFS, HC-LFS, HC-RFS, HA-LFS series HC-UFS 2000r/min series	General environment	Straight	MS3106B20-29S	15.9 (0.626) (Inner diameter of bushing)	MS3057-12A
		Angled	MS3108B20-29S		

● Brake connectors

The following motors are not provided with brake connectors. Order from previous pages, or choose from among the following recommended products. To order the following recommended products, contact the relevant manufacturer directly.



Motor model	Application	① Plug (made by DDK)	② Cable connector			
		Model	Type	Cable diameter mm (inch)	Model	Manufacturer
HC-SFS121B, 201B, 301B HC-SFS202B, 352B, 502B, 702B, 2024B, 3524B, 5024B, 7024B HC-SFS203B, 353B HC-LFS202B, 302B HC-UFS202B, 352B, 502B	IP65 IP67	MS3106A10SL-4S (D190)	Straight	4 to 8 (0.157 to 0.315)	ACS-08RL-MS10F	Nippon Flex
				8 to 12 (0.315 to 0.472)	ACS-12RL-MS10F	
				5 to 8.3 (0.197 to 0.327)	YSO10-5~8	Daiwa Dengyo
			Angled	4 to 8 (0.157 to 0.315)	ACA-08RL-MS10F	Nippon Flex
				8 to 12 (0.315 to 0.472)	ACA-12RL-MS10F	
				5 to 8.3 (0.197 to 0.327)	YLO10-5~8	Daiwa Dengyo



Motor model	Application	① Plug (made by DDK)		② Cable clamp (made by DDK)	
		Type	Model	Cable diameter mm (inch)	Model
HC-SFS121B, 201B, 301B HC-SFS202B, 352B, 502B, 702B, 2024B, 3524B, 5024B, 7024B HC-SFS203B, 353B HC-LFS202B, 302B HA-LFS601B, 801B, 12K1B, 6014B, 8014B, 12K14B HA-LFS701MB, 11K1MB, 15K1MB, 701M4B, 11K1M4B, 15K1M4B HA-LFS11K2B, 15K2B, 22K2B, 11K24B, 15K24B, 22K24B HC-UFS202B, 352B, 502B	General environment	Straight	MS3106A10SL-4S	5.6 (0.220) (Inner diameter of bushing)	MS3057-4A

Options

● Power factor improvement reactor (FR-BAL, FR-BEL, MR-DCL)

This reactor enables users to boost the servo amplifier's power factor and reduce its power supply capacity.

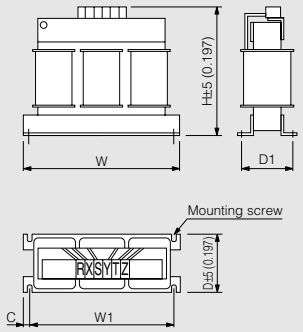
Type	Model	Applicable servo amplifier	Fig.
AC reactor	FR-BAL-0.4K	MR-J2S-10A/A1/B/B1/CP/CP1/CL/CL1 MR-J2S-20A/B/CP/CL	A
	FR-BAL-0.75K	MR-J2S-40A/B/CP/CL MR-J2S-20A1/B1/CP1/CL1	
	FR-BAL-1.5K	MR-J2S-60A/B/CP/CL MR-J2S-70A/B/CP/CL (-U□) MR-J2S-40A1/B1/CP1/CL1	
	FR-BAL-2.2K	MR-J2S-100A/B/CP/CL	
	FR-BAL-3.7K	MR-J2S-200A/B/CP/CL	
	FR-BAL-7.5K	MR-J2S-350A/B/CP/CL	
	FR-BAL-11K	MR-J2S-500A/B/CP/CL	
	FR-BAL-15K	MR-J2S-700A/B/CP/CL MR-J2S-11KA/B	
	FR-BAL-22K	MR-J2S-15KA/B	
	FR-BAL-30K	MR-J2S-22KA/B	

Type	Model	Applicable servo amplifier	Fig.
AC reactor	FR-BAL-H1.5K	MR-J2S-60A4/B4	A
	FR-BAL-H2.2K	MR-J2S-100A4/B4	
	FR-BAL-H3.7K	MR-J2S-200A4/B4	
	FR-BAL-H7.5K	MR-J2S-350A4/B4	
	FR-BAL-H11K	MR-J2S-500A4/B4	
	FR-BAL-H15K	MR-J2S-700A4/B4 MR-J2S-11KA4/B4	
	FR-BAL-H22K	MR-J2S-15KA4/B4	
	FR-BAL-H30K	MR-J2S-22KA4/B4	
DC reactor	FR-BEL-15K	MR-J2S-11KA/B	B
	FR-BEL-22K	MR-J2S-15KA/B	
	FR-BEL-30K	MR-J2S-22KA/B	
	FR-BEL-H15K	MR-J2S-11KA4/B4	
	FR-BEL-H22K	MR-J2S-15KA4/B4	
	FR-BEL-H30K	MR-J2S-22KA4/B4	
	MR-DCL30K	MR-J2S-30KA/B	C
	MR-DCL37K	MR-J2S-37KA/B	
	MR-DCL30K-4	MR-J2S-30KA4/B4	
	MR-DCL37K-4	MR-J2S-37KA4/B4	
	MR-DCL45K-4	MR-J2S-45KA4/B4	
	MR-DCL55K-4	MR-J2S-55KA4/B4	

External dimensions

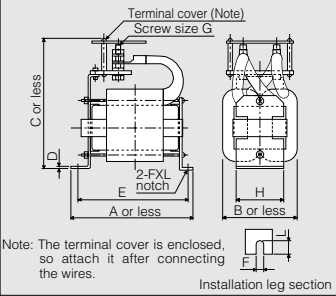
Unit: mm (inch)

A



Type	Variable dimensions mm (inch)						Mounting screw size	Terminal screw size	Mass kg (lb)
	W	W1	H	D	D1	C			
FR-BAL-0.4K	135 (5.31)	120 (4.72)	115 (4.53)	59 (2.32)	45 $^{0}_{-2.5}$ (1.77 $^{0}_{-0.0984}$)	7.5 (0.3)	M4	M3.5	2.0 (4.4)
FR-BAL-0.75K	135 (5.31)	120 (4.72)	115 (4.53)	69 (2.72)	57 $^{0}_{-2.5}$ (2.24 $^{0}_{-0.0984}$)	7.5 (0.3)	M4	M3.5	2.8 (6.2)
FR-BAL-1.5K	160 (6.3)	145 (5.71)	140 (5.51)	71 (2.8)	55 $^{0}_{-2.5}$ (2.17 $^{0}_{-0.0984}$)	7.5 (0.3)	M4	M3.5	3.7 (8.2)
FR-BAL-2.2K	160 (6.3)	145 (5.71)	140 (5.51)	91 (3.58)	75 $^{0}_{-2.5}$ (2.95 $^{0}_{-0.0984}$)	7.5 (0.3)	M4	M3.5	5.6 (12.3)
FR-BAL-3.7K	220 (8.66)	200 (7.87)	192 (7.56)	90 (3.54)	70 $^{0}_{-2.5}$ (2.76 $^{0}_{-0.0984}$)	10 (0.39)	M5	M4	8.5 (18.7)
FR-BAL-7.5K	220 (8.66)	200 (7.87)	194 (7.64)	120 (4.72)	100 $^{0}_{-2.5}$ (3.94 $^{0}_{-0.0984}$)	10 (0.39)	M5	M5	14.5 (31.9)
FR-BAL-11K	280 (11.02)	255 (10.04)	220 (8.66)	135 (5.31)	100 $^{0}_{-2.5}$ (3.94 $^{0}_{-0.0984}$)	12.5 (0.49)	M6	M6	19 (41.9)
FR-BAL-15K	295 (11.61)	270 (10.63)	275 (10.83)	133 (5.24)	110 $^{0}_{-2.5}$ (4.33 $^{0}_{-0.0984}$)	12.5 (0.49)	M6	M6	27 (59.5)
FR-BAL-22K	290 (11.42)	240 (9.45)	301 (11.85)	199 (7.83)	170±5 (6.69±0.1969)	25 (0.98)	M8	M8	35 (77.1)
FR-BAL-30K	290 (11.42)	240 (9.45)	301 (11.85)	219 (8.62)	190±5 (7.48±0.1969)	25 (0.98)	M8	M8	43 (94.7)
FR-BAL-H1.5K	160 (6.3)	145 (5.71)	140 (5.51)	87 (3.43)	70 $^{0}_{-2.5}$ (2.76 $^{0}_{-0.0984}$)	7.5 (0.3)	M4	M3.5	5.3 (11.7)
FR-BAL-H2.2K	160 (6.3)	145 (5.71)	140 (5.51)	91 (3.58)	75 $^{0}_{-2.5}$ (2.95 $^{0}_{-0.0984}$)	7.5 (0.3)	M4	M3.5	5.9 (13)
FR-BAL-H3.7K	220 (8.66)	200 (7.87)	190 (7.48)	90 (3.54)	70 $^{0}_{-2.5}$ (2.76 $^{0}_{-0.0984}$)	10 (0.39)	M5	M3.5	8.5 (18.7)
FR-BAL-H7.5K	220 (8.66)	200 (7.87)	192 (7.56)	120 (4.72)	100±5 (3.94±0.1969)	10 (0.39)	M5	M4	14 (30.8)
FR-BAL-H11K	280 (11.02)	255 (10.04)	226 (8.9)	130 (5.12)	100±5 (3.94±0.1969)	12.5 (0.49)	M6	M5	18.5 (40.8)
FR-BAL-H15K	295 (11.61)	270 (10.63)	244 (9.61)	130 (5.12)	110±5 (4.33±0.1969)	12.5 (0.49)	M6	M5	27 (59.5)
FR-BAL-H22K	290 (11.42)	240 (9.45)	269 (10.59)	199 (7.83)	170±5 (6.69±0.1969)	25 (0.98)	M8	M8	35 (77.1)
FR-BAL-H30K	290 (11.42)	240 (9.45)	290 (11.42)	219 (8.62)	190±5 (7.48±0.1969)	25 (0.98)	M8	M8	43 (94.7)

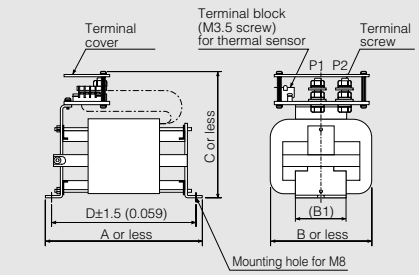
B



Note: The terminal cover is enclosed, so attach it after connecting the wires.

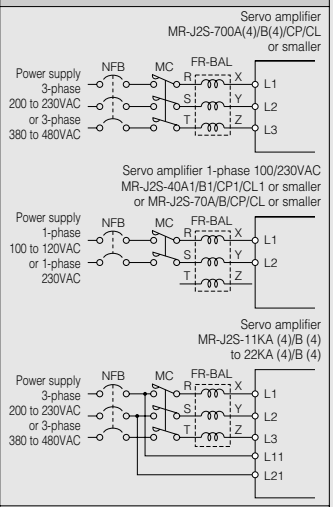
Type	Variable dimensions mm (inch)									Mounting screw size	Mass kg (lb)	Wire size (mm²)
	A	B	C	D	E	F	L	G	H			
FR-BEL-15K	170 (6.69)	93 (3.66)	170 (6.69)	2.3 (0.09)	155 (6.1)	6 (0.24)	14 (0.55)	M8	56 (2.2)	M5	3.8 (8.4)	22 (AWG4)
FR-BEL-22K	185 (7.28)	119 (4.69)	182 (7.17)	2.6 (0.1)	165 (6.5)	7 (0.28)	15 (0.59)	M8	70 (2.76)	M6	5.4 (11.9)	30 (AWG2)
FR-BEL-30K	185 (7.28)	119 (4.69)	201 (7.91)	2.6 (0.1)	165 (6.5)	7 (0.28)	15 (0.59)	M8	70 (2.76)	M6	6.7 (14.8)	60 (AWG2/0)
FR-BEL-H15K	170 (6.69)	93 (3.66)	160 (6.3)	2.3 (0.09)	155 (6.1)	6 (0.24)	14 (0.55)	M6	56 (2.2)	M5	3.7 (8.2)	8 (AWG8)
FR-BEL-H22K	185 (7.28)	119 (4.69)	171 (6.73)	2.6 (0.1)	165 (6.5)	7 (0.28)	15 (0.59)	M6	70 (2.76)	M6	5.0 (11)	22 (AWG4)
FR-BEL-H30K	185 (7.28)	119 (4.69)	189 (7.44)	2.6 (0.1)	165 (6.5)	7 (0.28)	15 (0.59)	M6	70 (2.76)	M6	6.7 (14.8)	22 (AWG4)

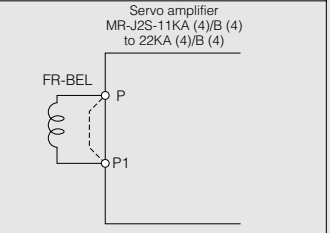
C



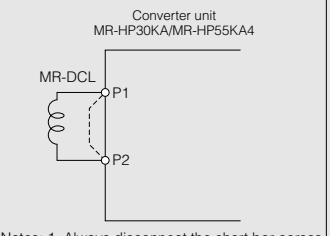
Type	Variable dimensions mm (inch)					Terminal screw size	Mass kg (lb)	Wire size (mm²)
	A	B	B1	C	D			
MR-DCL30K	255 (10.04)	135 (5.31)	80 (3.15)	215 (8.46)	232 (9.13)	M12	9.5 (20.9)	60 (AWG2/0)
MR-DCL37K								80 (AWG3/0)
MR-DCL30K-4	205 (8.07)	135 (5.31)	75 (2.95)	200 (7.87)	175 (6.89)	M8	6.5 (14.3)	30 (AWG2)
MR-DCL37K-4	225 (8.86)	135 (5.31)	80 (3.15)	200 (7.87)	197 (7.76)	M8	7 (15.4)	38 (AWG2)
MR-DCL45K-4	240 (9.45)	135 (5.31)	80 (3.15)	200 (7.87)	212 (8.35)	M8	7.5 (16.5)	50 (AWG1/0)
MR-DCL55K-4	260 (10.24)	135 (5.31)	80 (3.15)	215 (8.46)	232 (9.13)	M8	9.5 (20.9)	60 (AWG2/0)

Connections





Notes: 1. Always disconnect the short bar across P-P1 when using the DC reactor.
2. Connect a DC reactor using the 5m (16.4ft) or shorter electric wire.



Notes: 1. Always disconnect the short bar across P1-P2 when using the DC reactor.
2. Connect a DC reactor using the 5m (16.4ft) or shorter electric wire.

Options

● Optional regeneration unit

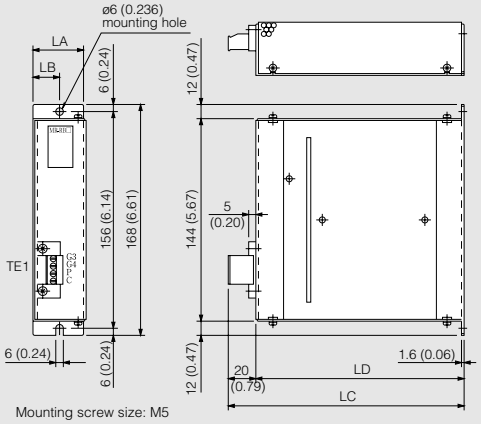
Servo amplifier model (MR-J2S-)	Built-in regenerative resistor/ tolerable regenerative power (W)	Standard accessory (external regenerative resistor)/tolerable regenerative power (W)					
		GRZG400-					
		2Ω×4	1Ω×5	0.8Ω×5	5Ω×4	2.5Ω×5	2Ω×5
10A(1)/B(1)/CP(1)/CL(1)	—	—	—	—	—	—	—
20A(1)/B(1)/CP(1)/CL(1)	10	—	—	—	—	—	—
40A(1)/B(1)/CP(1)/CL(1)	10	—	—	—	—	—	—
60A/B/CP/CL	10	—	—	—	—	—	—
70A/B/CP/CL(-U□)	20	—	—	—	—	—	—
100A/B/CP/CL	20	—	—	—	—	—	—
200A/B/CP/CL	100	—	—	—	—	—	—
350A/B/CP/CL	100	—	—	—	—	—	—
500A/B/CP/CL	130	—	—	—	—	—	—
700A/B/CP/CL	170	—	—	—	—	—	—
11KA/B	—	500 (800)	—	—	—	—	—
15KA/B	—	—	850 (1300)	—	—	—	—
22KA/B	—	—	—	850 (1300)	—	—	—
30KA/B	—	—	—	—	—	—	—
37KA/B	—	—	—	—	—	—	—
60A4/B4	10	—	—	—	—	—	—
100A4/B4	20	—	—	—	—	—	—
200A4/B4	100	—	—	—	—	—	—
350A4/B4	100	—	—	—	—	—	—
500A4/B4	130	—	—	—	—	—	—
700A4/B4	170	—	—	—	—	—	—
11KA4/B4	—	—	—	—	500 (800)	—	—
15KA4/B4	—	—	—	—	—	850 (1300)	—
22KA4/B4	—	—	—	—	—	—	850 (1300)
30KA4/B4	—	—	—	—	—	—	—
37KA4/B4	—	—	—	—	—	—	—
45KA4/B4	—	—	—	—	—	—	—
55KA4/B4	—	—	—	—	—	—	—

Notes: 1. The tolerable regenerative power in the table differs from the regenerative resistor's rated wattage.
2. For the values given in parentheses, install cooling fans (approx. 1.0m³/min, □92×2 units), and change the parameter No. 0 (for MR-J2S-A type) or No. 2 (for MR-J2S-B type).

External dimensions

Unit: mm (inch)

● MR-RB032, MR-RB12



Mounting screw size: M5

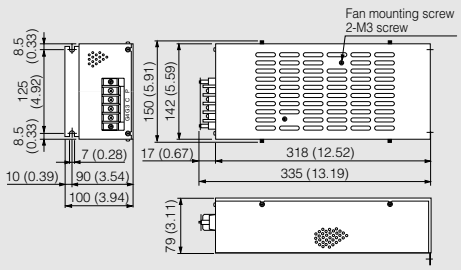
<Terminal arrangement>

TE1
G3
G4
P
C

Terminal screw size: M3

Type	Variable dimensions				Mass kg (lb)
	LA	LB	LC	LD	
MR-RB032	30 (1.18)	15 (0.59)	119 (4.69)	99 (3.90)	0.5 (1.1)
MR-RB12	40 (1.57)	15 (0.59)	169 (6.65)	149 (5.87)	1.1 (2.4)

● MR-RB30, MR-RB31, MR-RB32



Mounting screw size: M6

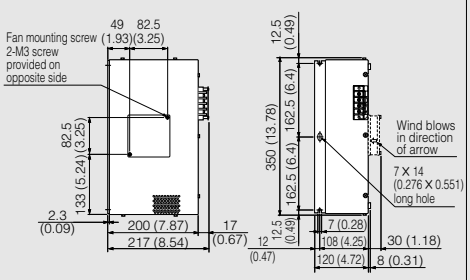
Type	Mass kg (lb)
MR-RB30	2.9 (6.4)
MR-RB31	2.9 (6.4)
MR-RB32	2.9 (6.4)

<Terminal arrangement>

P
C
G3
G4

Terminal screw size: M4

● MR-RB50, MR-RB51



Mounting screw size: M6

Type	Mass kg (lb)
MR-RB50	5.6 (12.3)
MR-RB51	5.6 (12.3)

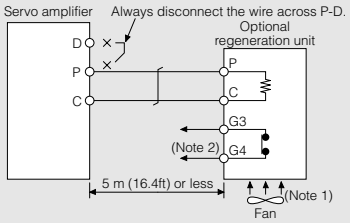
<Terminal arrangement>

P
C
G3
G4

Terminal screw size: M4

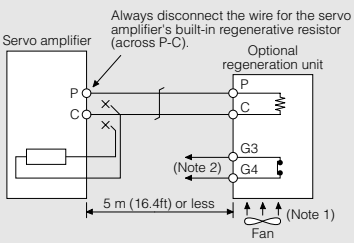
Connections

● MR-J2S-350□ or smaller



Notes: 1. When using the MR-RB50, always forcibly cool with a cooling fan (approx. 1.0m³/min, □92). The cooling fan must be ordered by user.
2. Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

● MR-J2S-500□, 700□



Notes: 1. When using the MR-RB50 and MR-RB51, always forcibly cool with a cooling fan (approx. 1.0m³/min, □92). The cooling fan must be ordered by user.
2. Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

Notes: 1. The optional regeneration unit will heat up to approx. 100°C (212°F), so do not directly mount it on a wall susceptible to heat. Use nonflammable wires or provide flame resistant treatment (use silicon tubes, etc.), and wire so that the wires do not contact the optional regeneration unit.
2. Always use twisted wires for the optional regeneration unit, and keep the length as short as possible (5m (16.4ft) or less).

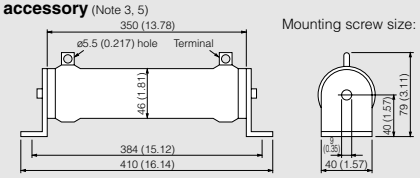
Optional regeneration unit/tolerable regenerative power (W)																								Resistance value (Ω)
MR-RB																								
032	12	30	31	32	50	51	65	66	67	139	137	1L-4	3M-4	3H-4	3G-4	34-4	5H-4	5G-4	54-4	6B-4	60-4	6K-4	136-4	138-4	
30	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	40
30	100	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	40
30	100	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	40
30	100	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	40
30	100	×	×	300	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	40
30	100	×	×	300	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	40
×	×	300	×	×	500	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	13
×	×	300	×	×	500	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	13
×	×	300	×	×	500	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	13
×	×	×	300	×	×	500	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	6.7
×	×	×	×	×	×	×	500 (800)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	8
×	×	×	×	×	×	×	×	850 (1300)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	5
×	×	×	×	×	×	×	×	×	850 (1300)	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	4
×	×	×	×	×	×	×	×	×	×	1300	3900	×	×	×	×	×	×	×	×	×	×	×	×	×	1.3 (Note 3)
×	×	×	×	×	×	×	×	×	×	1300	3900	×	×	×	×	×	×	×	×	×	×	×	×	×	1.3 (Note 3)
×	×	×	×	×	×	×	×	×	×	×	×	100	×	×	×	×	×	×	×	×	×	×	×	×	270
×	×	×	×	×	×	×	×	×	×	×	×	×	300	×	×	×	×	×	×	×	×	×	×	×	120
×	×	×	×	×	×	×	×	×	×	×	×	×	×	300	×	×	500	×	×	×	×	×	×	×	80
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	300	×	×	500	×	×	×	×	×	×	47
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	300	×	×	500	×	×	×	×	×	×	47
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	300	×	×	500	×	×	×	×	×	26
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	500 (800)	×	×	×	×	20
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	850 (1300)	×	×	×	12.5
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	850 (1300)	×	×	10
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	1300	3900	5 (Note 3)
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	1300	3900	5 (Note 3)
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	1300	3900	5 (Note 3)
×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	1300	3900	5 (Note 3)

3. As for MR-RB137 or MR-RB138-4, this is the value when 3 regeneration units are connected.

External dimensions

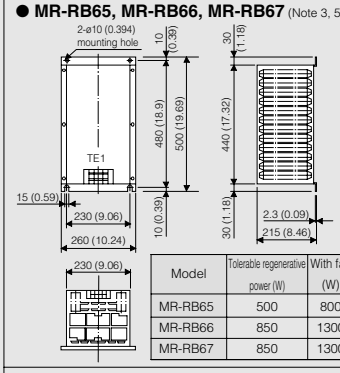
Unit: mm (inch)

● GRZG400-2Ω, GRZG400-1Ω, GRZG400-0.8Ω:Standard accessory (Note 3, 5)



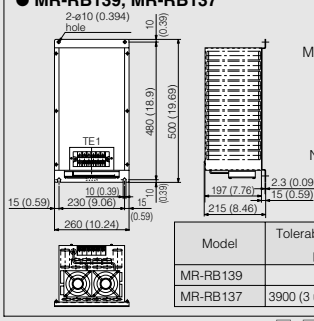
Model	Qty.	Tolerable regenerative power (W)	With fan (W)	Resistance value (Ω)	Mass/unit kg (lb)
GRZG400-2Ω	4	500	800	8 (2Ω×4)	0.8 (1.8)
GRZG400-1Ω	5	850	1300	5 (1Ω×5)	0.8 (1.8)
GRZG400-0.8Ω	5	850	1300	4 (0.8Ω×5)	0.8 (1.8)

● MR-RB65, MR-RB66, MR-RB67 (Note 3, 5)



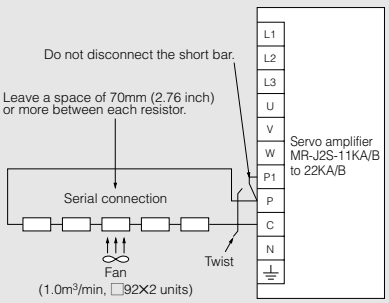
Model	Tolerable regenerative power (W)	With fan (W)	Description	Mass kg (lb)
MR-RB65	500	800	GRZG400-2Ω×4	10 (22)
MR-RB66	850	1300	GRZG400-1Ω×5	11 (24.2)
MR-RB67	850	1300	GRZG400-0.8Ω×5	11 (24.2)

● MR-RB139, MR-RB137

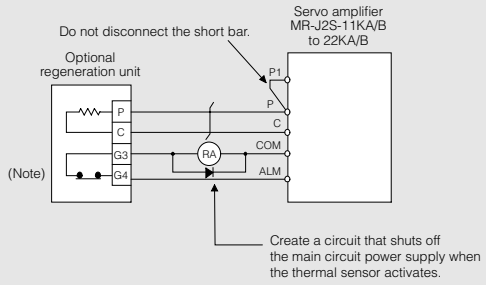


Model	Tolerable regenerative power (W)	Mass kg (lb)
MR-RB139	1300	10 (22)
MR-RB137	3900 (3 units are required.)	11 (24.2)

Connections

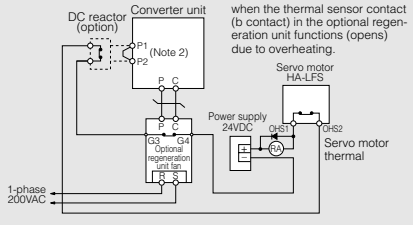


Note: By installing the thermal sensor, create a safety circuit that shuts off the main circuit power supply when abnormal overheating occurs.



Note: Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

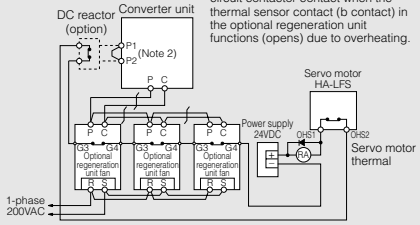
● MR-RB139



✻Create an external sequence that turns off the servo amplifier's main circuit contactor contact when the thermal sensor contact (b contact) in the optional regeneration unit functions (opens) due to overheating.

Notes: 1. Connect MR-RB139 to the converter unit.
2. Disconnect the short bar across P1–P2 when using the DC reactor.

● MR-RB137



✻Create an external sequence that turns off the servo amplifier's main circuit contactor contact when the thermal sensor contact (b contact) in the optional regeneration unit functions (opens) due to overheating.

Notes: 1. Connect MR-RB137 to the converter unit.
2. Disconnect the short bar across P1–P2 when using the DC reactor.

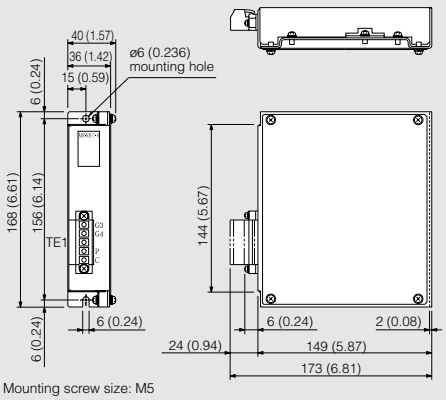
3. The servo amplifier (MR-J2S-□K□-PX) without enclosed regenerative resistor is available for the servo amplifiers MR-J2S-11KA/B to 22KA/B.
4. Always use twisted wires for a thermal sensor, and make sure that the sensor does not fail to work properly due to inducted noise.
5. When increasing the regeneration braking frequency, install cooling fans (approx. 1.0m³/min, □92×2 units) and change the parameter No. 0 (for MR-J2S-A type) or No. 2 (for MR-J2S-B type). The cooling fan must be ordered by user.

Options

● Optional regeneration unit

External dimensions Unit: mm (inch)

● MR-RB1L-4



Mounting screw size: M5

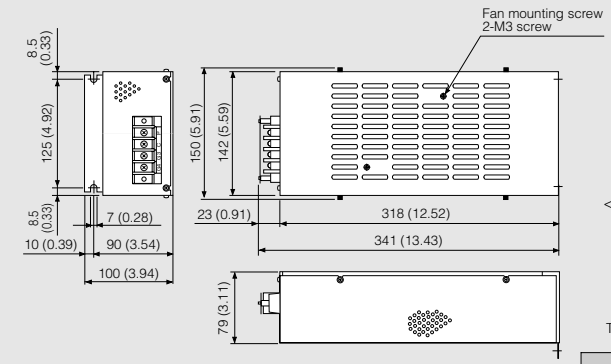
<Terminal arrangement>

TE1
G3
G4
P
C

Terminal screw size: M3

Type	Mass kg (lb)
MR-RB1L-4	1.1 (2.4)

● MR-RB3M-4, MR-RB3H-4, MR-RB3G-4, MR-RB34-4



Mounting screw size: M6

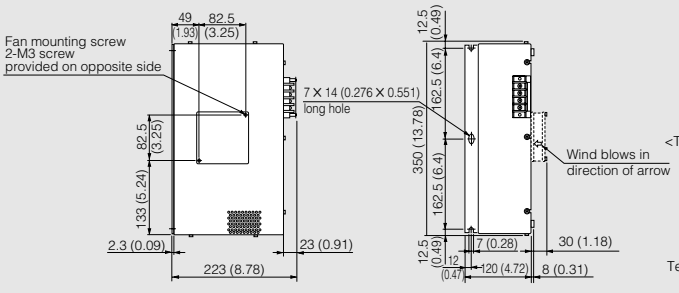
<Terminal arrangement>

P
C
G3
G4

Terminal screw size: M4

Model	Mass kg (lb)
MR-RB3M-4	2.9 (6.4)
MR-RB3H-4	2.9 (6.4)
MR-RB3G-4	2.9 (6.4)
MR-RB34-4	2.9 (6.4)

● MR-RB5H-4, MR-RB5G-4, MR-RB54-4



Mounting screw size: M6

<Terminal arrangement>

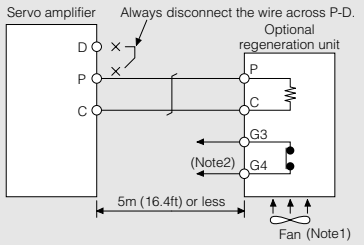
P
C
G3
G4

Terminal screw size: M4

Model	Mass kg (lb)
MR-RB5H-4	5.6 (12.3)
MR-RB5G-4	5.6 (12.3)
MR-RB54-4	5.6 (12.3)

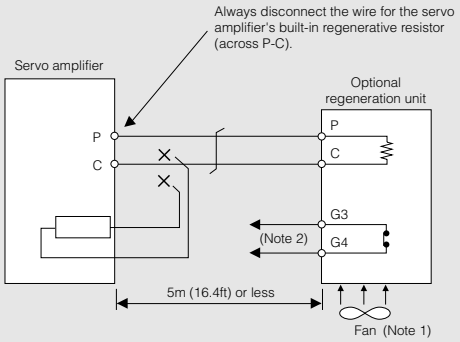
Connections

● MR-J2S-200A4/B4 or smaller



Notes: 1. When using the MR-RB5H-4, always forcibly cool with a cooling fan (approx. 1.0m³/min, □92). The cooling fan must be ordered by user.
2. Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

● MR-J2S-350A4/B4 to 700A4/B4



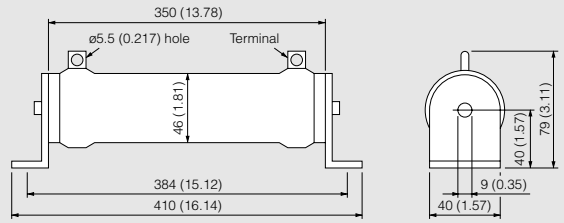
Notes: 1. When using the MR-RB5G-4 or MR-RB54-4, always forcibly cool with a cooling fan (approx. 1.0m³/min, □92). The cooling fan must be ordered by user.
2. Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

Notes: 1. The optional regeneration unit will heat up to approx. 100°C (212°F), so do not directly mount it on a wall susceptible to heat. Use nonflammable wires or provide flame resistant treatment (use silicon tubes, etc.), and wire so that the wires do not contact the optional regeneration unit.
2. Always use twisted wires for the optional regeneration unit, and keep the length as short as possible (5m (16.4ft) or less).

External dimensions Unit: mm (inch)

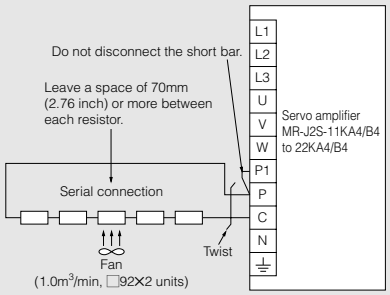
Connections

● **GRZG400-5Ω, GRZG400-2.5Ω, GRZG400-2Ω: Standard accessory** (Note 3, 5)



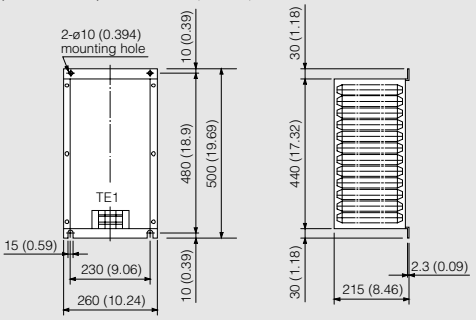
Mounting screw size: M5

Model	Qty.	Tolerable regenerative power (W)	With fan (W)	Resistance value (Ω)	Mass/unit kg (lb)
GRZG400-5Ω	4	500	800	20 (5Ω×4)	0.8 (1.8)
GRZG400-2.5Ω	5	850	1300	12.5 (2.5Ω×5)	0.8 (1.8)
GRZG400-2Ω	5	850	1300	10 (2Ω×5)	0.8 (1.8)



Note: By installing the thermal sensor, create a safety circuit that shuts off the main circuit power supply when abnormal overheating occurs.

● **MR-RB6B-4, MR-RB60-4, MR-RB6K-4** (Note 3, 5)

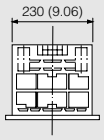


<Terminal arrangement>

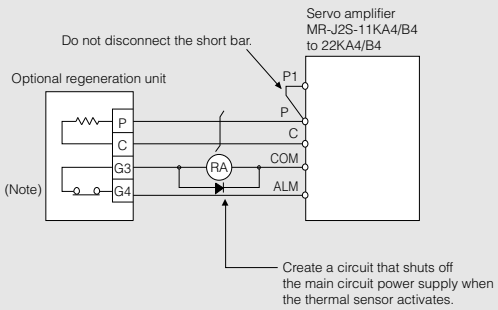
TE1	G4	G3	C	P

Terminal screw size: M5

Mounting screw size: M8

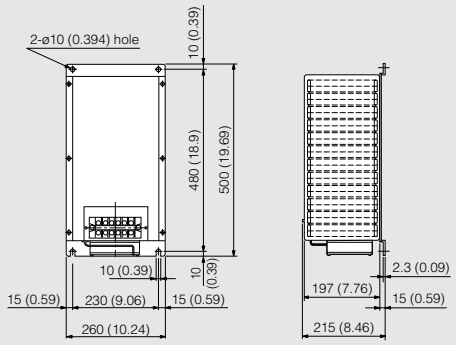


Model	Tolerable regenerative power (W)	With fan (W)	Description	Mass kg (lb)
MR-RB6B-4	500	800	GRZG400-5Ω×4	10 (22)
MR-RB60-4	850	1300	GRZG400-2.5Ω×5	11 (24.2)
MR-RB6K-4	850	1300	GRZG400-2Ω×5	11 (24.2)



Note: Create a sequence that turns off the magnetic contactor (MC) when abnormal overheating occurs.

● **MR-RB136-4, MR-RB138-4**

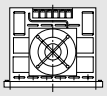


<Terminal arrangement>

R400	S400	G4	G3	C	P

Terminal screw size: M5

Mounting screw size: M8

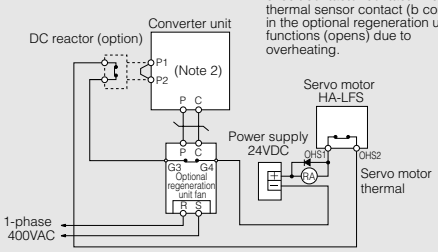


Model	Tolerable regenerative power (W)	Mass kg (lb)
MR-RB136-4	1300	10 (22)
MR-RB138-4	3900 (3 units are required.)	11 (24.2)

Note: 3 units of MR-RB138-4 are required for each servo amplifier.

● **MR-RB136-4**

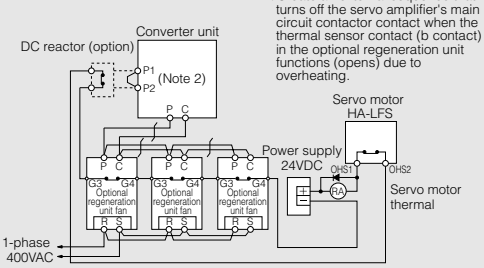
✻Create an external sequence that turns off the servo amplifier's main circuit contactor contact when the thermal sensor contact (b contact) in the optional regeneration unit functions (opens) due to overheating.



Notes: 1. Connect MR-RB136-4 to the converter unit.
2. Disconnect the short bar across P1-P2 when using the DC reactor.

● **MR-RB138-4**

✻Create an external sequence that turns off the servo amplifier's main circuit contactor contact when the thermal sensor contact (b contact) in the optional regeneration unit functions (opens) due to overheating.

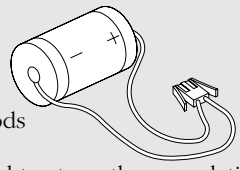


Notes: 1. Connect MR-RB138-4 to the converter unit.
2. Disconnect the short bar across P1-P2 when using the DC reactor.

3. The servo amplifier (MR-J2S-□K□4-PX) without enclosed regenerative resistor is available for the servo amplifiers MR-J2S-11KA4/B4 to 22KA4/B4.
4. Always use twisted wires for a thermal sensor, and make sure that the sensor does not fail to work properly due to inducted noise.
5. When increasing the regeneration braking frequency, install cooling fans (approx. 1.0m³/min, □92 x 2 units) and change the parameter No. 0 (for MR-J2S-A type) or No. 2 (for MR-J2S-B type). The cooling fan must be ordered by user.

Options

● Battery (MR-BAT)



The servo motor's absolute value can be maintained by installing a battery in the servo amplifier.
There is no need to install the battery when your servo system is used in an incremental mode.

Notes: 1. A6BAT can be used also.

2. The 44th Edition of the IATA (International Air Transportation Association) Dangerous Goods Regulations was effected in January 1st, 2003 and administered immediately.
In this edition, the provisions relating to lithium and lithium ion batteries have been revised to strengthen regulations on the air transportation of battery.
This battery is not dangerous goods (not class 9). Therefore, 24 units or less of batteries are not subject to the regulations.

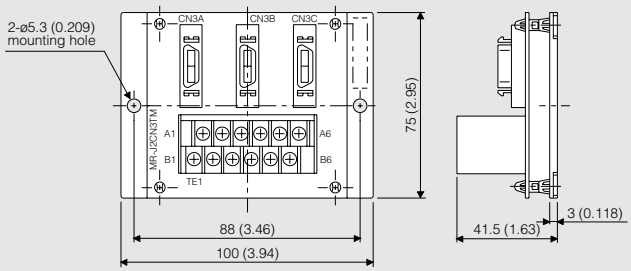
Type	MR-BAT
Nominal voltage	3.6V
Nominal capacity	1700mAh
Lithium content	0.48g

These batteries more than 24 units require packing based on Packing Instruction 903.
If you need the self-certification form for the battery safety test, contact Mitsubishi.
For more information, contact Mitsubishi. (as of July, 2004)

● Maintenance relay card (MR-J2CN3TM) ... Use with MR-J2S-700A (4)/B (4)/CP/CL or smaller

The maintenance relay card is used when using the personal computer and analog monitor output simultaneously.

External dimensions Unit: mm (inch)



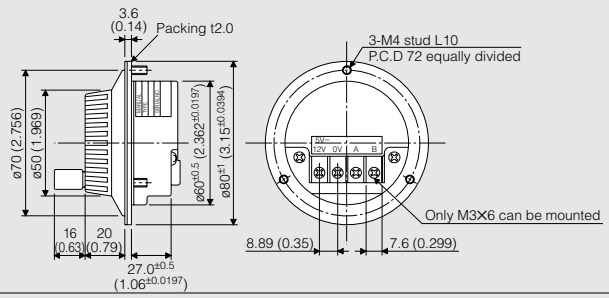
Notes:
1. Use the MR-J2HBUS□M for the maintenance relay card cable.
2. Use the connector CN4 and cable MR-H3CBL1M for the MR-J2S-11KA(4)/B(4) or larger analog monitor output.

Model	Mass kg (lb)
MR-J2CN3TM	0.11 (0.24)

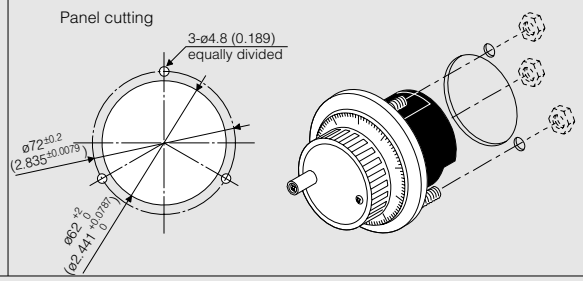
Note: Cannot be used with CC-Link compatible product (MR-J2S-□CP-S084).

● Manual pulse generator (MR-HDP01) ... Compatible only with MR-J2S-CP type and MR-J2S-CL type. (Note 1)

External dimensions Unit: mm (inch)



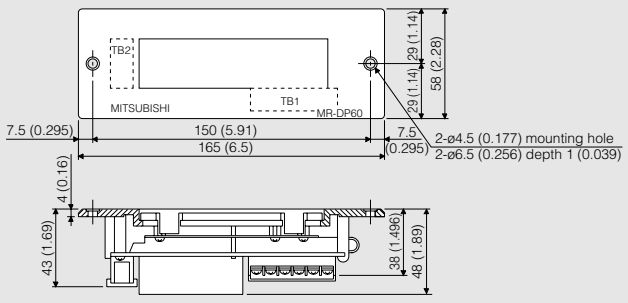
Mounting Unit: mm (inch)



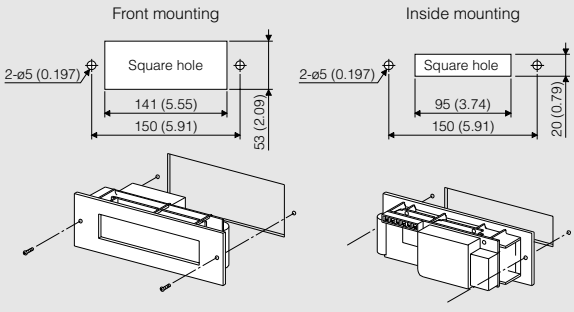
Notes: 1. Cannot be used with CC-Link compatible product (MR-J2S-□CP-S084).
2. Manufacture the manual pulse generator cable with the optional CN1 connector (MR-J2CN1). Refer to "MR-J2S SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

● External digital display (MR-DP60) ... Compatible only with MR-J2S-CP type and MR-J2S-CL type.

External dimensions Unit: mm (inch)



Mounting Unit: mm (inch)

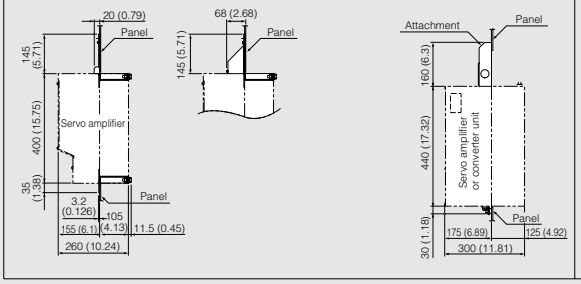


Notes: 1. When using the MR-DP60, change the parameter No. 16 value. Refer to "MR-J2S SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
2. Manufacture the external digital display cable with the optional CN1 connector (MR-J2CN1). Refer to "MR-J2S SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

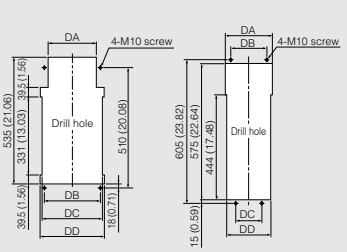
● Heat sink outside attachment (MR-(J)ACN)

By mounting the heat sink outside attachment on the converter unit or servo amplifier, the heat generating section can be mounted outside the control box. This makes it possible to dissipate the unit's heat to outside the box. Approx. 50% of the heating value can be dissipated with this method, and the control box dimensions can be downsized.

Mounting Unit: mm (inch)



Panel cutting dimensions Unit: mm (inch)



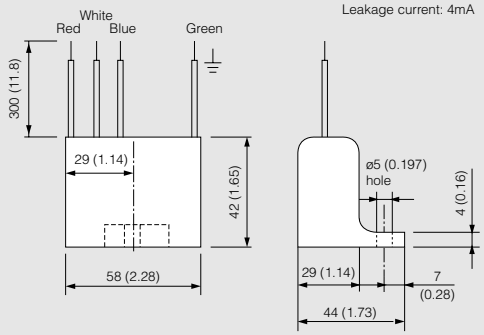
Model	Applicable servo amplifier or converter unit	Variable dimensions DA	DB	DC	DD
MR-JACN15K	MR-J2S-11KA/B MR-J2S-15KA/B MR-J2S-11KA4/B4 MR-J2S-15KA4/B4	203 (7.99)	236 (9.29)	255 (10.04)	270 (10.63)
MR-JACN22K	MR-J2S-22KA/B MR-J2S-22KA4/B4	290 (11.42)	326 (12.83)	345 (13.58)	360 (14.17)
MR-ACNP55K	MR-HP30KA MR-HP55KA4	205 (8.07)	156 (6.14)	110 (4.33)	190 (7.48)
MR-ACN30K	MR-J2S-30KA4/B4	385 (15.16)	336 (13.23)	290 (11.42)	370 (14.57)
MR-ACN55K	MR-J2S-30KA/B MR-J2S-37KA/B MR-J2S-37KA4/B4 MR-J2S-45KA4/B4 MR-J2S-55KA4/B4	455 (17.91)	406 (15.98)	360 (14.17)	440 (17.32)

● Radio noise filter (FR-BIF, FR-BIF-H)

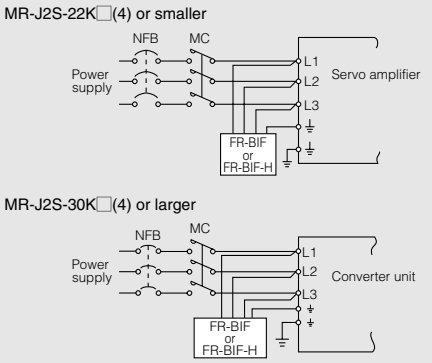
This filter effectively controls noise emitted from the power supply side of the servo amplifier or converter unit, and is especially effective for radio frequency bands under 10MHz. Only for input.

Model	Applicable servo amplifier
FR-BIF	MR-J2S-22K□or smaller, MR-J2S-30K□ or 37K□
FR-BIF-H	MR-J2S-60□4 to MR-J2S-55K□4

External dimensions Unit: mm (inch)



Connections



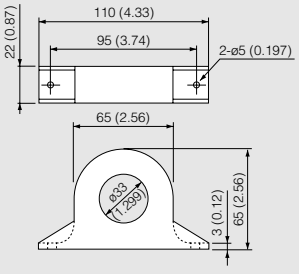
Notes:
1. Cannot be connected to output side of the servo amplifier or converter unit.
2. Wiring should be as short as possible, and please connect to the terminal block of the unit.
3. Be sure to isolate the unused wire when using the FR-BIF with the 1-phase wire.

● Line noise filter (FR-BSF01, FR-BLF)

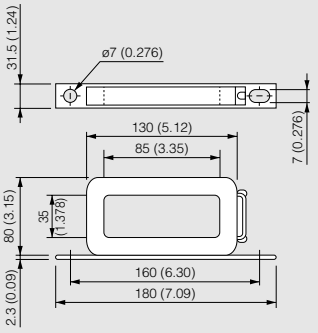
This filter is effective for suppressing radio noise emitted from the servo amplifier's or converter unit's power supply side or output side, and high-frequency leakage current (zero-phase current). Especially effective in the 0.5MHz to 5MHz band.

External dimensions Unit: mm (inch)

<FR-BSF01>
MR-J2S-200□(4) or smaller

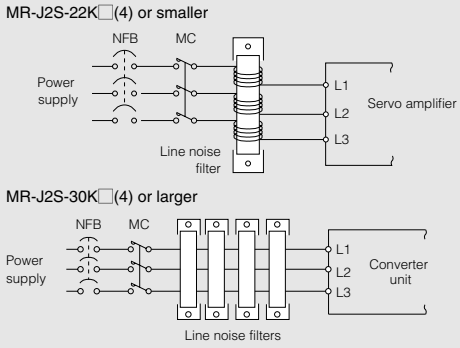


<FR-BLF>
MR-J2S-350□(4) or larger



Connections

Wind the 3-phase wires in the same direction and the same number of winds, and then connect them to the power supply side and output side of the servo amplifier or converter unit. Increasing the number of winds on the power supply side is effective, but normally, the number of penetrations on the power supply side is approx. four times. If the wire is thick and hard to wind, use two or more filters, and make sure that the total of penetrations exceeds the above number. Make sure that the number of penetrations on the output side is four times or less. Do not wind the grounding (earth) wire together with the 3-phase wires. The effect of the filter will drop. Use a separate wire for grounding.



Peripheral Equipment

● EMC filter

The following filters are provided as a filter compliant with the EMC directive for the servo amplifier's power supply.

Model	Applicable servo amplifier	Fig.
SF1252	MR-J2S-10A/B/CP/CL to 100A/B/CP/CL MR-J2S-10A1/B1/CP1/CL1 to 40A1/B1/CP1/CL1	A
SF1253	MR-J2S-200A/B/CP/CL MR-J2S-350A/B/CP/CL	B
HF3040A-TM (Note)	MR-J2S-500A/B/CP/CL	C
HF3050A-TM (Note)	MR-J2S-700A/B/CP/CL	
HF3060A-TMA (Note)	MR-J2S-11KA/B	
HF3080A-TMA (Note)	MR-J2S-15KA/B	
HF3100A-TMA (Note)	MR-J2S-22KA/B	
HF3200A-TMA (Note)	MR-J2S-30KA/B MR-J2S-37KA/B	D

Note: Made by SOSHIN ELECTRIC CO.

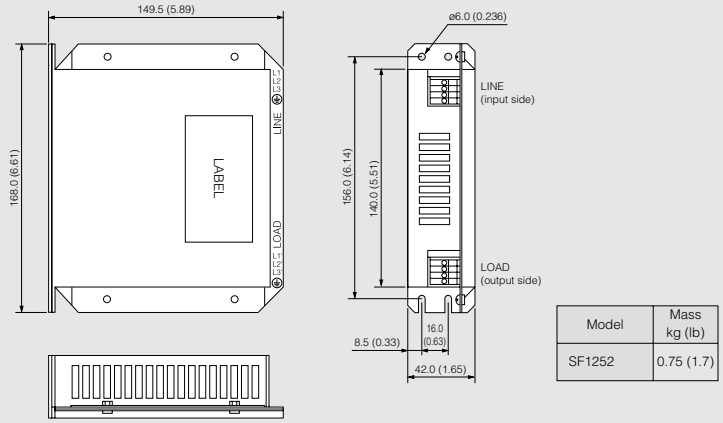
Model	Applicable servo amplifier	Fig.
TF3005C-TX (Note)	MR-J2S-60A4/B4 MR-J2S-100A4/B4 MR-J2S-200A4/B4	E
TF3020C-TX (Note)	MR-J2S-350A4/B4 MR-J2S-500A4/B4 MR-J2S-700A4/B4	
TF3030C-TX (Note)	MR-J2S-11KA4/B4	
TF3040C-TX (Note)	MR-J2S-15KA4/B4	F
TF3060C-TX (Note)	MR-J2S-22KA4/B4	
TF3150C-TX (Note)	MR-J2S-30KA4/B4 MR-J2S-37KA4/B4 MR-J2S-45KA4/B4 MR-J2S-55KA4/B4	G

External dimensions — Unit: mm (inch)

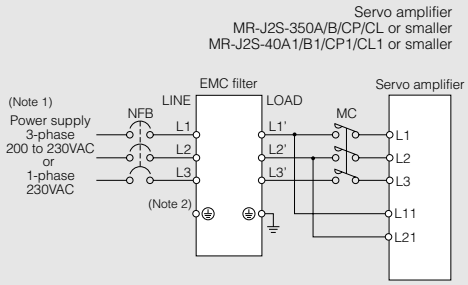
Connections

A

● **SF1252**

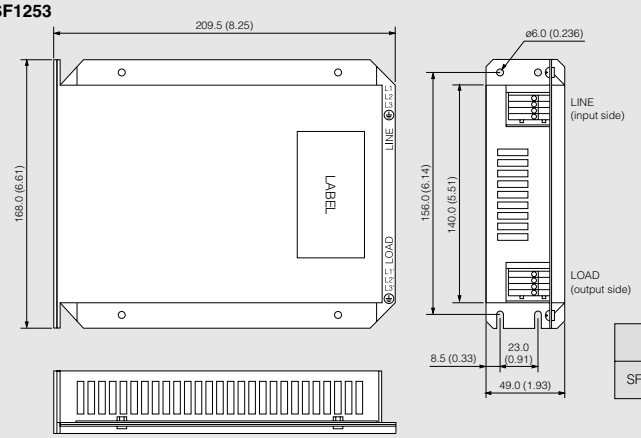


Model	Mass kg (lb)
SF1252	0.75 (1.7)



B

● **SF1253**



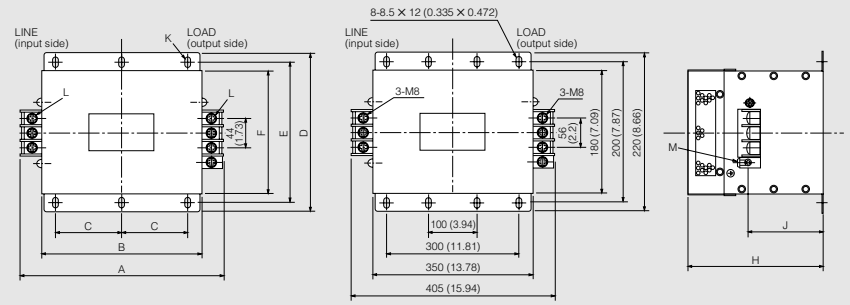
Model	Mass kg (lb)
SF1253	1.37 (3)

Notes: 1. For 1-phase 230VAC power supply, connect the power supply to L1, L2, and leave L3 open. 1-phase 230VAC is available only for the MR-J2S-70□ or smaller. There is no L3 for 1-phase 100 to 120VAC power supply.
2. Connect when the power supply has earth.

C

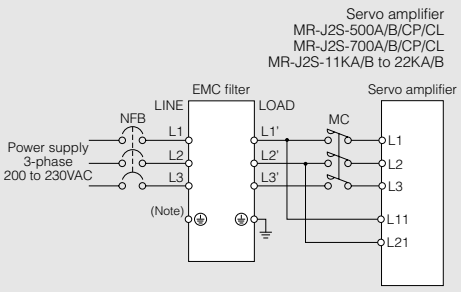
● **HF3040A-TM, HF3050A-TM, HF3060A-TMA, HF3080A-TMA, HF3100A-TMA**

<HF3040A-TM, HF3050A-TM, HF3060A-TMA> <HF3080A-TMA, HF3100A-TMA>

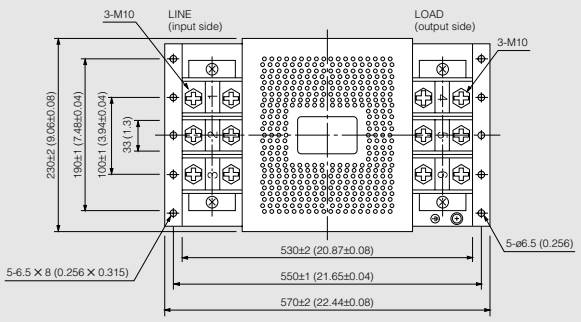
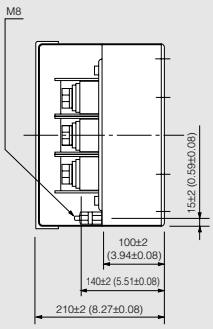
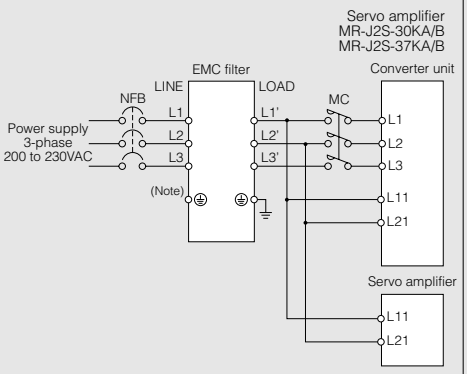
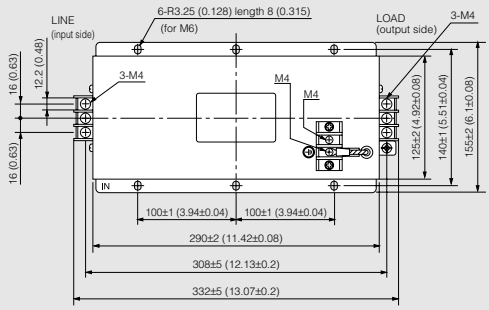
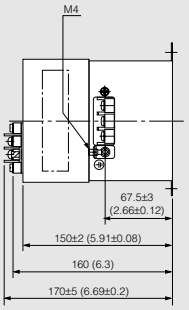
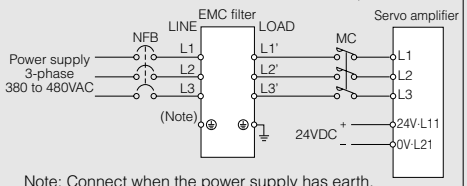
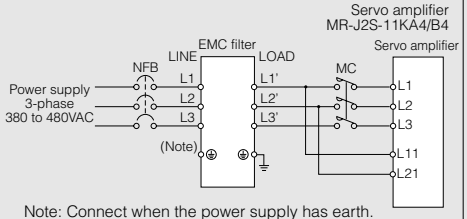
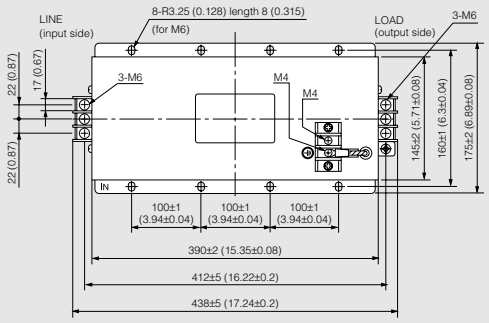
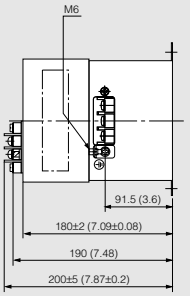
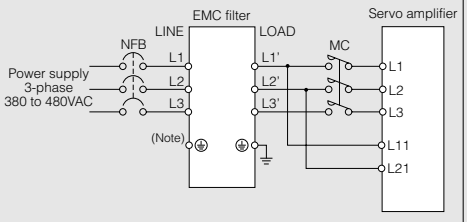
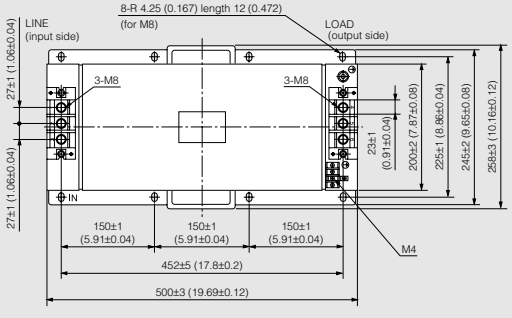
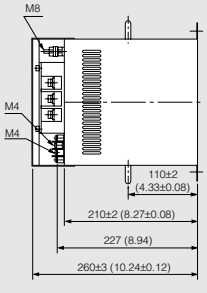
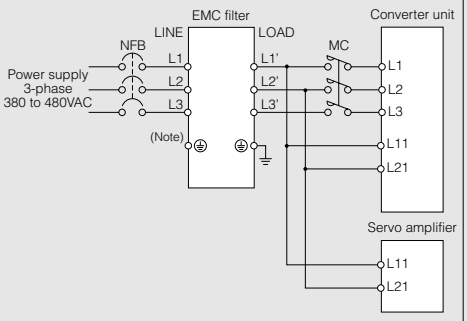


Model	Dimensions mm (inch)												Mass kg (lb)
	A	B	C	D	E	F	G	H	J	K	L	M	
HF3040A-TM	260 (10.24)	210 (8.27)	85 (3.35)	155 (6.1)	140 (5.51)	125 (4.92)	44 (1.73)	140 (5.51)	70 (2.76)	R3.24 (0.128) length 8 (0.315)	M5	M4	5.5 (12.1)
HF3050A-TM	290 (11.42)	240 (9.45)	100 (3.94)	190 (7.48)	175 (6.89)	160 (6.3)	44 (1.73)	170 (6.69)	100 (3.94)		M6	M4	6.7 (14.8)
HF3060A-TMA	290 (11.42)	240 (9.45)	100 (3.94)	190 (7.48)	175 (6.89)	160 (6.3)	44 (1.73)	230 (9.06)	160 (6.3)		M6	M4	10 (22)
HF3080A-TMA	—	—	—	—	—	—	—	210 (8.27)	135 (5.31)	—	—	M6	13 (28.6)
HF3100A-TMA													14.5 (31.9)

Note: A surge protector is separately required to use this EMC filter. Refer to the "EMC Installation Guidelines".



Note: Connect when the power supply has earth.

	External dimensions (Unit: mm (inch))	Connections
D	**● HF3200A-TMA**   Note: A surge protector is separately required to use this EMC filter. Refer to “EMC Installation Guidelines”. Model: HF3200A-TMA; Mass kg (lb): 23.5 (51.8)	 Note: Connect when the power supply has earth.
E	**● TF3005C-TX, TF3020C-TX, TF3030C-TX**   Model: TF3005C-TX, TF3020C-TX, TF3030C-TX; Mass kg (lb): 6 (13.2); TF3030C-TX: 7.5 (16.5)	Servo amplifier MR-J2S-700A4/B4 or smaller  Note: Connect when the power supply has earth. Servo amplifier MR-J2S-11KA4/B4  Note: Connect when the power supply has earth.
F	**● TF3040C-TX, TF3060C-TX**   Model: TF3040C-TX, TF3060C-TX; Mass kg (lb): 12.5 (27.5)	Servo amplifier MR-J2S-15KA4/B4 MR-J2S-22KA4/B4  Note: Connect when the power supply has earth.
G	**● TF3150C-TX**   Model: TF3150C-TX; Mass kg (lb): 31 (68.3)	Servo amplifier MR-J2S-30KA4/B4 to 55KA4/B4  Note: Connect when the power supply has earth.

Peripheral Equipment

● Electric wires, circuit breakers, magnetic contactors

Servo amplifier	Circuit breaker	Magnetic contactor	Electric wire size (mm²)						
			L1, L2, L3, ⏚	L11, L21, 24V · L11, 0V · L21 (Note 6)	U, V, W, ⏚	P, C (Note 7)	BU, BV, BW	B1, B2	OHS1, OHS2
MR-J2S-10A/A1/B/B1/CP/CP1/CL/CL1 MR-J2S-20A/B/CP/CL	30A frame 5A	S-N10	2 (AWG14)	1.25 (AWG16)	1.25 (AWG16)	2 (AWG14)	—	1.25 (AWG16)	—
MR-J2S-40A/B/CP/CL MR-J2S-20A1/B1/CP1/CL1	30A frame 10A								
MR-J2S-60A/B/CP/CL MR-J2S-40A1/B1/CP1/CL1	30A frame 15A								
MR-J2S-70A/B/CP/CL (-U□)					2 (AWG14)				
MR-J2S-100A/B/CP/CL									
MR-J2S-200A/B/CP/CL	30A frame 20A	S-N18	3.5 (AWG12)		3.5 (AWG12)				
MR-J2S-350A/B/CP/CL	30A frame 30A	S-N20	5.5 (AWG10)		5.5 (AWG10) (Note 2)				
MR-J2S-500A/B/CP/CL	50A frame 50A	S-N35			5.5 (AWG10)				
MR-J2S-700A/B/CP/CL	100A frame 75A	S-N50	8 (AWG8)		8 (AWG8)	3.5 (AWG12)	(Note 3)		(Note 4)
MR-J2S-11KA/B	100A frame 100A	S-N65	14 (AWG6)		22 (AWG4)	5.5 (AWG10)	2 (AWG14)	2 (AWG14)	1.25 (AWG16)
MR-J2S-15KA/B	225A frame 125A	S-N95	22 (AWG4)		30 (AWG2) (Note 5)				
MR-J2S-22KA/B	225A frame 175A	S-N125	50 (AWG1/0)		60 (AWG2/0)			—	
MR-J2S-30KA/B	400A frame 250A	S-K150		2 (AWG14)					
MR-J2S-37KA/B	400A frame 300A	S-K180	60 (AWG2/0)		80 (AWG3/0)				
MR-J2S-60A4/B4	30A frame 5A	S-N10	2 (AWG14)	1.25 (AWG16)	1.25 (AWG16)	2 (AWG14)	— (Note 3)	1.25 (AWG16)	— (Note 4)
MR-J2S-100A4/B4	30A frame 10A								
MR-J2S-200A4/B4	30A frame 15A				2 (AWG14)				
MR-J2S-350A4/B4	30A frame 20A	S-N18	3.5 (AWG12)		3.5 (AWG12)				
MR-J2S-500A4/B4	30A frame 30A		5.5 (AWG10)		5.5 (AWG10)				
MR-J2S-700A4/B4	50A frame 40A	S-N20							
MR-J2S-11KA4/B4	60A frame 60A	S-N25	8 (AWG8)		8 (AWG8)	3.5 (AWG12)	2 (AWG14)	2 (AWG14)	1.25 (AWG16)
MR-J2S-15KA4/B4	100A frame 75A	S-N35	14 (AWG6)		22 (AWG4)	5.5 (AWG10)			
MR-J2S-22KA4/B4	225A frame 125A	S-N65							
MR-J2S-30KA4/B4	225A frame 150A	S-K95	22 (AWG4)		30 (AWG2)		1.25 (AWG16)	—	
MR-J2S-37KA4/B4	225A frame 175A	S-K125	30 (AWG2)	2 (AWG14)	38 (AWG2)				
MR-J2S-45KA4/B4	225A frame 225A	S-K150	38 (AWG2)		50 (AWG1/0)				
MR-J2S-55KA4/B4	400A frame 250A	S-K180	50 (AWG1/0)		60 (AWG2/0)				

Notes: 1. The wires in the above table are assumed to use a 600V polyvinyl chloride electric wire having a length of 30 m (98.43ft).
2. Use a 3.5mm² (AWG12) electric wire when connecting the servo motor HC-RFS203.
3. Use a 2mm² (AWG14) electric wire when connecting the servo motor HA-LFS601(4) or HA-LFS701M(4).
4. Use a 1.25mm² (AWG16) electric wire when connecting the servo motor HA-LFS601(4) or HA-LFS701M(4).
5. Always use the 38-S6 (made by JST Mfg.) or R38-6S (made by NICHIFU) crimping terminal when connecting to U, V and W terminals of MR-J2S-15KA/B.
6. The 24V · L11 and 0V · L21 terminals are for the servo amplifier MR-J2S-60A4/B4 to MR-J2S-700A4/B4.
7. Connect an optional regeneration unit using the 5 m (16.4ft) or shorter electric wire.

● Surge suppressor

Attach surge suppressors to the servo amplifier and signal cable's AC relays, AC valves and AC electromagnetic brake. Attach diodes to DC relays and DC valves.

Sample configuration

Surge suppressor: 972A-2003 504 11 (rated 200VAC, made by Matsuo Denki)

Diode : A diode with resisting pressure 4 or more times greater than the relay's drive voltage, and 2 or more times greater than the current.

● Data line filter

Attaching a data line filter to the pulse output cable or motor encoder cable of the pulse train output controller (QD75D, etc.) is effective in preventing noise penetration.

Sample configuration

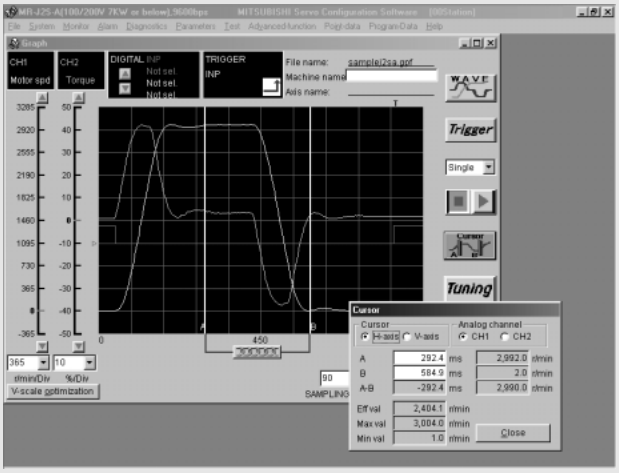
Data line filter: ESD-SR-25 (made by NEC TOKIN), ZCAT3035-1330 (made by TDK)

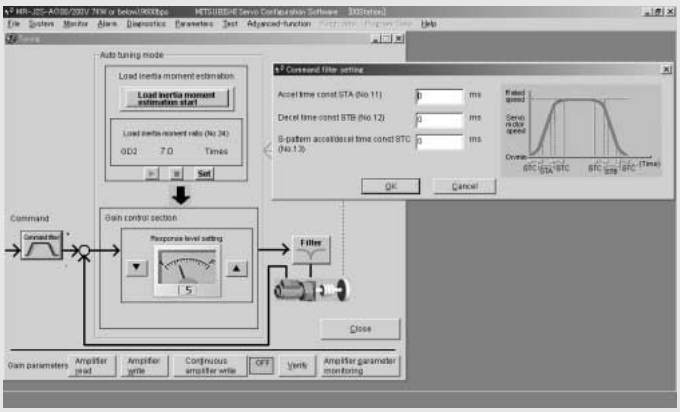
Using a Personal Computer

< MR Configurator (Setup software) >

● MRZJW3-SETUP161E

This software makes it easy to do monitor display, diagnostic, reading and writing of parameters, and test operations from the setup with a personal computer.





Features

(1) This software can easily set up and tune your servo system with a personal computer.
Compatible personal computers: Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional, Windows® XP Professional and Windows® XP Home Edition (Note 1, 2).

(2) Multiple monitor functions
Graphic display functions are provided to display the servo motor status with the input signal triggers, such as the command pulse, droop pulse and speed.

(3) Test operations from a Personal Computer
Allows servo motors to be tested easily from a personal computer.

● Operating conditions

(Note 1, 8) Personal computer	IBM PC/AT compatible unit running Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional, Windows® XP Professional and Windows® XP Home Edition. Processor : Pentium 133MHz or faster (Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows NT® Workstation4.0, Windows® 2000 Professional) Pentium 150MHz or faster (Windows® Me) Pentium 300MHz (Windows® XP Professional/Home Edition) Memory : 16MB or more (Windows® 95), 24MB or more (Windows® 98, Windows® 98 Second Edition) 32MB or more (Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional) 128MB or more (Windows® XP Professional/Home Edition) Open hard disk capacity: 60MB or more Serial port used
OS	Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional, Windows® XP Professional, Windows® XP Home Edition (Note 2)
Monitor	Capable of resolution 800X600 or more, high color (16-bit display)
Keyboard	Compatible with above personal computers.
Mouse	Compatible with above personal computers. Note that serial mice are incompatible.
Printer	Compatible with above personal computers.
Communication cable	MR-CPCATCBL3M

● Specifications (Items in parentheses do not work with the MR-J2S.)

Main-menu	Functions
Monitors	Batch display, high speed monitor and graph display.
Alarms	Alarm display, alarm history, display of data that generated alarm
Diagnostics	Digital I/O display, function device display (Note 7), failure to rotate reason display, power ON count display, amplifier version display, motor information display, tuning data display, absolute data display, automatic voltage control offset display (Note 3), axis name setting, (unit composition list display), fully-closed diagnostic (Note 5)
Parameters	Parameter setting, list displays, tuning display of change list, display of detailed information and device setting (Note 7).
Test operations	JOG operation, positioning operation, operation without motor, forced digital output, program operation using simple language, single-step feed, and program test operation. (Note 6)
Advanced function	Machine analyzer, gain search, machine simulation
Program data (Note 6)	Program data, indirect addressing
Point data	Point table (Note 4)
File operation	Data reading, saving, and printing.
Other	Automatic operation and help display.

Notes:
1. Windows and Windows NT are registered trademarks of Microsoft Corporation in the United States and other countries.
2. Windows® XP is compatible from MRZJW3-SETUP161E.
3. The automatic voltage control offset display is compatible only with the MR-J2S-A type.
4. Compatible only with the MR-J2S-CP type.
5. Compatible only with the full closed control compatible amplifiers.
6. Compatible only with MR-J2S-CL type.
7. Compatible with MR-J2S-CP and MR-J2S-CL types.
8. This software may not run correctly depending on the personal computer being used.
9. The screens shown on this page are for reference and may differ from the actual screens.

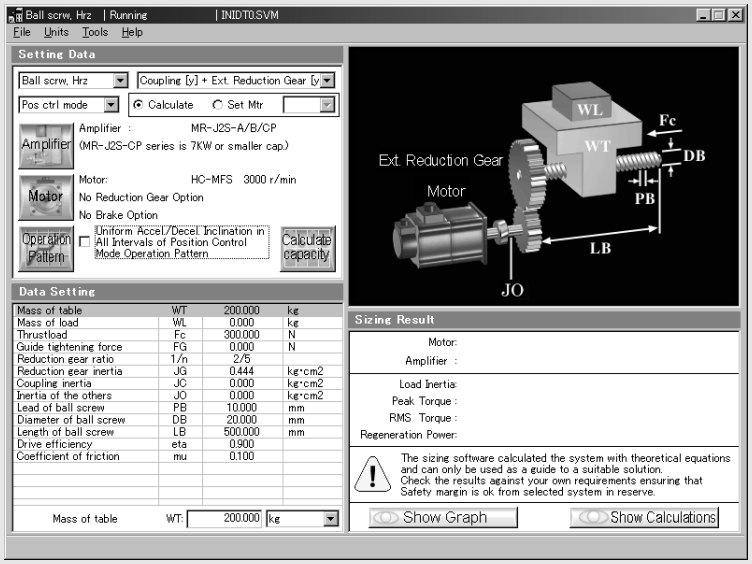
MELSOFT

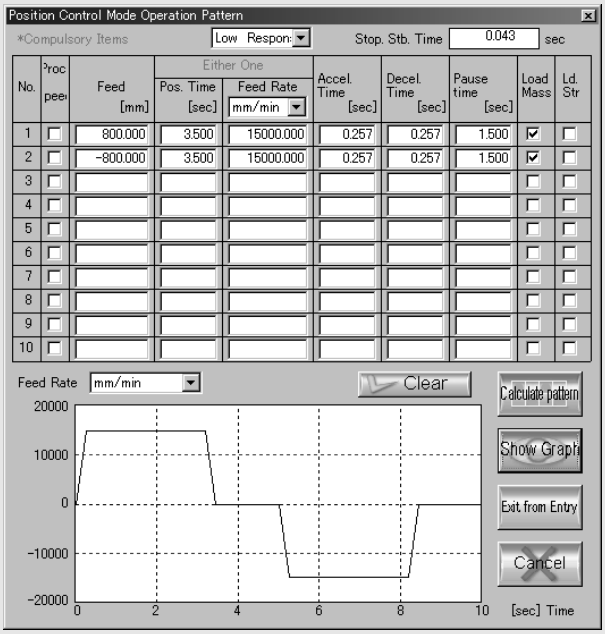
Using a Personal Computer

<Capacity selection software>

● MRZJW3-MOTSZ111E (Note 4)

A user-friendly design facilitates selection of the optimum servo amplifier, servo motor (including the servo motor with a electro-magnetic brake) and optional regeneration unit when entering constants and an operation pattern into machine-specific windows.





Features

(1) User defined operation patterns can be set. The user defined operation pattern can be selected from the position control mode operation or speed control mode operation patterns. The set operation pattern can be also displayed in the graph.

(2) The feedrate (or motor speed) and torque can be also displayed in the graph during the selection process.

(3) Compatible with Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional, Windows® XP Professional and Windows® XP Home Edition (Note 1).

● Operating conditions

Personal computer (Note 1, 2)	IBM PC/AT compatible unit running Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional. Processor : Pentium 133MHz or faster (Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows NT® Workstation4.0, Windows® 2000 Professional) Pentium 150MHz or faster (Windows® Me) Pentium 300MHz (Windows® XP Professional/Home Edition) Memory : 16MB or more (Windows® 95), 24MB or more (Windows® 98, Windows® 98 Second Edition) 32MB or more (Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional) 128MB or more (Windows® XP Professional/Home Edition) Open hard disk capacity: 40MB or more
OS	Windows® 95, Windows® 98, Windows® 98 Second Edition, Windows® Me, Windows NT® Workstation4.0, Windows® 2000 Professional, Windows® XP Professional, Windows® XP Home Edition
Monitor	Capable of resolution 800×600 or more, high color (16-bit display).
Keyboard	Compatible with above personal computers.
Mouse	Compatible with above personal computers. Note that serial mice are incompatible.
Printer	Compatible with above personal computers.

● Specifications

Item		Description
Types of machine component		Horizontal ball screws, vertical ball screws, rack and pinions, roll feeds, rotating tables, dollies, elevators, conveyors, and other (direct inertia input) devices.
Output of results	Parameter	Selected servo amplifier model, selected servo motor model, selected regenerative resistor model, load inertia moment, load inertia moment ratio, peak torque, peak torque ratio, effective torque, effective torque ratio, regenerative power (regenerative energy for MR-J2M), and regenerative power ratio.
	Printing	Prints input specifications, operation pattern, calculation process, selection process feedrate (or motor speed) and torque graphs, and selection results.
	Data storage	Assigns a file name to input specifications, operation patterns and selection results, and saves them on hard disk or floppy disk, etc.
Inertia moment calculation function		Cylinder, core alignment column, variable speed, linear movement, suspension, conical, truncated cone

Notes:
1. Windows and Windows NT are registered trademarks of Microsoft Corporation in the United States and other countries.
2. This software may not run correctly depending on the personal computer being used.
3. The screens shown on this page are for reference and may differ from the actual screens.
4. This software can be obtained for free. Contact Mitsubishi for the details.

The Differences: Comparison with MR-J2 Series

The Differences (Comparison with MR-J2 series)

● Servo amplifier

MR-J2S-□A series

	Item	MR-J2S-□A	MR-J2-□A
Hardware	External dimensions/Mounting method	Same as MR-J2-□A/Same as MR-J2-□A	—
	Rated output	1-phase 100VAC : 0.05 to 0.4kW 3-phase 200VAC : 0.05 to 37kW 3-phase 400VAC : 0.5 to 55kW	1-phase 100VAC : 0.05 to 0.4kW 3-phase 200VAC : 0.05 to 3.5kW 3-phase 400VAC : —
	External wiring	Compatible with MR-J2-□A (including encoder wiring) RS-422 communication function added	—
	7 segment display panel/ No. of operation buttons	5-digit 1 2 3 4 5 /4	4-digit 1 2 3 4 /4
	Communication interface	Selecting RS-232C or RS-422 possible	RS-232C only
	Pulse train input	500kpps (in differential mode)	400kpps (in differential mode)

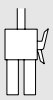
MR-J2S-□B series

	Item	MR-J2S-□B	MR-J2-□B
Hardware	External dimensions/Mounting method	Same as MR-J2-□B/Same as MR-J2-□B	—
	Rated output	1-phase 100VAC : 0.05 to 0.4kW 3-phase 200VAC : 0.05 to 37kW 3-phase 400VAC : 0.5 to 55kW	1-phase 100VAC : — 3-phase 200VAC : 0.05 to 3.5kW 3-phase 400VAC : —
	External wiring	Compatible with MR-J2-□B (including encoder wiring), Encoder pulse output (ABZ) signal added	—

MR-J2S-□CP series

	Item	MR-J2S-□CP	MR-J2-□C
Hardware	External dimensions/Mounting method	Same as MR-J2-□C/Same as MR-J2-□C	—
	Rated output	1-phase 100VAC : 0.05 to 0.4kW 3-phase 200VAC : 0.05 to 7kW	1-phase 100VAC : — 3-phase 200VAC : 0.05 to 3.5kW
	External wiring	Compatible with MR-J2-□C (including encoder wiring)	—
	7 segment display panel/ No. of operation buttons	5-digit 1 2 3 4 5 /4	4-digit 1 2 3 4 /4
	Communication interface	Compatible with MR-J2-□C	—
	Special compliance	Compatible with CC-Link using special parts	—

● Servo motor

Item	HC-□S, HA-LFS	HC-□
Encoder resolution	ABS 17bit (131072 p/rev)	ABS 13bit (8192 p/rev), 14bit (16384 p/rev)
External dimensions/Mounting method	Compatible	—
Power-supply connector	 <HC-KFS/HC-MFS/HC-UFS 3000r/min> power-supply connector (made by MOLEX) 5557-04R-210 (receptacle in case without brake) 5557-06R-210 (receptacle in case with brake) 5556PBT (female terminal)	<Existing models: HC-KF/HC-MF/HC-UF 3000r/min>  insulated tip, round-crimping terminal is attached
Rated output	3-phase 200VAC: 0.05 to 37kW 3-phase 400VAC: 0.5 to 55kW	3-phase 200VAC: 0.05 to 3.5kW
Brake	Same as existing models	—
Protection level	HC-KFS/HC-MFS: IP55 (IP65) (Note)	HC-KF/HC-MF: IP44 (IP65) (Note)

Note: Protection level with rating of IP65 corresponds to special product. Not compatible with the motor capacity 50W.

Connectivity with Existing Models

The MR-J2S servo amplifiers are compatible for connection to existing motors, however, performance of the MR-J2S series will not be improved. Please note that the new model motors (HC-□S series or HA-LFS series) cannot be connected to the servo amplifier of the MR-J2 series.

Cautions Concerning Use

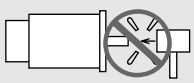
To ensure safe use

- To ensure the safe and proper use of the product, we ask that you read the instruction manual and "MR-J2S INSTRUCTION MANUAL" prior to its use.
- These products are not designed or manufactured for use in machinery and systems where human safety is at stake.
- When considering the product for use in such special applications as equipment or systems employed in passenger transportation, medicine, aerospace, nuclear power generation, or underwater relays, please contact our sales representative.
- These products have been manufactured to the most rigorous quality standards. However, we ask that you employ safety devices when using the product in equipment in which any failure on its part can be expected to cause a serious accident or loss.

Cautions concerning use

Transport and installation of motor

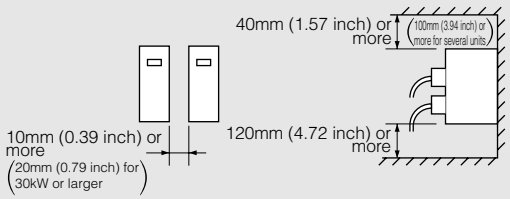
- Protect the motor or encoder from impact during handling. When installing a pulley or coupling, do not hammer on the shaft. Impact can damage the encoder. In the case of motor with key, install a pulley or coupling with the screw of shaft-end. Use a pulley extractor when taking off the pulley.



- Do not apply a load exceeding the tolerable load onto the servo motor shaft. The shaft could break.

Installation

- Avoid installation in an environment in which oil mist, dust, etc. are in the air. When using in such an environment, enclose the servo amplifier in a sealed panel. Protect the motor by furnishing a cover for it or taking similar measures.
- Mount the amplifier vertically on a wall.
- When installing several amplifiers in a row in a sealed panel, leave 10mm (0.39 inch) or more open between each amplifier. Note that when using the MR-J2S-30K□(4) or larger capacity, leave 20mm (0.79 inch) or more open between the amplifiers. Leave 100mm (3.94 inch) or more open in the upward direction, and 120mm (4.72 inch) or more open in the downward direction.
  When using one amplifier, always leave 40mm (1.57 inch) or more open in the upward direction and 120mm (4.72 inch) or more open in the downward direction.
  To ensure the life and reliability, keep space as open as possible toward the top plate so that heat does not build up.
  Take special care, especially when installing several amplifiers in a row.



- For installing a single motor, the motor can be installed horizontally or vertically. When installing vertically (shaft-up), take measures on the machine side to ensure that oil from the gear box does not get into the motor.
- Do not touch the servo motor while turned ON or for a period after the power has been shutoff. The motor could be very hot, and touching it could burn skin.
- The optional regeneration unit becomes hot (temperature rise of 100°C (212°F) or more) with frequent use. Do not install within flammable objects or objects subject to thermal deformation. Take care to ensure that electric wires do not come into contact with the main unit.
- Carefully consider the cable clamping method, and make sure that bending stress and the stress of the cable's own weight are not applied on the cable connection section.
- If using in an application where the servo motor moves, select the cable bending radius according to the required bending life and wire type.
- Fix the power and encoder cables led out from the servo motor onto the servo motor so that they do not move. Failure to do so could result in disconnections.
  Do not modify the connector or terminals, etc., on the end of the cable.

Grounding

- Securely ground to prevent electric shocks and to stabilize the potential in the control circuit.
- To ground the servo motor and servo amplifier at one point, connect the servo motor's grounding terminal from each unit, and ground from the servo amplifier side.
- Faults such as a deviation in position could occur if the grounding is insufficient.

Wiring

- When a commercial power supply is applied to the amplifier's output terminal (U, V, W), the amplifier will be damaged. Before switching the power on, perform thorough wiring and sequence checks to ensure that there are no wiring errors, etc.
- When a commercial power supply is applied to the motor's input terminal (U, V, W), the motor will be damaged. Connect the motor to the amplifier's output terminal (U, V, W).
- Match the phase of the motor's input terminal (U, V, W) to the amplifier's output terminal (U, V, W) before connecting. If they are not the same, the motor control cannot be performed.
- In the case of position or speed control mode, connect the stroke end signals (LSP, LSN) to the common terminal (SG). If the signals are invalid, the motor will not rotate.

Factory settings

- All available motor and amplifier combinations are predetermined. Confirm the model of the motor and amplifier to be used before installation.
- For the MR-J2S-A type, use the parameter No.0 for the control mode to set position, speed and torque. For the MR-J2S-B type, these are selected by a controller.
- As for 22kW or smaller, when using the optional regeneration units, please change the parameter No.0 (MR-J2S-A, MR-J2S-CP or MR-J2S-CL type) or parameter No.2 (MR-J2S-B type). When using the 30kW or larger capacity, change the converter unit parameter No.0. The optional regeneration unit is disabled as the default, so the parameter must be changed to increase the regeneration performance.

Operation

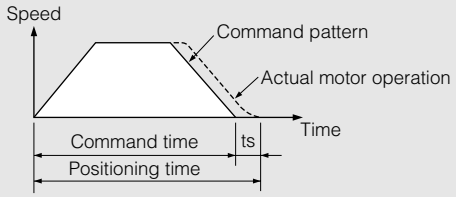
- When a magnetic contactor (MC) is installed on the amplifier's primary side, do not perform frequent starts and stops with the MC. Doing so could cause the amplifier to fail.
- As for 7kW or smaller, when a trouble occurs, the amplifier's safety features are activated, halting output, and the dynamic brake instantly stops the motor. If free run is required, contact Mitsubishi about solutions involving servo amplifiers where the dynamic brake is not activated.
- When an error occurs, the 11kW or larger amplifier's protection function will activate and the output will stop. The servo motor will coast to a stop. If the dynamic brake operation is required, use the option DBU-□K(-4).
- When using a motor with an electromagnetic brake, do not apply the brake when the servo is on. Doing so could cause an amplifier overload or shorten brake life. Apply the brake when the servo is off.

Precautions for Choosing the Products

- Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

Cautions concerning model selection

- Select a motor with a rated torque above the continuous effective load torque.
- Design the operation pattern in the command section so that positioning can be completed, taking the stop setting time (ts) into account .



- The load inertia moment should be below the recommended load inertia moment ratio of the motor being used. If it is too large, desired performance may not be attainable.

MEMO

⚠ Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

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