MITSUBISHI ELECTRIC

SERVO AMPLIFIERS & MOTORS

Changes for the Better

Advanced servo technology with optical network

MELSERVO J3

Your partner, MR-J3

For higher function and performance.
For more comfortable use.

Industry leading performance

Speed frequency response of 2.1kHz

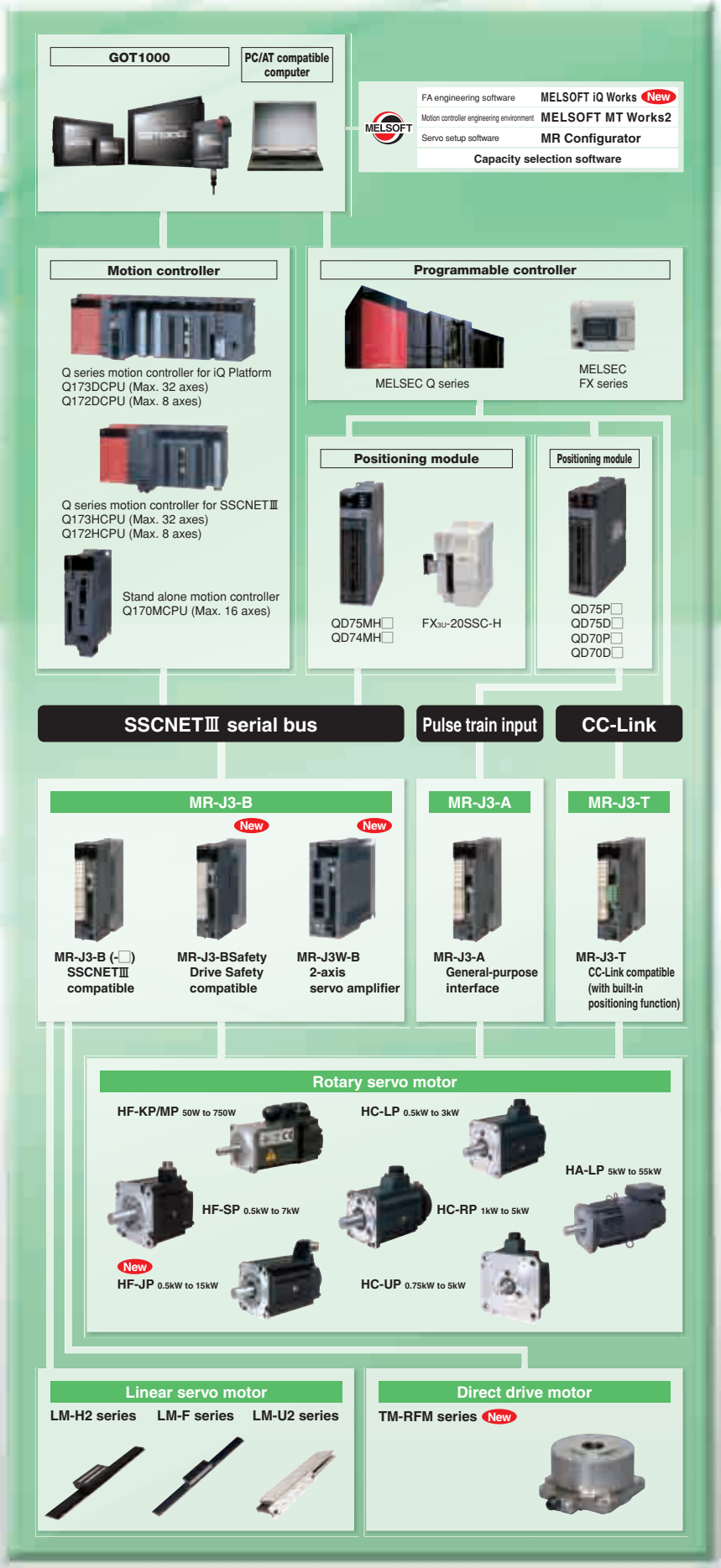
Wide range of product lines

Compatible with rotary and
linear servo motor, and direct drive motor.

Ever-evolving tuning function

High level tuning with the advanced gain search function

Our Total Solution for Your Satisfaction



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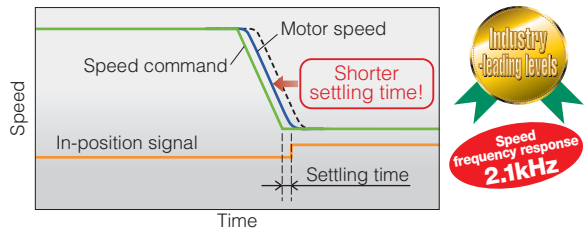
Improving Machine Performance!

Machine performance can be substantially improved with MR-J3.

Shorter tact time

Industry leading level of control

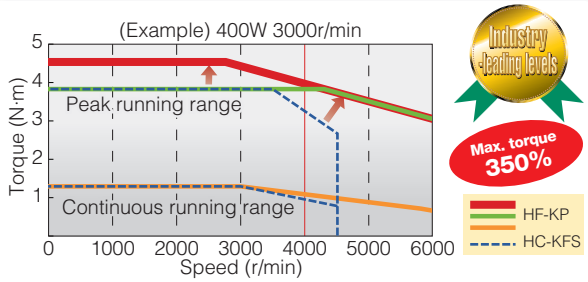
Speed frequency response is increased to 2.1kHz* , meeting high end machine needs.



✻ Available with MR-J3-A/B(-RJ006)/BSafety.

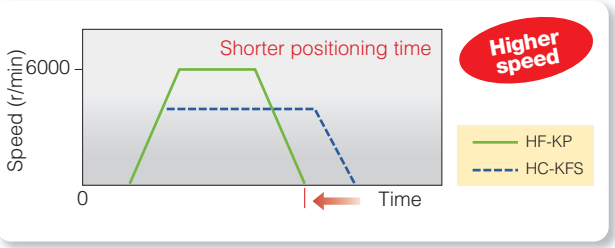
Increased motor speed and torque

Since higher torque is output even at high speeds as compared to the prior model, a machine can be downsized by using 1 rank smaller servo motor. Additionally, acceleration/deceleration time can be shortened.
For HF-KP series, the maximum torque is increased to 350%*.



✻ Available with MR-J3-A/B(-RJ006)/BSafety.

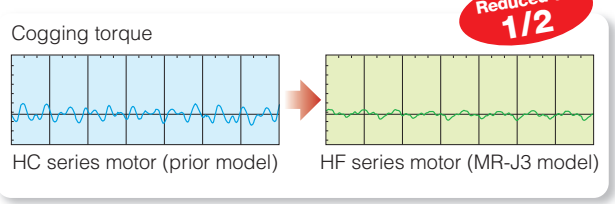
The servo motor can operate at up to 6000r/min, and thereby shortens positioning time and improves machine throughput.



Highly accurate operation

Decreased cogging torque

Fluctuations in motor torque are reduced, realizing smooth machine operation at stable speed.



High-resolution absolute encoder

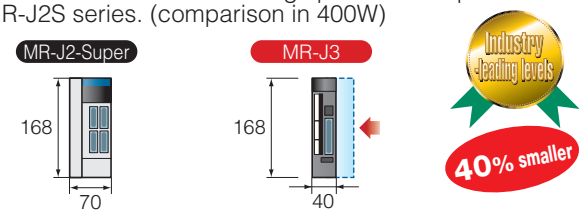
The servo motor is equipped with a 262144p/rev (18bit*) absolute encoder as a standard for highly accurate positioning. Absolute position detection system can be easily configured by mounting MR-J3BAT battery.

✻ Contact your local sales office for encoders higher than 18-bit resolution.

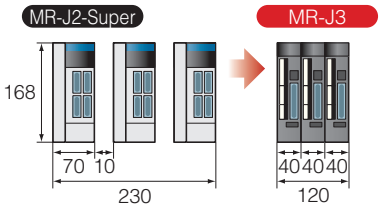
More compact

Servo amplifier

Needs 40% smaller mounting space as compared to MR-J2S series. (comparison in 400W)



Close mounting is possible*. (200V 3.5kW or smaller)



✻ The working environment is different for close mounting. Refer to the sections "Cautions concerning use" in this catalog for details.

Servo motor

- **HF-KP/HF-MP series**

Motor lengths are shortened by 20%. (Comparison of HF-KP/MP and HC-KFS/MFS in 400W)

- **HF-SP series**

The connectors of the HF-SP series are smaller than those of the HC-SFS series (prior model), so that the user's system can be made even more compact.

- **HF-JP series** New!

Motor volumes are reduced by 46%. (Comparison of HF-JP and HA-LP in 11kW) Compact motor with large capacity has been realized.

Flexible wiring

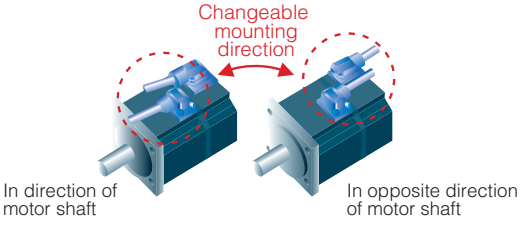
Connector type available

Connectors have been adopted* for the servo amplifier terminal block thereby reducing the time required for wiring.

✻ Connector type is available for 200V 3.5kW or smaller and 400V 2kW or smaller servo amplifiers.

Selectable cable leading direction

Cable mounting direction is changeable according to the selected cables. (HF-KP/HF-MP series)



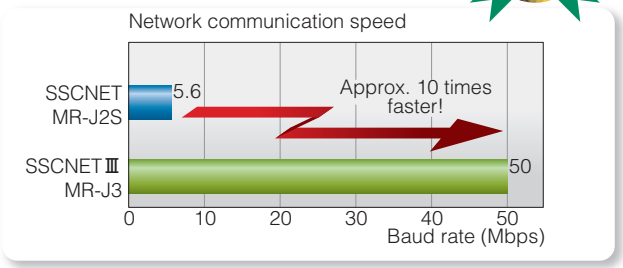
Improving Total System Dynamics!

System's fast response and reliability are realized with SSCNET Ⅲ.

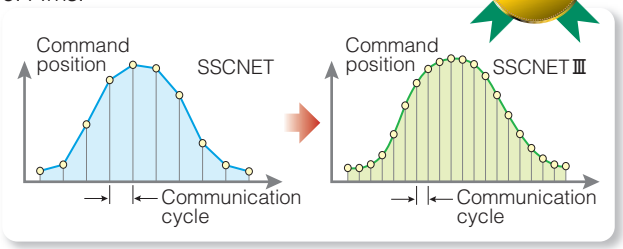
Fast and accurate optical communication

Improved communication speed and command communication cycle

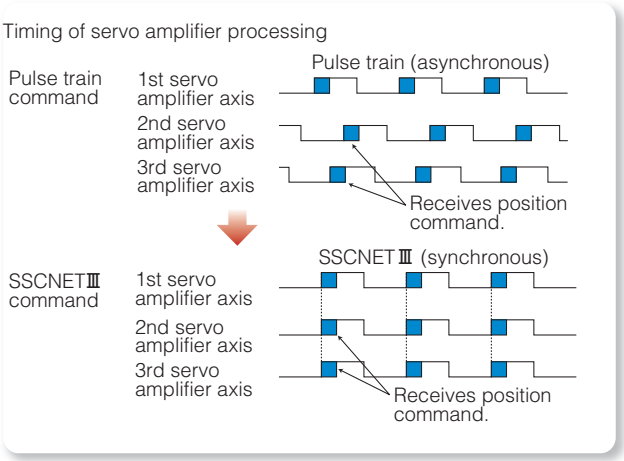
Achieves up to 50 Mbps full duplex baud rate (equivalent to 100Mbps one way) and improves system response.



Smooth control using high-speed serial communication with cycle times as fast as 0.44ms.



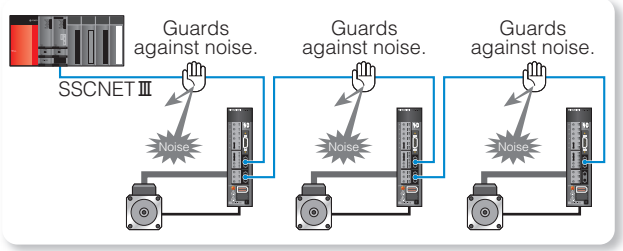
Complete synchronized communication is achieved with SSCNET Ⅲ, offering technical advantages in machines such as printing and food processing machines that require synchronous accuracy.



Improved noise immunity

High quality communication

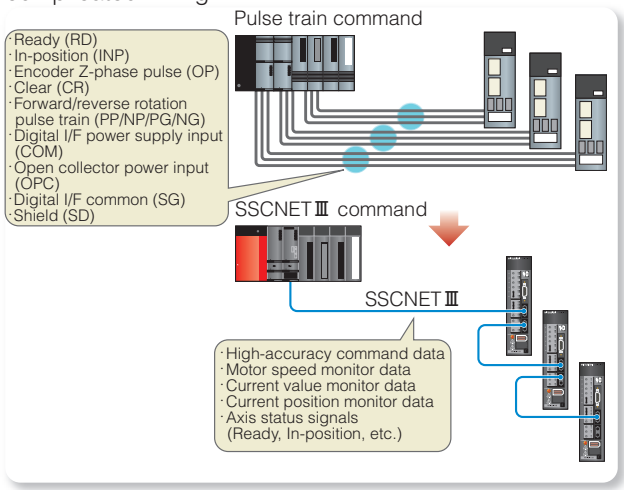
The optical fiber cables thoroughly shut out noise that enters from the power cable or external devices. Noise immunity is dramatically improved as compared to metal cables.



Simple and flexible wiring

Simple wiring

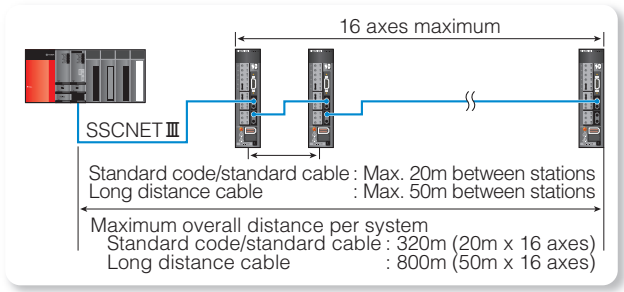
Simple connections with dedicated cables reduce both wiring time and chances of wiring errors. No more complicated wiring.



Reduced wiring is achieved by issuing the stroke limit and the proximity dog signals via the servo amplifier.

Long distance wiring

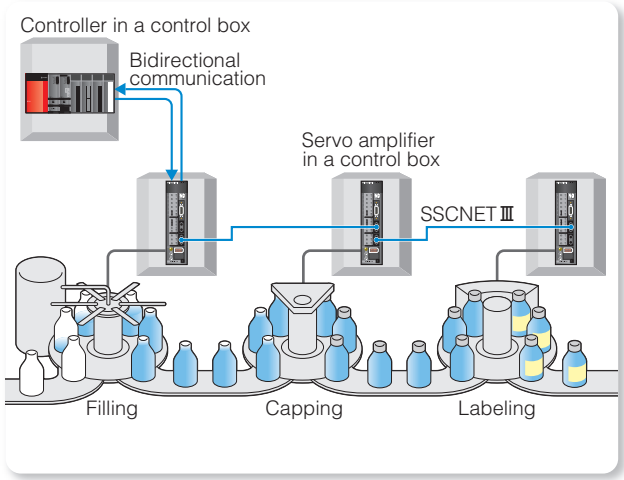
Long distance wiring is possible up to 800m per system (maximum of 50m between stations x 16 axes). Thus, it is suitable for large-scale systems.



Easy data management

Bidirectional optical communication

Large amount of data can be transmitted and received between the controller and the servo amplifiers in real time. Servo monitor information can be stored in a host application and can be used for control.



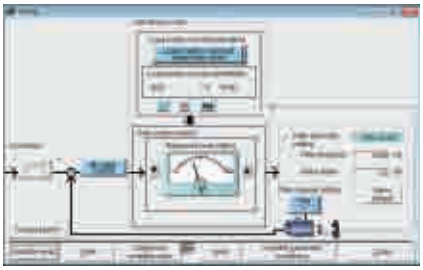
Optimal Servo Adjustment for Machines!

Easy servo adjustment for machine's maximum performance with the high control

Easy adjustment

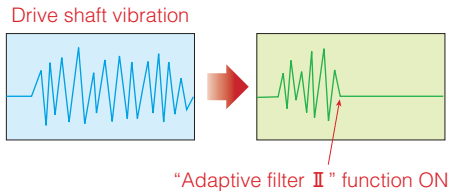
Ever-evolving real time auto-tuning

All gains including position and speed control gains can be automatically adjusted by setting responsiveness.
32 scales of response level can be set.



Adaptive filter Ⅱ

Resonance on the driving mechanism, such as a ball screw, can be suppressed automatically using this filter.
Automatic adjustment range: 100Hz to 2.25kHz.
Machine resonance suppress filter setting range: 100Hz to 4.5kHz.
Optimal filters are automatically set by one-click with the auto tuning function of the MR Configurator. Then, these filters are automatically optimized by changing the responsiveness of the real time auto tuning.

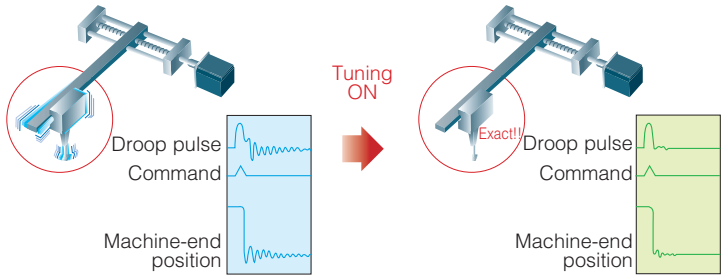


Optimal adjustment function for machines

Advanced vibration control

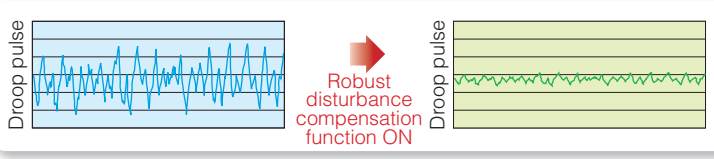
An optimal filter is automatically set with the automatic tuning function for suppressing 100Hz or lower frequency vibration that occurs when a driving part stops.
The auto tuning function is effective in suppressing vibration at the end of an arm and in reducing residual vibration in a machine.

Industry's first

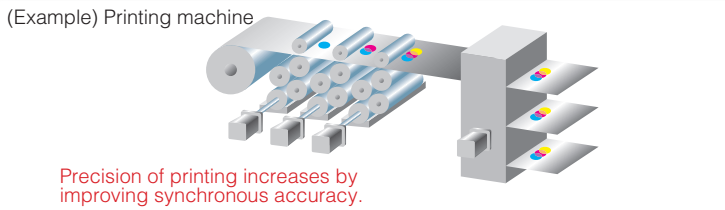


Robust disturbance compensation function

The response to a disturbance element can be increased independently of other control loop gains. This enables suppression of the disturbance while maintaining stable operations.



Effective for improving synchronous accuracy of printing and packaging machines.



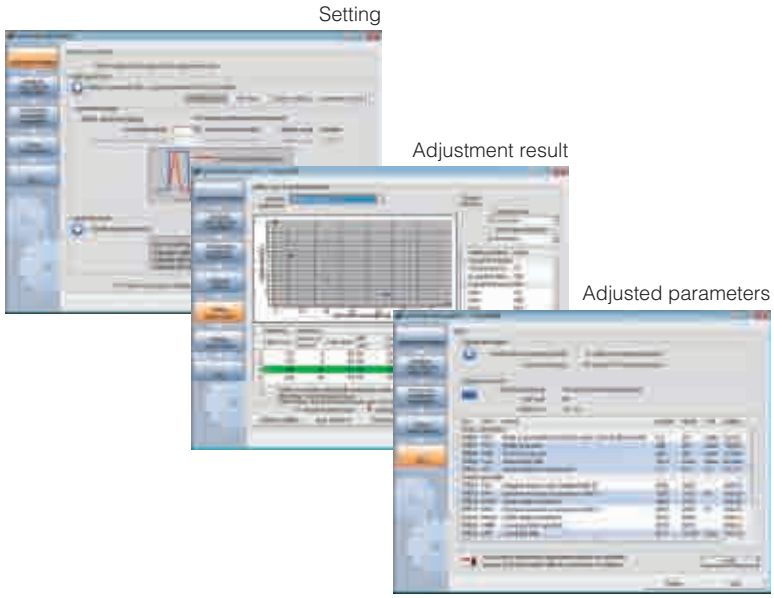
For more advanced adjustment

Advanced gain search* New!

Easy servo adjustment for maximum machine performance without technical know-how.

- Easy: Operate just by following the flow.
- Reliable: No vibration in a machine during adjustment.
- Stable: Takes variations of mechanical characteristics in consideration.
- Quick: Takes approximately 10 minutes per axis for adjustment.
- Visual: Visually shows adjustment result.

Machine resonance suppress filter is automatically adjusted in addition to position and speed control gains.
Adjusted parameters can be written into the servo amplifier by one-click on the screen.



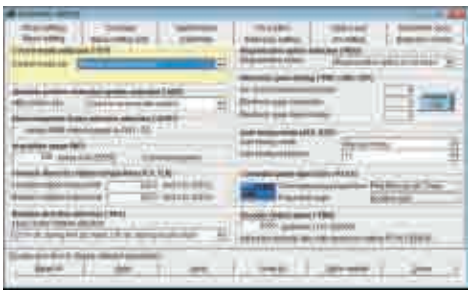
* This function is available with MR Configurator (MRZJW3-SETUP221E).
Software version C2 or above is required.

Start-up and adjustment support tool

MR Configurator (MRZJW3-SETUP221E)

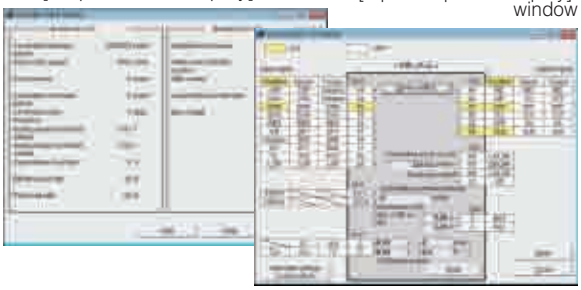
With the MR Configurator, setup, tuning, monitor display, diagnostics, reading/writing parameters and test operations can be easily performed on a personal computer. This software realizes a stable machine system, optimum control and short setup time.

- [Parameter setting] function
  Basic setting parameters can be displayed in list and visual formats. Parameters can be set by selecting from the drop down list.

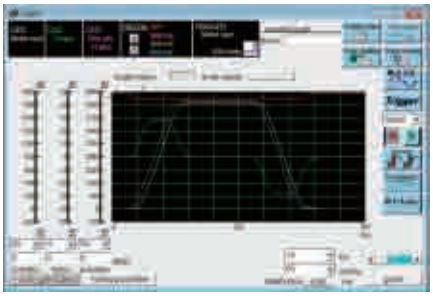


- [Monitor] function
  Operation status can be monitored in real time with the "Monitor-Display all" function. Input/output signal assignments and ON/OFF status can be monitored on the "Input/Output I/F Display" window.

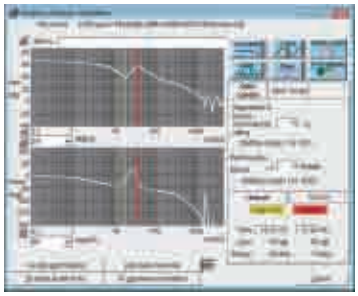
[Amplifier Data Display] window [Input/Output I/F Display] window



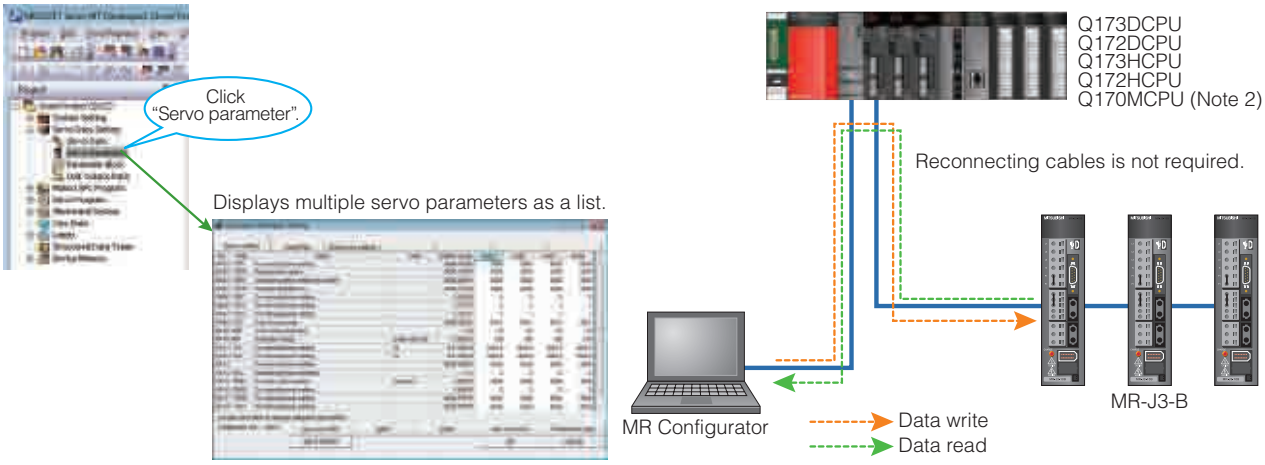
- [Graph display] function
  Servo data with 3 analog and 4 digital channels can be displayed in a graph. The graph function supports start-up and adjustment of the servo system. Convenient functions such as [Over write] for overwriting multiple data and [Graph history] for displaying graph history are available.



- [Machine analyzer operation] function
  This function automatically inputs random torque to the servo motor and analyzes frequency characteristic (0.1kHz to 4.5kHz) of a machine system just by pressing the [Start] button. This function supports setting machine resonance suppress filter, etc.



- Using MR Configurator via motion controller
  For MR-J3-B servo amplifier, MR Configurator can be used with MT Developer2 on a personal computer that is connected to a motion controller (Q173DCPU/Q172DCPU/Q173HCPU/Q172HCPU/Q170MCPU). (Note 1)
  Information such as parameter settings and monitoring for multiple servo amplifiers can be easily consolidated just by connecting the motion controller and the personal computer.



Notes: 1. MR Configurator software version C1 or above is compatible with MT Developer2 (motion controller programming software).
2. MR Configurator software version C2 or above is compatible with Q170MCPU stand alone motion controller.

Servo Amplifiers for Satisfying Various Control

For satisfying machine needs, a wide variety of servo amplifiers are available in addition

Drive safety compatible servo amplifier: MR-J3-BSafety New!

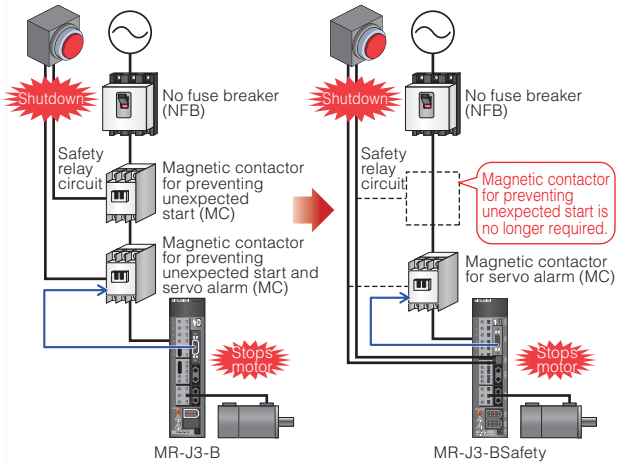
For improving machine safety!

Realizing safety circuit

As a safety function, MR-J3-BSafety servo amplifier has an integrated Safe torque off (STO) function. With STO, the safety circuit, designed without a magnetic contactor (MC), prevents on unexpected start of servo motor.
Stop category 1 (SS1 function) can be realized by combining MR-J3-BSafety with an optional MR-J3-D05 safety logic unit.
The safety level of the STO and SS1 functions comply with IEC/EN 61508 SIL 2, EN62061 SIL CL2 and EN ISO 13849-1 PL d (Category 3).

MR-J3-D05

Shutdown with STO function



Replacement of MR-J3-B

MR-J3-B can be easily replaced by the MR-J3-BSafety since both of these servo amplifiers use the same cables and connectors.

Compatible with fully closed loop control system

The MR-J3-BSafety lineup incorporates fully closed loop control system. MR-J3-B-RJ006 can be replaced by the MR-J3-BSafety.

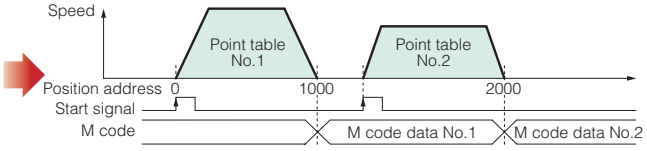
CC-Link compatible servo amplifier with built-in positioning function: MR-J3-T

Lower cost by reduced wiring with CC-Link network!

Built-in positioning function

By setting position and speed data in the point tables in the servo amplifier, positioning operation is possible with a start signal from a host controller.

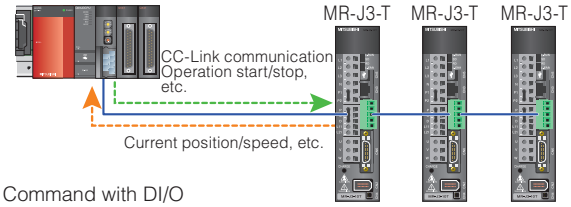
Point table No.	Position data	Servo motor speed	Acceleration time constant	Deceleration time constant	Dwell time	Auxiliary function	M code
1	1000	2000	200	200	0	1	1
2	2000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	3000	3000	100	100	0	2	99



CC-Link communication compatible

Setting position and speed data in the point table, and start and stop operation are all possible via CC-Link communication. Servo monitor information is also transmitted to a host controller via CC-Link communication and can be used for control. CC-Link communication also makes it possible to design a system with the servo amplifiers dispersed throughout.

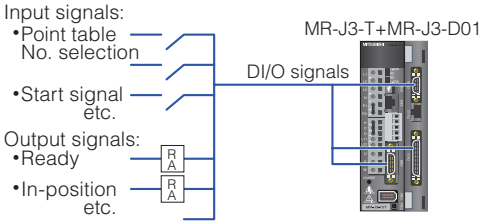
Command via CC-Link communication



DI/O command with MR-J3-D01 extension IO unit (optional)

Selecting the point tables and starting positioning operation are possible by the DI command. In addition, alarm and M codes can be digitally output. (CC-Link communication is not available when using MR-J3-D01.)

Command with DI/O



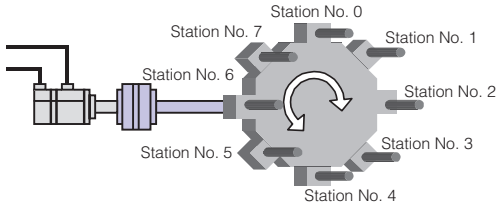
Speed control operation New!

Speed command can be set directly with CC-Link remote register (when 2 stations are occupied).

Operational functions

- Roll feed function
- Indexer function
  Capable of positioning to a set number of equally divided stations (up to 255 stations).

Indexer function



Parameter unit, MR-PRU03

MR-PRU03

Parameter setting, monitoring, alarm display and test operation are possible by connecting the MR-PRU03 to the servo amplifier.
Up to 32 servo amplifier axes can be connected and controlled with a multi-drop system.

Requirements of Machines

to MR-J3-A with pulse train interface and MR-J3-B with SSCNET Ⅲ compatible.

Fully closed loop control compatible servo amplifier: MR-J3-B-RJ006

For highly accurate load-side positioning!

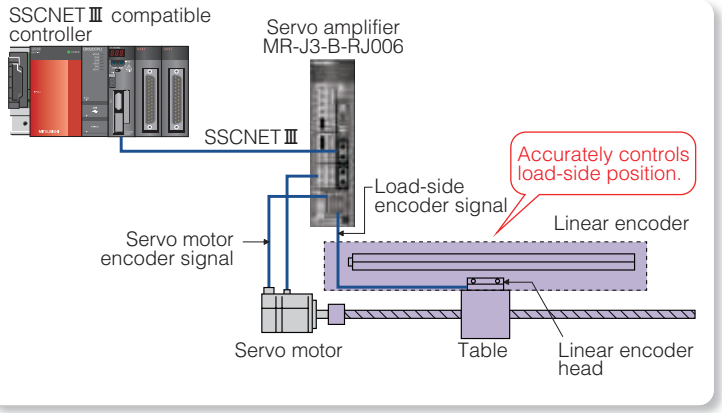
■ High accuracy and high response position control

High response fully closed control function is realized with our original dual feedback control method*.

* The dual feedback control is performed by switching between servo motor encoder and load-side encoder.

■ Flexible system structure

MR-J3-B-RJ006 is compatible with a wide variety of other manufacturers' linear encoders, allowing users to create system that meets their precision requirements. Absolute position detection system is easily configured without a battery by using a serial interface ABS type linear encoder.
Linear encoder with compatible ABZ phase pulse train interface can also be used.

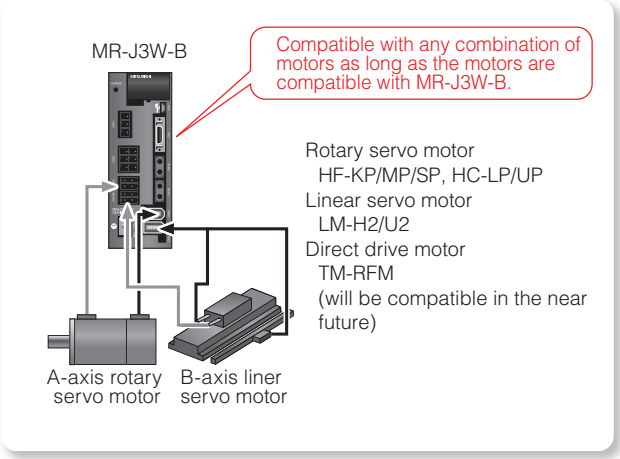


2-axis servo amplifier: MR-J3W-B New!

Eco-friendly and energy-conservative servo amplifier for a more compact machine at a smaller cost!

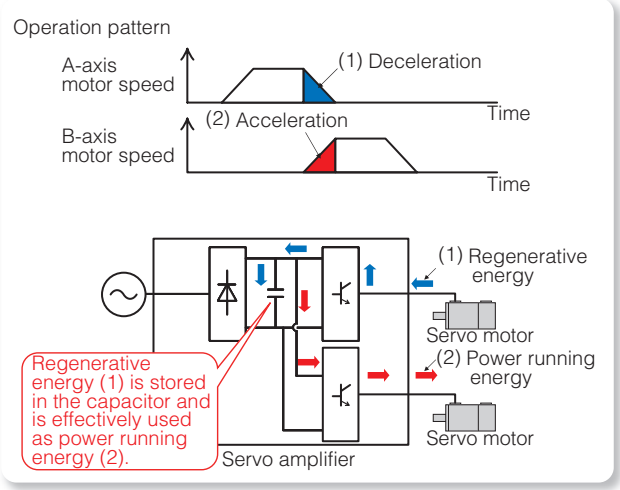
■ SSCNET Ⅲ compatible 2-axis servo amplifier

One unit of MR-J3W-B servo amplifier operates any combination of two rotary/linear servo motors and has MR-J3-B servo amplifier's high performance, functionality and usability.
Direct drive motor will be also compatible in the near future.



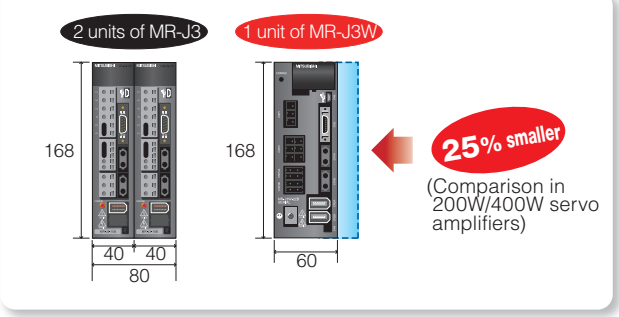
■ Contributes to energy saving

Two motors are operated by a common power supply. Thus, the regenerative energy can be effectively used.

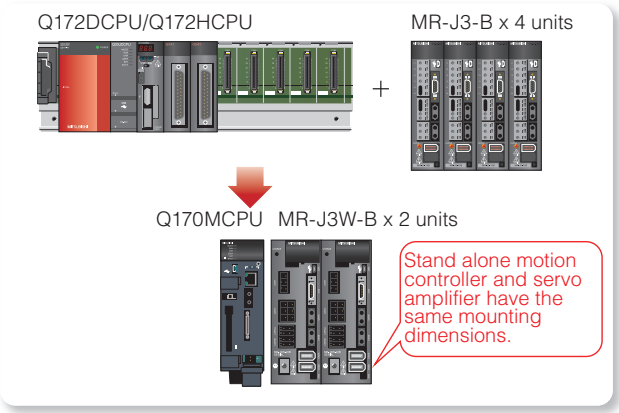


■ Space-saving and reduced wiring

With the MR-J3W-B servo amplifier, two units of motors are operated by one unit of servo amplifier. Thus, mounting area of the servo amplifier can be smaller than ever.



In addition, by configuring together with Q170MCPU stand alone motion controller, overall system including a controller can be made further compact.



The two axes use the same main and control power supply, and SSCNET Ⅲ cables. Thus, wiring is greatly reduced.

■ Common parameters with MR-J3-B

MR-J3W-B servo amplifier uses many of MR-J3-B(-RJ004)'s parameters. Replacement of MR-J3-B is easy. (Different parameters are partially used.)

Variety of Motor Lines for optimal machine drive

To satisfy machine drive needs, a wide variety of motors including rotary, linear

Rotary servo motor

Wide range of capacities and series for various applications.

Wide range of products

Motor capacities varying from 50W to 55kW with ultra-low to medium inertia are available for various applications. Low-inertia and high-speed HF-JP servo motor series is now also available in medium to large capacities.

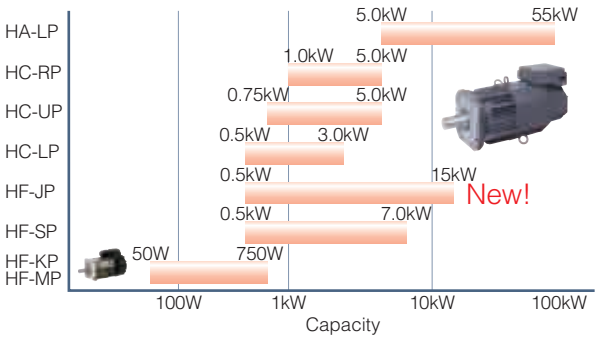
Improved environmental safety

HF-KP/HF-MP/HC-LP/HC-RP/HC-UP servo motors are rated IP65 (excluding the shaft-through portion).
HF-SP/HF-JP servo motors are rated IP67 (excluding the shaft-through portion).

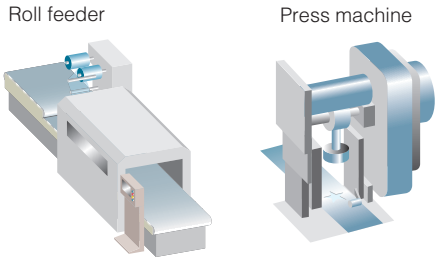
HF-JP series (medium to large capacity) New!

- Low inertia, medium capacity servo motor (0.5kW to 5kW)
  Max. speed: 6000r/min (rated speed: 3000r/min)
  This motor is suitable for frequent positioning and acceleration/deceleration operations, and optimal for food packaging and printing machines.
- Low inertia, large capacity fan-less servo motor (11kW, 15kW)
  Max. speed: 3000r/min (rated speed: 1500r/min)
  Compact size is realized by removing a cooling fan, and wiring is reduced by adopting a power supply connector (reduction by approximately 46% in volume and 34% in mass as compared to HA-LP series).
  This motor is suitable for frequent positioning and acceleration/deceleration operations, and optimal for injection molding and large press machines.

Capacity range of servo motors



Application examples of HF-JP servo motor series

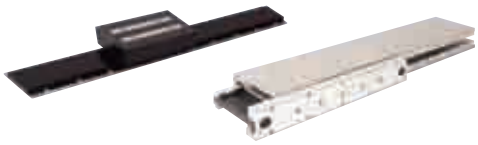


Linear servo motor

Suitable for direct drive system requiring high speed and accuracy!

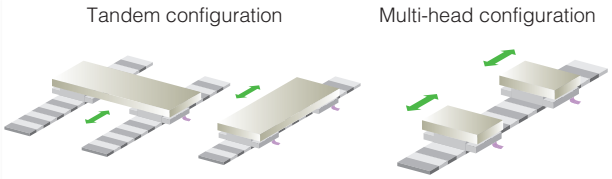
High-speed and high-accuracy

High-speed operation (2m/s) is now possible with this direct drive system. (Conventional transmission mechanisms typically could not achieve such fast operational speeds.)
A fully closed loop control system is realized by using position feedback signals from a load-side encoder such as a linear encoder.



Structuring flexible machine drive part

Direct drive arrangement with the linear servo motor enables compact driving part. The linear servo motor is suitable for long-stroke applications since the motor coil moves along with the motor magnet. By configuring multi-head systems with two motor coils on one motor magnet, non-complex and high-tact machine structures can be realized. In addition, the linear servo motors can be configured in tandem especially in large systems that require highly accurate synchronous operation between two axes.



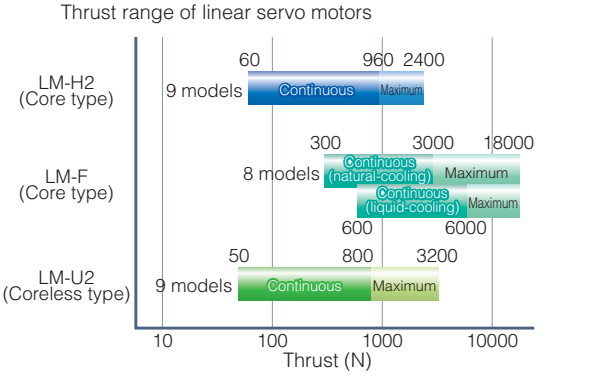
Wide range of products

Continuous thrust: 50N to 6000N Max. thrust: 18000N
Core and coreless types are available.
Core type (with laminated core in the primary side)
- The thrust/volume ratio is increased, allowing space-savings.
- High-rigidity is achieved due to the magnetic attraction force functions as a pre-load on the linear guide.

Coreless type (without laminated core in the primary side)
- Speed fluctuations are very small due to elimination of magnetic attraction force and cogging.
- The linear guide life can be extended as there is no magnetic attraction force.

For LM-F series, the continuous thrust is doubled by cooling forcibly with liquid.

Thrust range of linear servo motors



Direct drive motor New!

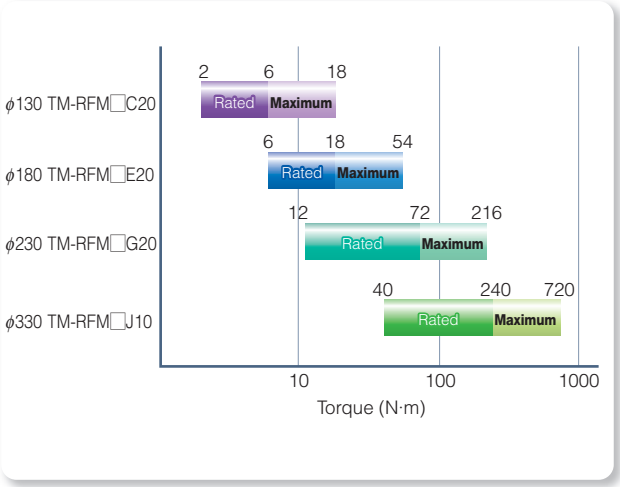
For compact and simplified machine driving part with high-accuracy control!

Direct drive structure

Since load is coupled directly with the direct drive motor, gear reducer and transmission elements can be eliminated, offering greater rigidity and torque. Due to the gearless structure of the system, errors caused by backlash can be eliminated, thereby offering high-accuracy operation and shorter settling times. In addition, smooth rotation with less audible noise is possible.
The high-resolution encoder contributes to high-accuracy control.
Lubrication and maintenance due to abrasion are not required.

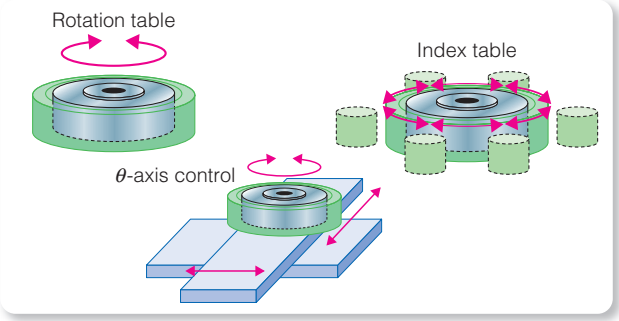
Product lines

12 models are available.



Simplifying machine structure

The motor's low profile design contributes to compact construction and a low center of gravity for enhanced machine stability.
The motor has an inner rotor with hollow shaft that allows cables and pipes to pass through.
This motor is suitable for rotation and index tables used in semiconductor manufacturing, liquid crystal manufacturing and machine tool devices.



Motor capacity selection software

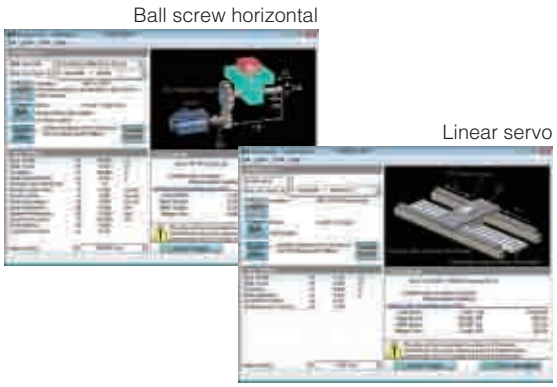
Freeware for easy calculation of motor capacity!

Capacity selection software (MRZJW3-MOTSZ111E)

Optimal servo amplifier, servo motor and optional regeneration unit can be selected just by entering constants and operation pattern.
Selection menu for linear servo motor is also available.
✻ This software will be compatible with direct drive motor soon.

Features
(1) 10 types of machine components are available.
(2) User-defined operation patterns can be set. (position and speed control mode operations)
(3) Feedrate and torque can be displayed in graph format during the selection process.
(4) Calculation process can be displayed.

✻ Capacity selection software (MRZJW3-MOTSZ111E) is available for free download. Contact your local sales office for more details.



Conformity with global standards

Complies with EN, UL and CSA (c-UL) standards

MELSERVO-J3 conforms to global standards.

✻ This product is not subject to China Compulsory Certification (CCC).

TÜV Rheinland

LISTED

✻ cULus mark is attached to MR-J3 series and cTUVus mark to MR-J3W series.
✻ Refer to "SERVO AMPLIFIER INSTRUCTION MANUAL" and "EMC Installation Guidelines" when your system needs to meet the EMC directive.

Complies with Restriction of Hazardous Substances Directive (RoHS).

Human and environment-friendly AC servo is compliant with RoHS Directive.

About RoHS directive
RoHS Directive requires member nations to guarantee that new electrical and electronic equipment sold in the market after July 1, 2006 do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. <G> mark indicating RoHS Directive compliance is printed on the package.

Our optional cables and connectors comply with "Measures for Administration of the Pollution Control of Electronic Information Products" (Chinese RoHS).

MELSERVO-J3 Product Lines

Flexible specifications corresponding to users' needs

■Servo amplifiers

●: Compatible —: Not compatible

Servo amplifier type		Interface						Control mode					Setup S/W	Model	Power supply spec.	Motor capacity, thrust or torque	Compatible motor series											
		Pulse train	Analog	DIO	SSCNET Ⅲ	RS-422 multi-drop	CC-Link	Position	Speed	Torque	Positioning function	Fully closed loop control					HF-KP	HF-MP	HF-SP	HF-JP	HC-LP	HC-RP	HC-UP	HA-LP	LM-H2	LM-F	LM-U2	TM-RFM
General-purpose interface	MR-J3-A 	● (*4)	● (*4)	—	—	●	—	●	●	●	—	—	●	MR-J3-□A MR-J3-DU□A	3-phase 200VAC	0.05kW to 37kW	●	●	●	●	●	●	●	●	—	—	—	—
														MR-J3-□A1	1-phase 100VAC	0.05kW to 0.4kW	●	●	—	—	—	—	—	—	—	—	—	—
														MR-J3-□A4 MR-J3-DU□A4	3-phase 400VAC	0.5kW to 55kW	—	—	●	●	—	—	—	●	—	—	—	—
SSCNET Ⅲ, new high-speed serial bus compatible	MR-J3-B 	—	—	—	●	—	—	●	—	—	—	—	●	MR-J3-□B MR-J3-DU□B	3-phase 200VAC	0.05kW to 37kW	●	●	●	●	●	●	●	●	—	—	—	—
														MR-J3-□B1	1-phase 100VAC	0.05kW to 0.4kW	●	●	—	—	—	—	—	—	—	—	—	—
														MR-J3-□B4 MR-J3-DU□B4	3-phase 400VAC	0.5kW to 55kW	—	—	●	●	—	—	—	●	—	—	—	—
	Drive safety compatible MR-J3-BSafety 	—	—	—	●	—	—	●	—	—	—	●	●	MR-J3-□S MR-J3-DU□S	3-phase 200VAC	0.05kW to 37kW	●	●	●	●	●	●	●	●	—	—	—	—
														MR-J3-□S1	1-phase 100VAC	0.05kW to 0.4kW	●	●	—	—	—	—	—	—	—	—	—	—
														MR-J3-□S4 MR-J3-DU□S4	3-phase 400VAC	0.5kW to 55kW	—	—	●	●	—	—	—	●	—	—	—	—
	Fully closed loop control compatible MR-J3-B-RJ006 	—	—	—	●	—	—	●	—	—	—	●	●	MR-J3-□B-RJ006	3-phase 200VAC	0.05kW to 25kW	●	●	●	● (*5)	●	●	●	●	—	—	—	—
														MR-J3-□B1-RJ006	1-phase 100VAC	0.05kW to 0.4kW	●	●	—	—	—	—	—	—	—	—	—	—
														MR-J3-□B4-RJ006	3-phase 400VAC	0.5kW to 22kW	—	—	●	● (*5)	—	—	—	●	—	—	—	—
	Linear Servo compatible MR-J3-B-RJ004 	—	—	—	●	—	—	●	—	—	—	●	●	MR-J3-□B(4)-RJ004	3-phase 200VAC / 400VAC (*3)	60N to 960N	—	—	—	—	—	—	—	—	●	—	—	—
																(Natural-cooling) 300N to 3000N (Liquid-cooling) 600N to 6000N	—	—	—	—	—	—	—	—	—	●	—	—
																50N to 800N	—	—	—	—	—	—	—	—	—	—	●	—
	Direct drive motor compatible MR-J3-B-RJ 080W 	—	—	—	●	—	—	●	—	—	—	—	●	MR-J3-□B-RJ080W	3-phase 200VAC	2N·m to 240N·m	—	—	—	—	—	—	—	—	—	—	—	●
	2-axis MR-J3W-B 	—	—	—	●	—	—	●	—	—	—	—	●	MR-J3W-□B	3-phase 200VAC	0.05kW to 0.75kW 50N to 240N × 2 units	●	●	●	—	●	—	●	—	●	—	●	○ (*6)
CC-Link compatible (with built-in positioning function)	MR-J3-T 	● (*1)	—	● (*2)	—	●	●	●	●	—	●	—	●	MR-J3-□T	3-phase 200VAC	0.05kW to 25kW	●	●	●	●	●	●	●	●	—	—	—	—
														MR-J3-□T1	1-phase 100VAC	0.05kW to 0.4kW	●	●	—	—	—	—	—	—	—	—	—	—
														MR-J3-□T4	3-phase 400VAC	0.5kW to 22kW	—	—	●	●	—	—	—	●	—	—	—	—

*1. Manual pulse generator (MR-HDP01) is required.
*2. Extension IO unit (MR-J3-D01) is required.
*3. For the linear servo compatible servo amplifiers, 3-phase 400VAC is available only in 22kW.
*4. High resolution analog speed and analog torque commands are available with a set of MR-J3-□A□-RJ040 and MR-J3-D01 extension IO unit. (Note that MR-J3-□A□-RJ040 is available only for 100V, 200V 22kW or smaller and 400V 11kW to 22kW).
*5. Contact your local sales office for the fully closed loop control compatible servo amplifier for 11kW and 15kW of HF-JP servo motor series.
*6. TM-RFM direct drive motor series will be compatible with MR-J3W-B in the near future.

■Servo motors

●: Compatible

Servo motor series (✻3)		Rated speed (maximum speed) (r/min)	Rated output (kW) (✻1, 2)	Servo motor type: With electro-magnetic brake (B)	IP rating (✻4)	Features	Application examples
Small capacity series	**HF-KP series** 	3000 (6000)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	IP65	**Low inertia** Perfect for general industrial machines.	●Belt drives ●Robots ●Mounters ●Sewing machines ●X-Y tables ●Food processing machines ●Semiconductor manufacturing devices ●Knitting and embroidery machines
	HF-MP series 	3000 (6000)	5 types 0.05, 0.1, 0.2, 0.4, 0.75	●	IP65	**Ultra-low inertia** Well suited for high-throughput operations.	●Inserters ●Mounters
Medium capacity series	**HF-SP series** 	1000 (1500)	6 types 0.5, 0.85, 1.2, 2.0, 3.0, 4.2	●	IP67	**Medium inertia** Two models, from low to high-speed, are available for various applications.	●Material handling systems ●Robots ●X-Y tables
		2000 (3000)	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**	●	IP67		
	HC-LP series 	2000 (3000)	5 types 0.5, 1.0, 1.5, 2.0, 3.0	●	IP65	**Low inertia** Perfect for general industrial machines.	●Roll feeders ●Loaders and unloaders ●High-throughput material handling systems
	HC-RP series 	3000 (4500)	5 types 1.0, 1.5, 2.0, 3.5, 5.0	●	IP65	**Ultra-low inertia** Well suited for high-throughput operations.	●Ultra-high-throughput material handling systems
Flat Medium capacity series	**HC-UP series** 	2000 (3000:0.75kW to 2kW 2500:3.5kW, 5kW)	5 types 0.75, 1.5, 2.0, 3.5, 5.0	●	IP65	**Flat type** The flat design makes this unit well suited for situations where the installation space is limited.	●Robots ●Food processing machines
Medium/Large capacity series	**HF-JP series** 	3000 (6000)	14 types 0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0 **0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0**	●	IP67	**Low inertia** Well suited for high-throuput and high-acceleration/ deceleration operations.	●Food processing machines ●Printing machines
		1500 (3000)	4 types 11, 15 **11, 15**	●	IP67		●Injection molding machines ●Large press machines
	HA-LP series 	1000 (1200)	16 types 6.0, 8.0, 12, 15, 20, 25, 30, 37 **6.0, 8.0, 12, 15, 20, 25, 30, 37**	● (Only for 6.0kW to 12kW)	IP44	**Low inertia** Three models, from low to medium-speed, are available for various applications. As standard, 30kW and larger motors can be mounted either with the flange or the feet. (✻5)	●Injection molding machines ●Semiconductor manufacturing devices ●Large material handling systems ●Press machines
		1500 (2000)	14 types 7.0, 11, 15, 22, 30, 37 **7.0, 11, 15, 22, 30, 37, 45, 50**	● (Only for 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**	● (Only for 11kW to 22kW)	IP44 IP65 for HA-LP502/702		

✻1. ■ are for 400V class.
✻2. Contact your local sales office for servo motors larger than 55kW.
✻3. Actual product availability may vary according to region.
✻4. The shaft-through portion is excluded.
✻5. Some motors from 15kW to 25kW capacities can be mounted with the feet. Refer to the section “Servo Motor Dimensions” in this catalog.

■Linear servo motors

Linear servo motor series	Maximum speed (m/s)	Continuous thrust (N) (*1)	Cooling method	Features	Application examples
LM-H2 series 	2.0	60, 120, 240, 360, 480, 720, 960	Natural-cooling	The thrust/volume ratio is increased, allowing space-savings.	●Semiconductor mounting systems ●Wafer cleaning systems ●LCD assembly systems
LM-F series 	2.0	300, 600, 900, 1200, 1800, 2400, 3000	Natural-cooling	By circulating cooling liquid at 5liter/min, the continuous thrust is double that of the natural-cooling method.	●NC machine tools ●Material handlings
	2.0	600, 1200, 1800, 2400, 3600, 4800, 6000	Liquid-cooling		
LM-U2 series 	2.0	50, 75, 100, 150, 225, 400, 600, 800	Natural-cooling	Speed fluctuations are very small due to elimination of magnetic attraction force and cogging.	●Screen printing systems ●Scanning exposure systems ●Inspection systems

■Direct drive motors

Direct drive motor series	Motor outer diameter	Rated speed (Maximum speed) (r/min)	Rated torque (N·m)	IP rating (*2)	Features	Application examples
TM-RFM series 	ϕ130	200 (500)	2, 4, 6	IP42	The motor's low profile design contributes to compact construction and a low center of gravity for enhanced machine stability.	●Semiconductor manufacturing devices ●Liquid crystal manufacturing devices ●Machine tool devices
	ϕ180	200 (500)	6, 12, 18	IP42		
	ϕ230	200 (500)	12, 48, 72	IP42		
	ϕ330	100 (200)	40, 120, 240	IP42		

*1. ■ are for 400V class.
*2. Connectors and gap between rotor and stator are excluded.

■Servo amplifier outlines

MR-J3-A | General-purpose interface

Pulse train and analog input are available as a general-purpose interface. Position, speed or torque control mode can be selected. Machine's performance can be boosted by using the optimum adjustment function such as advanced vibration control and adaptive filter Ⅱ.

MR-J3-B | SSCNETⅢ compatible

By adopting SSCNETⅢ (optical communication), a complete synchronous system can be configured by using the high-speed serial communication with cycle time as fast as 0.44ms between the controller and servo amplifier. SSCNETⅢ can be set up just by inserting a dedicated cable (optical-fiber cable) into connectors, resulting in reduced wiring and preventing possibility of wiring error.
Thanks to the optical communication, noise immunity has been greatly improved, and long distance wiring is made possible by up to 800m (maximum of 50m between stations x 16 axes).
Fully closed loop control compatible servo amplifier is also available (MR-J3-B-RJ006).

MR-J3-BSafety | Drive safety compatible

STO function has been added to the SSCNETⅢ compatible servo amplifier as a safety function. By using the STO function, magnetic contactors previously required for preventing unexpected start are no longer required. SS1 function can be realized by using MR-J3-D05 safety logic unit. MR-J3-BSafety lineup incorporates fully closed loop control system.

MR-J3W-B | 2-axis servo amplifier

With the same high performance and same functions of MR-J3-B, one unit of MR-J3W-B servo amplifier operates two motors including combinations of rotary and linear servo motor, and direct drive motor. (The direct drive motors will be compatible soon.)
Installation space has been reduced by approximately 17% to 25% as compared to two units of MR-J3 series servo amplifier, allowing your system to be more compact. In addition, as the two axes are able to share cables for power supplies and SSCNETⅢ communication, wiring is reduced.

MR-J3-T | CC-Link compatible (with built-in positioning function)

By setting position and speed data in the point tables in the servo amplifier, positioning operation is possible with a start signal from a host controller. Setting position and speed data in the point table, and start and stop operation are possible via CC-Link communication. By using MR-J3-D01 extension IO unit, point table selection and positioning operation with DI/O commands are enabled. (CC-Link communication is not available when using the MR-J3-D01.)

For Servo Amplifier Model Configurations

MR-J3-□□□□

Mitsubishi general-purpose AC servo amplifier MELSERVO-J3 Series

A: General-purpose interface
B: SSCNET Ⅲ compatible
T: CC-Link compatible (with built-in positioning function)

Symbol	Rated output (kW)
10	0.1
20	0.2
40	0.4
60	0.6
70	0.75
100	1
200	2
350	3.5
500	5
700	7
11K	11
15K	15
22K	22

Symbol	Special specifications
U004	1-phase 200 to 240VAC (Note1)
RJ040	Compatible with high resolution analog speed command and analog torque command (Note 2)
RJ006	Compatible with fully closed loop control (Note 3)
RU006	Compatible with fully closed loop control, without a dynamic brake (Note 3, 6)
RZ006	Compatible with fully closed loop control, without an enclosed regenerative resistor (Note 3, 4)
KE	Compatible with 4Mpps command (Note 5)
ED	Without a dynamic brake (Note 6)
PX	Without an enclosed regenerative resistor (Note 4)
LR	Dedicated servo amplifier for HF-JP servo motor of 11kW and 15kW, with an enclosed regenerative resistor
LW	Dedicated servo amplifier for HF-JP servo motor of 11kW and 15kW, without an enclosed regenerative resistor (Note 7)
U1□□	Dedicated servo amplifier for increasing the maximum torque of HF-JP series (0.5kW to 5kW) (Note 8)

Notes: 1. Available in 750W or smaller servo amplifier.
2. Available in MR-J3-□A□ only. Extension IO unit, MR-J3-D01, is required.
3. Available in MR-J3-□B□ only.
4. Available in 11kW to 22kW servo amplifier. A regenerative resistor (standard accessory) is not enclosed.
5. Available in MR-J3-□A(1) only.
6. Dynamic brake does not work at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
7. This servo amplifier is required when using HF-JP servo motor of 11kW and 15kW. Regenerative resistor is not included.
8. This servo amplifier is required when using HF-JP servo motor of 0.5kW to 5kW and when increasing the maximum torque.

Symbol	Power supply
None	3-phase 200VAC or 1-phase 200VAC (Note 1)
1	1-phase 100VAC (Note 2)
4	3-phase 400VAC (Note 3)

Notes: 1. MR-J3-10□, -20□, -40□, -60□ and -70□ are available for 1-phase 200VAC.
2. MR-J3-10□1, -20□1 and -40□1 are available.
3. MR-J3-60□4, -100□4, -200□4, -350□4, -500□4, -700□4, -11K□4, -15K□4 and 22K□4 are available.

List of compatible servo motors

Symbol	200V class									400V class			
	HF-KP	HF-MP	HF-SP	HF-JP		HC-LP	HC-RP	HC-UP	HA-LP	HF-SP	HF-JP		HA-LP
10	053, 13	053, 13	—	—	—	—	—	—	—	—	—	—	—
20	23	23	—	—	—	—	—	—	—	—	—	—	—
40	43	43	—	—	—	—	—	—	—	—	—	—	—
60	—	—	51, 52	53	—	52	—	—	—	524	534	—	—
70	73	73	—	73	—	—	—	72	—	—	—	—	—
100	—	—	81, 102	103	53 (Note 1)	102	—	—	—	1024	734, 1034	534 (Note 1)	—
200	—	—	121, 201, 152, 202	153, 203	73, 103 (Note 1)	152	103, 153	152	—	1524, 2024	1534, 2034	734, 1034 (Note 1)	—
350	—	—	301, 352	353	153, 203 (Note 1)	202	203	202	—	3524	3534	1534, 2034 (Note 1)	—
500	—	—	421, 502	503	353 (Note 1)	302	353, 503	352, 502	502	5024	5034	3534 (Note 1)	—
700	—	—	702	—	503 (Note 1)	—	—	—	601, 701M, 702	7024	—	5034 (Note 1)	6014, 701M4
11K	—	—	—	11K1M (Note 2)	—	—	—	—	801, 12K1, 11K1M, 11K2	—	11K1M4 (Note 2)	—	8014, 12K14, 11K1M4,11K24
15K	—	—	—	15K1M (Note 2)	—	—	—	—	15K1, 15K1M, 15K2	—	15K1M4 (Note 2)	—	15K14, 15K1M4, 15K24
22K	—	—	—	—	—	—	—	—	20K1, 25K1, 22K1M, 22K2	—	—	—	20K14, 22K1M4, 22K24

Notes: 1. Use this servo motor with a dedicated servo amplifier MR-J3-□A(4)/B(4)/T(4)-U1□□ when increasing the maximum torque.
2. Use a dedicated servo amplifier MR-J3-□A(4)/B(4)/T(4)-LR/-LW for HF-JP11K1M(4) and HF-JP15K1M(4). These servo motors cannot be used with any other servo amplifiers without "-LR/-LW".

★The servo amplifiers above conform to EN, UL and c-UL standards.

For Drive Unit/Converter Unit Model Configurations

■For drive unit 200VAC/400VAC

MR-J3-DU 30K A □

Mitsubishi general-purpose AC servo amplifier MELSERVO-J3 Series

A: General-purpose interface
B: SSCNET Ⅲ compatible

Symbol	Power supply
None	3-phase 200VAC
4	3-phase 400VAC

Converter unit (MR-J3-CR55K(4)) is required for the drive unit.

Symbol	Rated output (kW)	Compatible servo motor HA-LP
30K	30	30K1, 30K1M, 30K2, 25K14, 30K14, 30K1M4, 30K24
37K	37	37K1, 37K1M, 37K2, 37K14, 37K1M4, 37K24
45K	45	45K1M4, 45K24
55K	55	50K1M4, 55K24

■For converter unit 200VAC/400VAC

MR-J3-CR 55K □

Mitsubishi general-purpose AC servo amplifier MELSERVO-J3 Series

Rated output: 55kW

Symbol	Power supply
None	3-phase 200VAC
4	3-phase 400VAC

✶The drive unit and the converter unit conform to EN, UL and c-UL standards.

For Servo Motor Model Configurations

■100V/200V class

HF-KP 05 3 B □ □

Symbol	Servo motor series
HF-KP	Low inertia, small capacity
HF-MP	Ultra-low inertia, small capacity
HF-SP	Medium inertia, medium capacity
HF-JP	Low inertia, medium-large capacity
HC-LP	Low inertia, medium capacity
HC-RP	Ultra-low inertia, medium capacity
HC-UP	Flat type, medium capacity
HA-LP	Low inertia, medium-large 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 to 37

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

Symbol	Electromagnetic brake
None	None
B	Installed

Note: Refer to the section “Electromagnetic brake specifications” in this catalog for the available models and detailed specifications.

Symbol	Oil seal
None	None (Note1)
J	Installed (Note2, 3)

Notes: 1. An oil seal is attached for HF-JP/HC-LP/HC-RP/HC-UP/HA-LP series as standard.
2. Oil seal is available for 0.1kW or larger HF-KP/HF-MP series and all HF-SP series.
3. Dimensions for HF-KP/HF-MP/HF-SP series with an oil seal is different from the standard models. Contact your local sales office for details.

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way or with key (Note1)
D	D-cut (Note1)

Notes: 1. Refer to the section “Special shaft end specifications” in this catalog for the available models and detailed specifications.

■400V class

HF-SP 5 2 4 B □ □

Symbol	Servo motor series
HF-SP	Medium inertia, medium capacity
HF-JP	Low inertia, medium-large capacity
HA-LP	Low inertia, medium-large capacity

400VAC class

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

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

Symbol	Electromagnetic brake
None	None
B	Installed

Note: Refer to the section “Electromagnetic brake specifications” in this catalog for the available models and detailed specifications.

Symbol	Oil seal
None	None (Note1)
J	Installed (Note2)

Notes: 1. An oil seal is attached for HF-JP/HA-LP series as standard.
2. Dimensions for HF-SP series with an oil seal is different from the standard models. Contact your local sales office for details.

Symbol	Shaft end
None	Standard (Straight shaft)
K	Key way (Note1)

Notes: 1. Refer to the section “Special shaft end specifications” in this catalog for the available models and detailed specifications.

∗The servo motors above conform to EN, UL and c-UL standards. However, some of the HF-SP, HF-JP and HA-LP servo motors are under application for these standards. Contact your local sales office for more details.

HF-KP Series Servo Motor Specifications

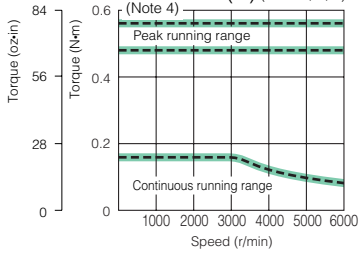
Servo motor series		HF-KP series (Low inertia, small capacity)				
Servo motor model HF-KP		053(B)	13(B)	23(B)	43(B)	73(B)
Compatible servo amplifier model MR-J3-		10A(1)/B(1)(-RJ006)/T(1)		20A(1)/B(1)(-RJ006)/T(1)	40A(1)/B(1)(-RJ006)/T(1)	70A/B(-RJ006)/T
Power supply capacity (Note 1) (kVA)		0.3	0.3	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)	2.4 (340)
Maximum torque (when increased) (Note 7) (N·m [oz·in])		0.56 (79.3)	1.11 (157)	2.23 (316)	4.46 (632)	8.36 (1180)
Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (135)	1.9 (269)	3.8 (538)	7.2 (1020)
Rated speed (r/min)		3000				
Maximum speed (r/min)		6000				
Permissible instantaneous speed (r/min)		6900				
Power rate at continuous rated torque (kW/s)		4.87	11.5	16.9	38.6	39.9
Rated current (A)		0.9	0.8	1.4	2.7	5.2
Maximum current (when increased) (Note 7) (A)		3.1	2.8	4.9	9.5	18.2
Maximum current (A)		2.7	2.4	4.2	8.1	15.6
Regenerative braking frequency (times/min) (Note 2)		(Note 2-1)	(Note 2-2)	448	249	140
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	0.052 (0.284)	0.088 (0.481)	0.24 (1.31)	0.42 (2.30)	1.43 (7.82)
	With electromagnetic brake	0.054 (0.295)	0.090 (0.492)	0.31 (1.69)	0.50 (2.73)	1.63 (8.91)
Recommended load to motor inertia moment ratio (Note 3)		15 times maximum		24 times maximum	22 times maximum	15 times maximum
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)				
Attachments		—	— (Motors with an oil seal are available (HF-KP□J))			
Insulation class		Class B				
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 4)				
Environment (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)				
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Elevation	1000m or less above sea level				
	Vibration (Note 5)	X: 49m/s^2 Y: 49m/s^2				
Mass (kg [lb])	Standard	0.35 (0.78)	0.56 (1.3)	0.94 (2.1)	1.5 (3.3)	2.9 (6.4)
	With electromagnetic brake	0.65 (1.5)	0.86 (1.9)	1.6 (3.6)	2.1 (4.7)	3.9 (8.6)

Notes:1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
2-1. When the motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range. When the motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is 8 times or less and the effective torque is within the rated torque range.
2-2. When the motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range. When the motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is 4 times or less and the effective torque is within the rated torque range.
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.

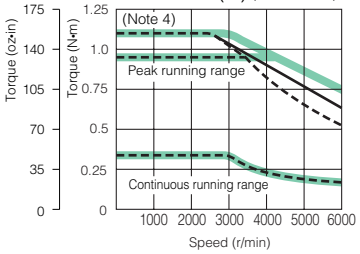
6. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.
7. The maximum torque can be increased from 300% to 350% of the rated toque by setting servo amplifier's parameter. The 350% torque is enabled with the following conditions:
(a) MR-J3-□A(1) with software version of C6 or above (manufactured in January 2010 or later), (b) MR-J3-□B(1)(-RJ006) with software version of C4 or above (manufactured in August 2009 or later) or (c) MR-J3-BSafety with any software version, and (d) HF-KP (manufactured in June 2009 or later).
Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for how to identify the production period and software version, and for details about setting parameters. (Contact your local sales office for more details about MR-J3-□A(1).)

HF-KP Series Servo Motor Torque Characteristics

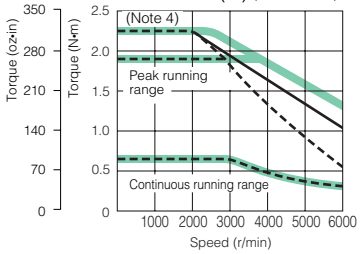
HF-KP053 (B) (Note 1, 2, 3)



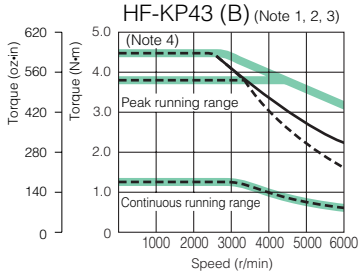
HF-KP13 (B) (Note 1, 2, 3)



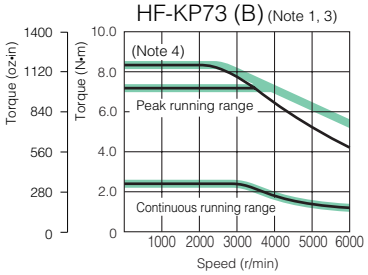
HF-KP23 (B) (Note 1, 2, 3)



HF-KP43 (B) (Note 1, 2, 3)



HF-KP73 (B) (Note 1, 3)



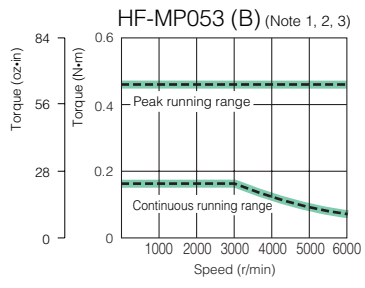
Notes:
1. ▬▬: For 3-phase 200VAC or 1-phase 230VAC.
2. - - -: For 1-phase 100VAC.
3. ——: For 1-phase 200VAC.
This line is drawn only where differs from the other two lines.
4. When the torque is maximally increased.

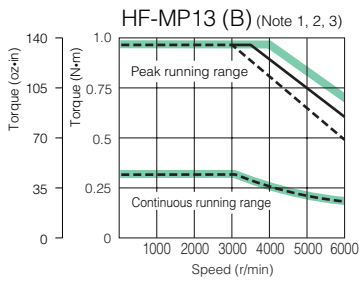
HF-MP Series Servo Motor Specifications

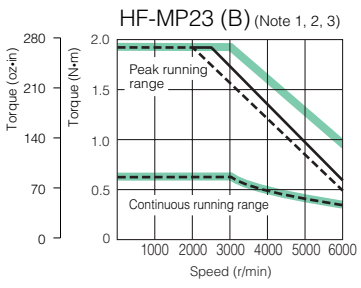
Servo motor series		HF-MP series (Ultra-low inertia, small capacity)				
Servo motor model HF-MP		053(B)	13(B)	23(B)	43(B)	73(B)
Compatible servo amplifier model (Note 6) MR-J3-		10A(1)/B(1)(-RJ006)/T(1)		20A(1)/B(1)(-RJ006)/T(1)	40A(1)/B(1)(-RJ006)/T(1)	70A/B(-RJ006)/T
Power supply capacity (Note 1) (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)	2.4 (340)
Maximum torque (N·m [oz·in])		0.48 (68.0)	0.95 (135)	1.9 (269)	3.8 (538)	7.2 (1020)
Rated speed (r/min)		3000				
Maximum speed (r/min)		6000				
Permissible instantaneous speed (r/min)		6900				
Power rate at continuous rated torque (kW/s)		13.3	31.7	46.1	111.6	95.5
Rated current (A)		1.1	0.9	1.6	2.7	5.6
Maximum current (A)		3.2	2.8	5.0	8.6	16.7
Regenerative braking frequency (times/min) (Note 2)		(Note 2-1)	(Note 2-2)	1570	920	420
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	0.019 (0.104)	0.032 (0.175)	0.088 (0.481)	0.15 (0.820)	0.60 (3.28)
	With electromagnetic brake	0.025 (0.137)	0.039 (0.213)	0.12 (0.656)	0.18 (0.984)	0.70 (3.83)
Recommended load to motor inertia moment ratio		Maximum of 30 times the servo motor's inertia moment (Note 3)				
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)				
Attachments		—	— (Motors with an oil seal are available (HF-MP□J))			
Insulation class		Class B				
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 4)				
Environment (Note 7)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)				
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Elevation	1000m or less above sea level				
	Vibration (Note 5)	X: 49m/s^2 Y: 49m/s^2				
Mass (kg [lb])	Standard	0.35 (0.78)	0.56 (1.3)	0.94 (2.1)	1.5 (3.3)	2.9 (6.4)
	With electromagnetic brake	0.65 (1.5)	0.86 (1.9)	1.6 (3.6)	2.1 (4.7)	3.9 (8.6)

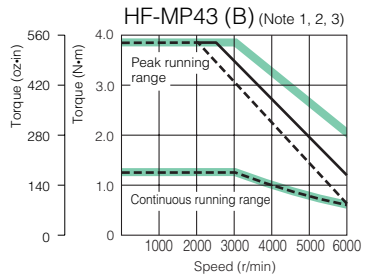
Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
2-1. When the motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range. When the motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is 26 times or less and the effective torque is within the rated torque range.
2-2. When the motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range. When the motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is 15 times or less and the effective torque is within the rated torque range.
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. To use MR-J3-□A(1) with the HF-MP series, the servo amplifier's software version must be A4 or above.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

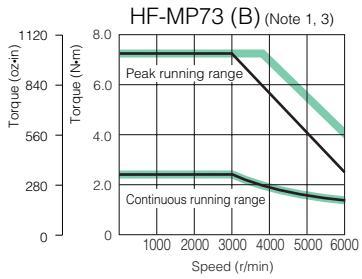
HF-MP Series Servo Motor Torque Characteristics



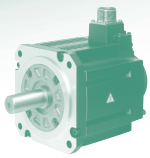








Notes:
1. : For 3-phase 200VAC or 1-phase 230VAC.
2. : For 1-phase 100VAC.
3. : For 1-phase 200VAC.
This line is drawn only where differs from the other two lines.



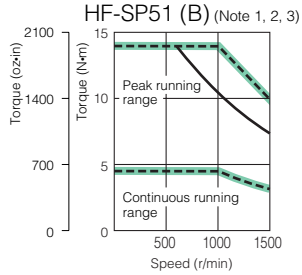
HF-SP 1000r/min Series Servo Motor Specifications

Servo motor series		HF-SP 1000r/min series (Medium inertia, medium capacity)					
Servo motor model HF-SP		51(B)	81(B)	121(B)	201(B)	301(B)	421(B)
Compatible servo amplifier model MR-J3-		60A/B(-RJ006)/T (Note 6)	100A/B(-RJ006)/T (Note 6)	200A/B(-RJ006)/T (Note 6)		350A/B(-RJ006)/T	500A/B(-RJ006)/T
Power supply capacity (Note 1) (kVA)		1.0	1.5	2.1	3.5	4.8	6.3
Continuous running duty	Rated output (kW)	0.5	0.85	1.2	2.0	3.0	4.2
	Rated torque (N·m [oz·in])	4.77 (675)	8.12 (1150)	11.5 (1630)	19.1 (2700)	28.6 (4050)	40.1 (5680)
Maximum torque (N·m [oz·in])		14.3 (2020)	24.4 (3460)	34.4 (4870)	57.3 (8110)	85.9 (12200)	120 (17000)
Rated speed (r/min)		1000					
Maximum speed (r/min)		1500					
Permissible instantaneous speed (r/min)		1725					
Power rate at continuous rated torque (kW/s)		19.2	37.0	34.3	48.6	84.6	104
Rated current (A)		2.9	4.5	6.5	11	16	24
Maximum current (A)		8.7	13.5	19.5	33	48	72
Regenerative braking frequency (times/min) (Note 2)		36	90	188	105	84	75
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	11.9 (65.1)	17.8 (97.3)	38.3 (209)	75.0 (410)	97.0 (530)	154 (842)
	With electromagnetic brake	14.0 (76.5)	20.0 (109)	47.9 (262)	84.7 (463)	107 (585)	164 (897)
Recommended load to motor inertia moment ratio		Maximum of 15 times the servo motor's inertia moment (Note 3)					
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)					
Attachments		— (Motors with an oil seal are available (HF-SP□J))					
Insulation class		Class F					
Structure		Totally enclosed non ventilated (IP rating: IP67) (Note 4)					
Environment (Note 7)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)					
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust					
	Elevation	1000m or less above sea level					
	Vibration (Note 5)	X: 24.5m/s^2 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	6.5 (15)	8.3 (19)	12 (27)	19 (42)	22 (49)	32 (71)
	With electromagnetic brake	8.5 (19)	10.3 (23)	18 (40)	25 (56)	28 (62)	38 (84)

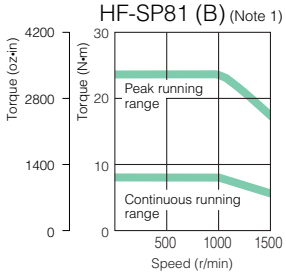
Notes:1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. To use MR-J3-200A or smaller with the HF-SP 1000r/min series, the servo amplifier's software version must be A4 or above.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

HF-SP 1000r/min Series Servo Motor Torque Characteristics

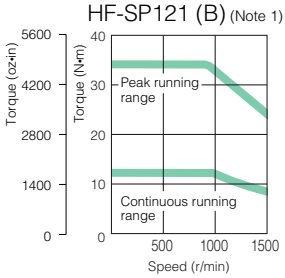
HF-SP51 (B) (Note 1, 2, 3)



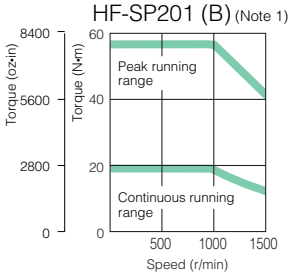
HF-SP81 (B) (Note 1)



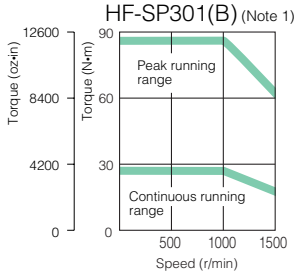
HF-SP121 (B) (Note 1)



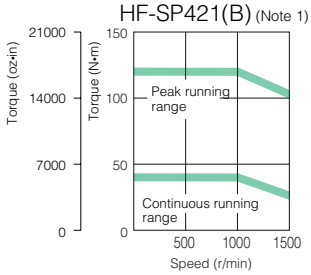
HF-SP201 (B) (Note 1)



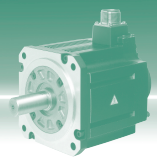
HF-SP301(B) (Note 1)



HF-SP421(B) (Note 1)



Notes:
1. : For 3-phase 200VAC.
2. : For 1-phase 230VAC.
3. : For 1-phase 200VAC.
This line is drawn only where differs from the other two lines.

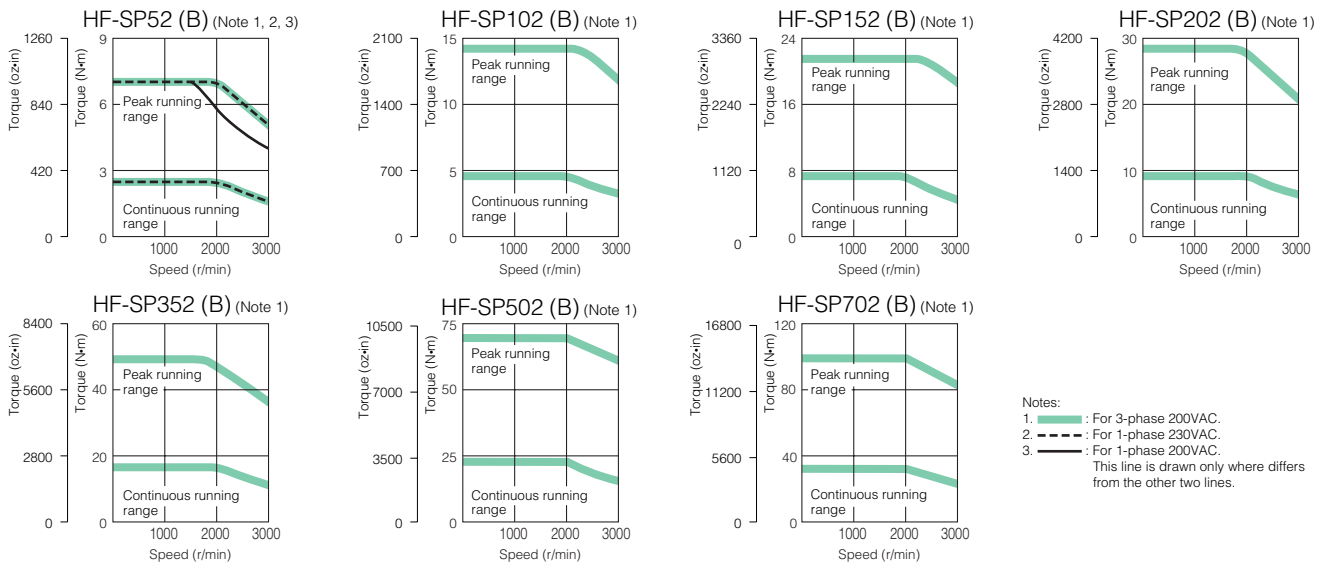


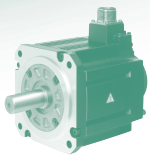
HF-SP 2000r/min Series Servo Motor Specifications (200VAC Class)

Servo motor series		HF-SP 2000r/min series (Medium inertia, medium capacity)						
Servo motor model HF-SP		52(B)	102(B)	152(B)	202(B)	352(B)	502(B)	702(B)
Compatible servo amplifier model MR-J3-		60A/B(-RJ006)/T	100A/B(-RJ006)/T	200A/B(-RJ006)/T		350A/B(-RJ006)/T	500A/B(-RJ006)/T	700A/B(-RJ006)/T
Power supply capacity (Note 1) (kVA)		1.0	1.7	2.5	3.5	5.5	7.5	10
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)	4.77 (675)	7.16 (1010)	9.55 (1350)	16.7 (2360)	23.9 (3380)	33.4 (4730)
Maximum torque (N·m [oz·in])		7.16 (1010)	14.3 (2020)	21.5 (3040)	28.6 (4050)	50.1 (7090)	71.6 (10100)	100 (14200)
Rated speed (r/min)		2000						
Maximum speed (r/min)		3000						
Permissible instantaneous speed (r/min)		3450						
Power rate at continuous rated torque (kW/s)		9.34	19.2	28.8	23.8	37.2	58.8	72.5
Rated current (A)		2.9	5.3	8.0	10	16	24	33
Maximum current (A)		8.7	15.9	24	30	48	72	99
Regenerative braking frequency (times/min) (Note 2)		60	62	152	71	33	37	31
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	6.1 (33.4)	11.9 (65.1)	17.8 (97.3)	38.3 (209)	75.0 (410)	97.0 (530)	154 (842)
	With electromagnetic brake	8.3 (45.4)	14.0 (76.5)	20.0 (109)	47.9 (262)	84.7 (463)	107 (585)	164 (897)
Recommended load to motor inertia moment ratio		Maximum of 15 times the servo motor's inertia moment (Note 3)						
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)						
Attachments		— (Motors with an oil seal are available (HF-SP□J))						
Insulation class		Class F						
Structure		Totally enclosed non ventilated (IP rating: IP67) (Note 4)						
Environment (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)						
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Elevation	1000m or less above sea level						
	Vibration (Note 5)	X: 24.5m/s^2 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	4.8 (11)	6.5 (15)	8.3 (19)	12 (27)	19 (42)	22 (49)	32 (71)
	With electromagnetic brake	6.7 (15)	8.5 (19)	10.3 (23)	18 (40)	25 (56)	28 (62)	38 (84)

Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).

HF-SP 2000r/min Series Servo Motor Torque Characteristics (200VAC Class)

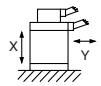




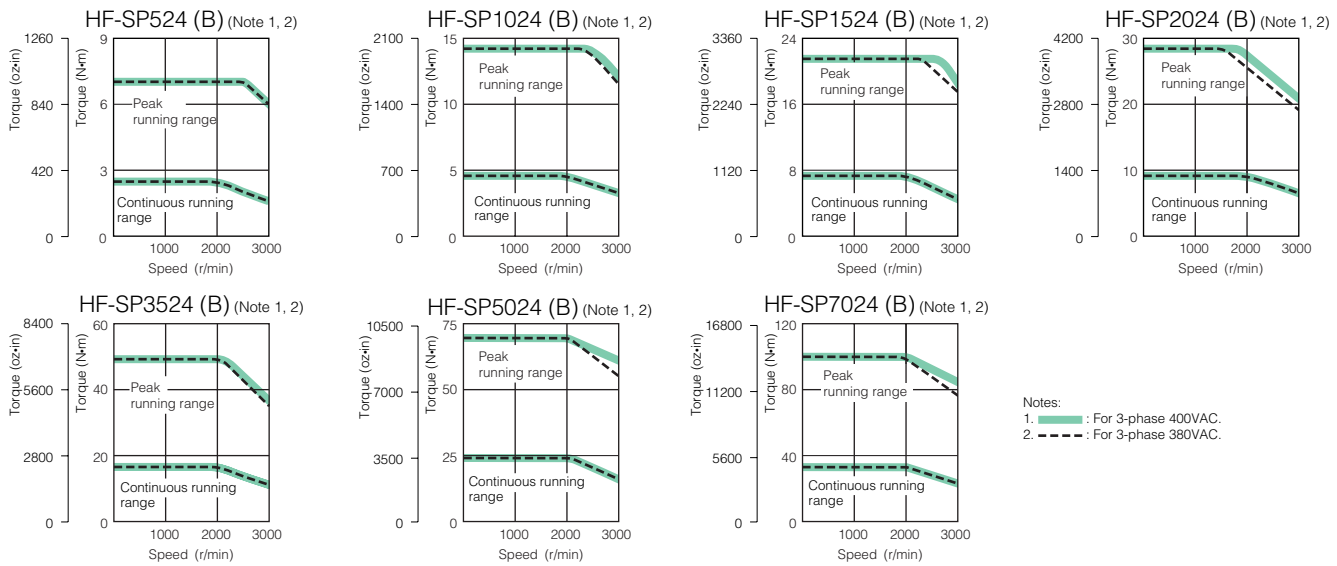
HF-SP 2000r/min Series Servo Motor Specifications (400VAC Class)

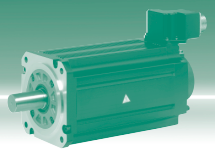
	HF-SP 2000r/min series (Medium inertia, medium capacity)						
	524(B)	1024(B)	1524(B)	2024(B)	3524(B)	5024(B)	7024(B)
	60A4/B4(-RJ006)/T4	100A4/B4(-RJ006)/T4	200A4/B4(-RJ006)/T4		350A4/B4(-RJ006)/T4	500A4/B4(-RJ006)/T4	700A4/B4(-RJ006)/T4
	1.0	1.7	2.5	3.5	5.5	7.5	10
	0.5	1.0	1.5	2.0	3.5	5.0	7.0
	2.39 (338)	4.77 (675)	7.16 (1010)	9.55 (1350)	16.7 (2360)	23.9 (3380)	33.4 (4730)
	7.16 (1010)	14.3 (2020)	21.5 (3040)	28.6 (4050)	50.1 (7090)	71.6 (10100)	100 (14200)
	2000						
	3000						
	3450						
	9.34	19.2	28.8	23.8	37.2	58.8	72.5
	1.5	2.9	4.1	5.0	8.4	12	16
	4.5	8.7	12	15	25	36	48
	90	46	154	72	37	34	28
	6.1 (33.4)	11.9 (65.1)	17.8 (97.3)	38.3 (209)	75.0 (410)	97.0 (530)	154 (842)
	8.3 (45.4)	14.0 (76.5)	20.0 (109)	47.9 (262)	84.7 (463)	107 (585)	164 (897)
	Maximum of 15 times the servo motor's inertia moment (Note 3)						
	18-bit encoder (resolution: 262144 p/rev)						
	— (Motors with an oil seal are available (HF-SP□J))						
	Class F						
	Totally enclosed non ventilated (IP rating: IP67) (Note 4)						
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)						
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	1000m or less above sea level						
	X: 24.5m/s^2 Y: 24.5m/s^2			X: 24.5m/s^2 Y: 49m/s^2		X: 24.5m/s^2 Y: 29.4m/s^2	
	4.8 (11)	6.7 (15)	8.5 (19)	13 (29)	19 (42)	22 (49)	32 (71)
	6.7 (15)	8.6 (19)	11 (25)	19 (42)	25 (56)	28 (62)	38 (84)

3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.



HF-SP 2000r/min Series Servo Motor Torque Characteristics (400VAC Class)



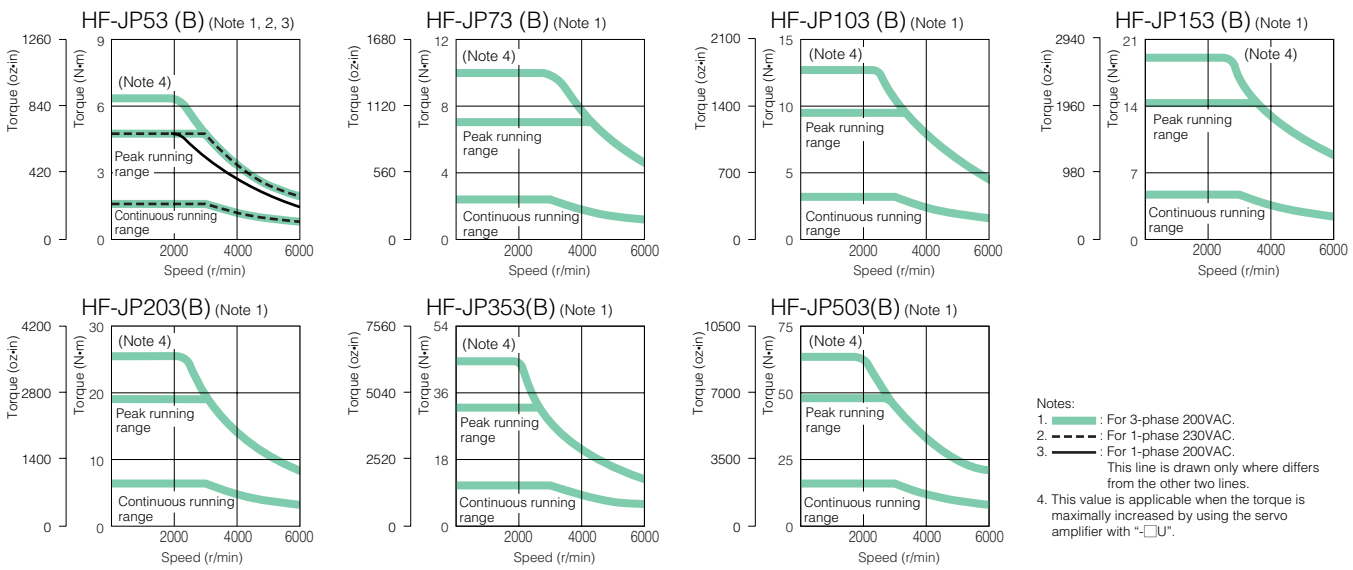


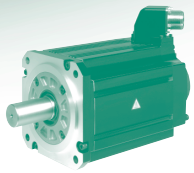
HF-JP 3000r/min Series Servo Motor Specifications (200VAC Class)

Servo motor series		HF-JP 3000r/min series (Low inertia, medium capacity)						
Servo motor model HF-JP		53 (B)	73 (B)	103 (B)	153 (B)	203 (B)	353 (B)	503 (B)
Compatible servo amplifier model MR-J3-		60A/B (-RJ006) /T	70A/B (-RJ006) /T	100A/B (-RJ006) /T	200A/B (-RJ006) /T		350A/B (-RJ006) /T	500A/B (-RJ006) /T
Power supply capacity (Note 1) (kVA)		1.0	1.3	1.7	2.5	3.5	5.5	7.5
Continuous running duty	Rated output (kW)	0.5	0.75	1.0	1.5	2.0	3.3 <3.5> (Note 7)	5.0
	Rated torque (N·m [oz·in])	1.59 (225)	2.39 (338)	3.18 (450)	4.77 (675)	6.37 (902)	10.5 (1490) <11.1 (1570)> (Note 7)	15.9 (2250)
Maximum torque (N·m [oz·in])		4.77 (675)	7.16 (1010)	9.55 (1350)	14.3 (2020)	19.1 (2700)	32.0 (4530)	47.7 (6750)
Rated speed (r/min)		3000						
Maximum speed (r/min)		6000						
Permissible instantaneous speed (r/min)		6900						
Power rate at continuous rated torque (kW/s)		16.7	27.3	38.2	60.2	82.4	83.5	133
Rated current (A)		3.0	5.6	5.6	10.6	10.6	16.6 <17.6> (Note 7)	27
Maximum current (A)		9.0	17	17	32	32	51	81
Regenerative braking frequency (times/min) (Note 2)		67	98	76	271	206	73	68
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	1.52 (8.31)	2.09 (11.4)	2.65 (14.5)	3.79 (20.7)	4.92 (26.9)	13.2 (72.2)	19.0 (104)
	With electromagnetic brake	2.02 (11.0)	2.59 (14.2)	3.15 (17.2)	4.29 (23.5)	5.42 (29.6)	15.4 (84.2)	21.2 (116)
Recommended load to motor inertia moment ratio		Maximum of 10 times the servo motor's inertia moment (Note 3)						
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)						
Attachments		Oil seal						
Insulation class		Class F						
Structure		Totally enclosed non ventilated (IP rating: IP67) (Note 4)						
Environment (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)						
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Elevation	1000m or less above sea level						
	Vibration (Note 5)	X: 24.5m/s^2 Y: 24.5m/s^2						
Mass (kg [lb])	Standard	3.0 (6.7)	3.7 (8.2)	4.5 (10)	5.9 (13)	7.5 (17)	13 (29)	18 (40)
	With electromagnetic brake	4.4 (9.7)	5.1 (12)	5.9 (13)	7.3 (16)	8.9 (20)	15 (33)	20 (44)
With increased maximum torque: (Note 9)	Compatible servo amplifier model MR-J3-	100A/B (-RJ006) /T-U100	200A/B (-RJ006) /T-U101	200A/B (-RJ006) /T-U102	350A/B (-RJ006) /T-U103	350A/B (-RJ006) /T-U104	500A/B (-RJ006) /T-U105	700A/B (-RJ006) /T-U106
	Maximum torque (N·m [oz·in])	6.37 (902)	9.55 (1350)	12.7 (1800)	19.1 (2700)	25.5 (3610)	44.6 (6320)	63.7 (9020)
	Maximum current (A)	12	23	23	43	43	71	108
	Regenerative braking frequency (times/min) (Note 2)	137	511	396	271	206	98	89

Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.

HF-JP 3000r/min Series Servo Motor Torque Characteristics (200VAC Class)



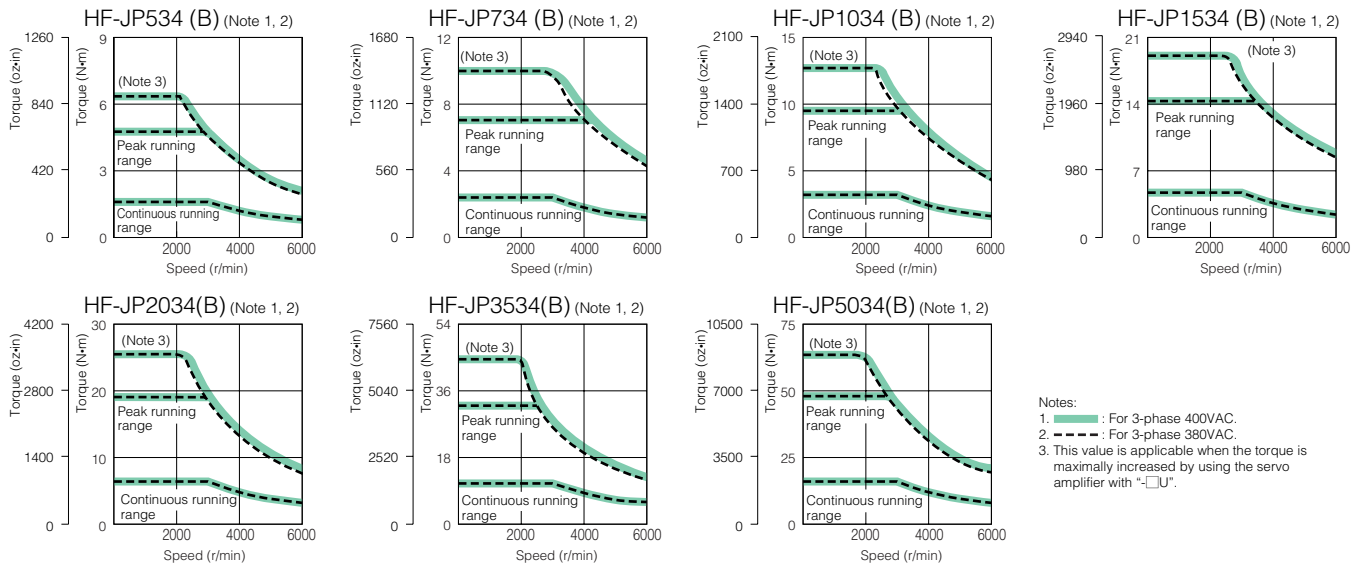


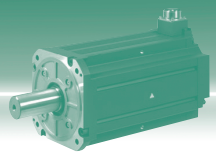
HF-JP 3000r/min Series Servo Motor Specifications (400VAC Class)

HF-JP 3000r/min series (Low inertia, medium capacity)							
	534 (B)	734 (B)	1034 (B)	1534 (B)	2034 (B)	3534 (B)	5034 (B)
	60A4/B4 (-RJ006) /T4	100A4/B4 (-RJ006) /T4		200A4/B4 (-RJ006) /T4		350A4/B4 (-RJ006) /T4	500A4/B4 (-RJ006) /T4
	1.0	1.3	1.7	2.5	3.5	5.5	7.5
	0.5	0.75	1.0	1.5	2.0	3.3 <3.5> (Note 8)	5.0
	1.59 (225)	2.39 (338)	3.18 (450)	4.77 (675)	6.37 (902)	10.5 (1490) <11.1 (1570)> (Note 8)	15.9 (2250)
	4.77 (675)	7.16 (1010)	9.55 (1350)	14.3 (2020)	19.1 (2700)	32.0 (4530)	47.7 (6750)
	3000						
	6000						
	6900						
	16.7	27.3	38.2	60.2	82.4	83.5	133
	1.5	2.8	2.8	5.4	5.4	8.3 <8.8> (Note 8)	14
	4.5	8.4	8.4	17	17	26	41
	99	72	56	265	203	75	68
	1.52 (8.31)	2.09 (11.4)	2.65 (14.5)	3.79 (20.7)	4.92 (26.9)	13.2 (72.2)	19.0 (104)
	2.02 (11.0)	2.59 (14.2)	3.15 (17.2)	4.29 (23.5)	5.42 (29.6)	15.4 (84.2)	21.2 (116)
	Maximum of 10 times the servo motor's inertia moment (Note 3)						
	18-bit encoder (resolution: 262144 p/rev)						
	Oil seal						
	Class F						
	Totally enclosed non ventilated (IP rating: IP67) (Note 4)						
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)						
	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)						
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	1000m or less above sea level						
	X: 24.5m/s² Y: 24.5m/s²						
	3.0 (6.7)	3.7 (8.2)	4.5 (10)	5.9 (13)	7.5 (17)	13 (29)	18 (40)
	4.4 (9.7)	5.1 (12)	5.9 (13)	7.3 (16)	8.9 (20)	15 (33)	20 (44)
	100A4/B4 (-RJ006) /T4-U110	200A4/B4 (-RJ006) /T4-U111	200A4/B4 (-RJ006) /T4-U112	350A4/B4 (-RJ006) /T4-U113	350A4/B4 (-RJ006) /T4-U114	500A4/B4 (-RJ006) /T4-U115	700A4/B4 (-RJ006) /T4-U116
	6.37 (902)	9.55 (1350)	12.7 (1800)	19.1 (2700)	25.5 (3610)	44.6 (6320)	63.7 (9020)
	6.0	12	12	22	22	36	54
	100	489	382	275	209	98	89

4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.
7. Value indicated in < > is applicable when connected to MR-J3-500A/B(-RJ006)/T-U105 servo amplifier.
8. Value indicated in < > is applicable when connected to MR-J3-500A4/B4(-RJ006)/T4-U115 servo amplifier.
9. Use servo amplifier MR-J3-□A(4)/B(4)(-RJ006)/T(4)-U□ to increase the maximum torque.

HF-JP 3000r/min Series Servo Motor Torque Characteristics (400VAC Class)



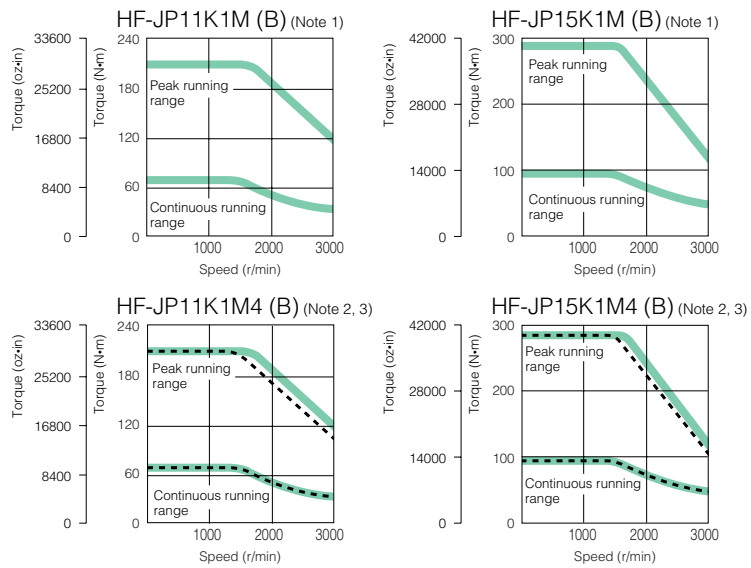


HF-JP 1500r/min Series Servo Motor Specifications (200VAC/400VAC Class)

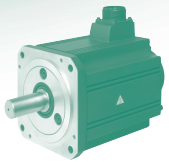
Servo motor series		HF-JP 1500r/min series (Low inertia, large capacity) (200VAC)		HF-JP 1500r/min series (Low inertia, large capacity) (400VAC)	
Servo motor model HF-JP		11K1M (B)	15K1M (B)	11K1M4 (B)	15K1M4 (B)
Compatible servo amplifier model (Note 8) MR-J3-		11KA/B/T-LR	15KA/B/T-LR	11KA4/B4/T4-LR	15KA4/B4/T4-LR
Power supply capacity (Note 1) (kVA)		16	22	16	22
Continuous running duty	Rated output (kW)	11	15	11	15
	Rated torque (N·m [oz·in])	70 (9910)	95.5 (13500)	70 (9910)	95.5 (13500)
Maximum torque (N·m [oz·in])		210 (29700)	286 (40500)	210 (29700)	286 (40500)
Rated speed (r/min)		1500			
Maximum speed (r/min)		3000			
Permissible instantaneous speed (r/min)		3450			
Power rate at continuous rated torque (kW/s)		223	290	223	290
Rated current (A)		60	76	32	38
Maximum current (A)		200	246	100	123
Regenerative braking frequency (times/min) (Note 2, 6)		143	162	143	162
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	220 (1200)	315 (1720)	220 (1200)	315 (1720)
	With electromagnetic brake	240 (1310)	336 (1840)	240 (1310)	336 (1840)
Recommended load to motor inertia moment ratio		Maximum of 10 times the servo motor's inertia moment (Note 3)			
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)			
Attachments		Oil seal			
Insulation class		Class F			
Structure		Totally enclosed non ventilated (IP rating: IP67) (Note 4)			
Environment (Note 7)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)			
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust			
	Elevation	1000m or less above sea level			
	Vibration (Note 5)	X: 24.5m/s^2 Y: 24.5m/s^2			
Mass (kg [lb])	Standard	62 (140)	86 (190)	62 (140)	86 (190)
	With electromagnetic brake	74 (165)	97 (215)	74 (165)	97 (215)

Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. The value is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.
8. Contact your local sales office for fully closed loop control compatible servo amplifier.

HF-JP 1500r/min Series Servo Motor Torque Characteristics (200VAC/400VAC Class)



Notes:
1. : For 3-phase 200VAC.
2. : For 3-phase 400VAC.
3. : For 3-phase 380VAC.

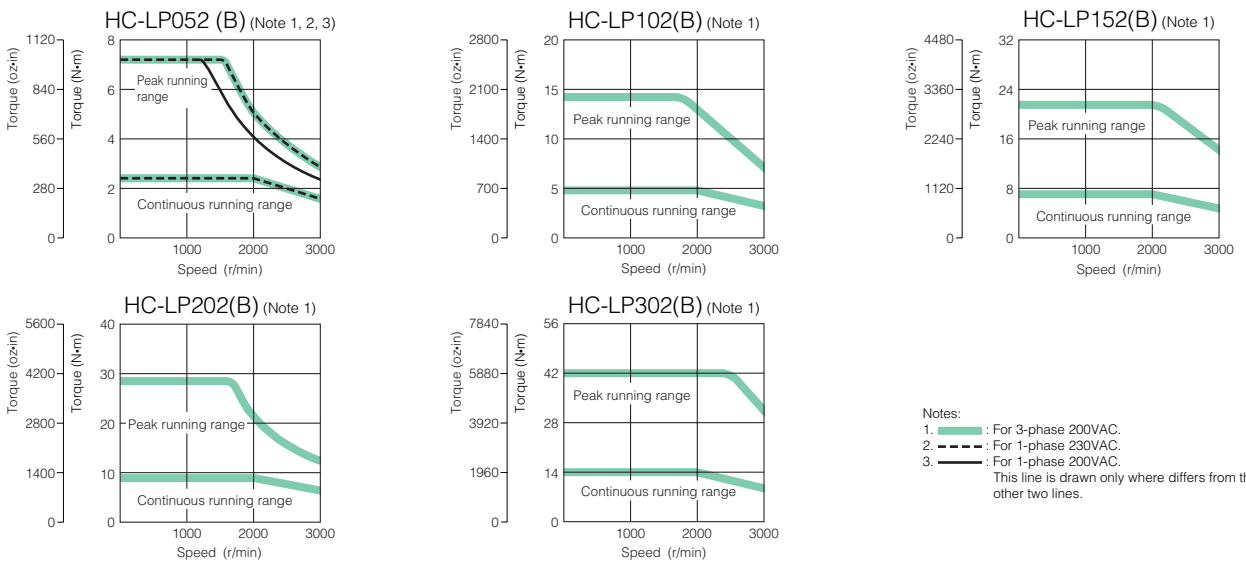


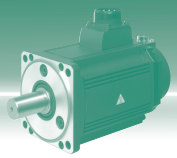
HC-LP Series Servo Motor Specifications

Servo motor series		HC-LP series (Low inertia, medium capacity)				
Servo motor model HC-LP		52(B)	102(B)	152(B)	202(B)	302(B)
Compatible servo amplifier model MR-J3-		60A/B(-RJ006)/T	100A/B(-RJ006)/T	200A/B(-RJ006)/T	350A/B(-RJ006)/T	500A/B(-RJ006)/T
Power supply 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)	4.78 (677)	7.16 (1010)	9.55 (1350)	14.3 (2020)
Maximum torque (N·m [oz·in])		7.16 (1010)	14.4 (2040)	21.6 (3060)	28.5 (4040)	42.9 (6070)
Rated speed (r/min)		2000				
Maximum speed (r/min)		3000				
Permissible instantaneous speed (r/min)		3450				
Power rate at continuous rated torque (kW/s)		18.4	49.3	79.8	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)		115	160	425	120	70
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	3.10 (16.9)	4.62 (25.3)	6.42 (35.1)	22.0 (120)	36.0 (197)
	With electromagnetic brake	5.20 (28.4)	6.72 (36.7)	8.52 (46.6)	32.0 (175)	46.0 (252)
Recommended load to motor inertia moment ratio		Maximum of 10 times the servo motor's inertia moment (Note 3)				
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)				
Attachments		Oil seal				
Insulation class		Class F				
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 4)				
Environment (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)				
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Elevation	1000m or less above sea level				
	Vibration (Note 5)	X: 9.8m/s^2 Y: 24.5m/s^2			X: 19.6m/s^2 Y: 49m/s^2	
Mass (kg [lb])	Standard	6.5 (15)	8.0 (18)	10 (22)	21 (47)	28 (62)
	With electromagnetic brake	9.0 (20)	11 (25)	13 (29)	27 (60)	34 (75)

Notes:
1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

HC-LP Series Servo Motor Torque Characteristics



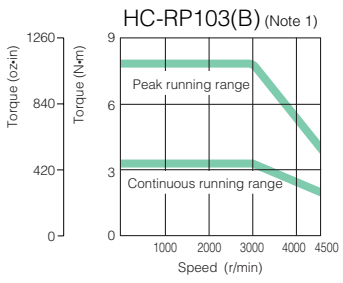


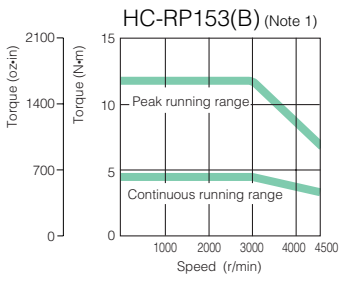
HC-RP Series Servo Motor Specifications

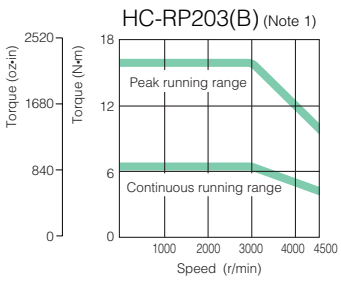
Servo motor series		HC-RP series (Ultra low inertia, medium capacity)				
Servo motor model HC-RP		103(B)	153(B)	203(B)	353(B)	503(B)
Compatible servo amplifier model MR-J3-		200A/B(-RJ006)/T		350A/B(-RJ006)/T	500A/B(-RJ006)/T	
Power supply capacity (Note 1) (kVA)		1.7	2.5	3.5	5.5	7.5
Continuous running duty	Rated output (kW)	1.0	1.5	2.0	3.5	5.0
	Rated torque (N·m [oz·in])	3.18 (450)	4.78 (677)	6.37 (902)	11.1 (1570)	15.9 (2250)
Maximum torque (N·m [oz·in])		7.95 (1130)	11.9 (1690)	15.9 (2250)	27.9 (3950)	39.7 (5620)
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	23	37	58	70
Regenerative braking frequency (times/min) (Note 2)		1090	860	710	174	125
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	1.50 (8.20)	1.90 (10.4)	2.30 (12.6)	8.30 (45.4)	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 to motor inertia moment ratio		Maximum of 5 times the servo motor's inertia moment (Note 3)				
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)				
Attachments		Oil seal				
Insulation class		Class F				
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 4)				
Environment (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)				
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Elevation	1000m or less above sea level				
	Vibration (Note 5)	X: 24.5m/s^2 Y: 24.5m/s^2				
Mass (kg [lb])	Standard	3.9 (8.6)	5.0 (11)	6.2 (14)	12 (27)	17 (38)
	With electromagnetic brake	6.0 (14)	7.0 (16)	8.3 (19)	15 (33)	21 (47)

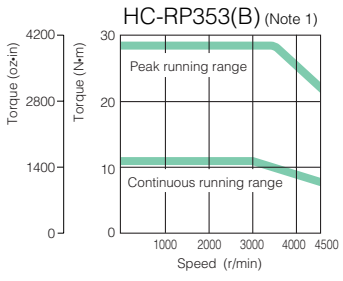
Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

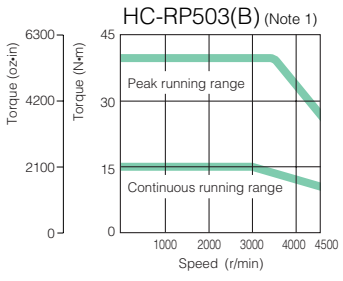
HC-RP Series Servo Motor Torque Characteristics



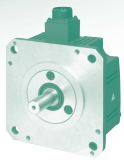








Notes:
1. ▬ : For 3-phase 200VAC.

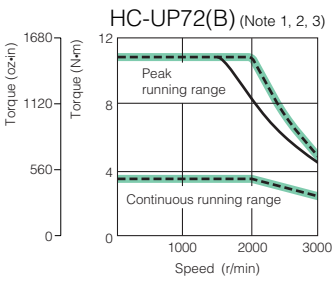


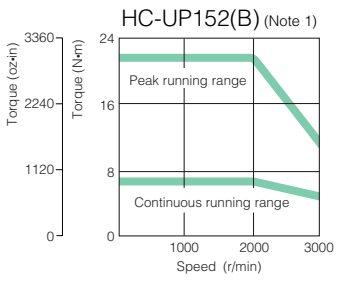
HC-UP Series Servo Motor Specifications

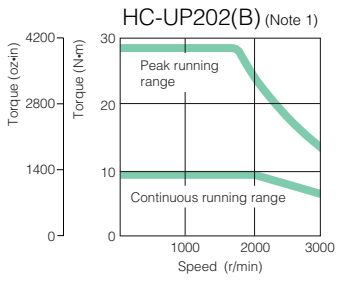
Servo motor series		HC-UP series (Flat type, medium capacity)				
Servo motor model HC-UP		72(B)	152(B)	202(B)	352(B)	502(B)
Compatible servo amplifier model MR-J3-		70A/B(-RJ006)/T	200A/B(-RJ006)/T	350A/B(-RJ006)/T	500A/B(-RJ006)/T	
Power supply capacity (Note 1) (kVA)		1.3	2.5	3.5	5.5	7.5
Continuous running duty	Rated output (kW)	0.75	1.5	2.0	3.5	5.0
	Rated torque (N·m [oz·in])	3.58 (507)	7.16 (1010)	9.55 (1350)	16.7 (2360)	23.9 (3380)
Maximum torque (N·m [oz·in])		10.7 (1520)	21.6 (3060)	28.5 (4040)	50.1 (7090)	71.6 (10100)
Rated speed (r/min)		2000				
Maximum speed (r/min)		3000			2500	
Permissible instantaneous speed (r/min)		3450			2875	
Power rate at continuous rated torque (kW/s)		12.3	23.2	23.9	36.5	49.6
Rated current (A)		5.4	9.7	14	23	28
Maximum current (A)		16	29	42	69	84
Regenerative braking frequency (times/min) (Note 2)		53	124	68	44	31
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	10.4 (56.9)	22.1 (121)	38.2 (209)	76.5 (418)	115 (629)
	With electromagnetic brake	12.5 (68.3)	24.2 (132)	46.8 (256)	85.1 (465)	124 (678)
Recommended load to motor inertia moment ratio		Maximum of 15 times the servo motor's inertia moment (Note 3)				
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)				
Attachments		Oil seal				
Insulation class		Class F				
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 4)				
Environment (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)				
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust				
	Elevation	1000m or less above sea level				
	Vibration (Note 5)	X: 24.5m/s^2 Y: 24.5m/s^2		X: 24.5m/s^2 Y: 49m/s^2		
Mass (kg [lb])	Standard	8.0 (18)	11 (25)	16 (36)	20 (44)	24 (53)
	With electromagnetic brake	10 (22)	13 (29)	22 (49)	26 (58)	30 (67)

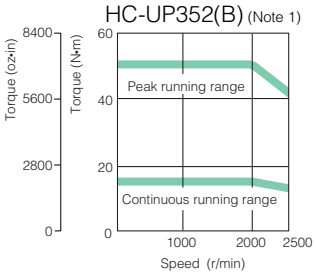
Notes:1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).
3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

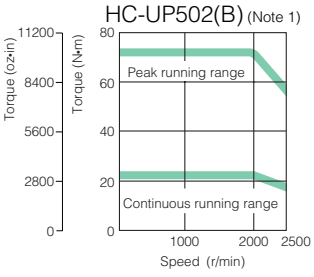
HC-UP Series Servo Motor Torque Characteristics



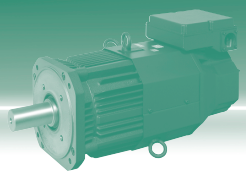








Notes:
1. : For 3-phase 200VAC.
2. : For 1-phase 230VAC.
3. : For 1-phase 200VAC.
This line is drawn only where differs from the other two lines.

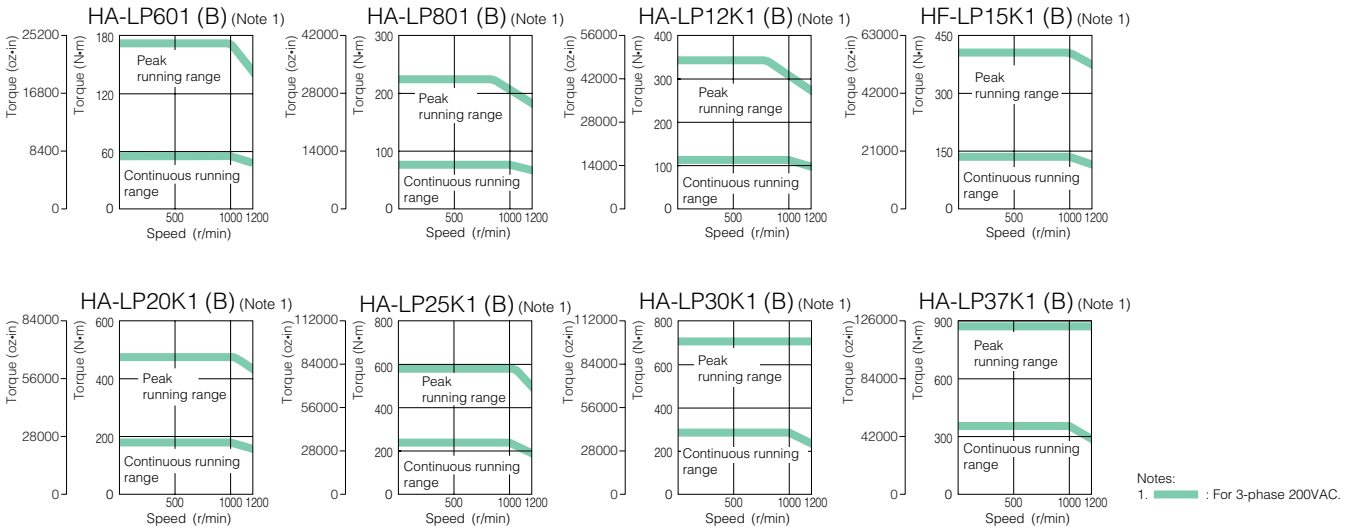


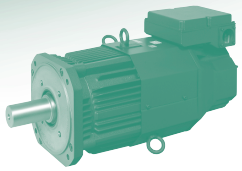
HA-LP 1000r/min Series Servo Motor Specifications (200VAC Class)

Servo motor series		HA-LP 1000r/min series (Low inertia, medium/large capacity)							
Servo motor model HA-LP		601(B)	801(B)	12K1(B)	15K1	20K1	25K1	30K1	37K1
Compatible servo amplifier model MR-J3-		700A/B (-RJ006)/T	11KA/B(-RJ006)/T		15KA/B (-RJ006)/T	22KA/B(-RJ006)/T		DU30KA/B	DU37KA/B
Power supply capacity (Note 1) (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
	Rated torque (N·m [oz·in])	57.3 (8110)	76.4 (10800)	115 (16300)	143 (20200)	191 (27000)	239 (33800)	286 (40500)	353 (50000)
Maximum torque (N·m [oz·in])		172 (24400)	229 (32400)	344 (48700)	415 (58800)	477 (67500)	597 (84500)	716 (101000)	883 (125000)
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 2)		158	354 (Note 6)	264 (Note 6)	230 (Note 6)	195 (Note 6)	117 (Note 6)	–	–
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	105 (574)	220 (1200)	295 (1610)	550 (3010)	650 (3550)	1080 (5900)	1310 (7160)	1870 (10200)
	With electromagnetic brake	113 (618)	293 (1600)	369 (2020)	–	–	–	–	–
Recommended load to motor inertia moment ratio		Maximum of 10 times the servo motor's inertia moment (Note 3)							
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)							
Attachments		Oil seal							
Insulation class		Class F							
Structure		Totally enclosed ventilated (IP rating: IP44) (Note 4)							
Environment (Note 7)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)							
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust							
	Elevation	1000m or less above sea level							
	Vibration (Note 5)	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 (125)	95 (210)	115 (255)	160 (355)	180 (400)	230 (510)	250 (555)	335 (740)
	With electromagnetic brake	70 (155)	130 (290)	150 (335)	–	–	–	–	–
Cooling fan: Power	Voltage, frequency	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 200 to 230VAC 50/60Hz						
	Input (W)	42 (50Hz) / 54 (60Hz)	62 (50Hz) / 76 (60Hz)		65 (50Hz) / 85 (60Hz)		120 (50Hz) / 175 (60Hz)		
Cooling fan: Rated current (A)		0.21 (50Hz) / 0.25 (60Hz)	0.18 (50Hz) / 0.17 (60Hz)		0.20 (50Hz) / 0.22 (60Hz)		0.65 (50Hz) / 0.80 (60Hz)		

Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).

HA-LP 1000r/min Series Servo Motor Torque Characteristics (200VAC Class)



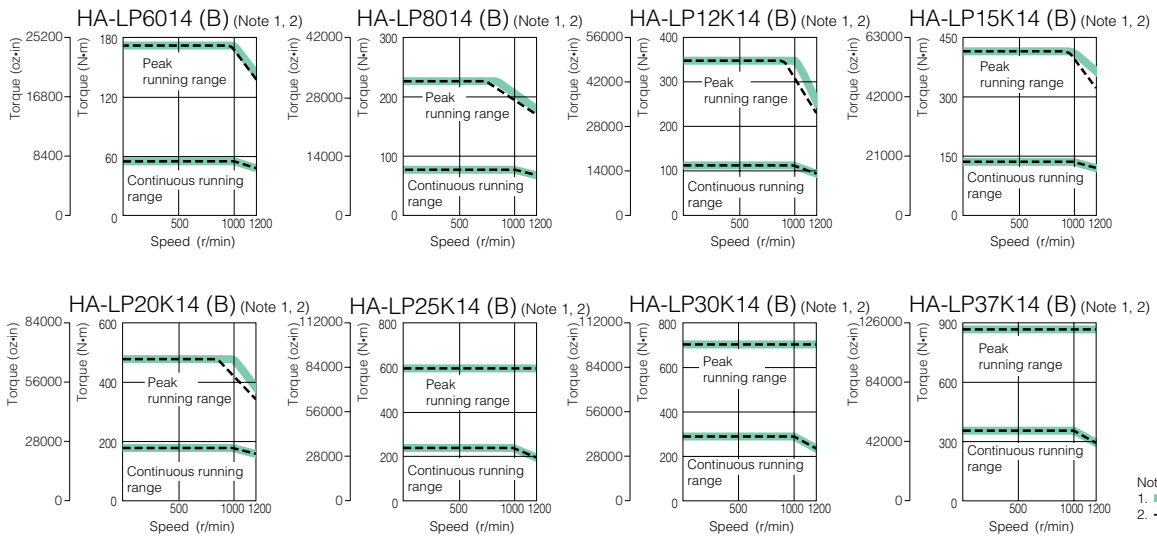


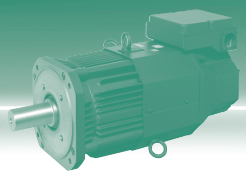
HA-LP 1000r/min Series Servo Motor Specifications (400VAC Class)

	HA-LP 1000r/min series (Low inertia, medium/large capacity)							
	6014(B)	8014(B)	12K14(B)	15K14	20K14	25K14	30K14	37K14
	700A4/B4 (-RJ006)/T4	11KA4/B4(-RJ006)/T4		15KA4/B4 (-RJ006)/T4	22KA4/B4 (-RJ006)/T4	DU30KA4/B4		DU37KA4/B4
	8.6	12	18	22	30	38	48	59
	6.0	8.0	12	15	20	25	30	37
	57.3 (8110)	76.4 (10800)	115 (16300)	143 (20200)	191 (27000)	239 (33800)	286 (40500)	353 (50000)
	172 (24400)	229 (32400)	344 (48700)	415 (58800)	477 (67500)	597 (84500)	716 (101000)	883 (125000)
	1000							
	1200							
	1380							
	313	265	445	373	561	528	626	668
	17	20	30	40	55	70	77	95
	51	60	90	120	138	175	193	238
	169	354 (Note 6)	264 (Note 6)	230 (Note 6)	195 (Note 6)	–	–	–
	105 (574)	220 (1200)	295 (1610)	550 (3010)	650 (3550)	1080 (5900)	1310 (7160)	1870 (10200)
	113 (618)	293 (1600)	369 (2020)	–	–	–	–	–
	Maximum of 10 times the servo motor's inertia moment (Note 3)							
	18-bit encoder (resolution: 262144 p/rev)							
	Oil seal							
	Class F							
	Totally enclosed ventilated (IP rating: IP44) (Note 4)							
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)							
	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)							
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust							
	1000m or less above sea level							
	X: 11.7m/s² Y: 29.4m/s²			X: 9.8m/s² Y: 9.8m/s²				
	55 (125)	95 (210)	115 (255)	160 (355)	180 (400)	230 (510)	250 (555)	335 (740)
	70 (155)	130 (290)	150 (335)	–	–	–	–	–
	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 380 to 440VAC/50Hz 3-phase 380 to 480VAC/60Hz		3-phase 380 to 460VAC/50Hz 3-phase 380 to 480VAC/60Hz				
	42 (50Hz) / 54 (60Hz)	62 (50Hz) / 76 (60Hz)		65 (50Hz) / 85 (60Hz)		110 (50Hz) / 150 (60Hz)		
	0.21 (50Hz) / 0.25 (60Hz)	0.14 (50Hz) / 0.11 (60Hz)		0.12 (50Hz) / 0.14 (60Hz)		0.20 (50Hz) / 0.22 (60Hz)		

3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. The value is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m³/min). Note that change in parameter No. PA02 is required.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

HA-LP 1000r/min Series Servo Motor Torque Characteristics (400VAC Class)



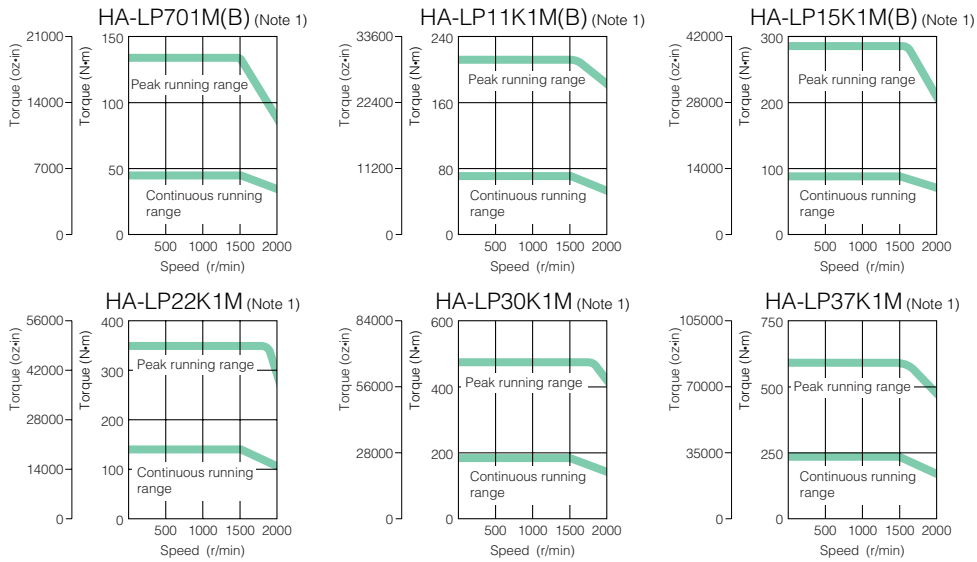


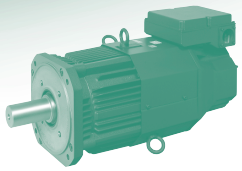
HA-LP 1500r/min Series Servo Motor Specifications (200VAC Class)

Servo motor series		HA-LP 1500r/min series (Low inertia, medium/large capacity)					
Servo motor model HA-LP		701M(B)	11K1M(B)	15K1M(B)	22K1M	30K1M	37K1M
Compatible servo amplifier model MR-J3-		700A/B(-RJ006)/T	11KA/B(-RJ006)/T	15KA/B(-RJ006)/T	22KA/B(-RJ006)/T	DU30KA/B	DU37KA/B
Power supply capacity (Note 1) (kVA)		10	16	22	33	48	59
Continuous running duty	Rated output (kW)	7.0	11	15	22	30	37
	Rated torque (N·m [oz·in])	44.6 (6320)	70.0 (9910)	95.5 (13500)	140 (19800)	191 (27000)	236 (33400)
Maximum torque (N·m [oz·in])		134 (19000)	210 (29700)	286 (40500)	350 (49600)	477 (67500)	589 (83400)
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 2)		70	158 (Note 6)	191 (Note 6)	102 (Note 6)	—	—
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	105 (574)	220 (1200)	295 (1610)	550 (3010)	650 (3550)	1080 (5900)
	With electromagnetic brake	113 (618)	293 (1600)	369 (2020)	—	—	—
Recommended load to motor inertia moment ratio		Maximum of 10 times the servo motor's inertia moment (Note 3)					
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)					
Attachments		Oil seal					
Insulation class		Class F					
Structure		Totally enclosed ventilated (IP rating: IP44) (Note 4)					
Environment (Note 7)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)					
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust					
	Elevation	1000m or less above sea level					
	Vibration (Note 5)	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 (125)	95 (210)	115 (255)	160 (355)	180 (400)	230 (510)
	With electromagnetic brake	70 (155)	130 (290)	150 (335)	—	—	—
Cooling fan	Power: Voltage, frequency	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 200 to 230VAC 50/60Hz				
	Power: Input (W)	42 (50Hz) / 54 (60Hz)	62 (50Hz) / 76 (60Hz)		65 (50Hz) / 85 (60Hz)	120 (50Hz) / 175 (60Hz)	
	Rated current (A)	0.21 (50Hz) / 0.25 (60Hz)	0.18 (50Hz) / 0.17 (60Hz)		0.20 (50Hz) / 0.22 (60Hz)	0.65 (50Hz) / 0.80 (60Hz)	

Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).

HA-LP 1500r/min Series Servo Motor Torque Characteristics (200VAC Class)



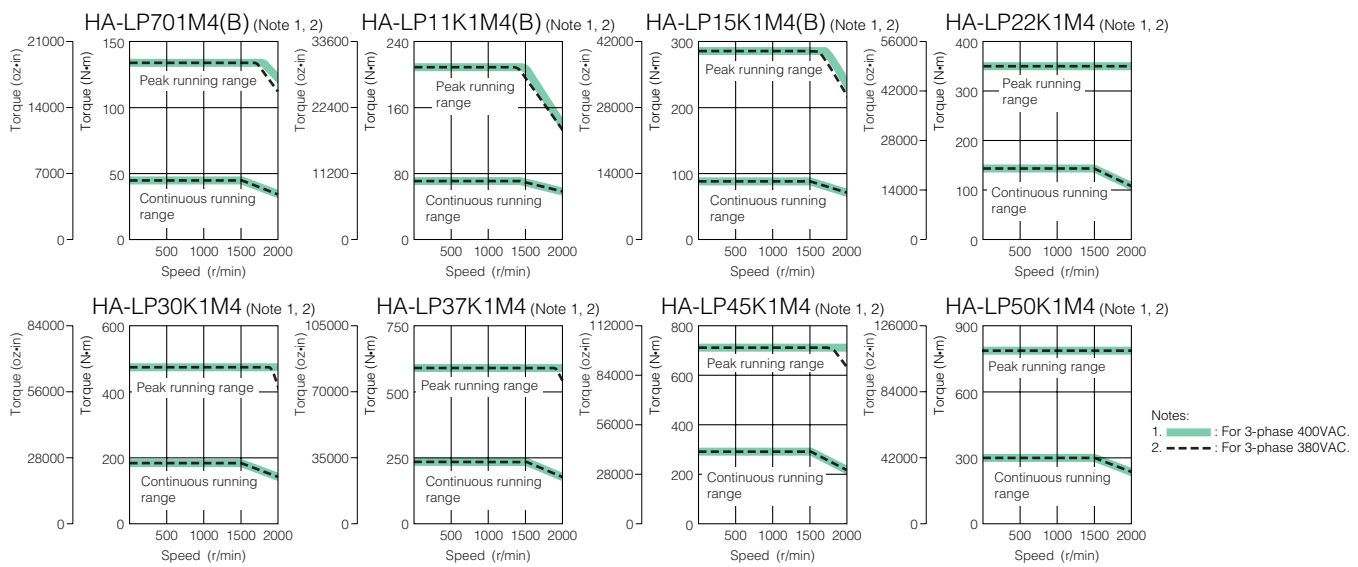


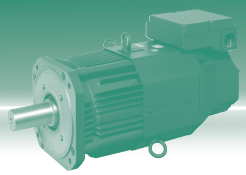
HA-LP 1500r/min Series Servo Motor Specifications (400VAC Class)

	HA-LP 1500r/min series (Low inertia, medium/large capacity)							
	701M4(B)	11K1M4(B)	15K1M4(B)	22K1M4	30K1M4	37K1M4	45K1M4	50K1M4
	700A4/B4(-RJ006)/T4	11KA4/B4(-RJ006)/T4	15KA4/B4(-RJ006)/T4	22KA4/B4(-RJ006)/T4	DU30KA4/B4	DU37KA4/B4	DU45KA4/B4	DU55KA4/B4
	10	16	22	33	48	59	71	80
	7.0	11	15	22	30	37	45	50
	44.6 (6320)	70.0 (9910)	95.5 (13500)	140 (19800)	191 (27000)	236 (33400)	286 (40500)	318 (45000)
	134 (19000)	210 (29700)	286 (40500)	350 (49600)	477 (67500)	589 (83400)	716 (101000)	796 (113000)
	1500							
	2000							
	2300							
	189	223	309	357	561	514	626	542
	18	31	41	63	87	101	128	143
	54	93	123	158	218	253	320	358
	75	158 (Note 6)	191 (Note 6)	102 (Note 6)	—	—	—	—
	105 (574)	220 (1200)	295 (1610)	550 (3010)	650 (3550)	1080 (5900)	1310 (7160)	1870 (10200)
	113 (618)	293 (1600)	369 (2020)	—	—	—	—	—
	Maximum of 10 times the servo motor's inertia moment (Note 3)							
	18-bit encoder (resolution: 262144 p/rev)							
	Oil seal							
	Class F							
	Totally enclosed ventilated (IP rating: IP44) (Note 4)							
	0 to 40°C (32 to 104°F) (non freezing), storage: –15 to 70°C (5 to 158°F) (non freezing)							
	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)							
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust							
	1000m 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 (125)	95 (210)	115 (255)	160 (355)	180 (400)	230 (510)	250 (555)	335 (740)
	70 (155)	130 (290)	150 (335)	—	—	—	—	—
	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 380 to 440VAC/50Hz 3-phase 380 to 480VAC/60Hz		3-phase 380 to 460VAC/50Hz 3-phase 380 to 480VAC/60Hz				
	42 (50Hz) / 54 (60Hz)	62 (50Hz) / 76 (60Hz)		65 (50Hz) / 85 (60Hz)		110 (50Hz) / 150 (60Hz)		
	0.21 (50Hz) / 0.25 (60Hz)	0.14 (50Hz) / 0.11 (60Hz)		0.12 (50Hz) / 0.14 (60Hz)		0.20 (50Hz) / 0.22 (60Hz)		

3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. The value is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

HA-LP 1500r/min Series Servo Motor Torque Characteristics (400VAC Class)



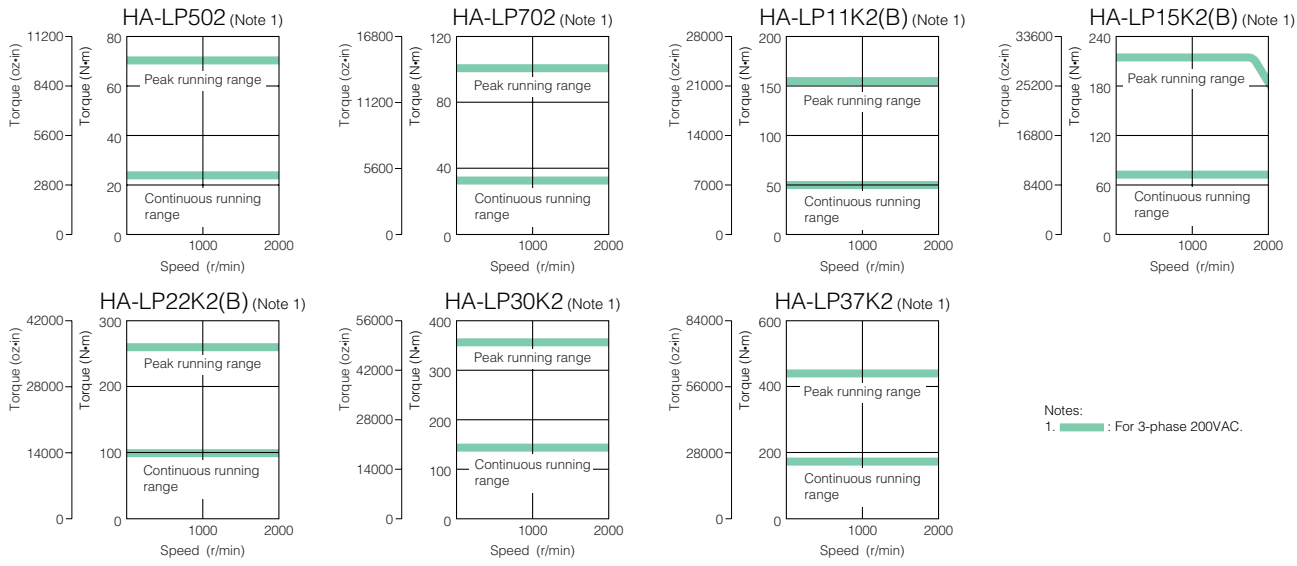


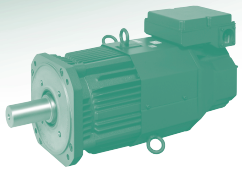
HA-LP 2000r/min Series Servo Motor Specifications (200VAC Class)

Servo motor series		HA-LP 2000r/min series (Low inertia, medium/large capacity)						
Servo motor model HA-LP		502	702	11K2(B)	15K2(B)	22K2(B)	30K2	37K2
Compatible servo amplifier model MR-J3-		500A/B(-RJ006)/T	700A/B(-RJ006)/T	11KA/B(-RJ006)/T	15KA/B(-RJ006)/T	22KA/B(-RJ006)/T	DU30KA/B	DU37KA/B
Power supply capacity (Note 1) (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
	Rated torque (N·m [oz·in])	23.9 (3380)	33.4 (4730)	52.5 (7430)	71.6 (10100)	105 (14900)	143 (20200)	177 (25100)
Maximum torque (N·m [oz·in])		71.6 (10100)	100 (14200)	158 (22400)	215 (30400)	263 (37200)	358 (50700)	442 (62600)
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 2)		50	50	186 (Note 6)	144 (Note 6)	107 (Note 6)	—	—
Moment of inertia J ($\times 10^{-4}$kg·m^2) [J (oz·in^2)]	Standard	74.0 (405)	94.2 (515)	105 (574)	220 (1200)	295 (1610)	550 (3010)	650 (3550)
	With electromagnetic brake	—	—	113 (618)	293 (1600)	369 (2020)	—	—
Recommended load to motor inertia moment ratio		Maximum of 10 times the servo motor's inertia moment (Note 3)						
Speed/position detector		18-bit encoder (resolution: 262144 p/rev)						
Attachments		Oil seal						
Insulation class		Class F						
Structure		Totally enclosed non ventilated (IP rating: IP65) (Note 4)		Totally enclosed ventilated (IP rating: IP44) (Note 4)				
Environment (Note 7)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)						
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	Elevation	1000m or less above sea level						
	Vibration (Note 5)	X: 11.7m/s^2 Y: 29.4m/s^2					X: 9.8m/s^2 Y: 9.8m/s^2	
Mass (kg [lb])	Standard	28 (62)	35 (78)	55 (125)	95 (210)	115 (255)	160 (355)	180 (400)
	With electromagnetic brake	—	—	70 (155)	130 (290)	150 (335)	—	—
Cooling fan	Power: Voltage, frequency	—	—	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 200 to 230VAC 50/60Hz			
	Power: Input (W)	—	—	42 (50Hz) / 54 (60Hz)	62 (50Hz) / 76 (60Hz)		65 (50Hz) / 85 (60Hz)	
	Rated current (A)	—	—	0.21 (50Hz) / 0.25 (60Hz)	0.18 (50Hz) / 0.17 (60Hz)		0.20 (50Hz) / 0.22 (60Hz)	

Notes: 1. The power supply capacity varies depending on the power supply's impedance.
2. The regenerative braking frequency shows the permissible frequency when the motor, without a load and an optional regeneration unit, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m=load inertia moment/motor inertia moment. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). If the operating speed changes frequently or when the regeneration is constant (as with vertical feeds), find the regenerative heating value (W) in operation. Provisions must be made to keep this heating value below the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. Refer to the section "Options ● Optional regeneration unit" in this catalog for details on the tolerable regenerative power (W).

HA-LP 2000r/min Series Servo Motor Torque Characteristics (200VAC Class)



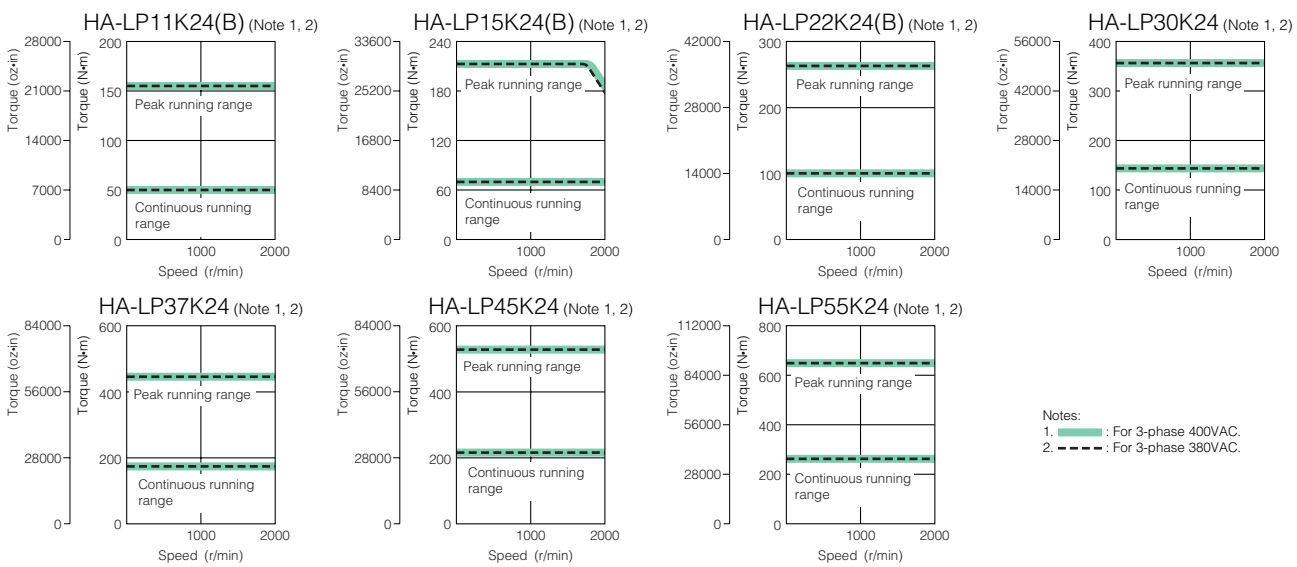


HA-LP 2000r/min Series Servo Motor Specifications (400VAC Class)

	HA-LP 2000r/min series (Low inertia, medium/large capacity)						
	11K24(B)	15K24(B)	22K24(B)	30K24	37K24	45K24	55K24
	11KA4/B4(-RJ006)/T4	15KA4/B4(-RJ006)/T4	22KA4/B4(-RJ006)/T4	DU30KA4/B4	DU37KA4/B4	DU45KA4/B4	DU55KA4/B4
	16	22	33	48	59	71	87
	11	15	22	30	37	45	55
	52.5 (7430)	71.6 (10100)	105 (14900)	143 (20200)	177 (25100)	215 (30400)	263 (37200)
	158 (22400)	215 (30400)	263 (37200)	358 (50700)	442 (62600)	537 (76000)	657 (93000)
	2000						
	2000						
	2300						
	263	233	374	373	480	427	526
	32	40	57	83	102	131	143
	96	120	143	208	255	328	358
	186 (Note 6)	144 (Note 6)	107 (Note 6)	—	—	—	—
	105 (574)	220 (1200)	295 (1610)	550 (3010)	650 (3550)	1080 (5900)	1310 (7160)
	113 (618)	293 (1600)	369 (2020)	—	—	—	—
	Maximum of 10 times the servo motor's inertia moment (Note 3)						
	18-bit encoder (resolution: 262144 p/rev)						
	Oil seal						
	Class F						
	Totally enclosed ventilated (IP rating: IP44) (Note 4)						
	0 to 40°C (32 to 104°F) (non freezing), storage: -15 to 70°C (5 to 158°F) (non freezing)						
	80% RH maximum (non condensing), storage: 90% RH maximum (non condensing)						
	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust						
	1000m 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 (125)	95 (210)	115 (255)	160 (355)	180 (400)	230 (510)	250 (555)
	70 (155)	130 (290)	150 (335)	—	—	—	—
	1-phase 200 to 220VAC/50Hz 1-phase 200 to 230VAC/60Hz	3-phase 380 to 440VAC/50Hz 3-phase 380 to 480VAC/60Hz		3-phase 380 to 460VAC/50Hz 3-phase 380 to 480VAC/60Hz			
	42 (50Hz) / 54 (60Hz)	62 (50Hz) / 76 (60Hz)		65 (50Hz) / 85 (60Hz)		110 (50Hz) / 150 (60Hz)	
	0.21 (50Hz) / 0.25 (60Hz)	0.14 (50Hz) / 0.11 (60Hz)		0.12 (50Hz) / 0.14 (60Hz)		0.20 (50Hz) / 0.22 (60Hz)	

3. Contact your local sales office if the load to motor inertia moment ratio exceeds the value in the table.
4. The shaft-through portion is excluded.
5. The vibration direction is shown in the diagram to the right. 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 the motor stops, so maintain vibration to approximately one-half of the allowable value.
6. The value is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

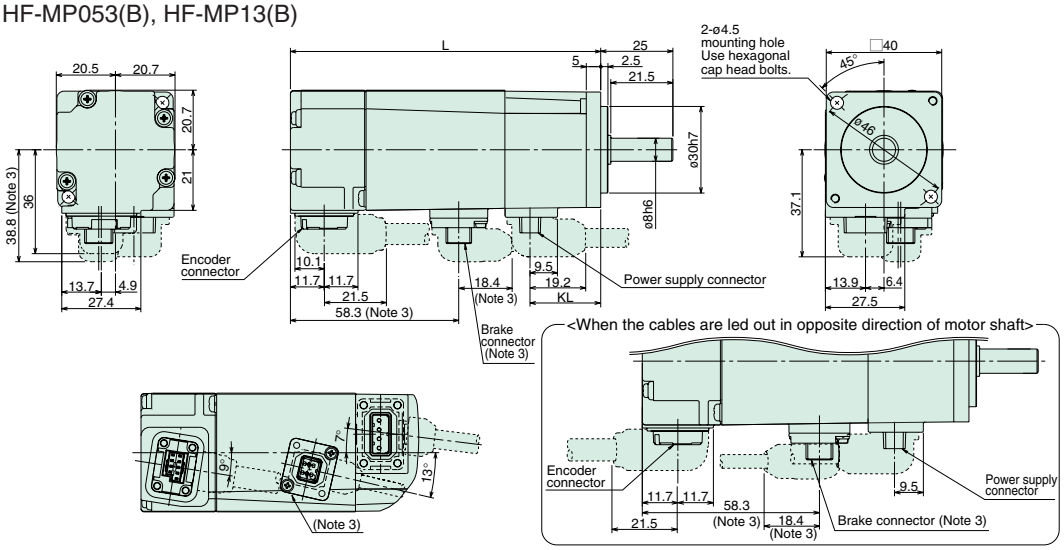
HA-LP 2000r/min Series Servo Motor Torque Characteristics (400VAC Class)



Servo Motor Dimensions

(Unit: mm)

●HF-KP053(B), HF-KP13(B)
●HF-MP053(B), HF-MP13(B)



Power supply connector pin assignment

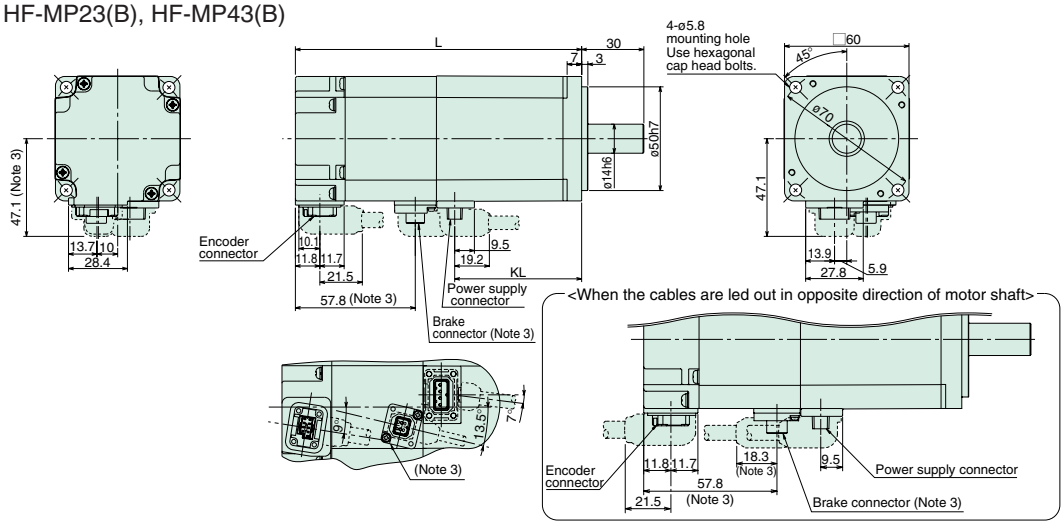
Pin No.	Signal name
1	Earth
2	U
3	V
4	W

Brake connector pin assignment (Note 3)

Pin No.	Signal name
1	B1
2	B2

Model	Variable dimensions	
	L	KL
HF-KP053(B) HF-MP053(B)	66.4 (107.5)	24.5
HF-KP13(B) HF-MP13(B)	82.4 (123.5)	40.5

●HF-KP23(B), HF-KP43(B)
●HF-MP23(B), HF-MP43(B)



Power supply connector pin assignment

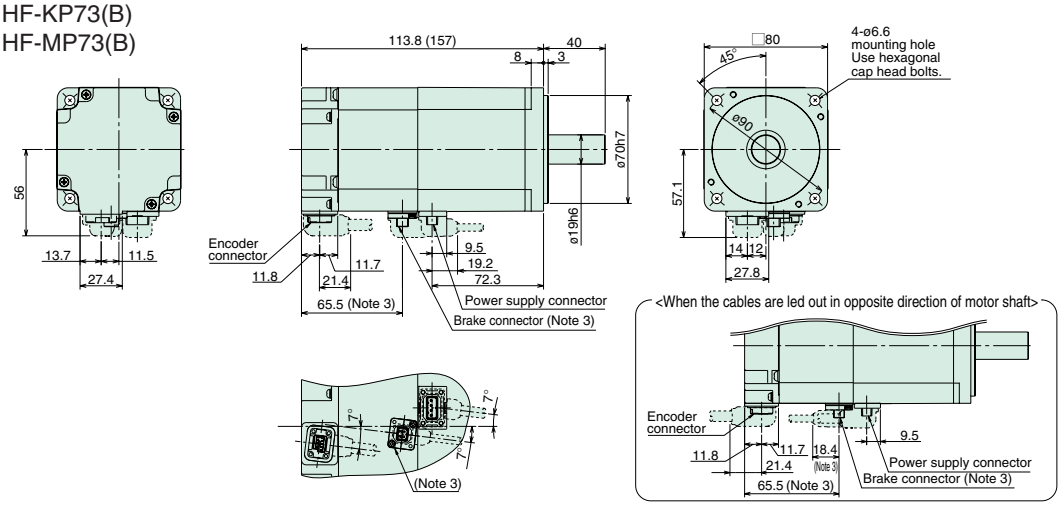
Pin No.	Signal name
1	Earth
2	U
3	V
4	W

Brake connector pin assignment (Note 3)

Pin No.	Signal name
1	B1
2	B2

Model	Variable dimensions	
	L	KL
HF-KP23(B) HF-MP23(B)	76.6 (116.1)	39.3
HF-KP43(B) HF-MP43(B)	98.5 (138)	61.2

●HF-KP73(B)
●HF-MP73(B)



Power supply connector pin assignment

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

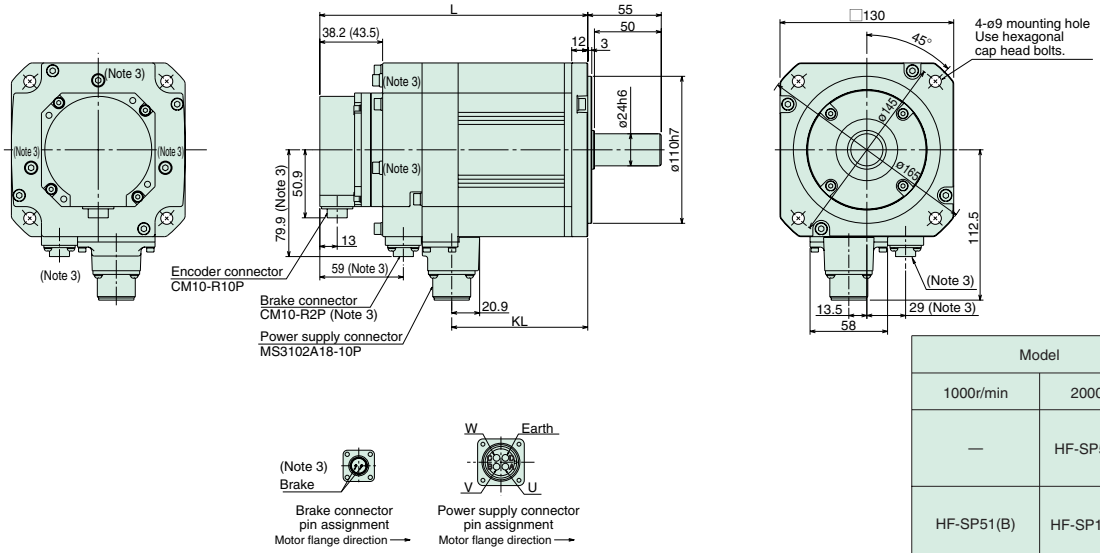
Brake connector pin assignment (Note 3)

Pin No.	Signal name
1	B1
2	B2

Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.
5. Dimensions for motors with an oil seal (HF-KP□J and HF-MP□J) are different from the above. Contact your local sales office for details.

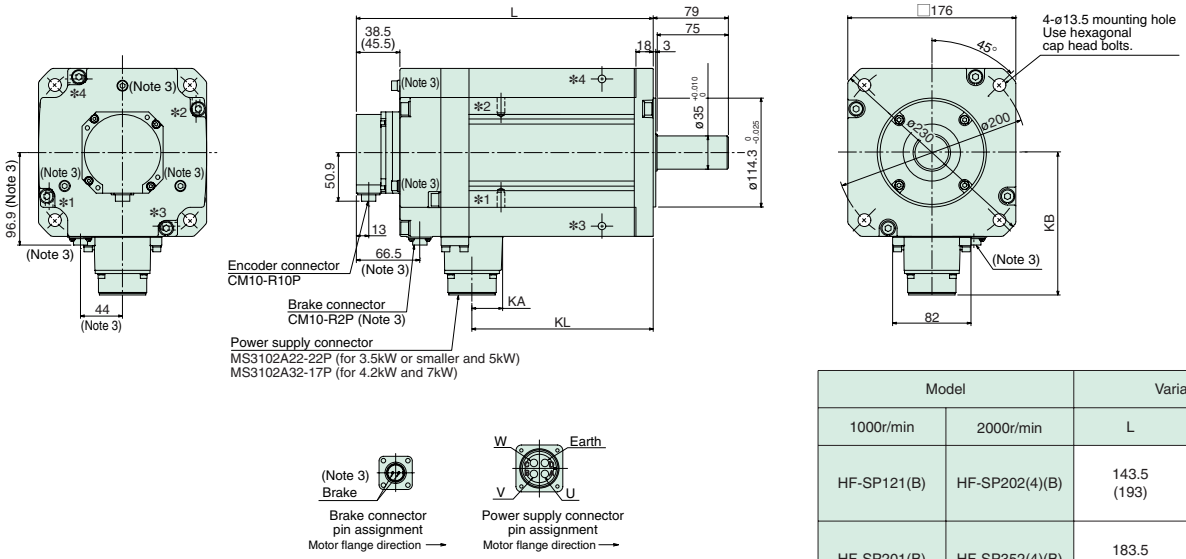
(Unit: mm)

●HF-SP51(B), HF-SP81(B)
●HF-SP52(B), HF-SP102(B), HF-SP152(B)
●HF-SP524(B), HF-SP1024(B), HF-SP1524(B)



Model		Variable dimensions	
1000r/min	2000r/min	L	KL
—	HF-SP52(4)(B)	118.5 (153)	57.8
HF-SP51(B)	HF-SP102(4)(B)	140.5 (175)	79.8
HF-SP81(B)	HF-SP152(4)(B)	162.5 (197)	101.8

●HF-SP121(B), HF-SP201(B), HF-SP301(B), HF-SP421(B)
●HF-SP202(B), HF-SP352(B), HF-SP502(B), HF-SP702(B)
●HF-SP2024(B),HF-SP3524(B), HF-SP5024(B), HF-SP7024(B)



Model		Variable dimensions			
1000r/min	2000r/min	L	KL	KA	KB
HF-SP121(B)	HF-SP202(4)(B)	143.5 (193)	79.8	24.8	140.9
HF-SP201(B)	HF-SP352(4)(B)	183.5 (233)	119.8		
HF-SP301(B)	HF-SP502(4)(B)	203.5 (253)	139.8		
HF-SP421(B)	HF-SP702(4)(B)	263.5 (313)	191.8	32	149.1

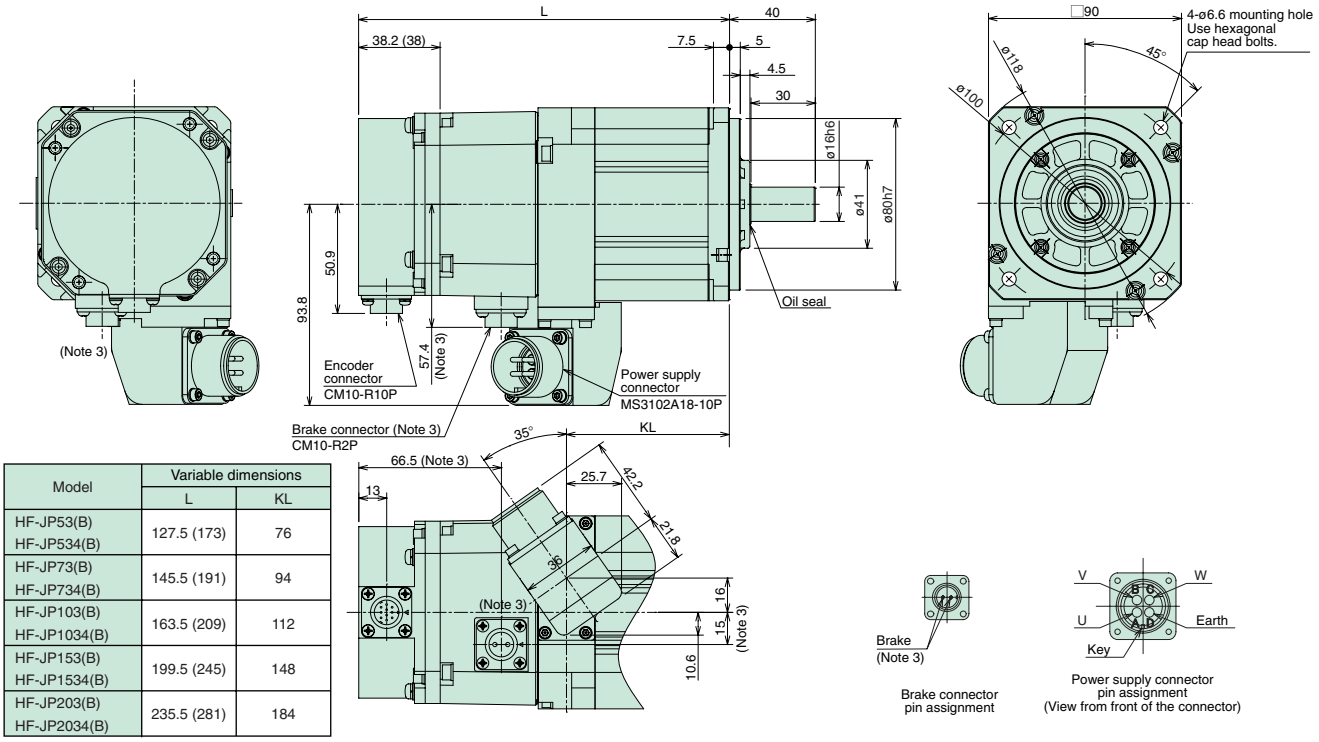
∗1, ∗2, ∗3 and ∗4 are screw holes for eyebolt.
•For HF-SP201(B), HF-SP301(B), HF-SP352(4)(B), HF-SP502(4)(B): ∗3, ∗4
•For HF-SP421(B), HF-SP702(4)(B): ∗1, ∗2, ∗3, ∗4

Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

Servo Motor Dimensions

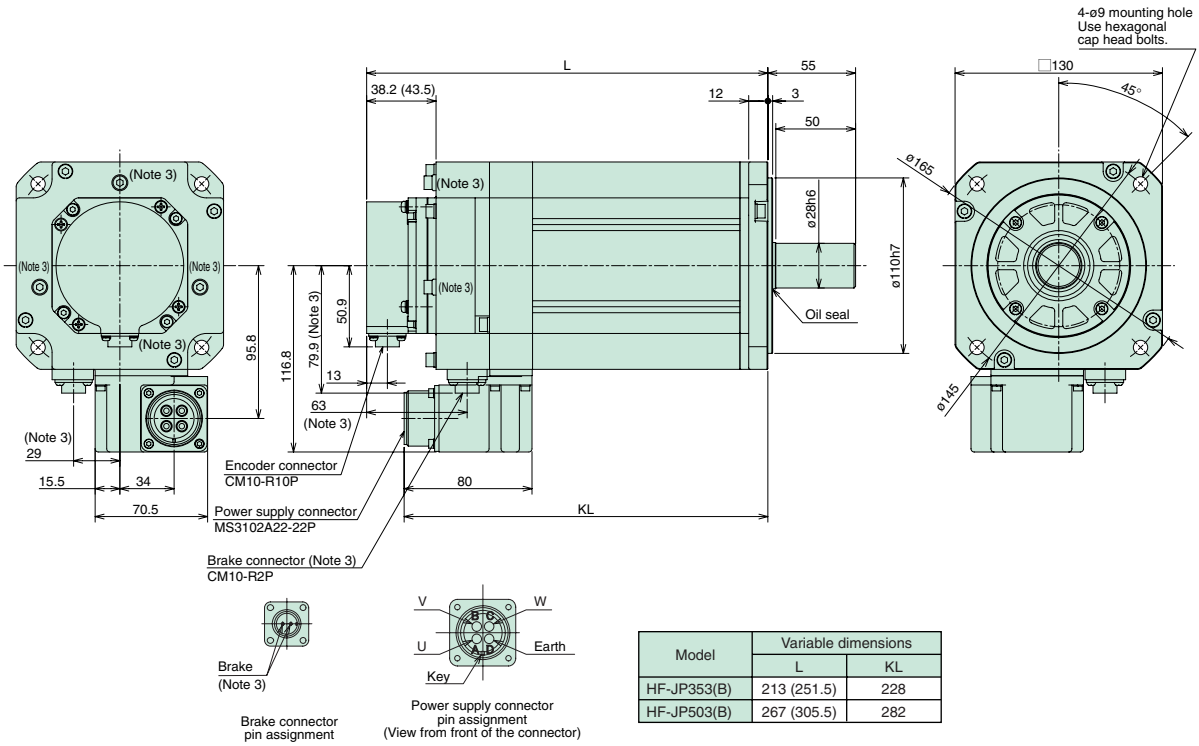
(Unit: mm)

●HF-JP53(B), HF-JP73(B), HF-JP103(B), HF-JP153(B), HF-JP203(B)
●HF-JP534(B), HF-JP734(B), HF-JP1034(B), HF-JP1534(B), HF-JP2034(B)



Model	Variable dimensions	
	L	KL
HF-JP53(B) HF-JP534(B)	127.5 (173)	76
HF-JP73(B) HF-JP734(B)	145.5 (191)	94
HF-JP103(B) HF-JP1034(B)	163.5 (209)	112
HF-JP153(B) HF-JP1534(B)	199.5 (245)	148
HF-JP203(B) HF-JP2034(B)	235.5 (281)	184

●HF-JP353(B), HF-JP503(B)

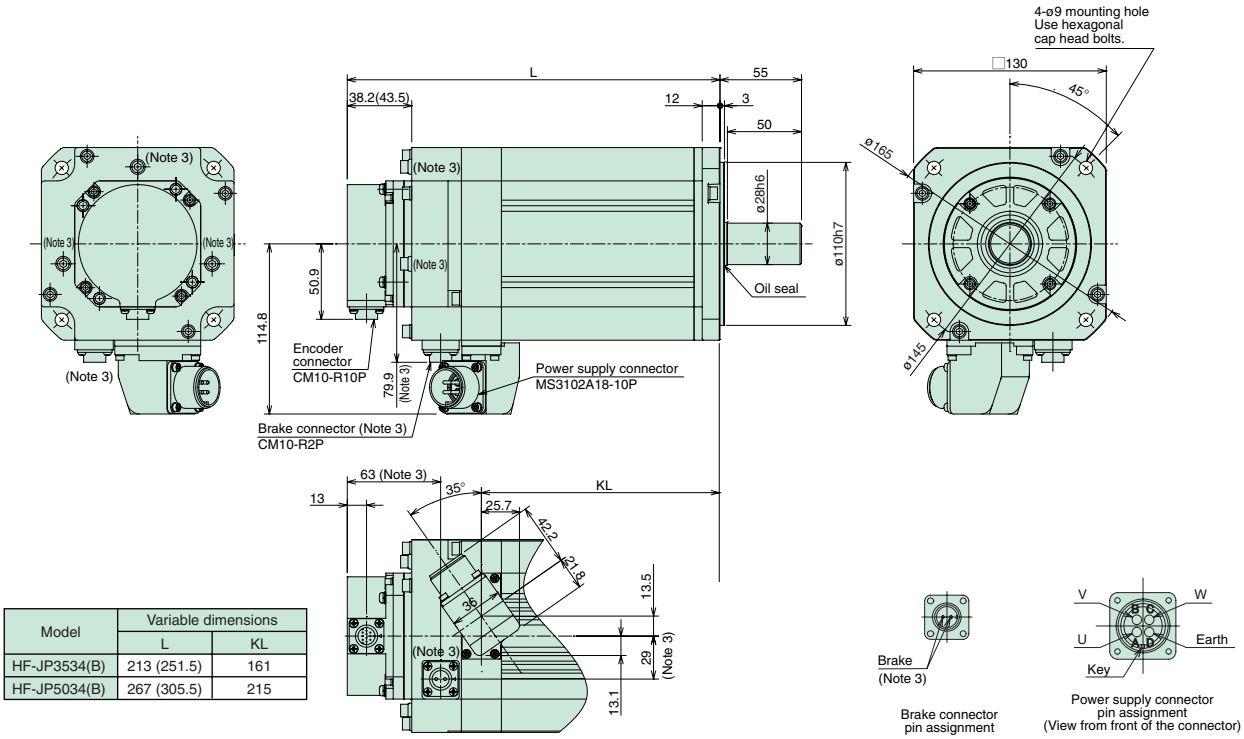


Model	Variable dimensions	
	L	KL
HF-JP353(B)	213 (251.5)	228
HF-JP503(B)	267 (305.5)	282

Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

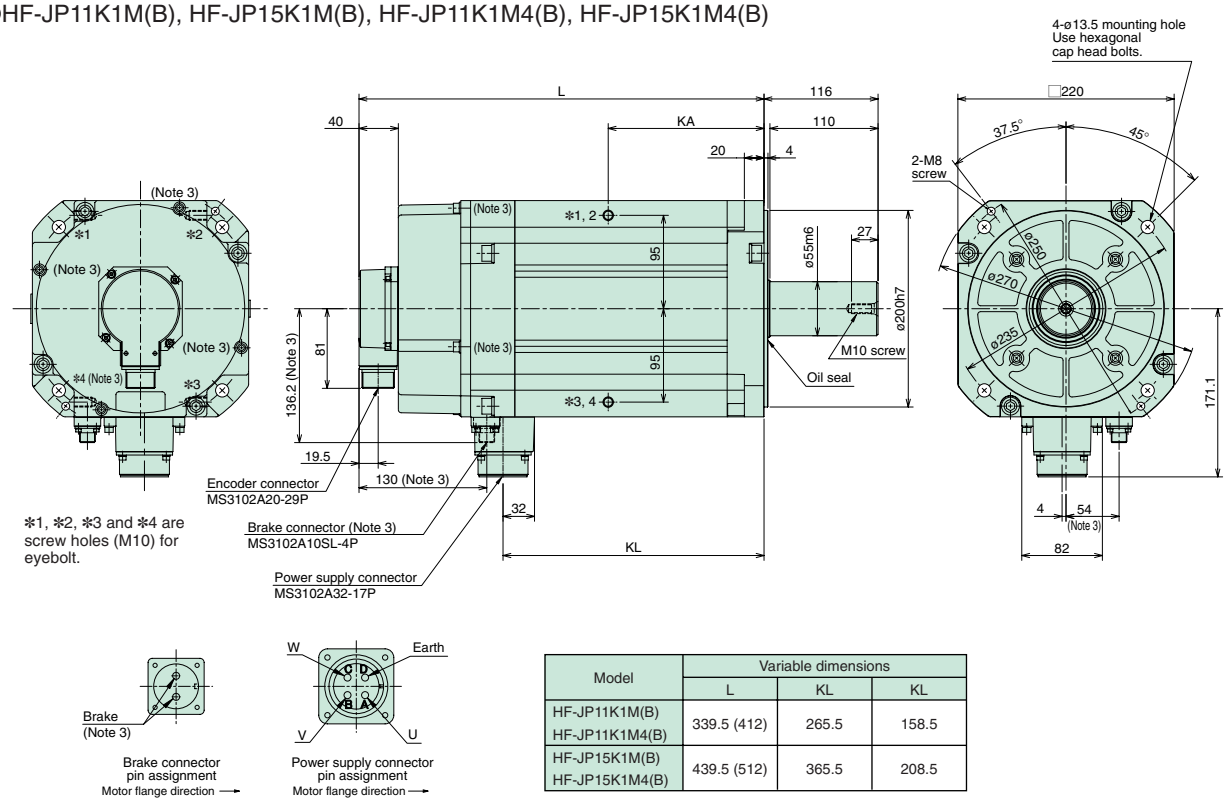
(Unit: mm)

●HF-JP3534(B), HF-JP5034(B)



Model	Variable dimensions	
	L	KL
HF-JP3534(B)	213 (251.5)	161
HF-JP5034(B)	267 (305.5)	215

●HF-JP11K1M(B), HF-JP15K1M(B), HF-JP11K1M4(B), HF-JP15K1M4(B)



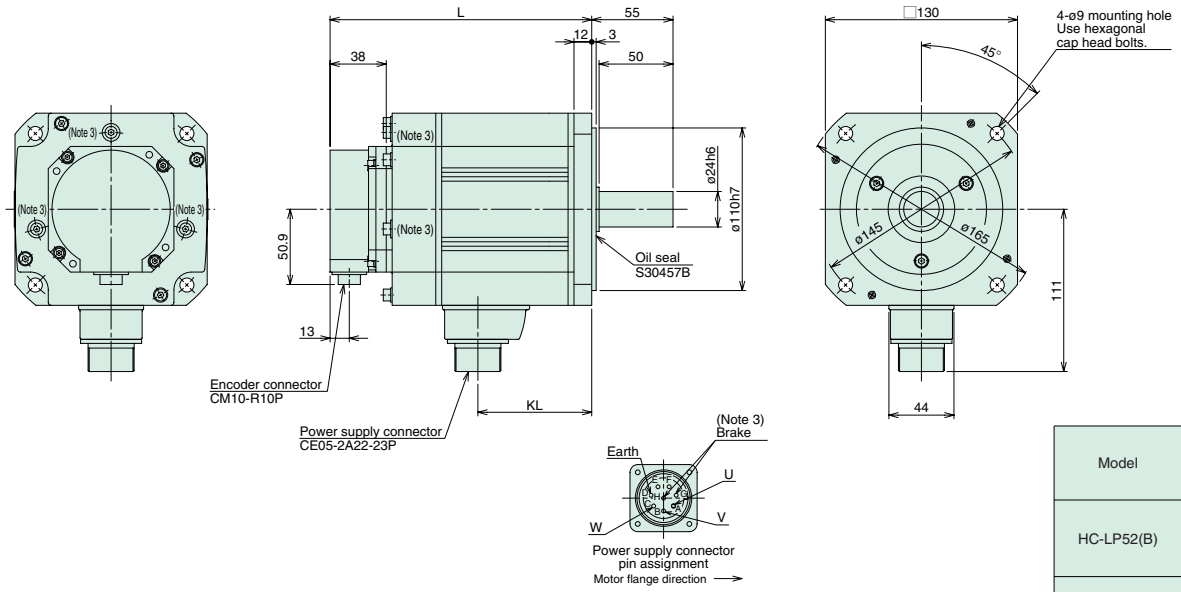
Model	Variable dimensions		
	L	KL	KL
HF-JP11K1M(B) HF-JP11K1M4(B)	339.5 (412)	265.5	158.5
HF-JP15K1M(B) HF-JP15K1M4(B)	439.5 (512)	365.5	208.5

Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

Servo Motor Dimensions

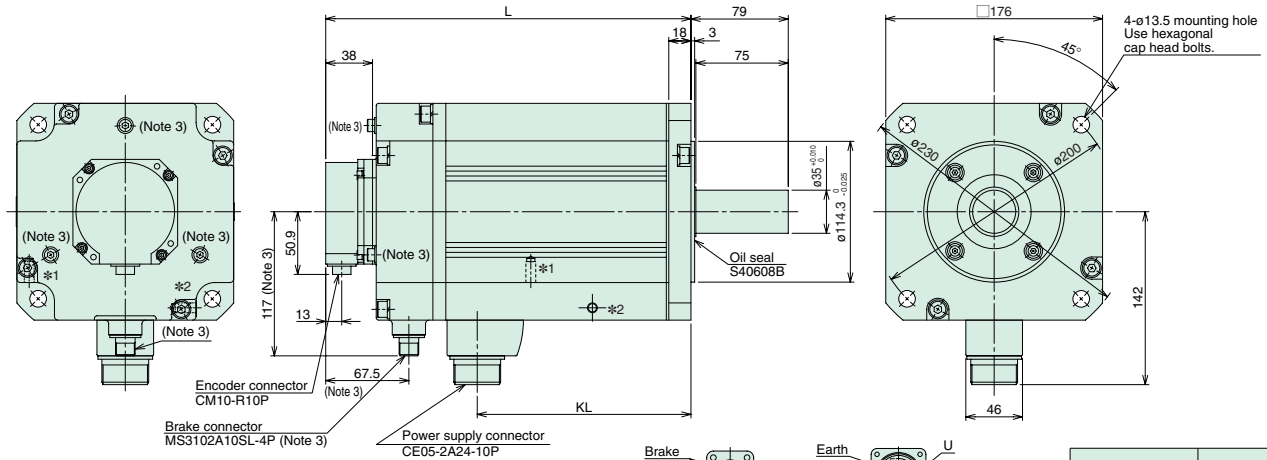
(Unit: mm)

●HC-LP52(B), HC-LP102(B), HC-LP152(B)



Model	Variable dimensions	
	L	KL
HC-LP52(B)	144 (177)	77
HC-LP102(B)	164 (197)	97
HC-LP152(B)	191.5 (224.5)	124.5

●HC-LP202(B), HC-LP302(B)



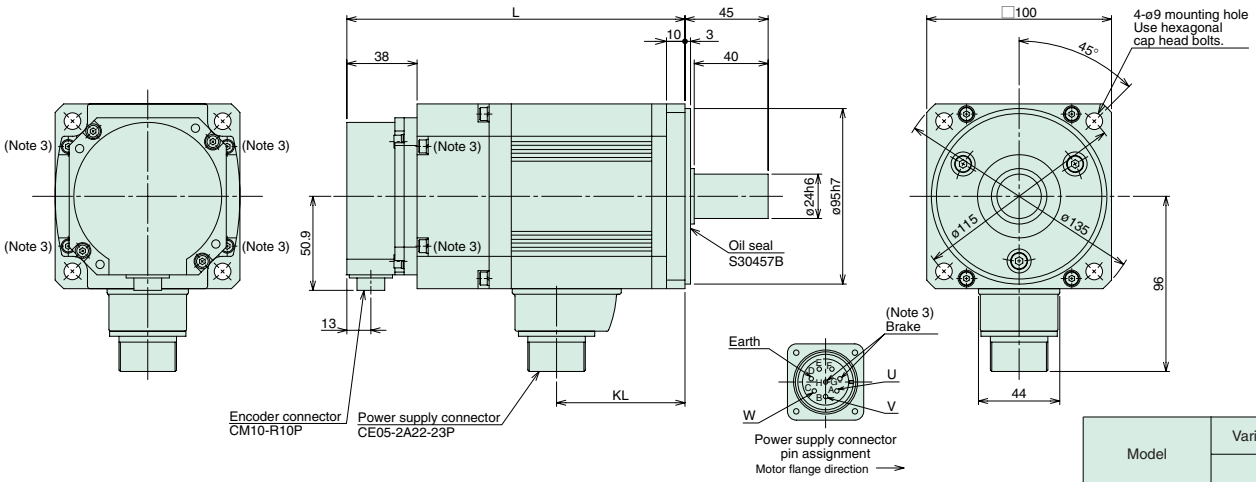
✻1 and ✻2 are screw holes (M8) for eyebolt. Only for HC-LP302(B).

Model	Variable dimensions	
	L	KL
HC-LP202(B)	198.5 (246.5)	123.5
HC-LP302(B)	248.5 (296.5)	173.5

Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

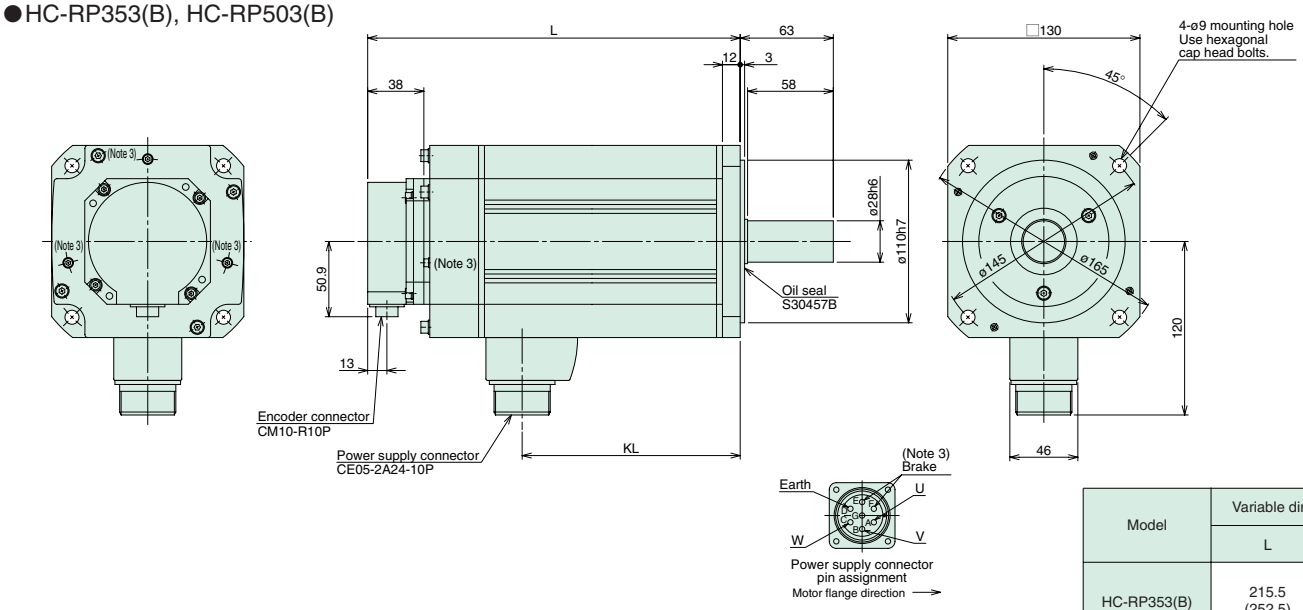
(Unit: mm)

●HC-RP103(B), HC-RP153(B), HC-RP203(B)



Model	Variable dimensions	
	L	KL
HC-RP103(B)	145.5 (183.5)	69.5
HC-RP153(B)	170.5 (208.5)	94.5
HC-RP203(B)	195.5 (233.5)	119.5

●HC-RP353(B), HC-RP503(B)



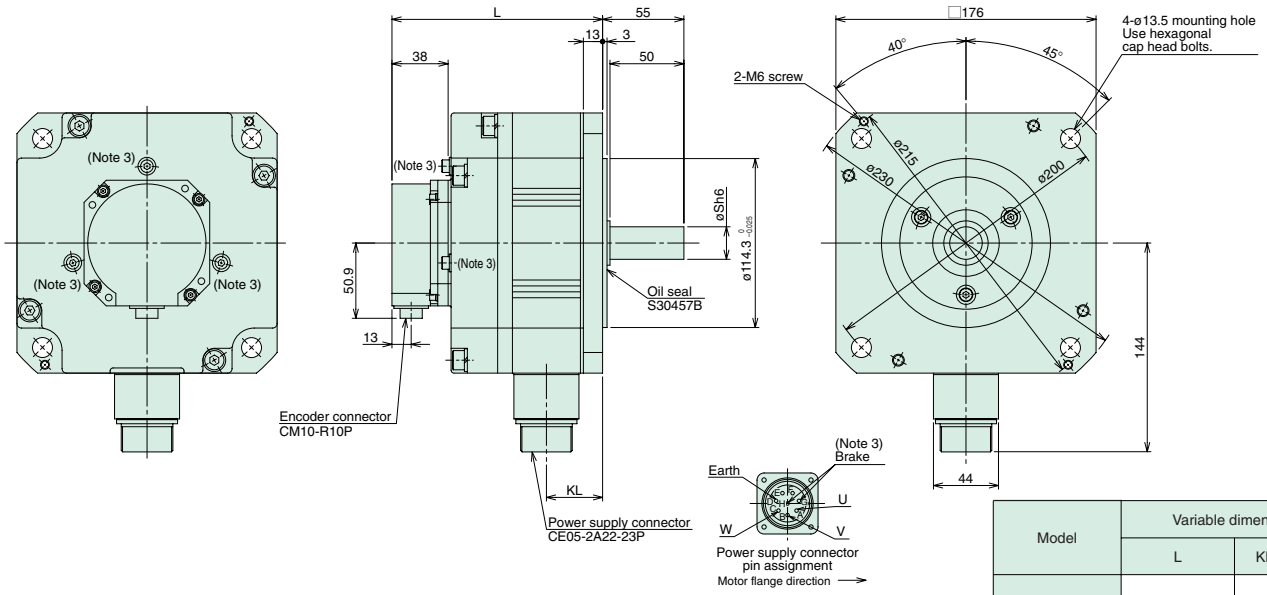
Model	Variable dimensions	
	L	KL
HC-RP353(B)	215.5 (252.5)	148
HC-RP503(B)	272.5 (309.5)	205

Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

Servo Motor Dimensions

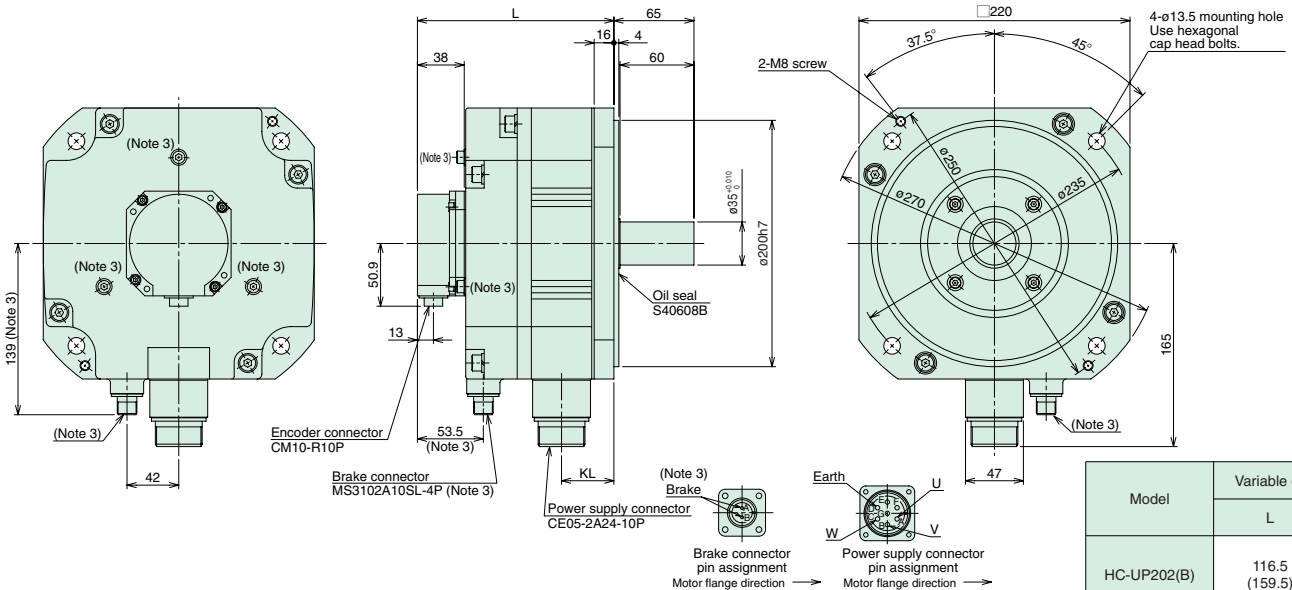
(Unit: mm)

●HC-UP72(B), HC-UP152(B)



Model	Variable dimensions		
	L	KL	S
HC-UP72(B)	109 (142.5)	38	22
HC-UP152(B)	118.5 (152)	47.5	28

●HC-UP202(B), HC-UP352(B), HC-UP502(B)

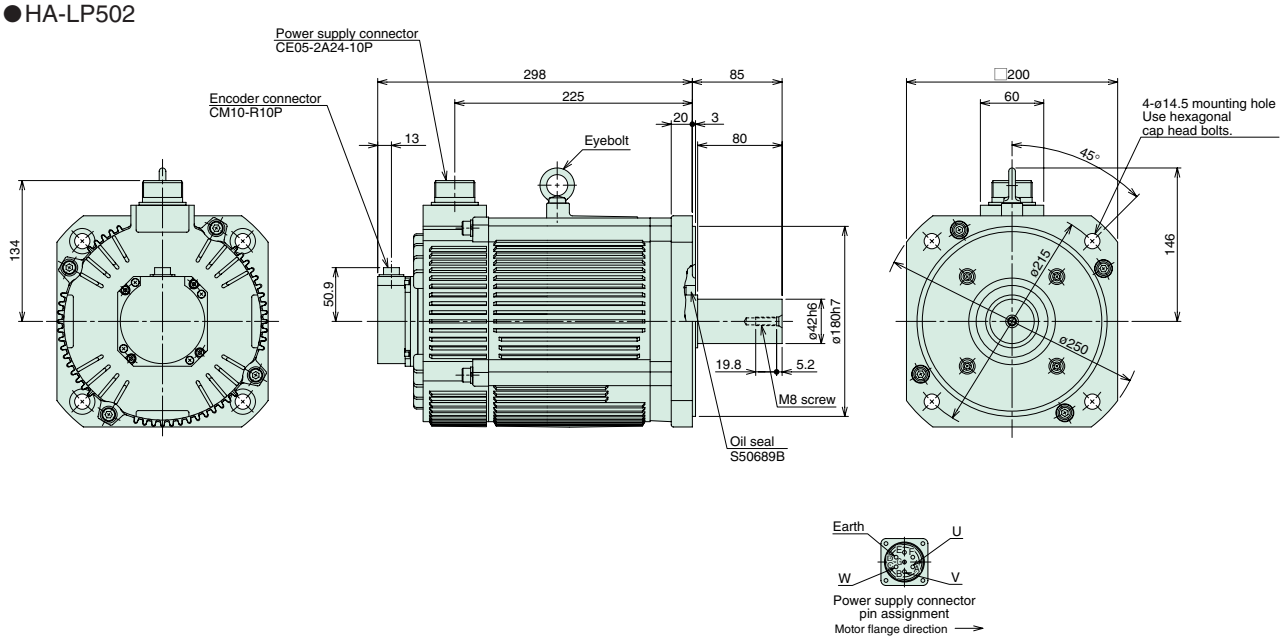


Model	Variable dimensions	
	L	KL
HC-UP202(B)	116.5 (159.5)	42.5
HC-UP352(B)	140.5 (183.5)	66.5
HC-UP502(B)	164.5 (207.5)	90.5

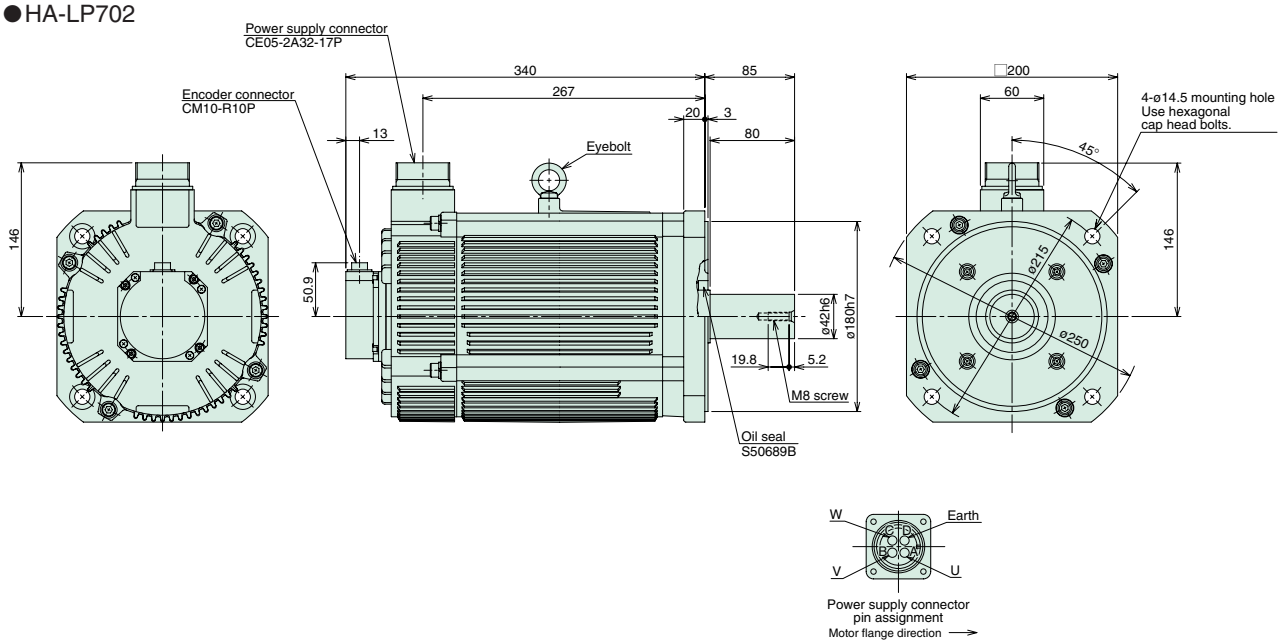
Notes: 1. Use a friction coupling to fasten a load.
2. Dimensions inside ( ) are for the models with an electromagnetic brake.
3. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
4. For dimensions where there is no tolerance listed, use general tolerance.

(Unit: mm)

●HA-LP502



●HA-LP702

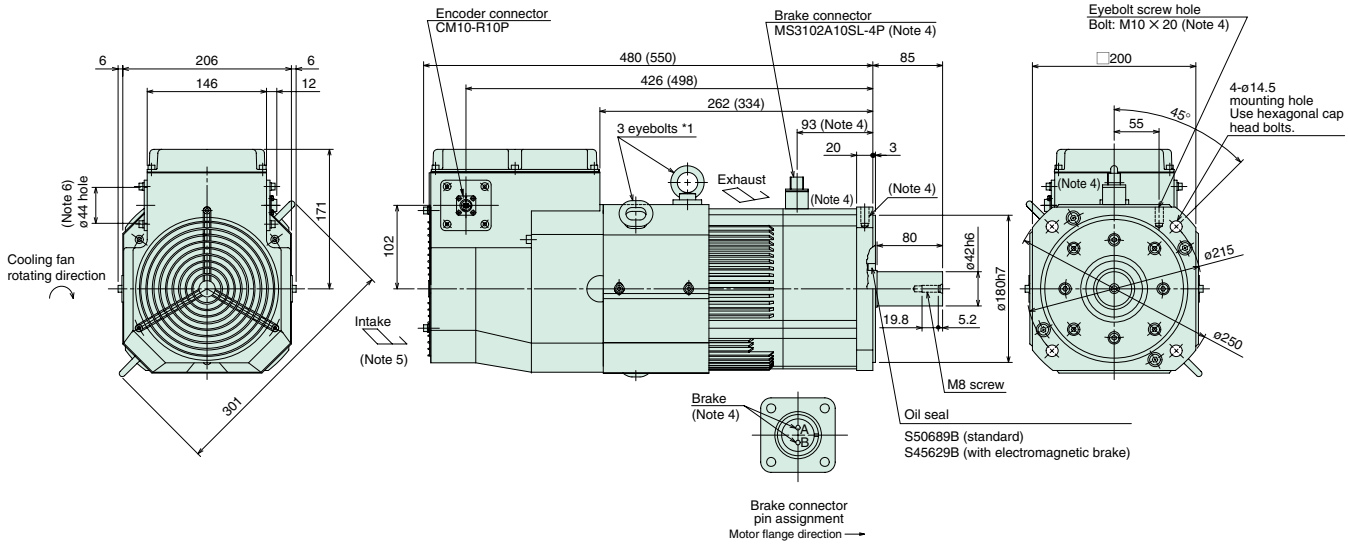


Notes: 1. Use a friction coupling to fasten a load.
2. For dimensions where there is no tolerance listed, use general tolerance.

Servo Motor Dimensions

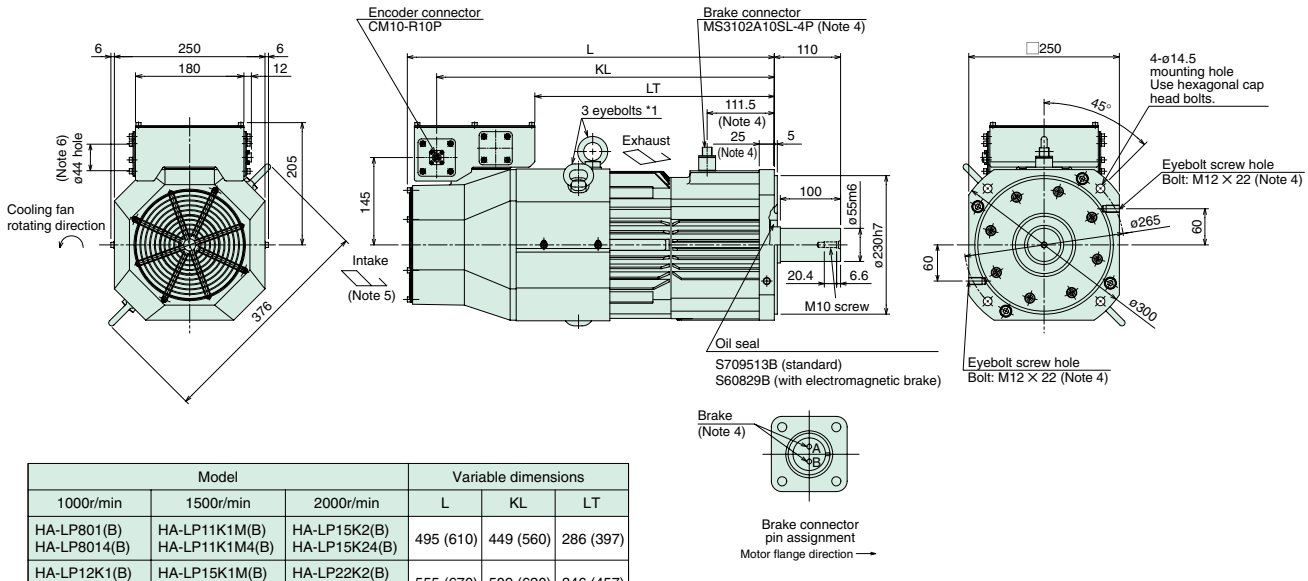
(Unit: mm)

- HA-LP601(B), HA-LP6014(B)
- HA-LP701M(B), HA-LP701M4(B)
- HA-LP11K2(B), HA-LP11K24(B)



*1 When using the motor without the eyebolt, plug the threaded hole with a bolt of M10 × 20 or shorter.
*2 The terminal block on the terminal box housing consists of M6 screws for the motor power supply (U, V, W), and M4 screws for the cooling fan (BU, BV) and for the thermal protector (OHS1, OHS2).

- HA-LP801(B), HA-LP12K1(B), HA-LP8014(B), HA-LP12K14(B)
- HA-LP11K1M(B), HA-LP15K1M(B), HA-LP11K1M4(B), HA-LP15K1M4(B)
- HA-LP15K2(B), HA-LP22K2(B), HA-LP15K24(B), HA-LP22K24(B)



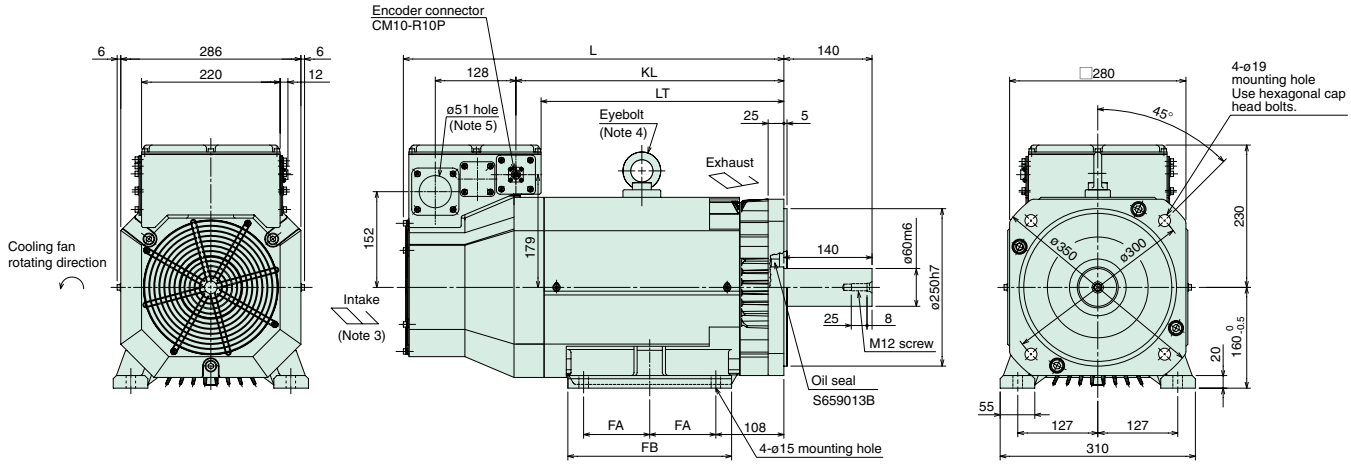
Model			Variable dimensions		
1000r/min	1500r/min	2000r/min	L	KL	LT
HA-LP801(B) HA-LP8014(B)	HA-LP11K1M(B) HA-LP11K1M4(B)	HA-LP15K2(B) HA-LP15K24(B)	495 (610)	449 (560)	286 (397)
HA-LP12K1(B) HA-LP12K14(B)	HA-LP15K1M(B) HA-LP15K1M4(B)	HA-LP22K2(B) HA-LP22K24(B)	555 (670)	509 (620)	346 (457)

*1 When using the motor without the eyebolt, plug the threaded hole with a bolt of M12 × 20 or shorter.
*2 The terminal block on the terminal box housing consists of M8 screws for the motor power supply (U, V, W), and M4 screws for the cooling fan (BU, BV, BW) and for the thermal protector (OHS1, OHS2).

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 an electromagnetic brake.
4. Only for the models with an electromagnetic brake. The electromagnetic brake terminals do not have polarity.
5. Leave a clearance of at least 100mm between the motor's intake side and wall.
6. Make sure that oil, water and dust, etc., will not enter the motor from the lead-in hole.

(Unit: mm)

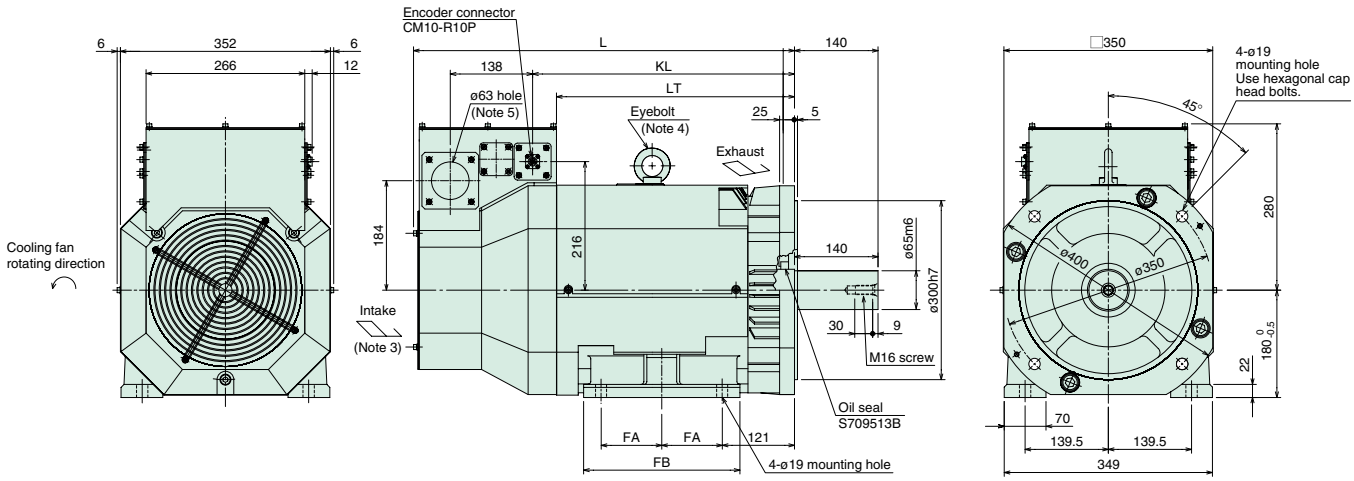
●HA-LP15K1, HA-LP20K1, HA-LP15K14, HA-LP20K14
●HA-LP22K1M, HA-LP22K1M4, HA-LP30K1M4
●HA-LP30K24, HA-LP37K24



Model			Variable dimensions				
1000r/min	1500r/min	2000r/min	L	KL	LT	FA	FB
HA-LP15K1 HA-LP15K14	HA-LP22K1M HA-LP22K1M4	HA-LP30K24	605	426	386	105	260
HA-LP20K1 HA-LP20K14	HA-LP30K1M4	HA-LP37K24	650	471	431	127	304

* The terminal block on the terminal box housing consists of M8 screws for the motor power supply (U, V, W), and M4 screws for the cooling fan (BU, BV, BW) and for the thermal protector (OHS1, OHS2).

●HA-LP25K1, HA-LP30K1, HA-LP25K14, HA-LP30K14
●HA-LP37K1M, HA-LP37K1M4, HA-LP45K1M4
●HA-LP45K24, HA-LP55K24



Model			Variable dimensions				
1000r/min	1500r/min	2000r/min	L	LT	KL	FA	FB
HA-LP25K1 HA-LP25K14	HA-LP37K1M HA-LP37K1M4	HA-LP45K24	640	399	439	101.5	262
HA-LP30K1 HA-LP30K14	HA-LP45K1M4	HA-LP55K24	685	444	484	120.5	300

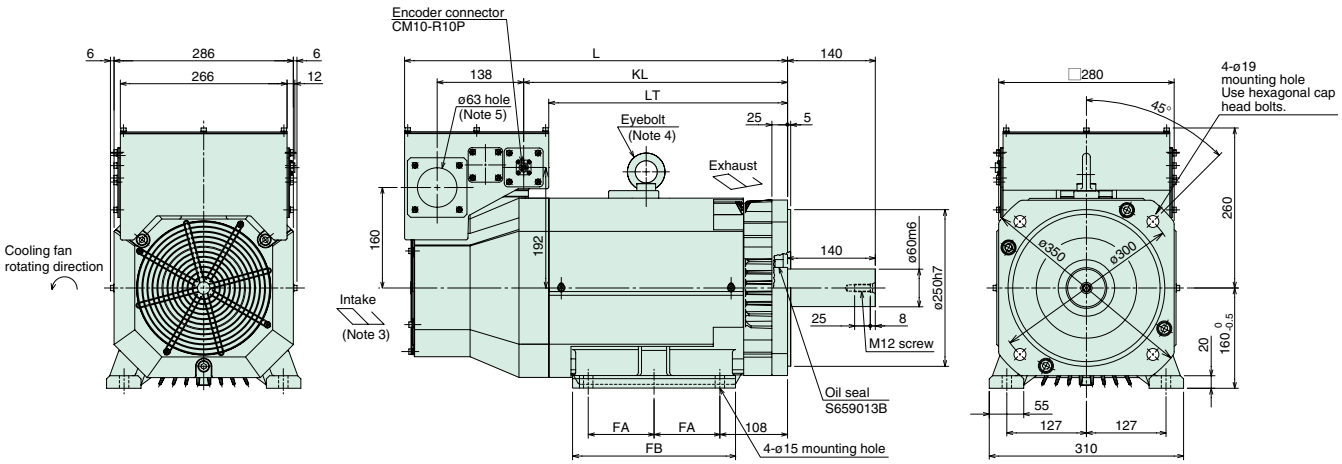
* The terminal block on the terminal box housing consists of M10 screws for the motor power supply (U, V, W), and M4 screws for the cooling fan (BU, BV, BW) and for the thermal protector (OHS1, OHS2).

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 between the motor's intake side and wall.
4. When using the motor without the eyebolt, plug the threaded hole with a bolt of M16 × 20 or shorter.
5. Make sure that oil, water and dust, etc., will not enter the motor from the lead-in hole.
6. When mounting the motor with the shaft horizontal, fix the motor either with the feet or the flange, keeping the feet downward. Note that when fixing the motor with the flange, also fix the feet to support the motor.

Servo Motor Dimensions

(Unit: mm)

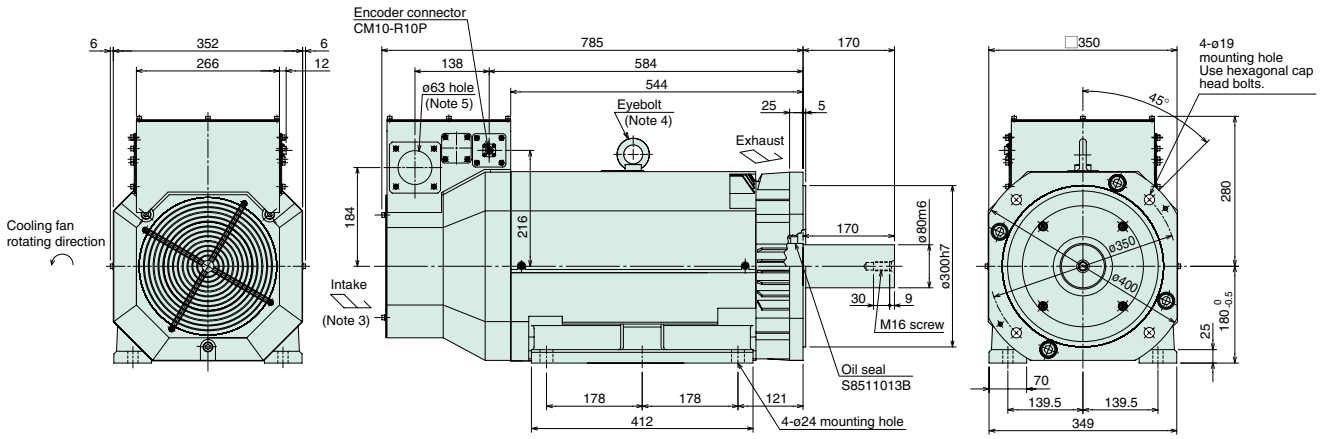
●HA-LP30K1M
●HA-LP30K2, HA-LP37K2



Model		Variable dimensions				
1500r/min	2000r/min	L	LT	KL	FA	FB
–	HA-LP30K2	615	381	421	105	260
HA-LP30K1M	HA-LP37K2	660	426	466	127	304

* The terminal block on the terminal box housing consists of M10 screws for the motor power supply (U, V, W), and M4 screws for the cooling fan (BU, BV, BW) and for the thermal protector (OHS1, OHS2).

●HA-LP37K1, HA-LP37K14
●HA-LP50K1M4



* The terminal block on the terminal box housing consists of M10 screws for the motor power supply (U, V, W), and M4 screws for the cooling fan (BU, BV, BW) and for the thermal protector (OHS1, OHS2).

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 between the motor's intake side and wall.
4. When using the motor without the eyebolt, plug the threaded hole with a bolt of M16 × 20 or shorter.
5. Make sure that oil, water and dust, etc., will not enter the motor from the lead-in hole.
6. When mounting the motor with the shaft horizontal, fix the motor either with the feet or the flange, keeping the feet downward. Note that when fixing the motor with the flange, also fix the feet to support the motor.

Electromagnetic Brake Specifications (Note 1)

Servo motor model		HF-KP/HF-MP					HF-SP 1000r/min					
		053B	13B	23B	43B	73B	51B	81B	121B	201B	301B	421B
Type		Spring-action safety brake					Spring-action safety brake					
Rated voltage		24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%					
Brake static friction torque	(N·m)	0.32	0.32	1.3	1.3	2.4	8.5	8.5	44	44	44	44
	(oz·in)	45.3	45.3	184	184	340	1200	1200	6230	6230	6230	6230
Power consumption (W) at 20°C (68°F)		6.3	6.3	7.9	7.9	10	20	20	34	34	34	34
Permissible braking work	(J)/time	5.6	5.6	22	22	64	400	400	4500	4500	4500	4500
	(J)/hour	56	56	220	220	640	4000	4000	45000	45000	45000	45000
Brake life (Note 2)	Number of times	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000
	Work per braking (J)	5.6	5.6	22	22	64	200	200	1000	1000	1000	1000

Servo motor model		HF-SP 2000r/min						
		52B/524B	102B/1024B	152B/1524B	202B/2024B	352B/3524B	502B/5024B	702B/7024B
Type		Spring-action safety brake						
Rated voltage		24VDC $^{0}_{-10}$%						
Brake static friction torque	(N·m)	8.5	8.5	8.5	44	44	44	44
	(oz·in)	1200	1200	1200	6230	6230	6230	6230
Power consumption (W) at 20°C (68°F)		20	20	20	34	34	34	34
Permissible braking work	(J)/time	400	400	400	4500	4500	4500	4500
	(J)/hour	4000	4000	4000	45000	45000	45000	45000
Brake life (Note 2)	Number of times	20000	20000	20000	20000	20000	20000	20000
	Work per braking (J)	200	200	200	1000	1000	1000	1000

Servo motor model		HF-JP 3000r/min							HF-JP 1500r/min	
		53B/534B	73B/734B	103B/1034B	153B/1534B	203B/2034B	353B/3534B	503B/5034B	11K1MB/11K1M4B	15K1MB/15K1M4B
Type		Spring-action safety brake								
Rated voltage		24VDC $^{0}_{-10}$%								
Brake static friction torque	(N·m)	6.6	6.6	6.6	6.6	6.6	16	16	127	127
	(oz·in)	935	935	935	935	935	2270	2270	18000	18000
Power consumption (W) at 20°C (68°F)		11.7	11.7	11.7	11.7	11.7	23	23	32	32
Permissible braking work	(J)/time	64	64	64	64	64	400	400	5000	5000
	(J)/hour	640	640	640	640	640	4000	4000	45200	45200
Brake life (Note 2)	Number of times	5000	5000	5000	5000	5000	5000	5000	20000	20000
	Work per braking (J)	64	64	64	64	64	400	400	400	400

Servo motor model		HC-LP					HC-RP				
		52B	102B	152B	202B	302B	103B	152B	203B	353B	503B
Type		Spring-action safety brake					Spring-action safety brake				
Rated voltage		24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%				
Brake static friction torque	(N·m)	8.5	8.5	8.5	44	44	7	7	7	17	17
	(oz·in)	1200	1200	1200	6230	6230	991	991	991	2410	2410
Power consumption (W) at 20°C (68°F)		19	19	19	34	34	19	19	19	23	23
Permissible braking work	(J)/time	400	400	400	4500	4500	400	400	400	400	400
	(J)/hour	4000	4000	4000	45000	45000	4000	4000	4000	4000	4000
Brake life (Note 2)	Number of times	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000
	Work per braking (J)	200	200	200	1000	1000	200	200	200	200	200

Servo motor model		HC-UP					HA-LP 1000r/min		
		72B	152B	202B	352B	502B	601B/6014B	801B/8014B	12K1B/12K14B
Type		Spring-action safety brake					Spring-action safety brake		
Rated voltage		24VDC $^{0}_{-10}$%					24VDC $^{0}_{-10}$%		
Brake static friction torque	(N·m)	8.5	8.5	44	44	44	82	160.5	160.5
	(oz·in)	1200	1200	6230	6230	6230	11600	22700	22700
Power consumption (W) at 20°C (68°F)		19	19	34	34	34	30	46	46
Permissible braking work	(J)/time	400	400	4500	4500	4500	3000	5000	5000
	(J)/hour	4000	4000	45000	45000	45000	30000	50000	50000
Brake life (Note 2)	Number of times	20000	20000	20000	20000	20000	20000	20000	20000
	Work per braking (J)	200	200	1000	1000	1000	1000	3000	3000

Servo motor model		HA-LP 1500r/min			HA-LP 2000r/min		
		701MB/701M4B	11K1MB/11K1M4B	15K1MB/15K1M4B	11K2B/11K24B	15K2B/15K24B	22K2B/22K24B
Type		Spring-action safety brake			Spring-action safety brake		
Rated voltage		24VDC $^{0}_{-10}$%			24VDC $^{0}_{-10}$%		
Brake static friction torque	(N·m)	82	160.5	160.5	82	160.5	160.5
	(oz·in)	11600	22700	22700	11600	22700	22700
Power consumption (W) at 20°C (68°F)		30	46	46	30	46	46
Permissible braking work	(J)/time	3000	5000	5000	3000	5000	5000
	(J)/hour	30000	50000	50000	30000	50000	50000
Brake life (Note 2)	Number of times	20000	20000	20000	20000	20000	20000
	Work per braking (J)	1000	3000	3000	1000	3000	3000

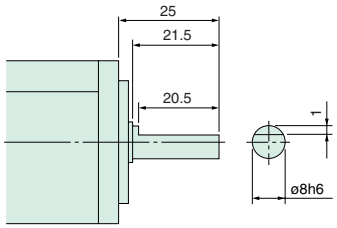
Notes: 1. The electromagnetic brake is for holding. It cannot be used for deceleration applications.
2. The brake gap cannot be adjusted. The brake life shows time until the readjustment is needed.

Special Shaft End Specifications

Motors with the following specifications are available.

HF-KP/HF-MP series

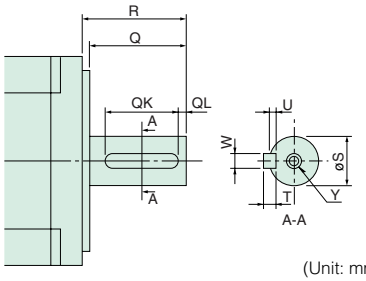
● D-cut shaft (Note 1) (50, 100W)



(Unit: mm)

● Keyway shaft with key (Note 1) (200, 400, 750W)

Servo motor model	Capacity (W)	Variable dimensions								
		T	S	R	Q	W	QK	QL	U	Y
HF-KP□K HF-MP□K	200, 400	5	14h6	30	27	5	20	3	3	M4 screw Depth: 15mm
	750	6	19h6	40	37	6	25	5	3.5	M5 screw Depth: 20mm



(Unit: mm)

HF-SP / HF-JP / HC-LP / HC-RP / HC-UP / HA-LP series

● Keyway shaft without key (Note 1, 2)

Servo motor model	Capacity (kW)	Variable dimensions									Fig.
		S	R	Q	W	QK	QL	U	r	Y	
HF-SP□K HC-LP□K (Note 3)	0.5 to 1.5	24h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20mm	A
	2.0 to 7.0	35 $^{+0.01}_{0}$	79	75	10 $^{0}_{-0.036}$	55	5	5 $^{+0.2}_{0}$	5		
HC-RP□K	1.0, 1.5, 2.0	24h6	45	40	8 $^{0}_{-0.036}$	25	5	4 $^{+0.2}_{0}$	4		
	3.5, 5.0	28h6	63	58	8 $^{0}_{-0.036}$	53	3	4 $^{+0.2}_{0}$	4		
HC-UP□K	0.75	22h6	55	50	6 $^{0}_{-0.036}$	42	3	3.5 $^{+0.1}_{0}$	3		
	1.5	28h6	55	50	8 $^{0}_{-0.036}$	40	3	4 $^{+0.2}_{0}$	4		
	2.0, 3.5, 5.0	35 $^{+0.01}_{0}$	65	60	10 $^{0}_{-0.036}$	50	5	5 $^{+0.2}_{0}$	5		
HF-JP□K	0.5 to 2.0	16h6	40	30	5 $^{0}_{-0.030}$	25	2	3 $^{+0.1}_{0}$	2.5	M4 screw Depth: 15mm	
	3.5, 5	28h6	55	50	8 $^{0}_{-0.036}$	36	5	4 $^{+0.2}_{0}$	4	M8 screw Depth: 20mm	
	11, 15	55M6	116	110	16 $^{0}_{-0.04}$	90	5	6 $^{+0.2}_{0}$	8	M10 screw Depth: 27mm	

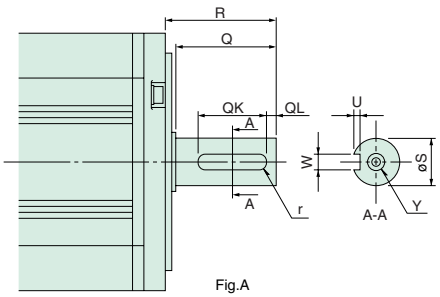


Fig.A

Servo motor model (HA-LP□K)	Variable dimensions									Fig.
	S	R	Q	W	QK	QL	U	r	Y	
601, 6014, 701M, 701M4, 502, 702, 11K2, 11K24	42h6	85	80	12 $^{0}_{-0.04}$	70	5	5 $^{+0.2}_{0}$	6	Same as standard motor's straight shaft.	A
801, 12K1, 8014, 12K14, 11K1M, 15K1M, 11K1M4,15K1M4, 15K2, 22K2, 15K24, 22K24	55m6	110	100	16 $^{0}_{-0.04}$	90	5	6 $^{+0.2}_{0}$	8		
15K1, 20K1, 15K14, 20K14, 22K1M, 30K1M, 22K1M4, 30K1M4, 30K2, 37K2, 30K24, 37K24	60m6	140	140	18 $^{0}_{-0.04}$	128	6	7 $^{+0.2}_{0}$	9		B
25K1, 30K1, 25K14, 30K14, 37K1M, 37K1M4, 45K1M4, 45K24, 55K24	65m6	140	140	18 $^{0}_{-0.04}$	128	6	7 $^{+0.2}_{0}$	9		
37K1, 37K14, 50K1M4	80m6	170	170	22 $^{0}_{-0.04}$	147	11	9 $^{+0.2}_{0}$	11		

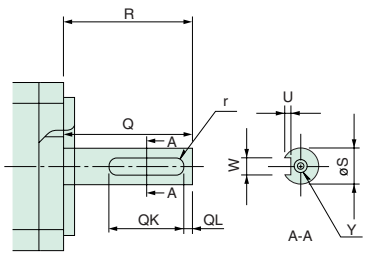


Fig.B

(Unit: mm)

Notes: 1. The servo motors with the keyway shaft (with/without key) or the D-cut shaft cannot be used in frequent start/stop applications.
2. A key is not supplied with the motor. The key shall be installed by the user.
3. For HF-SP121K, the variable dimensions are same as the lower row, 2.0kW to 7.0kW.

MR-J3-A: Connections with Peripheral Equipment (Note 1)

Peripheral equipment is connected to MR-J3-A as described below.
Connectors, options, and other necessary equipment are available so that users can set up MR-J3-A easily and start using it right away.

Power supply
3-phase 200VAC to 230VAC
or
1-phase 200VAC to 230VAC
or
3-phase 380VAC to 480VAC

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-BEL)

Optional regeneration unit (option)
Install this unit in situations involving frequent regeneration and large load inertia moments.

Display panel
Displays monitoring data, parameter, and alarm.

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

<With front cover open>

Servo amplifier MR-J3-□A□ (Note 3)

Charge lamp
Illuminates when the main circuit power supply is charged.

Motor power supply cable (option)

Encoder cable (option)

Battery (option)
The battery (MR-J3BAT) is required for absolute position detection system.

Servo motor
(The picture is of HF-KP13.)

USB communication (CN5) (option)
Monitoring, batch parameter entry and saving, graph display and test operation can be performed with MR Configurator (setup software) when connecting to user's personal computer. Optional USB cable (MR-J3USBCBL3M) is necessary.

Analog monitor output (CN6) (option)
The speed or torque's analog signal is output. (2ch)

RS-422 communication (CN3)
The parameter unit or GOT can be connected. (Note 2)

(Note 4)

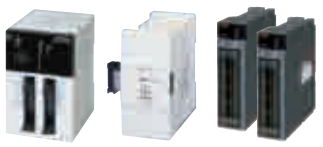
Parameter unit MR-PRU03

GOT

(Note 4)

Junction terminal block (option)
All signals can be received easily at this terminal block without connecting the signals to the connector.

Controllers
MR-J3-A can be connected to a Mitsubishi controller or any pulse train output controller.



FX 2N-□GM FX 2N-□PG QD70P□ QD70D□ QD75P□ QD75D□ A1SD75P□

Control signal (for operation panel)
Connected to a programmable controller's I/O port or a machine's operation panel.

Notes: 1. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for the actual connections.
2. A personal computer can be connected using a RS-422/RS-232C conversion cable (refer to the section "Ordering Information for Customers" in this catalog). In this case, some functions of MR Configurator (setup software) may be limited.
3. The connections with peripheral equipment shown above is for the MR-J3-350A or smaller servo amplifier.
4. USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time.

MR-J3-A Servo Amplifier Specifications: 100VAC/200VAC, 22kW or Smaller

Servo amplifier model MR-J3-		10A	20A	40A	60A	70A	100A	200A	350A	500A	700A	11KA	15KA	22KA	10A1	20A1	40A1
Output	Rated voltage	3-phase 170VAC															
	Rated current (A)	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0	1.1	1.5	2.8
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz (Note 10)					3-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)	0.9	1.5	2.6	3.2	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0	3.0	5.0	9.0
	Permissible voltage fluctuation	For 3-phase 200 to 230VAC: 3-phase170 to 253VAC For 1-phase 200 to 230VAC: 1-phase170 to 253VAC (Note 10)					3-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation	±5% maximum															
Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz (Note 10)					1-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)	0.2								0.3					0.4		
	Permissible voltage fluctuation	1-phase 170 to 253VAC (Note 10)					1-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation	±5% maximum															
	Power consumption (W)	30								45					30		
Interface power supply		24VDC ±10% (required current capacity: 0.3A (Note 7))															
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	—	10	10	10	20	20	100	100	130	170	—	—	—	—	10	10
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)	—	—	—
Control system		Sine-wave PWM control/current control system															
Dynamic brake		Built-in (Note 8, 13)										External option (Note 14)			Built-in (Note 8, 13)		
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	1Mpps (when using differential receiver), 200kpps (when using open collector), (4Mpps (Note 11))															
	Positioning feedback pulse	Encoder resolution: 262144 p/rev															
	Command pulse multiple	Electronic gear A/B multiple, A: 1 to 1048576, B: 1 to 1048576, 1/10 < A/B < 2000															
	Positioning complete width setting	0 to ±10000 pulses (command pulse unit)															
	Excess error	±3 rotations															
	Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum 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 (possible to change the speed in 10V using parameter No. PC12.) (Note 12)															
	Speed fluctuation rate	±0.01% maximum (load fluctuation 0 to 100%), 0% (power fluctuation ±10%) ±0.2% maximum (ambient temperature 25°C±10°C (59°F to 95°F)), when using analog speed command															
	Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque) (Note 12)															
Torque control mode	Analog torque command input	0 to ±8VDC/maximum torque (input impedance 10 to 12kΩ) (Note 12)															
	Speed limit	Set by parameters or external analog input (0 to ±10VDC/rated speed)															
Structure		Natural-cooling open (IP00)					Fan cooling open (IP00)								Natural-cooling open (IP00)		
Environment	Ambient temperature (Note 9)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)															
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust															
	Elevation	1000m or less above sea level															
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)															
Mass (kg [lb])		0.8 (1.8)	0.8 (1.8)	1.0 (2.2)	1.0 (2.2)	1.4 (3.1)	1.4 (3.1)	2.1 (4.6)	2.3 (5.1)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)	0.8 (1.8)	0.8 (1.8)	1.0 (2.2)

Notes:
1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section "Options ● Optional regeneration unit" in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "Servo Amplifier Model Configurations" for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.3A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□A(1)-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. MR-J3-350A or smaller servo amplifiers can be mounted closely. In this case, operate them at the ambient temperature of 0 to 45°C (32 to 113°F) or at 75% or less of the effective load ratio.
10. Special specification servo amplifiers for 1-phase 200 to 240VAC are also available: MR-J3-□A-U004. The permissible voltage fluctuation for MR-J3-□A-U004 is 1-phase 170 to 264VAC.
11. 4Mpps compatible servo amplifier is also available: MR-J3-□A(1)-KE. Contact your local sales office for 4Mpps compatible servo amplifier for HF-JP11K1M and HF-JP15K1M.
12. High resolution analog speed command and analog torque command is available with a set of MR-J3-□A(1)-RJ040 and MR-J3-D01 extension IO unit.
13. When using the built-in dynamic brake, refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for the permissible load inertia moment ratio.
14. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-A Servo Amplifier Specifications: 200VAC, 30kW or Larger

Drive unit	Drive unit model		MR-J3-DU30KA	MR-J3-DU37KA
	Output	Rated voltage	3-phase 170VAC	
		Rated current (A)	174	204
	Main circuit power supply		The drive unit's main circuit power is supplied from the converter unit.	
	Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz	
		Rated current (A)	0.3	
		Permissible voltage fluctuation	1-phase 170 to 253VAC	
		Permissible frequency fluctuation	±5% maximum	
		Power consumption (W)	45	
	Interface power supply		24VDC ±10% (required current capacity: 0.3A (Note 3))	
	Control system		Sine-wave PWM control/current control system	
	Dynamic brake		External option (Note 4)	
	Safety features		Overcurrent shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection	
	Position control mode	Maximum input pulse frequency	1Mpps (when using differential receiver), 200kpps (when using open collector)	
		Positioning feedback pulse	Encoder resolution: 262144 p/rev	
		Command pulse multiple	Electronic gear A/B multiple, A: 1 to 1048576, B: 1 to 1048576, 1/10 < A/B < 2000	
		Positioning complete width setting	0 to ±10000 pulses (command pulse unit)	
		Excess error	±3 rotations	
		Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum 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 (possible to change the speed in 10V using parameter No. PC12.)	
		Speed fluctuation rate	±0.01% maximum (load fluctuation 0 to 100%), 0% (power fluctuation ±10%) ±0.2% maximum (ambient temperature 25°C±10°C (59°F to 95°F)), when using analog speed command	
		Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque)	
	Torque control mode	Analog torque command input	0 to ±8VDC/maximum torque (input impedance 10 to 12kΩ)	
		Speed limit	Set by parameters or external analog input (0 to ±10VDC/rated speed)	
	Structure		Fan cooling open (IP00)	
	Mass (kg [lb])		26 (57)	
Converter unit	Converter unit model		MR-J3-CR55K	
	Output	Rated voltage	283 to 326VDC	
		Rated current (A)	215.9	
	Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 200 to 230VAC 50/60Hz	
		Rated current (A)	251.1	
		Permissible voltage fluctuation	3-phase 170 to 253VAC	
		Permissible frequency fluctuation	±5% maximum	
	Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz	
		Rated current (A)	0.3	
		Permissible voltage fluctuation	1-phase 170 to 253VAC	
		Permissible frequency fluctuation	±5% maximum	
		Power consumption (W)	45	
	Interface power supply		24VDC ±10% (required current capacity: 0.13A (Note 3))	
	Safety features		Regeneration overvoltage shutdown, regeneration fault protection, overload shutdown (electronic thermal), undervoltage/sudden power outage protection	
	Structure		Fan cooling open (IP00)	
	Mass (kg [lb])		25 (55)	
Drive unit/ Converter unit	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 maximum (non condensing), storage: 90% RH maximum (non condensing)	
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust	
		Elevation	1000m or less above sea level	
		Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)	

Notes: 1. Rated output and speed of a servo motor are applicable when the drive unit and the converter unit, combined with the servo motor, are operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. The interface power supply can be shared with the drive unit and the converter unit. When all of the input/output points are used, 0.3A is required for the drive unit, and 0.13A is required for the converter unit. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-A Servo Amplifier Specifications: 400VAC, 22kW or Smaller

Servo amplifier model MR-J3-		60A4	100A4	200A4	350A4	500A4	700A4	11KA4	15KA4	22KA4
Output	Rated voltage	3-phase 323VAC								
	Rated current (A)	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation	3-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	0.1			0.2					
	Permissible voltage fluctuation	1-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
	Power consumption (W)	30			45					
Interface power supply		24VDC ±10% (required current capacity: 0.3A (Note 7))								
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	15	15	100	100	130 (Note 9)	170 (Note 9)	—	—	—
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)
Control system		Sine-wave PWM control/current control system								
Dynamic brake		Built-in (Note 8, 10)						External option (Note 12)		
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	1Mpps (when using differential receiver), 200kpps (when using open collector)								
	Positioning feedback pulse	Encoder resolution: 262144 p/rev								
	Command pulse multiple	Electronic gear A/B multiple, A: 1 to 1048576, B: 1 to 1048576, 1/10 < A/B < 2000								
	Positioning complete width setting	0 to ±10000 pulses (command pulse unit)								
	Excess error	±3 rotations								
	Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum 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 (possible to change the speed in 10V using parameter No. PC12.) (Note 11)								
	Speed fluctuation rate	±0.01% maximum (load fluctuation 0 to 100%), 0% (power fluctuation ±10%) ±0.2% maximum (ambient temperature 25°C±10°C (59°F to 95°F)), when using analog speed command								
	Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque) (Note 11)								
Torque control mode	Analog torque command input	0 to ±8VDC/maximum torque (input impedance 10 to 12kΩ) (Note 11)								
	Speed limit	Set by parameters or external analog input (0 to ±10VDC/rated speed)								
Structure		Natural-cooling open (IP00)			Fan cooling open (IP00)					
Environment	Ambient temperature (Note 6)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)								
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Elevation	1000m or less above sea level								
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)								
Mass (kg [lb])		1.7 (3.7)	1.7 (3.7)	2.1 (4.6)	4.6 (10)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)

Notes:1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section “Servo motor torque characteristics” in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section “Options ● Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “Servo Amplifier Model Configurations” for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min).
Note that change in parameter No. PA02 is required.
7. 0.3A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to “MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□A4-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. The amplifier built-in resistor is compatible with the maximum torque deceleration when the motor is used within the rated speed and the recommended load to motor inertia moment ratio. Contact your local sales office if the operating motor speed and the load to motor inertia moment ratio exceed the rated speed and the recommended ratio.
10. When using the built-in dynamic brake, refer to “MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL” for the permissible load inertia moment ratio.
11. For the servo amplifier 11kW to 22kW, high resolution analog speed command and analog torque command is available with a set of MR-J3-□A4-RJ040 and MR-J3-D01 extension IO unit. Servo amplifier 7kW or smaller, compatible with high resolution analog speed torque command, will be available.
12. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

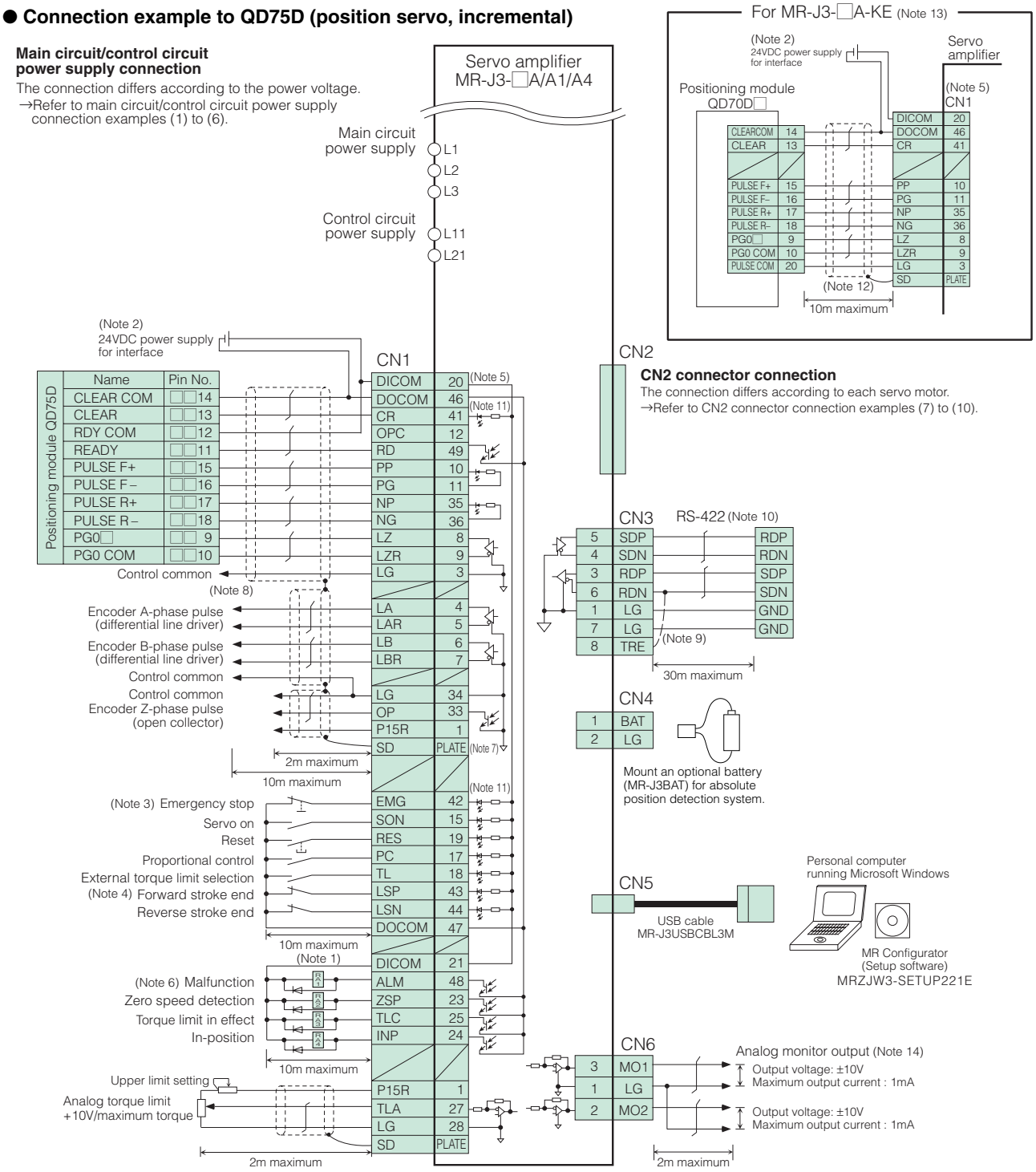
MR-J3-A Servo Amplifier Specifications: 400VAC, 30kW or Larger

Drive unit	Drive unit model		MR-J3-DU30KA4	MR-J3-DU37KA4	MR-J3-DU45KA4	MR-J3-DU55KA4
	Output	Rated voltage	3-phase 323VAC			
		Rated current (A)	87	102	131	143
	Main circuit power supply		The drive unit's main circuit power is supplied from the converter unit.			
	Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	0.2			
		Permissible voltage fluctuation	1-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
		Power consumption (W)	45			
	Interface power supply		24VDC ±10% (required current capacity: 0.3A (Note 3))			
	Control system		Sine-wave PWM control/current control system			
	Dynamic brake		External option (Note 4)			
	Safety features		Overcurrent shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection			
	Position control mode	Maximum input pulse frequency	1Mpps (when using differential receiver), 200kpps (when using open collector)			
		Positioning feedback pulse	Encoder resolution: 262144 p/rev			
		Command pulse multiple	Electronic gear A/B multiple, A: 1 to 1048576, B: 1 to 1048576, 1/10 < A/B < 2000			
		Positioning complete width setting	0 to ±10000 pulses (command pulse unit)			
		Excess error	±3 rotations			
		Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum 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 (possible to change the speed in 10V using parameter No. PC12.)			
		Speed fluctuation rate	±0.01% maximum (load fluctuation 0 to 100%), 0% (power fluctuation ±10%) ±0.2% maximum (ambient temperature 25°C±10°C (59°F to 95°F)), when using analog speed command			
		Torque limit	Set by parameters or external analog input (0 to +10VDC/maximum torque)			
	Torque control mode	Analog torque command input	0 to ±8VDC/maximum torque (input impedance 10 to 12kΩ)			
		Speed limit	Set by parameters or external analog input (0 to ±10VDC/rated speed)			
	Structure		Fan cooling open (IP00)			
	Mass (kg [lb])		18 (40)		26 (57)	
Converter unit	Converter unit model		MR-J3-CR55K4			
	Output	Rated voltage	538 to 678VDC			
		Rated current (A)	113.8			
	Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	132.2			
		Permissible voltage fluctuation	3-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
	Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	0.2			
		Permissible voltage fluctuation	1-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
		Power consumption (W)	45			
	Interface power supply		24VDC ±10% (required current capacity: 0.13A (Note 3))			
	Safety features		Regeneration overvoltage shutdown, regeneration fault protection, overload shutdown (electronic thermal), undervoltage/sudden power outage protection			
	Structure		Fan cooling open (IP00)			
	Mass (kg [lb])		25 (55)			
Drive unit/ Converter unit	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 maximum (non condensing), storage: 90% RH maximum (non condensing)			
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust			
		Elevation	1000m or less above sea level			
		Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)			

Notes: 1. Rated output and speed of a servo motor are applicable when the drive unit and the converter unit, combined with the servo motor, are operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. The interface power supply can be shared with the drive unit and the converter unit. When all of the input/output points are used, 0.3A is required for the drive unit, and 0.13A is required for the converter unit. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-□A□ Standard Wiring Diagram: Position Control Operation

● Connection example to QD75D (position servo, incremental)



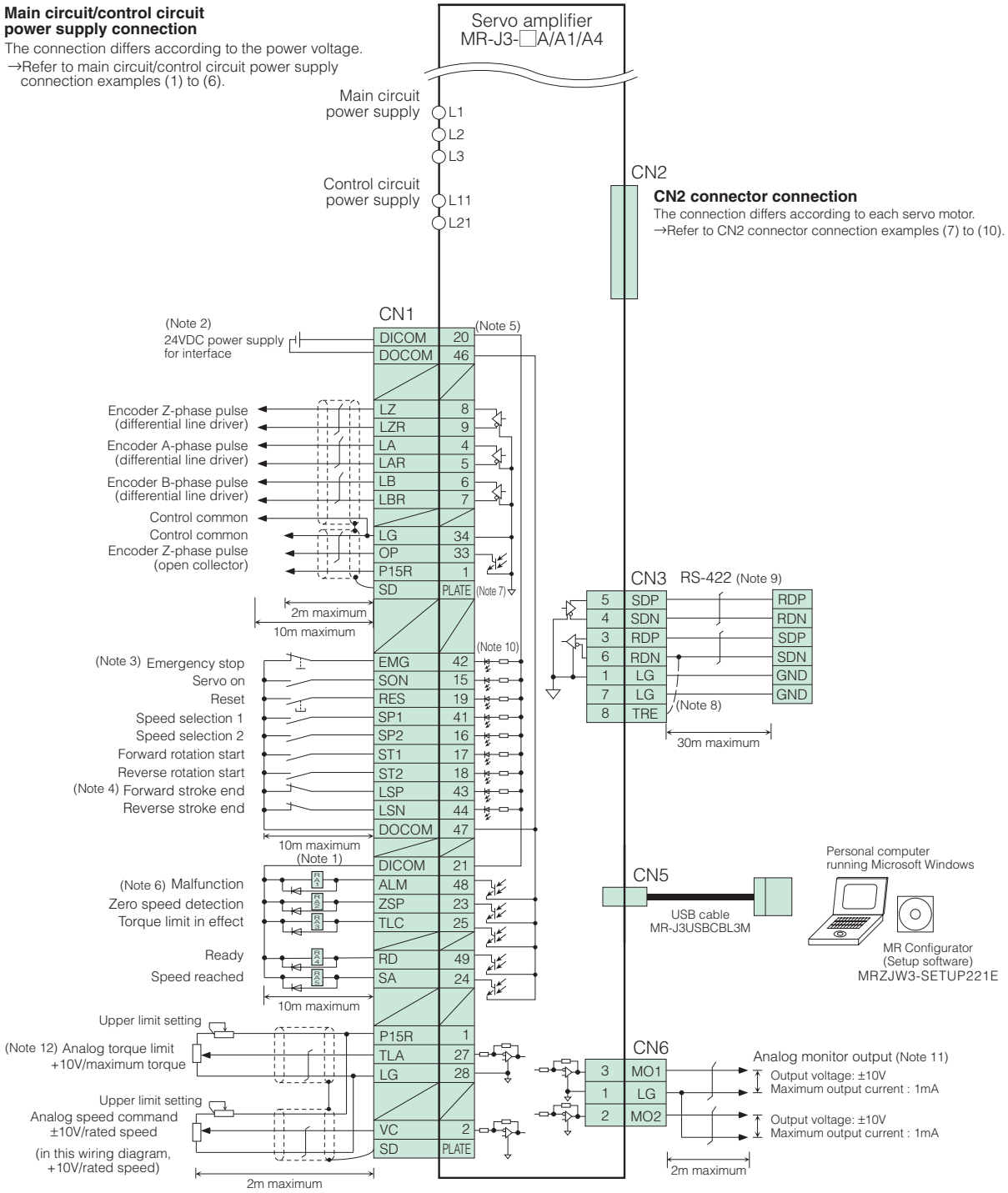
Notes:

1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the emergency stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.3A). 0.3A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. Always turn on the emergency stop (EMG) signal (normally closed contact) before starting the operation. If not, the operation will not start.
4. Always turn on the forward and reverse stroke end (LSP, LSN) signals (normally closed contact) before starting the operation. If not, the commands will not be accepted.
5. Signals with the same name are connected internally.
6. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
7. Connect the shield wire securely to the plate inside the connector (ground plate).
8. This connection is not necessary for QD75D positioning module. Note that the connection between LG and control common terminal is recommended for some positioning modules to improve noise immunity.
9. For the final axis, connect TRE and RDN.
10. A personal computer can be connected using a RS-422/RS-232C conversion cable. Note that USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time. Refer to the section "Ordering Information for Customers" in this catalog for the RS-422/RS-232C conversion cable.
11. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
12. FA goods (Model: FA-CBLQ75M2J3(-P)/-1(P)) cannot be used.
13. Do not use CN2L connector.
14. Output voltage range varies depending on the monitored signal.

MR-J3-□A□ Standard Wiring Diagram: Speed Control Operation

● Connection example

Main circuit/control circuit power supply connection
The connection differs according to the power voltage.
→Refer to main circuit/control circuit power supply connection examples (1) to (6).

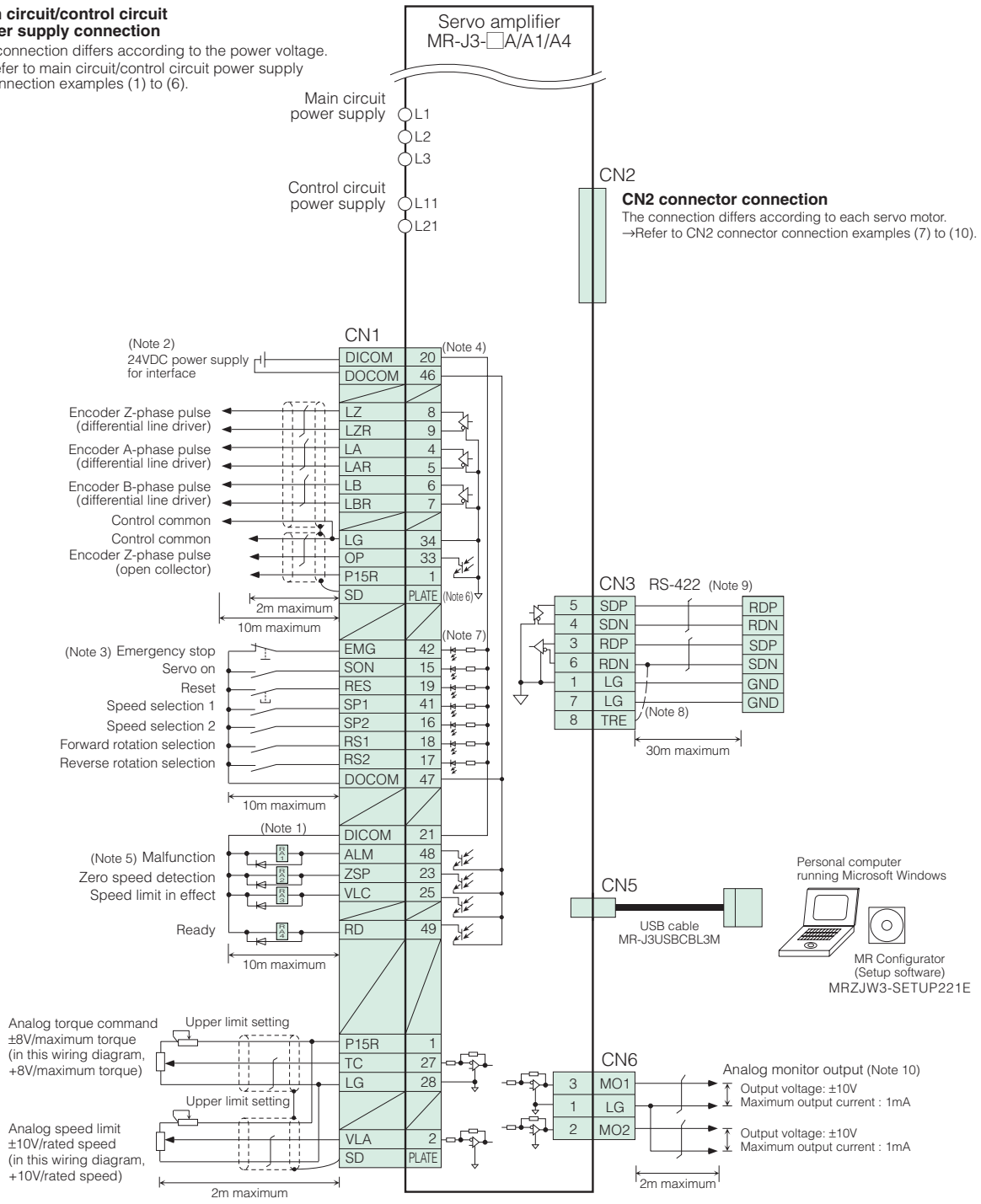


Notes:
1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the emergency stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.3A). 0.3A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. Always turn on the emergency stop (EMG) signal (normally closed contact) before starting the operation. If not, the operation will not start.
4. Always turn on the forward and reverse stroke end (LSP, LSN) signals (normally closed contact) before starting the operation. If not, the commands will not be accepted.
5. Signals with the same name are connected internally.
6. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
7. Connect the shield wire securely to the plate inside the connector (ground plate).
8. For the final axis, connect TRE and RDN.
9. A personal computer can be connected using a RS-422/RS-232C conversion cable. Note that USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time. Refer to the section "Ordering Information for Customers" in this catalog for the RS-422/RS-232C conversion cable.
10. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
11. Output voltage range varies depending on the monitored signal.
12. TLA can be used when external torque limit (TL) is enabled by setting parameters.

MR-J3-□A□ Standard Wiring Diagram: Torque Control Operation

● Connection example

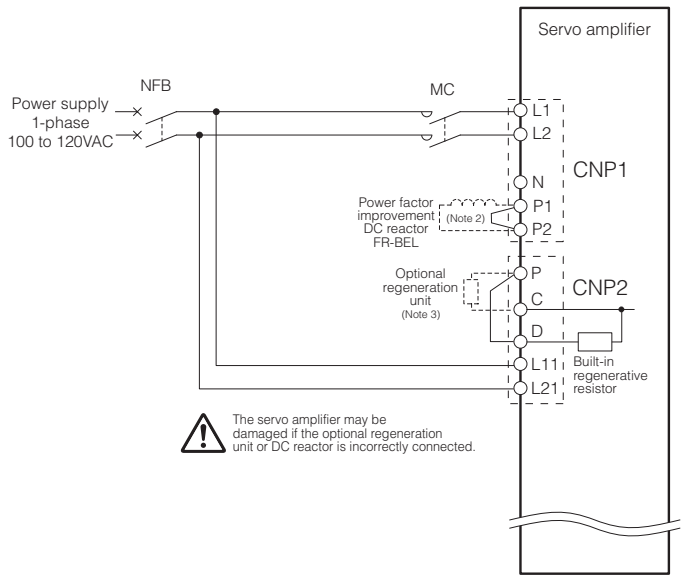
Main circuit/control circuit power supply connection
The connection differs according to the power voltage.
→Refer to main circuit/control circuit power supply connection examples (1) to (6).



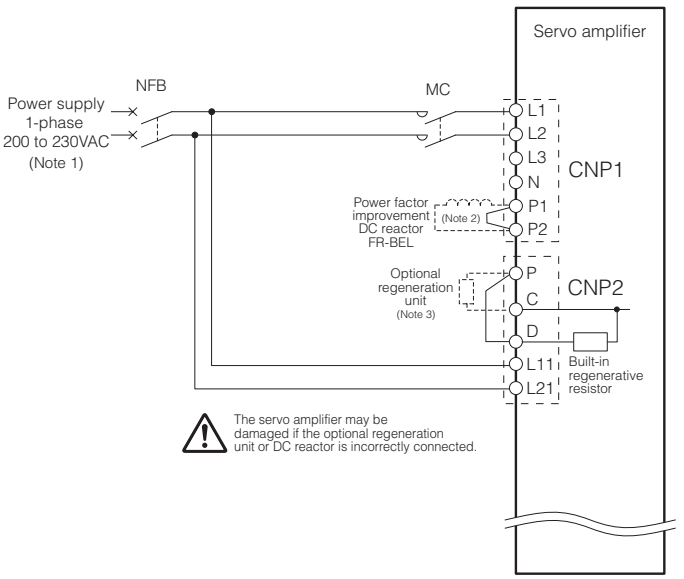
Notes:
1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the emergency stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.3A). 0.3A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. Always turn on the emergency stop (EMG) signal (normally closed contact) before starting the operation. If not, the operation will not start.
4. Signals with the same name are connected internally.
5. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
6. Connect the shield wire securely to the plate inside the connector (ground plate).
7. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
8. For the final axis, connect TRE and RDN.
9. A personal computer can be connected using a RS-422/RS-232C conversion cable. Note that USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time. Refer to the section "Ordering Information for Customers" in this catalog for the RS-422/RS-232C conversion cable.
10. Output voltage range varies depending on the monitored signal.

Main Circuit/Control Circuit Power Supply Connection Examples

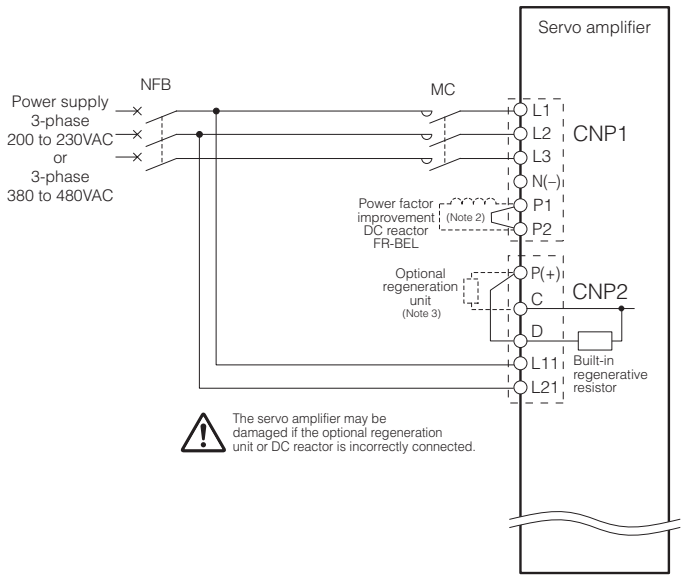
(1) 1-phase 100V



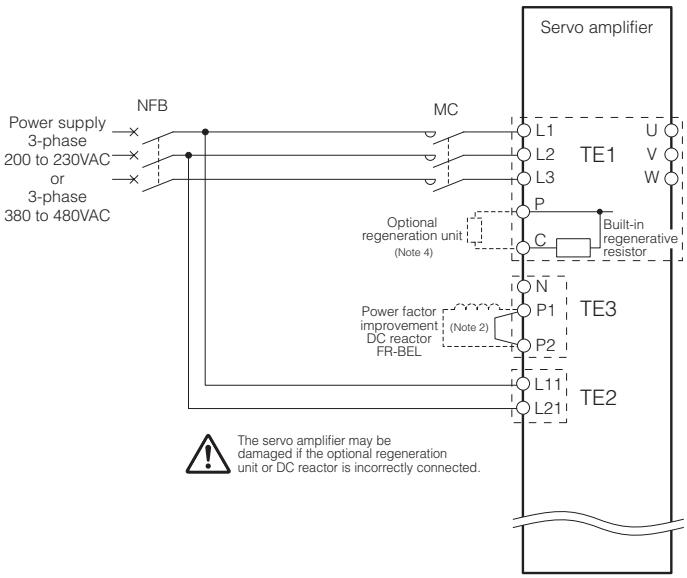
(2) 1-phase 200V



(3) 3-phase 200V 0.1kW to 3.5kW or 3-phase 400V 0.6kW to 2kW

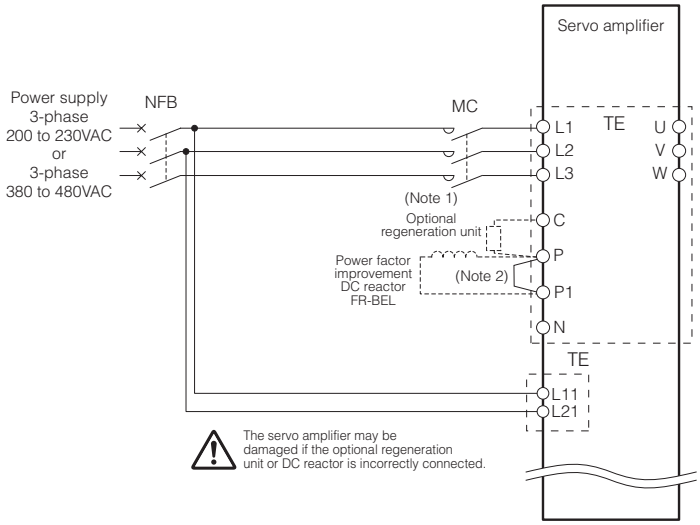


(4) 3-phase 200V 5kW or 7kW, or 3-phase 400V 3.5kW to 7kW

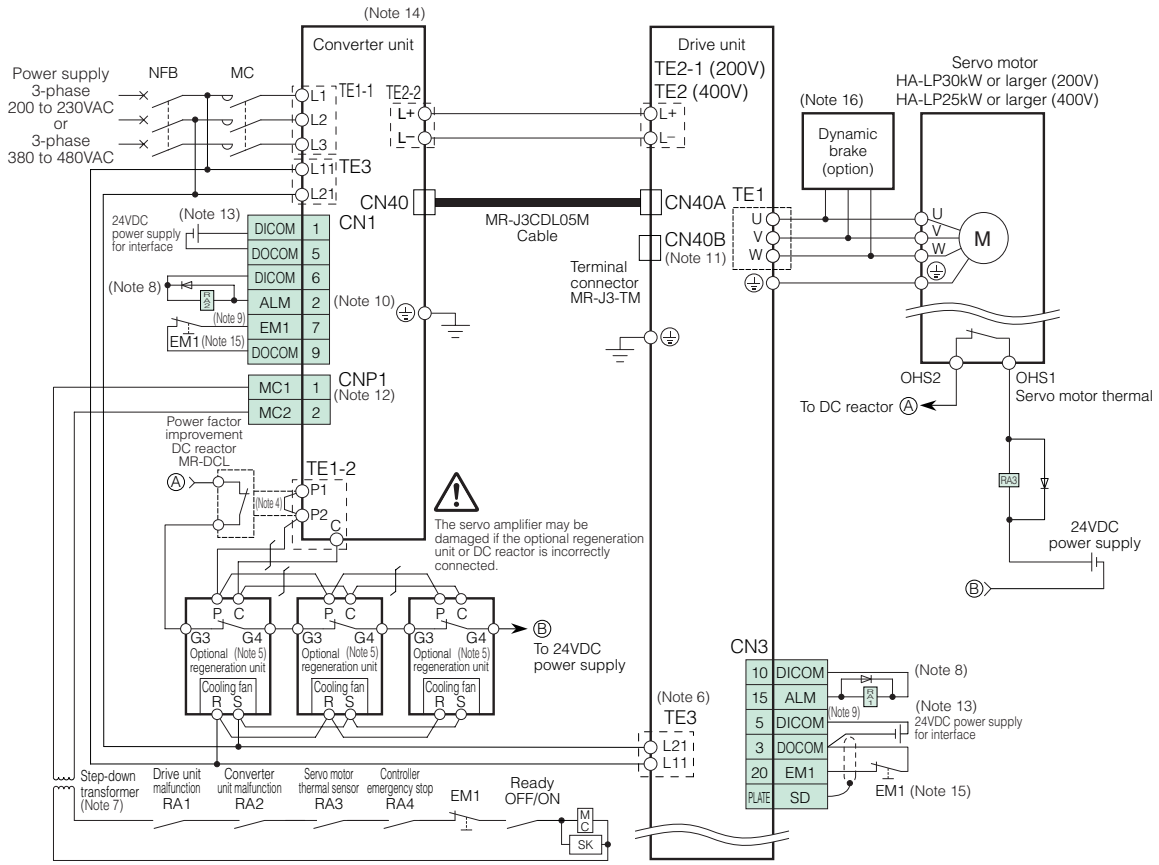


Notes:
1. When using a 1-phase 200VAC to 230VAC, connect the power supply to the L1 and L2 terminals. Do not connect anything to L3.
2. Disconnect P1 and P2 when using the DC reactor.
3. Disconnect P(+) and D when connecting the optional regeneration unit externally.
4. Disconnect the wires for the built-in regenerative resistor (P and C) when connecting the optional regeneration unit externally.

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



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

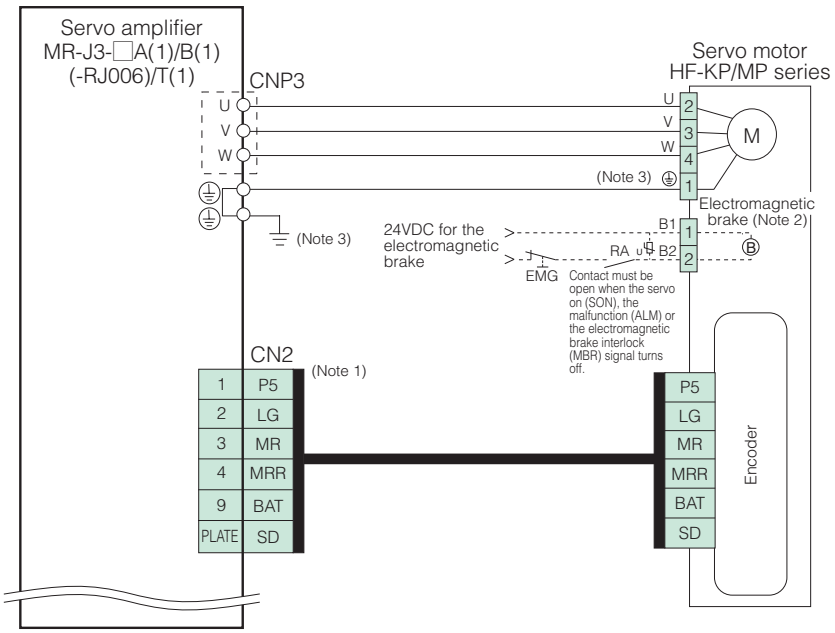


Notes:

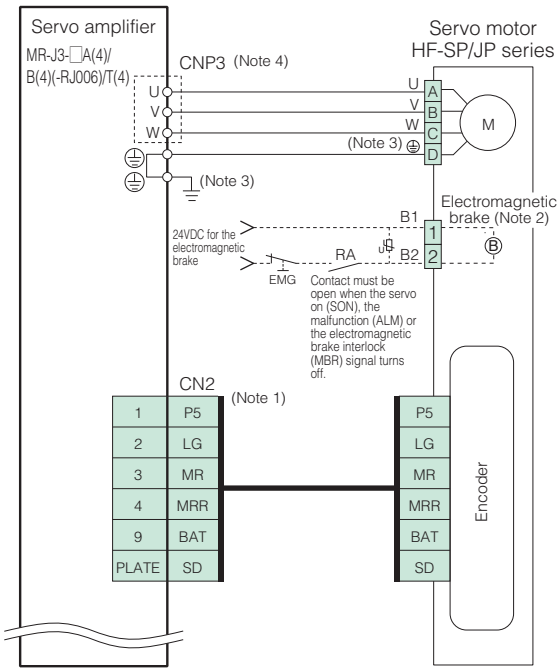
1. 11kW or larger servo amplifiers do not have a built-in regenerative resistor.
2. Remove the short bar between P and P1 when using the DC reactor.
3. This wiring diagram is for MR-J3-DU□B(4). For MR-J3-DU□A(4), refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL".
4. Remove the short bar between P1 and P2 when using the DC reactor.
5. This is for MR-RB137 (for 200V) or MR-RB138-4 (for 400V). Three units of MR-RB137 or MR-RB138-4 are required for each converter unit (tolerable regenerative power 3900W).
6. The phases of the power supply connected to L11 and L21 on the converter unit and the drive unit must always match the phases connected to L1 and L2. An incorrect connection may damage the drive unit and/or the converter unit.
7. A step-down transformer is required when coil voltage of the magnetic contactor (MC) is 200V class, and the converter unit and the drive unit are 400V class.
8. Do not reverse the diode's direction. Connecting it backwards may cause the drive unit and/or the converter unit to malfunction such that the signals are not output, and the emergency stop and other safety circuits are inoperable.
9. Select a device that does not make the circuit current exceed 40mA.
10. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
11. Always connect the terminal connector (MR-J3-TM) to CN40B.
12. MC1 and MC2 outputs are controlled by the converter unit. For creating a system same as that of the prior servo amplifier by invalidating CNP1, refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
13. The interface power supply can be shared with the drive unit and the converter unit. When all of the input/output points are used, 0.15A is required for the drive unit and 0.13A for the converter unit. The current capacity can be stepped down according to the number of input/output points in use.
14. A converter unit is required per drive unit.
15. Create a circuit that shuts off the forced stop (EM1) of the converter unit and the drive unit at the same time.
16. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

CN2 Connector Connection Examples

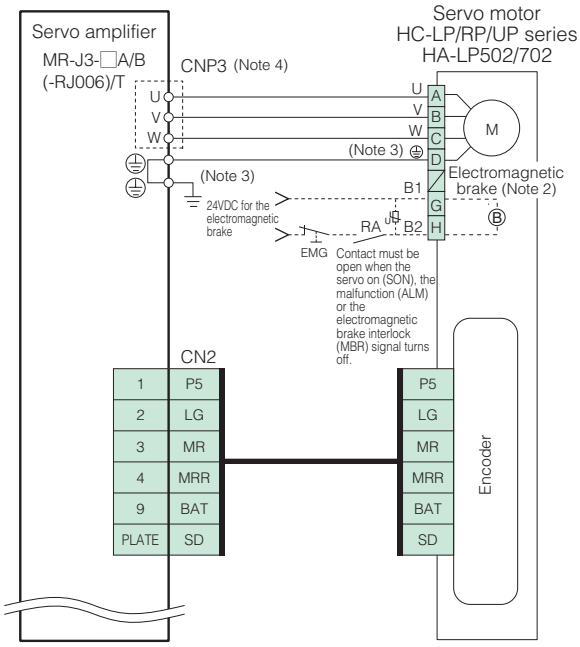
(7) HF-KP/HF-MP series



(8) HF-SP/HF-JP series

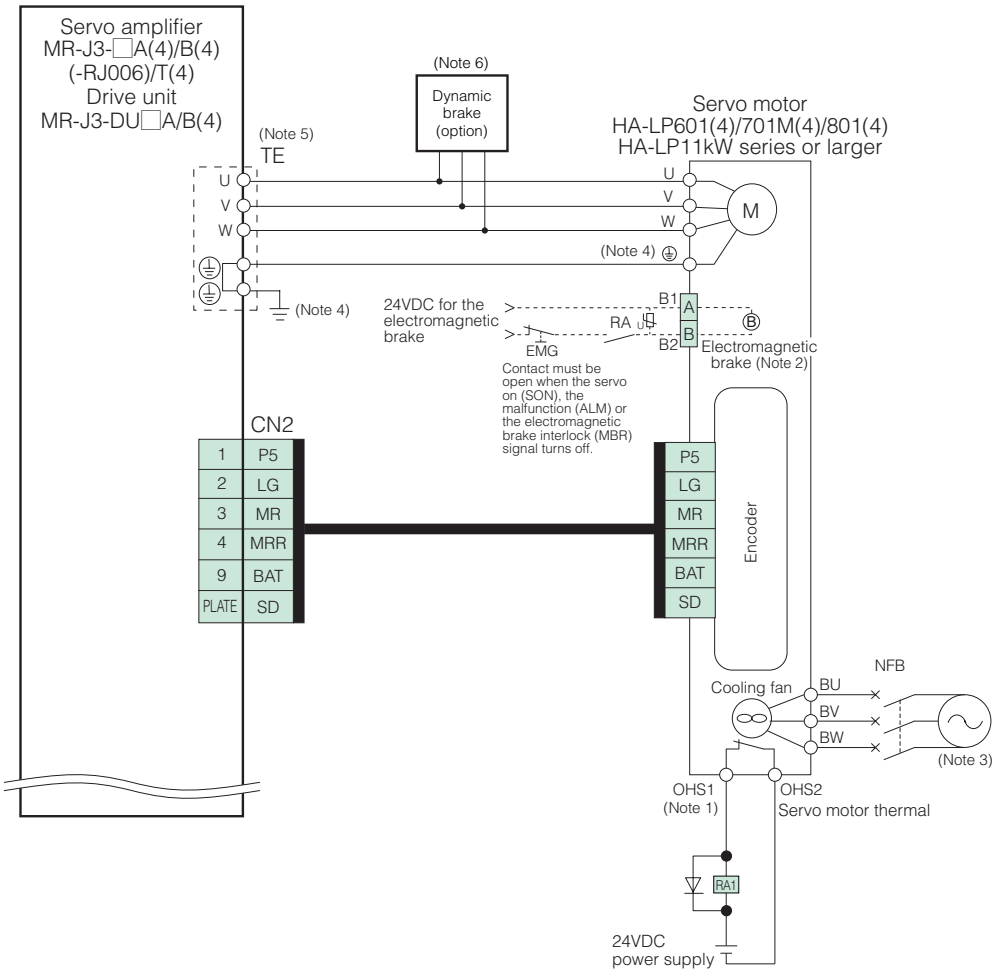


(9) HC-LP/HC-RP/HC-UP series or HA-LP502/702



Notes:
1. The signals shown is applicable when using a two-wire type encoder cable. When using a four-wire type encoder cable for HF-KP/HF-MP series or 11kW and 15kW of HF-JP series, refer to “MR-J3 SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
2. This is for the motor with an electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity. A separate connector from the motor power supply connector is prepared as an electromagnetic brake connector for HC-LP202B, 302B, and HC-UP202B to 502B.
3. For grounding, connect the ground wire to the control box’s protection ground (PE) terminal via the servo amplifier’s protection ground (PE) terminal.
4. U, V and W terminals are available in TE1 for 200V 5kW or larger and 400V 3.5kW or larger servo amplifiers.

(10) HA-LP601(4)/701M(4)/801(4) or HA-LP series 11kW or larger

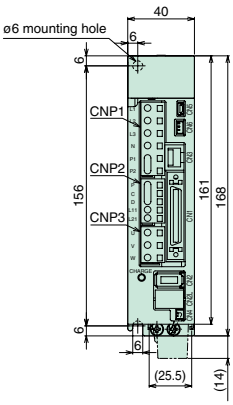


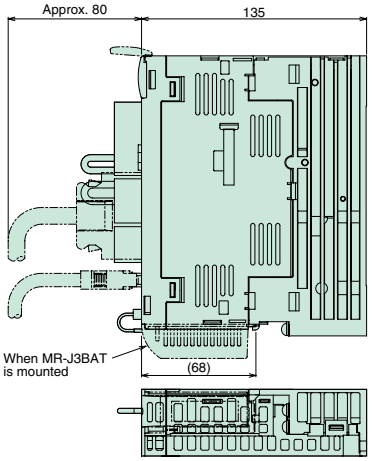
Notes:
1. Make sure that the current flowing to the servo motor thermal circuit is between 0.15A and 3A.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Always supply power to the cooling fan terminal. The power supply differs according to the motor. Refer to “Cooling fan power supply” under the Motor Specifications in this catalog.
4. When using the servo amplifier 22kW or smaller, connect the ground wire to the control box’s protection ground (PE) terminal via the servo amplifier’s protection ground (PE) terminal. When using the drive unit, connect the servo motor’s ground wire to the protection ground (PE) terminal of the drive unit. Put the ground wires of the drive unit and the converter unit together into one on the protection ground (PE) terminal in the control box, and then connect to ground.
5. U, V and W terminals are available in TE1 for HA-LP601(4) and HA-LP701M(4).
6. Use an optional external dynamic brake with the 11kW or larger servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-□A□ Servo Amplifier Dimensions

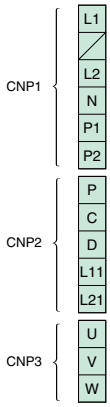
(Unit: mm)

● MR-J3-10A, 20A, 10A1, 20A1 (Note 1)



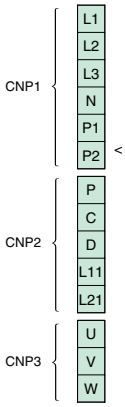


< Terminal arrangement >



For 1-phase 100VAC

< Terminal arrangement >



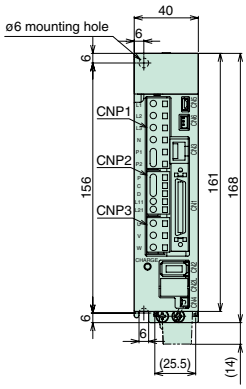
PE

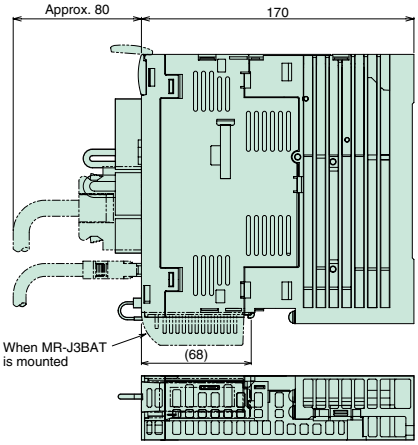
Screw size: M4

< Mounting screw size >
M5

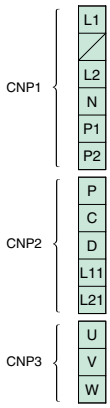
For 3-phase 200VAC
or 1-phase 200VAC

● MR-J3-40A, 60A, 40A1 (Note 1)



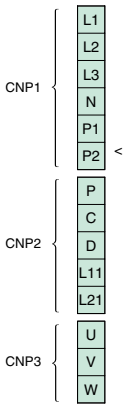


< Terminal arrangement >



For 1-phase 100VAC

< Terminal arrangement >



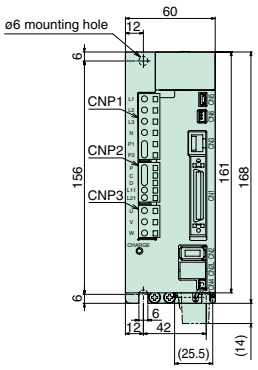
PE

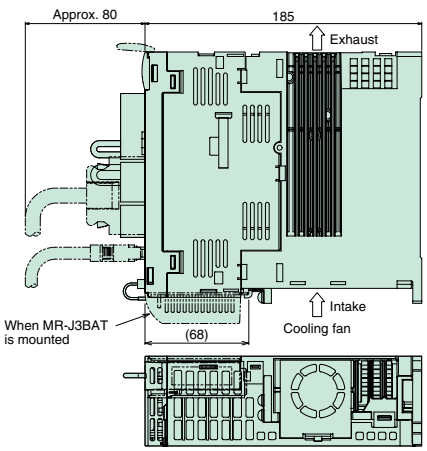
Screw size: M4

< Mounting screw size >
M5

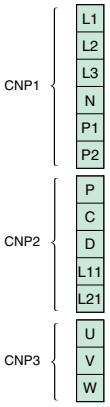
For 3-phase 200VAC
or 1-phase 200VAC

● MR-J3-70A, 100A (Note 1)





< Terminal arrangement >



PE

Screw size: M4

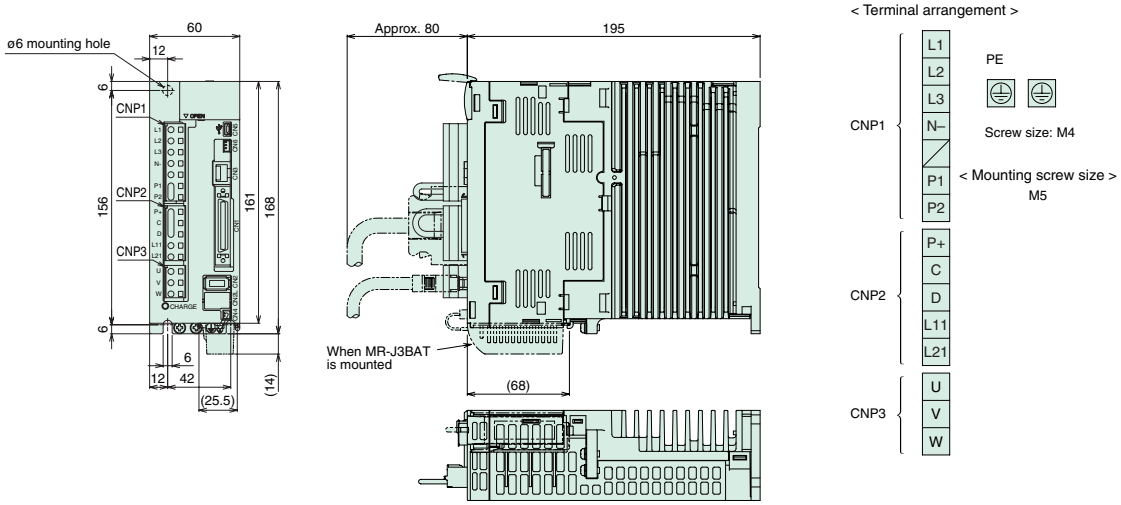
< Mounting screw size >
M5

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.

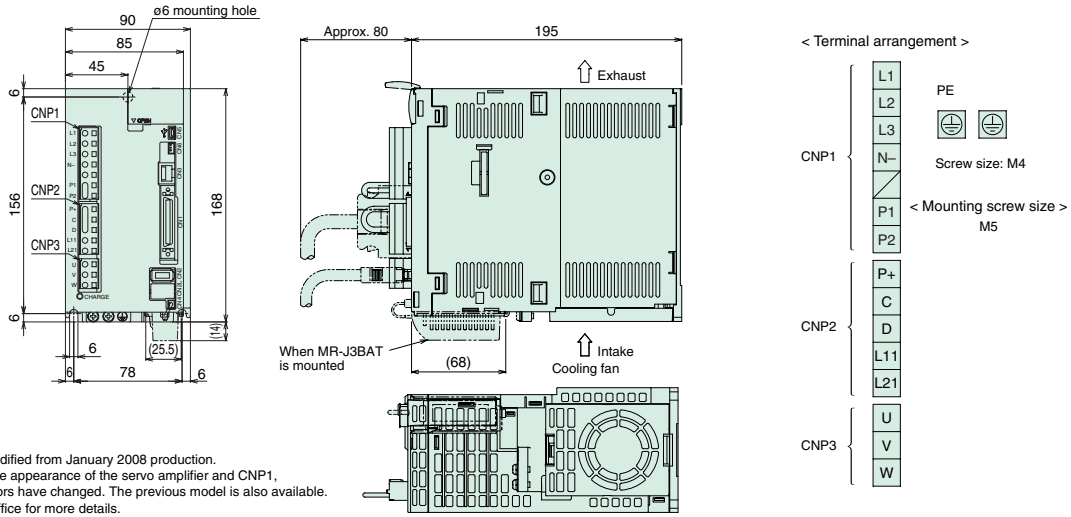
MR-J3-□A□ Servo Amplifier Dimensions

(Unit: mm)

● MR-J3-60A4, 100A4 (Note 1)

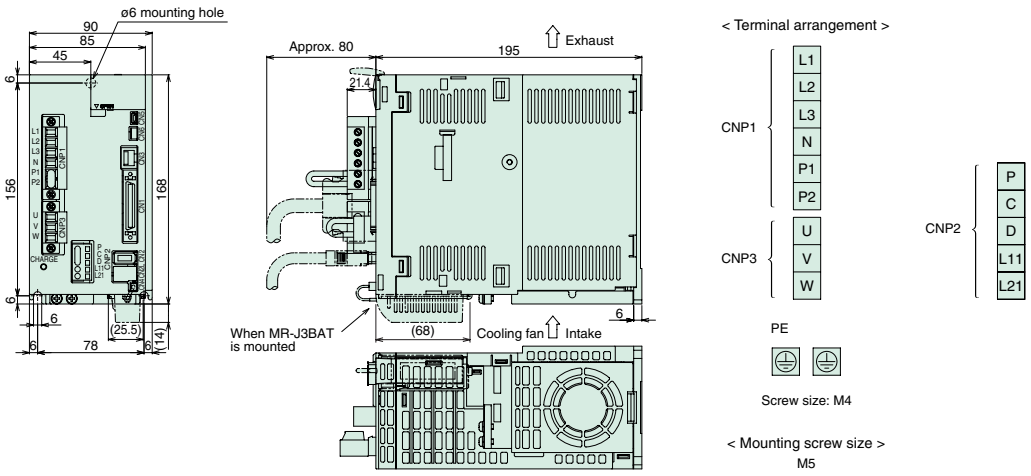


● MR-J3-200A*, 200A4 (Note 1)



* MR-J3-200A has been modified from January 2008 production.
Due to the modification, the appearance of the servo amplifier and CNP1, CNP2 and CNP3 connectors have changed. The previous model is also available. Contact your local sales office for more details.

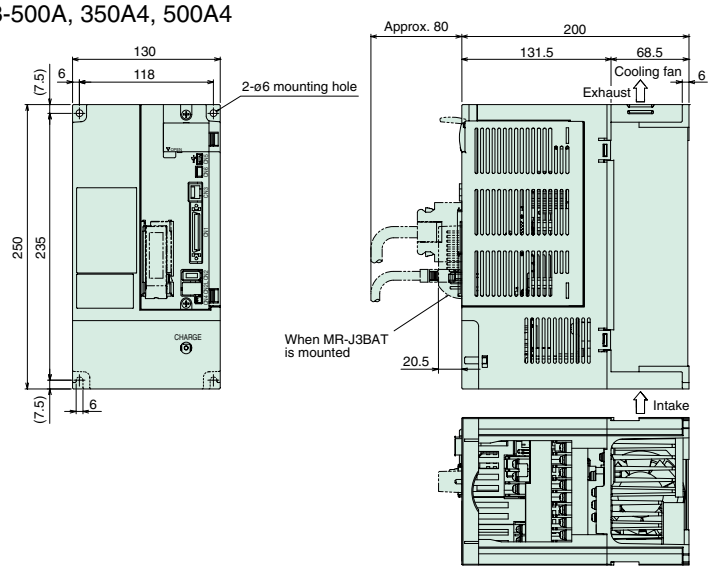
● MR-J3-350A (Note 1)

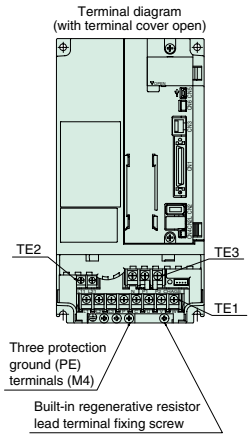


Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.

(Unit: mm)

● MR-J3-500A, 350A4, 500A4





< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

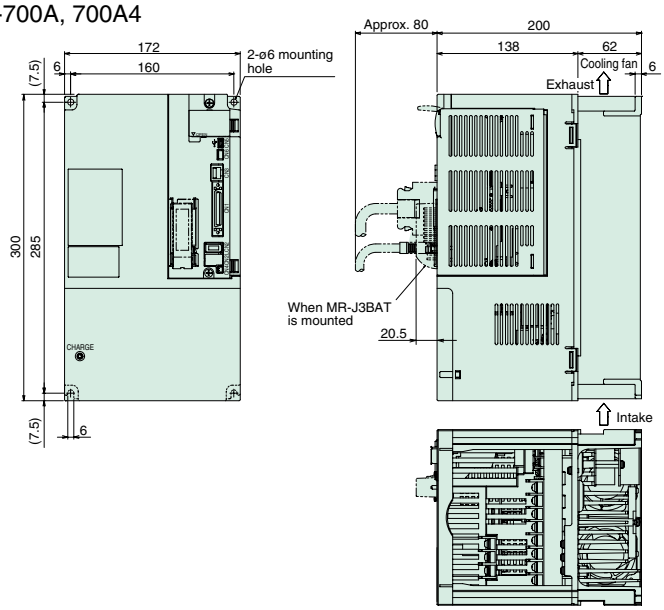
TE2		TE3		
L11	L21	N	P1	P2

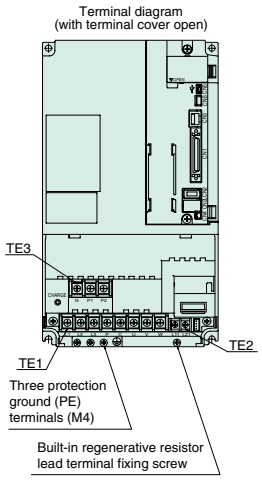
TE1								
L1	L2	L3	P	C	U	V	W	

PE

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-700A, 700A4





< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

TE3		
N	P1	P2

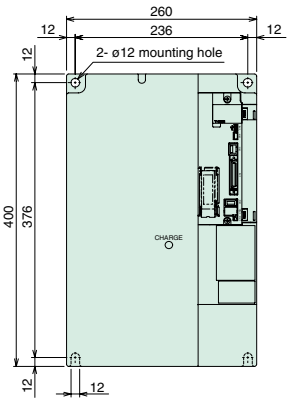
TE1								
L1	L2	L3	P	C	U	V	W	

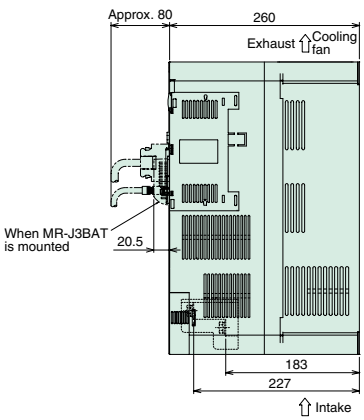
TE2	
L11	L21

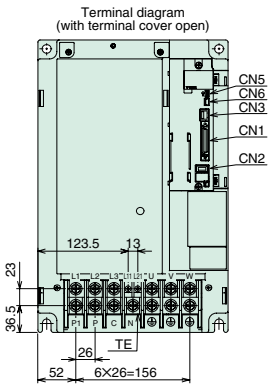
PE

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-11KA to 22KA, 11KA4 to 22KA4







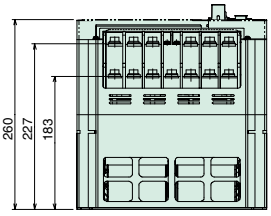
< Terminal arrangement >

TE								
	L11			L21				
	L1	L2	L3		U	V	W	
	P1	P	C	N	⏚	⏚	⏚	

< Terminal screw size >

Terminals \ Model	MR-J3-11KA(4), 15KA(4)	MR-J3-22KA(4)
L1, L2, L3, U, V, W, P1, P, C, N, ⏚	M6	M8
L11, L21	M4	M4

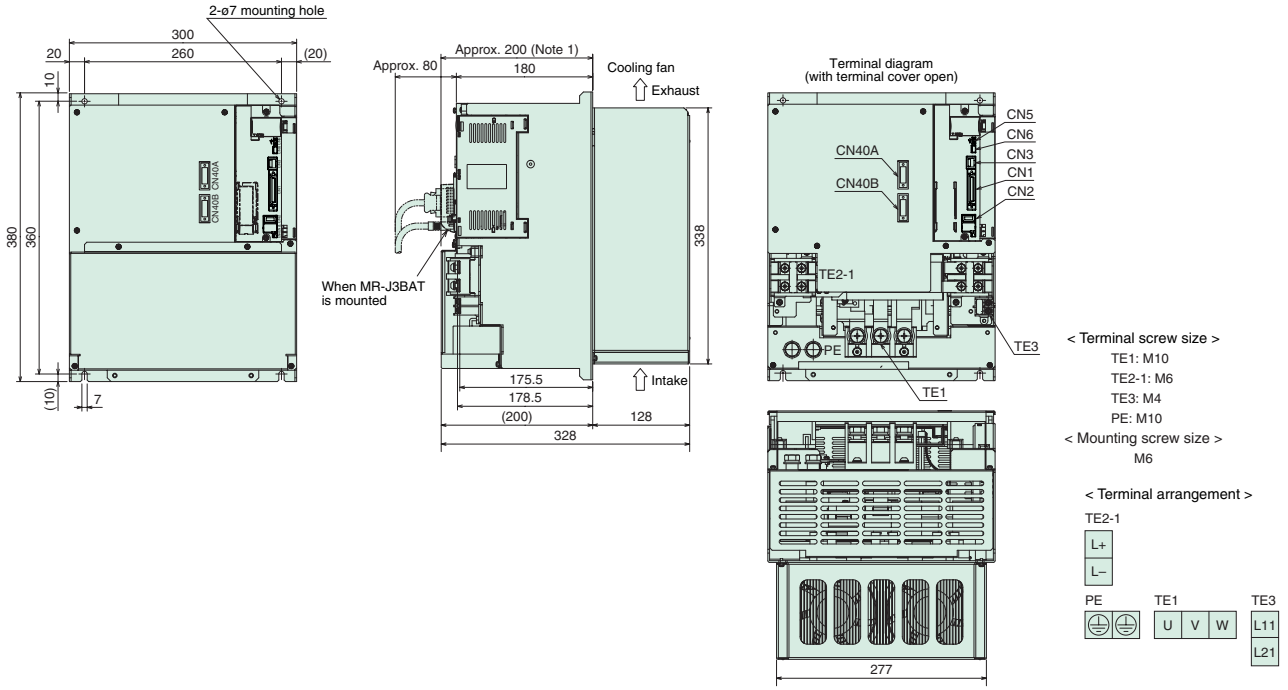
< Mounting screw size >
M10



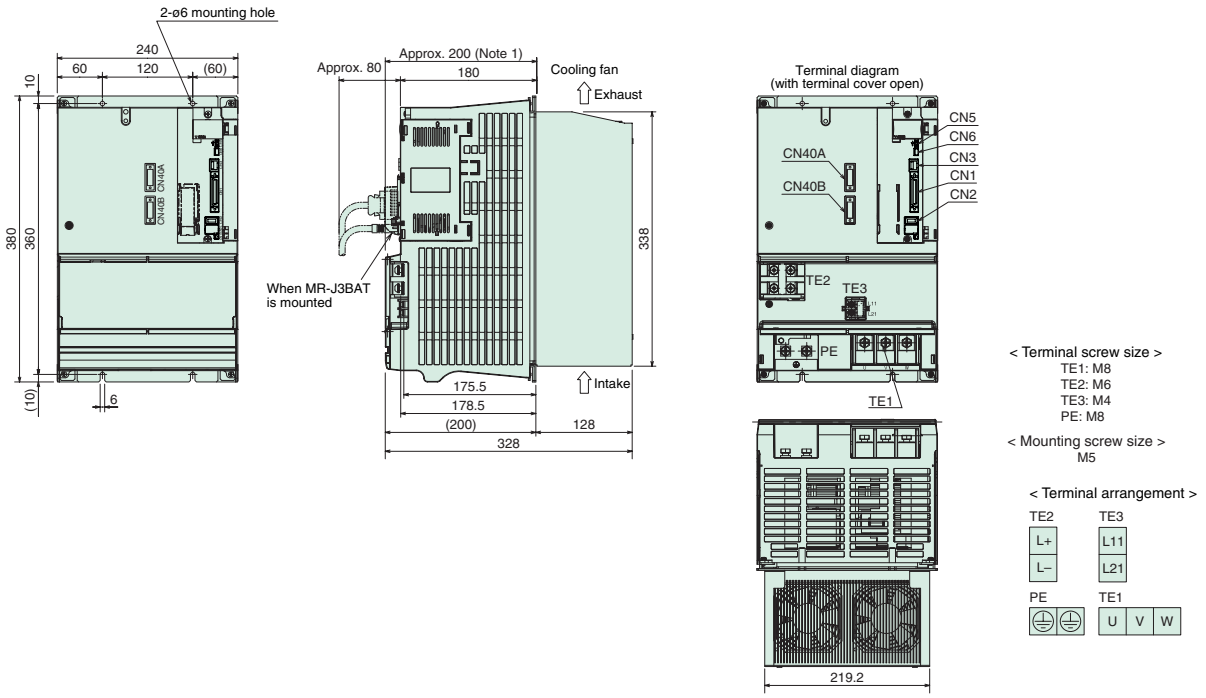
MR-J3-DU□A(4) Drive Unit Dimensions

(Unit: mm)

● MR-J3-DU30KA, DU37KA, DU45KA4, DU55KA4



● MR-J3-DU30KA4, DU37KA4

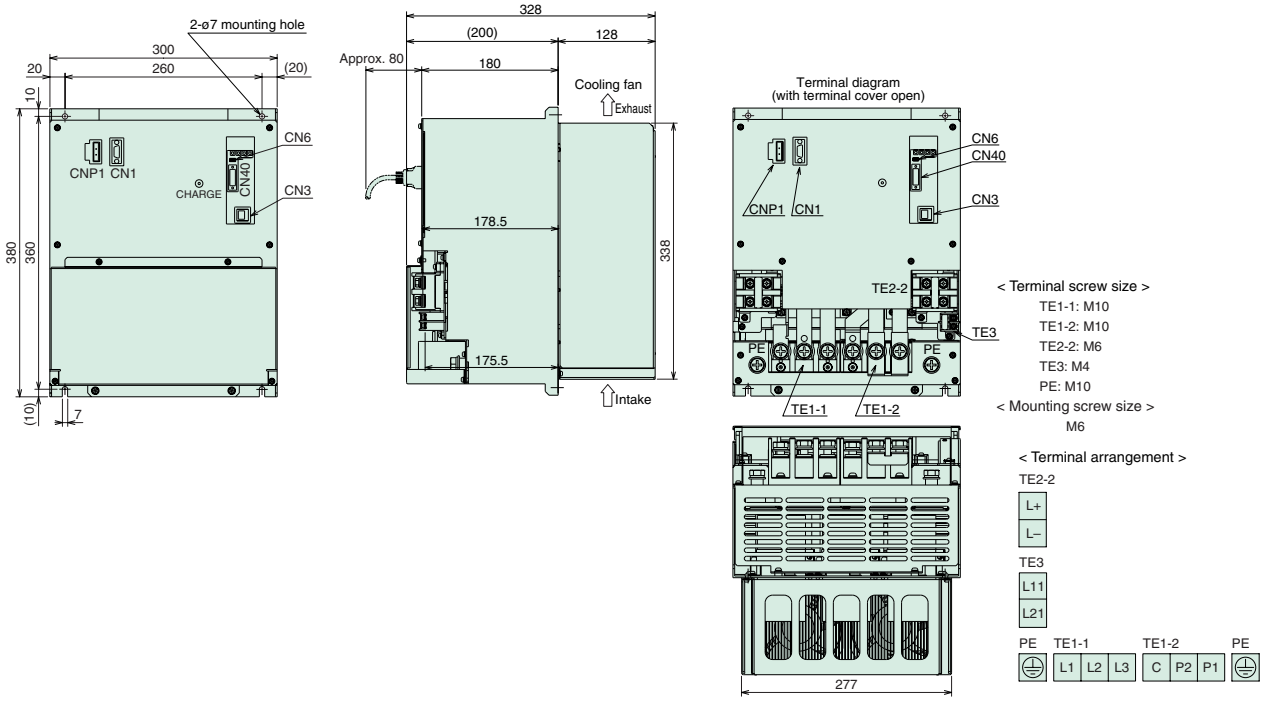


Notes: 1. The dimension is applicable when MR-J3BAT is mounted.

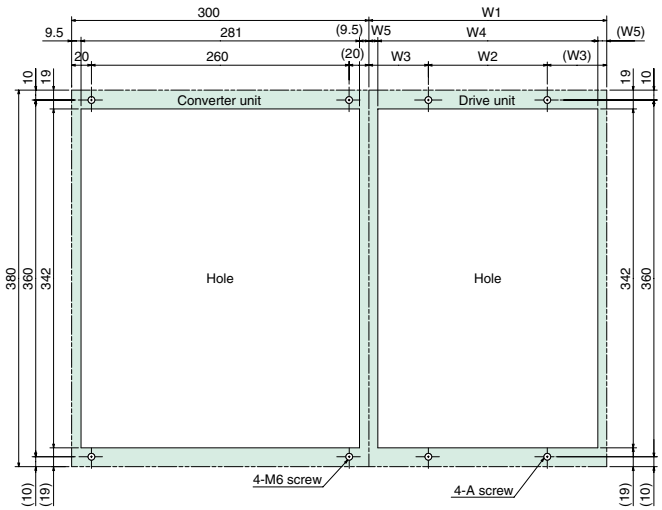
MR-J3-CR55K(4) Converter Unit Dimensions

(Unit: mm)

● MR-J3-CR55K, CR55K4 (Note 1)



● Panel-cut dimensions for converter unit and drive unit (Note 1)



Drive unit model	Variable dimensions					
	W1	W2	W3	W4	W5	A
MR-J3-DU30KA/B, 37KA/B, 45KA4/B4, 55KA4/B4	300	260	20	281	9.5	M6
MR-J3-DU30KA4/B4, 37KA4/B4	240	120	60	222	9	M5

Notes: 1. The converter unit dimensions and the panel-cut dimensions for converter unit and drive unit are same for MR-J3-DU□A(4) and MR-J3-DU□B(4).

MR-J3-B: Connections with Peripheral Equipment (Note 1)

Peripheral equipment is connected to MR-J3-B as described below.
Connectors, cables, options, and other necessary equipment are available so that users can set up MR-J3-B easily and start using it right away. Due to the SSCNET Ⅲ-compatible simple connections, the MR-J3-B reduces wiring and prevents wiring errors.

<SSCNET Ⅲ compatible controller>
Q173DCPU/Q173HCPU
Max. 32-axis control
(Max. 16 axes/system × 2)
Q172DCPU/Q172HCPU
Max. 8-axis control

Q170MCPU
Max. 16-axis control

QD75MH
Max. 4-axis control

QD74MH16
Max. 16-axis control
QD74MH8
Max. 8-axis control

FX3U-20SSC-H
2-axis control

CN5 for USB communication (option)

In addition to the traditional functions, MR Configurator (setup software) can be used by connecting to a motion controller (Q173DCPU, Q172DCPU, Q173HCPU, Q172HCPU or Q170MCPU).
Parameters for several axes can be set, and the several axes can be monitored.

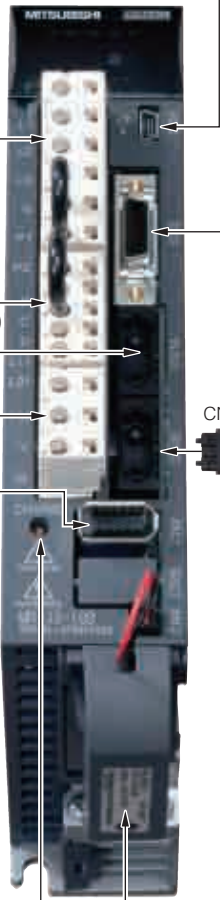
(Note 3)

mini-B connector

Connect the connector to the SSCNET Ⅲ compatible controller.

SSCNET Ⅲ

Servo amplifier
MR-J3-□B□ (Note 2)



CNP1 connector
(For main circuit power supply)

CNP2 connector
(For control circuit power supply)

CNP3 connector
(For motor power supply)

CN1A

CN1B

CN2

CN3 for input/output signal (option)

This option is required for using the forced stop input, in-position, magnetic brake interlock or malfunction signal.

Display panel

Displays servo amplifier status and alarm number.

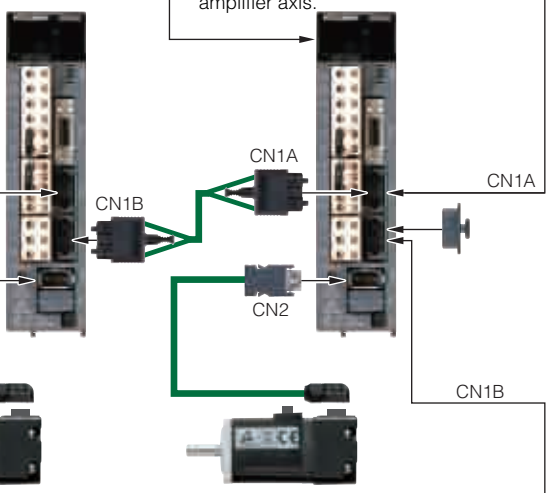
<With front cover open>

Axis setting section

Selects an axis using the axis selection rotary switch (SW1).

CN1A for connecting SSCNET Ⅲ (previous)

Connects SSCNET Ⅲ compatible controller or the previous servo amplifier axis.



CN1A
CN1B
CN2

Servo motor
(The picture is of HF-KP13.)

Charge lamp

Illuminates when the main circuit power supply is charged.

Battery (option)

The battery (MR-J3BAT) is required for absolute position detection system.

CN1B for connecting SSCNET Ⅲ (next)

Connects the next servo amplifier axis.

Notes: 1. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for the actual connections.
2. The connections with the peripheral equipment shown above is for MR-J3-350B or smaller servo amplifier.
3. Cable for connecting a controller and a personal computer must be prepared by the user. Refer to relevant User's Manual for details.

MR-J3-B Servo Amplifier Specifications: 100VAC/200VAC, 22kW or Smaller

Servo amplifier model MR-J3-		10B	20B	40B	60B	70B	100B	200B	350B	500B	700B	11KB	15KB	22KB	10B1	20B1	40B1
Output	Rated voltage	3-phase 170VAC															
	Rated current (A)	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0	1.1	1.5	2.8
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz (Note 10)					3-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)	0.9	1.5	2.6	3.2	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0	3.0	5.0	9.0
	Permissible voltage fluctuation	For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC (Note 10)					3-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation	±5% maximum															
Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz (Note 10)					1-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)	0.2								0.3					0.4		
	Permissible voltage fluctuation	1-phase 170 to 253VAC (Note 10)					1-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation	±5% maximum															
	Power consumption (W)	30								45					30		
Interface power supply		24VDC ±10% (required current capacity: 0.15A (Note 7))															
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	—	10	10	10	20	20	100	100	130	170	—	—	—	—	10	10
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)	—	—	—
Control system		Sine-wave PWM control/current control system															
Dynamic brake		Built-in (Note 8, 11)										External option (Note 12)			Built-in (Note 8, 11)		
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		Natural-cooling open (IP00)				Fan cooling open (IP00)									Natural-cooling open (IP00)		
Environment	Ambient temperature (Note 9)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)															
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust															
	Elevation	1000m or less above sea level															
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)															
Mass (kg [lb])		0.8 (1.8)	0.8 (1.8)	1.0 (2.2)	1.0 (2.2)	1.4 (3.1)	1.4 (3.1)	2.1 (4.6)	2.3 (5.1)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)	0.8 (1.8)	0.8 (1.8)	1.0 (2.2)

Notes:
1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section "Options ●Optional regeneration unit" in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "Servo Amplifier Model Configurations" for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□B(1)-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. MR-J3-350B or smaller servo amplifiers can be mounted closely. In this case, operate them at the ambient temperature of 0 to 45°C (32 to 113°F) or at 75% or less of the effective load ratio.
10. Special specification servo amplifiers for 1-phase 200 to 240VAC are also available: MR-J3-□B-U004. The permissible voltage fluctuation for MR-J3-□B-U004 is 1-phase 170 to 264VAC.
11. When using the built-in dynamic brake, refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for the permissible load inertia moment ratio.
12. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-B Servo Amplifier Specifications: 200VAC, 30kW or Larger

Drive unit	Drive unit model		MR-J3-DU30KB	MR-J3-DU37KB
	Output	Rated voltage	3-phase 170VAC	
		Rated current (A)	174	204
	Main circuit power supply		The drive unit's main circuit power is supplied from the converter unit.	
	Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz	
		Rated current (A)	0.3	
		Permissible voltage fluctuation	1-phase 170 to 253VAC	
		Permissible frequency fluctuation	±5% maximum	
		Power consumption (W)	45	
	Interface power supply		24VDC ±10% (required current capacity: 0.15A (Note 3))	
	Control system		Sine-wave PWM control/current control system	
	Dynamic brake		External option (Note 4)	
	Safety features		Overcurrent shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection	
	Structure		Fan cooling open (IP00)	
	Mass (kg [lb])		26 (57)	
Converter unit	Converter unit model		MR-J3-CR55K	
	Output	Rated voltage	283 to 326VDC	
		Rated current (A)	215.9	
	Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 200 to 230VAC 50/60Hz	
		Rated current (A)	251.1	
		Permissible voltage fluctuation	3-phase 170 to 253VAC	
		Permissible frequency fluctuation	±5% maximum	
	Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz	
		Rated current (A)	0.3	
		Permissible voltage fluctuation	1-phase 170 to 253VAC	
		Permissible frequency fluctuation	±5% maximum	
		Power consumption (W)	45	
	Interface power supply		24VDC ±10% (required current capacity: 0.13A (Note 3))	
	Safety features		Regeneration overvoltage shutdown, regeneration fault protection, overload shutdown (electronic thermal), undervoltage/sudden power outage protection	
	Structure		Fan cooling open (IP00)	
	Mass (kg [lb])		25 (55)	
Drive unit/ Converter unit	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 maximum (non condensing), storage: 90% RH maximum (non condensing)	
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust	
		Elevation	1000m or less above sea level	
		Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)	

Notes: 1. Rated output and speed of a servo motor are applicable when the drive unit and the converter unit, combined with the servo motor, are operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. The interface power supply can be shared with the drive unit and the converter unit. When all of the input/output points are used, 0.15A is required for the drive unit, and 0.13A is required for the converter unit. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-B Servo Amplifier Specifications: 400VAC, 22kW or Smaller

Servo amplifier model MR-J3-		60B4	100B4	200B4	350B4	500B4	700B4	11KB4	15KB4	22KB4
Output	Rated voltage	3-phase 323VAC								
	Rated current (A)	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation	3-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	0.1			0.2					
	Permissible voltage fluctuation	1-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
	Power consumption (W)	30			45					
Interface power supply		24VDC ±10% (required current capacity: 0.15A (Note 7))								
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	15	15	100	100	130 (Note 9)	170 (Note 9)	—	—	—
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)
Control system		Sine-wave PWM control/current control system								
Dynamic brake		Built-in (Note 8, 10)						External option (Note 11)		
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		Natural-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 maximum (non condensing), storage: 90% RH maximum (non condensing)								
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Elevation	1000m or less above sea level								
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)								
Mass (kg [lb])		1.7 (3.7)	1.7 (3.7)	2.1 (4.6)	4.6 (10)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)

Notes:1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section “Servo motor torque characteristics” in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section “Options ●Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “Servo Amplifier Model Configurations” for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to “MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□B4-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. The amplifier built-in resistor is compatible with the maximum torque deceleration when the motor is used within the rated speed and the recommended load to motor inertia moment ratio. Contact your local sales office if the operating motor speed and the load to motor inertia moment ratio exceed the rated speed and the recommended ratio.
10. When using the built-in dynamic brake, refer to “MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL” for the permissible load inertia moment ratio.
11. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

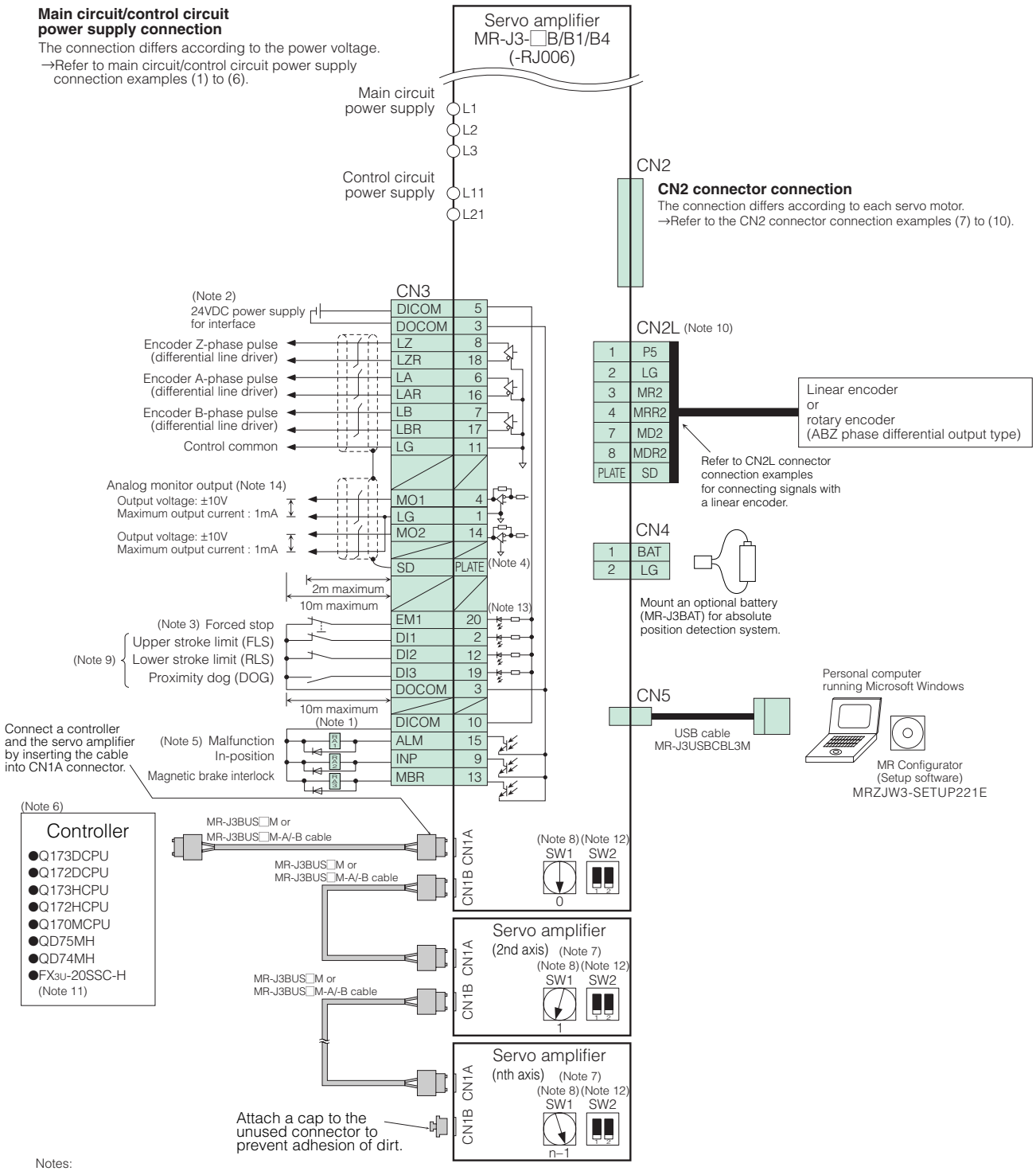
MR-J3-B Servo Amplifier Specifications: 400VAC, 30kW or Larger

Drive unit	Drive unit model		MR-J3-DU30KB4	MR-J3-DU37KB4	MR-J3-DU45KB4	MR-J3-DU55KB4
	Output	Rated voltage	3-phase 323VAC			
		Rated current (A)	87	102	131	143
	Main circuit power supply		The drive unit's main circuit power is supplied from the converter unit.			
	Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	0.2			
		Permissible voltage fluctuation	1-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
		Power consumption (W)	45			
	Interface power supply		24VDC ±10% (required current capacity: 0.15A (Note 3))			
	Control system		Sine-wave PWM control/current control system			
	Dynamic brake		External option (Note 4)			
	Safety features		Overcurrent shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection			
	Structure		Fan cooling open (IP00)			
	Mass (kg [lb])		18 (40)		26 (57)	
Converter unit	Converter unit model		MR-J3-CR55K4			
	Output	Rated voltage	538 to 678VDC			
		Rated current (A)	113.8			
	Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	132.2			
		Permissible voltage fluctuation	3-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
	Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz			
		Rated current (A)	0.2			
		Permissible voltage fluctuation	1-phase 323 to 528VAC			
		Permissible frequency fluctuation	±5% maximum			
		Power consumption (W)	45			
	Interface power supply		24VDC ±10% (required current capacity: 0.13A (Note 3))			
	Safety features		Regeneration overvoltage shutdown, regeneration fault protection, overload shutdown (electronic thermal), undervoltage/sudden power outage protection			
	Structure		Fan cooling open (IP00)			
	Mass (kg [lb])		25 (55)			
Drive unit/ Converter unit	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 maximum (non condensing), storage: 90% RH maximum (non condensing)			
		Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust			
		Elevation	1000m or less above sea level			
		Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)			

Notes: 1. Rated output and speed of a servo motor are applicable when the drive unit and the converter unit, combined with the servo motor, are operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. The interface power supply can be shared with the drive unit and the converter unit. When all of the input/output points are used, 0.15A is required for the drive unit, and 0.13A is required for the converter unit. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-□B□ Standard Wiring Diagram

● Connection example



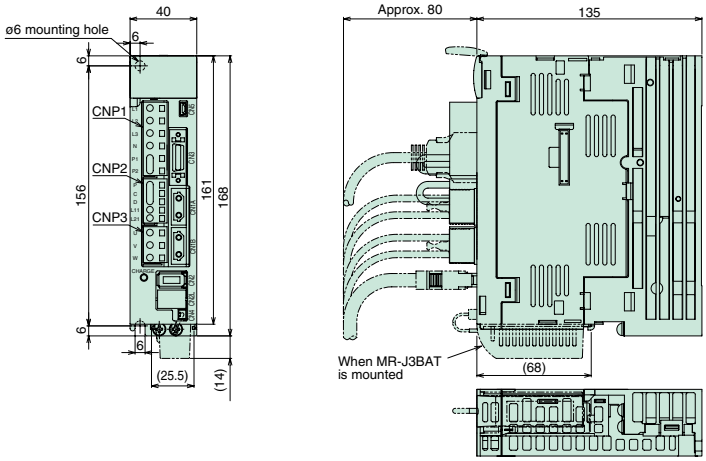
Notes:

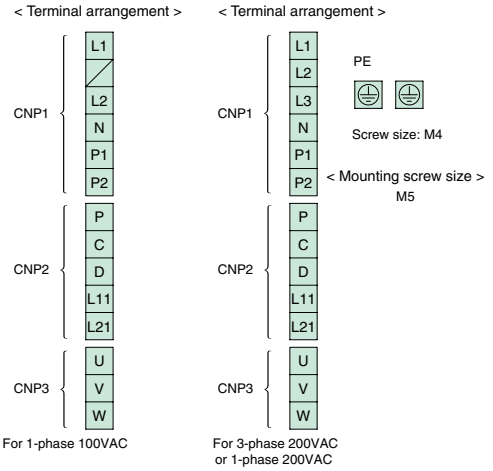
1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the forced stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.15A). 0.15A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. The forced stop signal is issued for each axis' servo amplifier individually. Use this signal as necessary when Q173DCPU, Q172DCPU, Q173HCPU, Q172HCPU, Q170MCPU, QD75MH or QD74MH is connected. When not using, invalidate the forced stop input with parameter No. PA04, or short-circuit EM1 and DOCOM in the connector. For overall system, apply the emergency stop on the controller side.
4. Connect the shield wire securely to the plate inside the connector (ground plate).
5. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
6. For details on the controllers, refer to relevant programming manual or user's manual.
7. Connections for the second and following axes are omitted.
8. Up to 16 axes (n = 1 to 16) can be set using the axis selection rotary switch (SW1).
9. Devices can be assigned for DI1, DI2 and DI3 with controller setting. Refer to the controller's instruction manuals for details on setting. These devices can be assigned with the controller, Q173DCPU, Q172DCPU, Q173HCPU, Q172HCPU, Q170MCPU, QD75MH or QD74MH.
10. CN2L connector is available only for the fully closed loop control compatible servo amplifier, MR-J3-□B□-RJ006.
11. FX3U-20SSC-H is not compatible with the fully closed loop control compatible servo amplifier, MR-J3-□B□-RJ006.
12. Test operation select switch (SW2-1) is used to perform test operation mode with MR Configurator. SW2-2 is for manufacturer setting.
13. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
14. Output voltage range varies depending on the monitored signal.

MR-J3-□B□ Servo Amplifier Dimensions

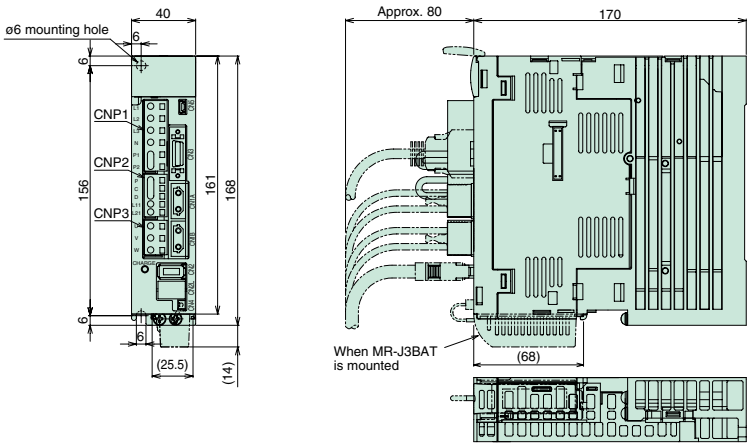
(Unit: mm)

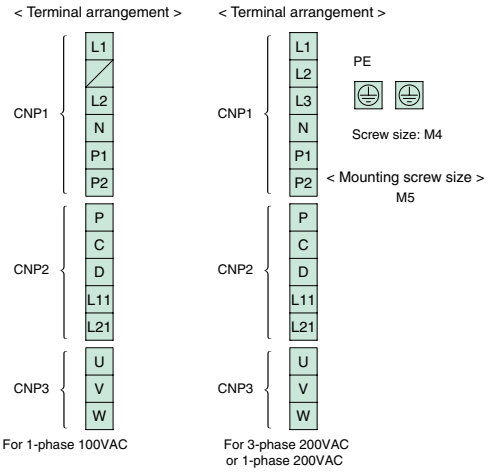
● MR-J3-10B, 20B,10B1, 20B1 (Note 1)



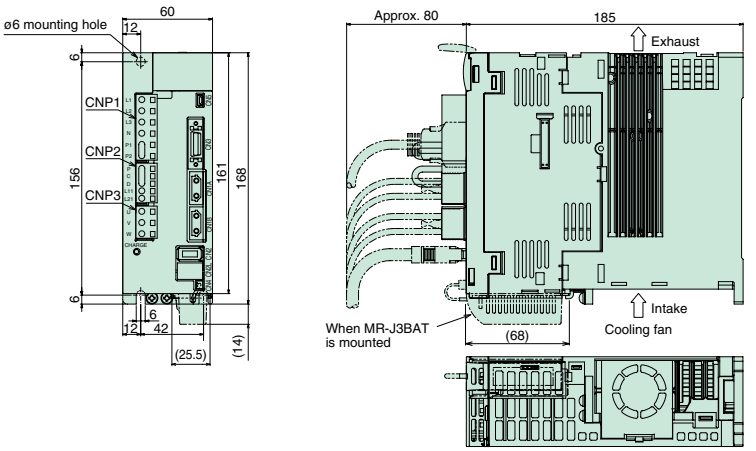


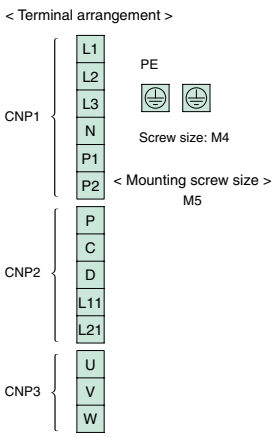
● MR-J3-40B, 60B, 40B1 (Note 1)





● MR-J3-70B, 100B (Note 1)

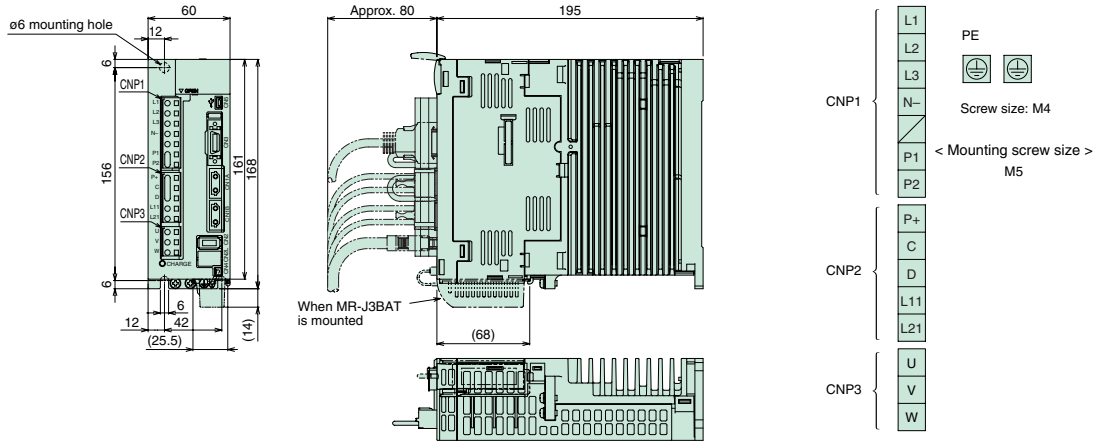




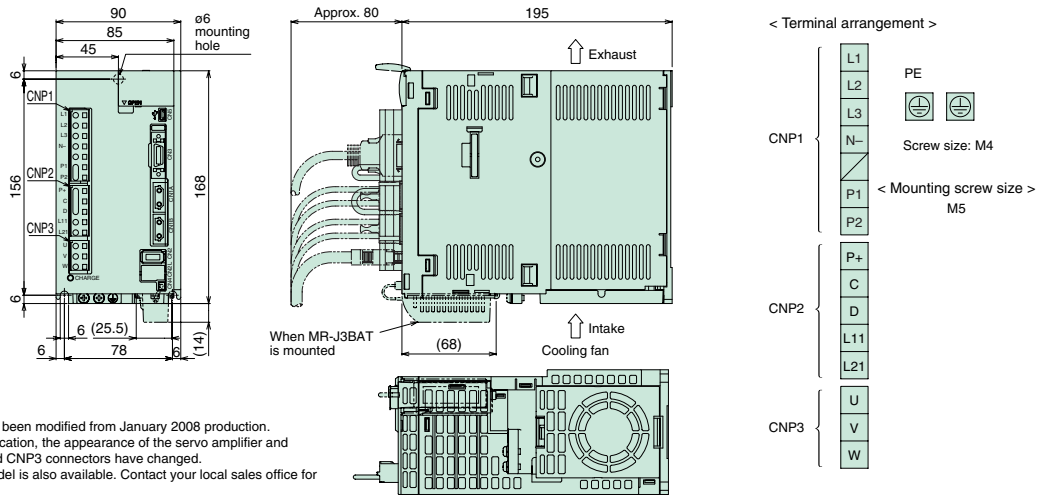
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.

(Unit: mm)

● MR-J3-60B4, 100B4 (Note 1)

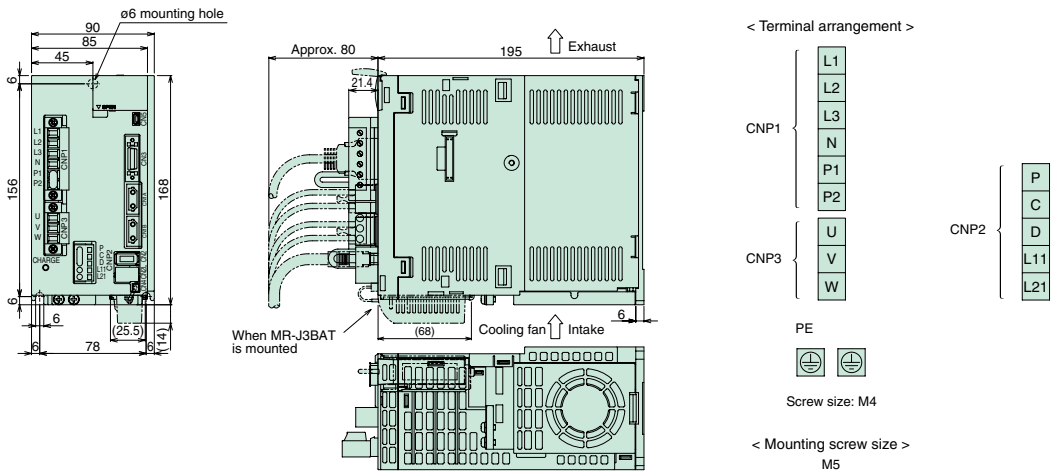


● MR-J3-200B*, 200B4 (Note 1)



* MR-J3-200B has been modified from January 2008 production.
Due to the modification, the appearance of the servo amplifier and CNP1, CNP2 and CNP3 connectors have changed.
The previous model is also available. Contact your local sales office for more details.

● MR-J3-350B (Note 1)

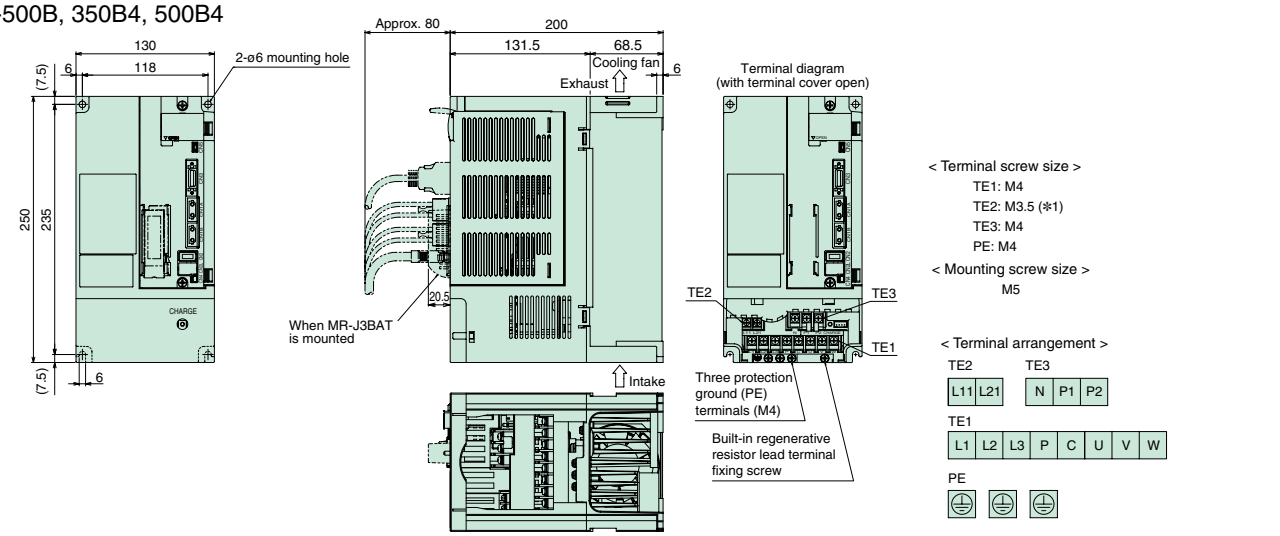


Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.

MR-J3-□B□ Servo Amplifier Dimensions

(Unit: mm)

● MR-J3-500B, 350B4, 500B4



< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

TE2	
L11	L21

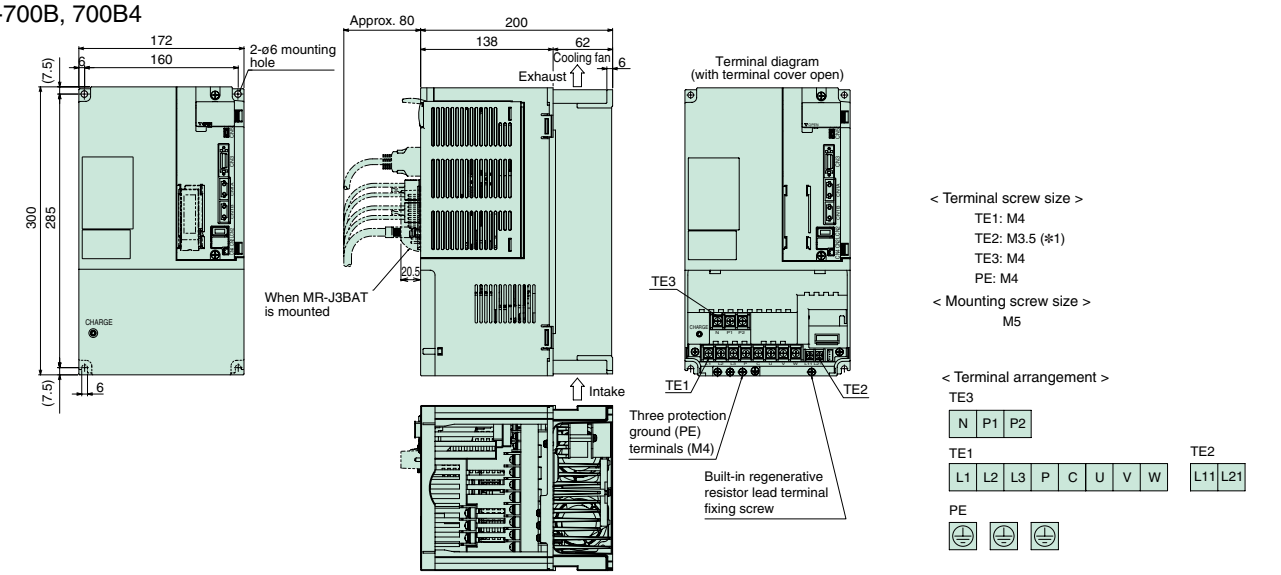
TE3		
N	P1	P2

TE1								
L1	L2	L3	P	C	U	V	W

PE

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-700B, 700B4



< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

TE3		
N	P1	P2

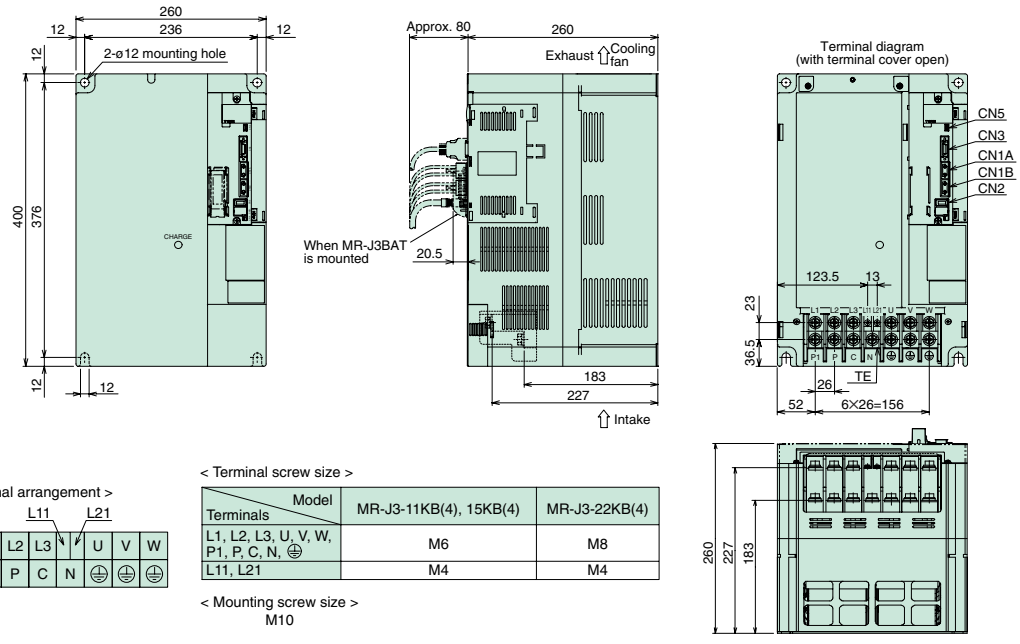
TE1								
L1	L2	L3	P	C	U	V	W

TE2	
L11	L21

PE

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-11KB to 22KB, 11KB4 to 22KB4



< Terminal arrangement >

	L11			L21			
TE	L1	L2	L3		U	V	W
	P1	P	C	N	⏚	⏚	⏚

< Terminal screw size >

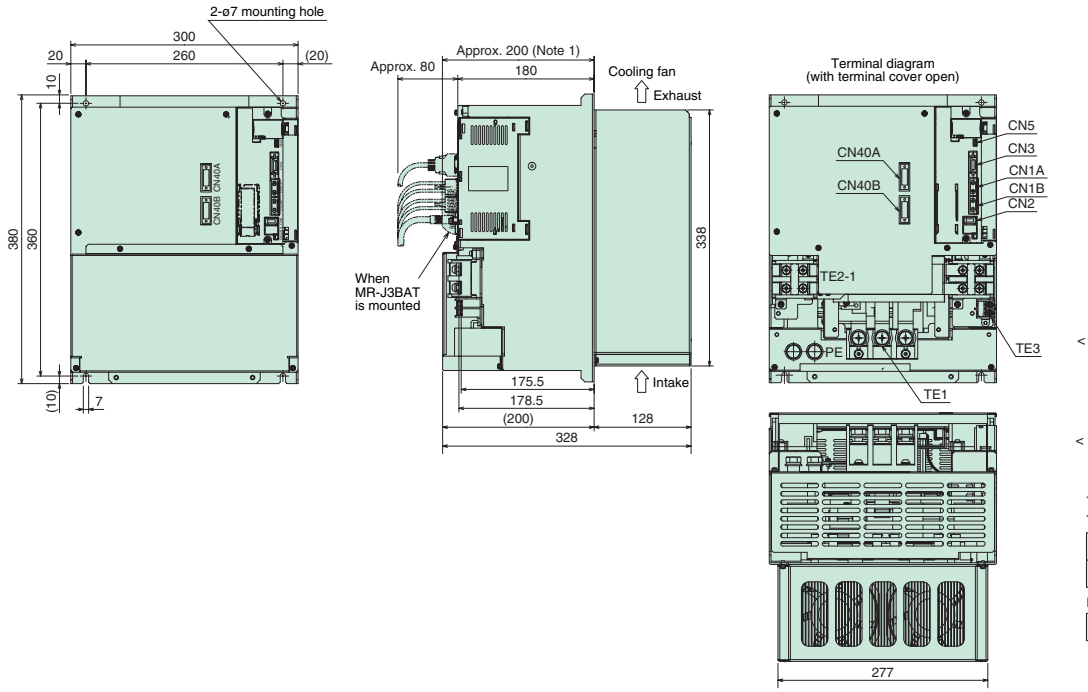
Terminals \ Model	MR-J3-11KB(4), 15KB(4)	MR-J3-22KB(4)
L1, L2, L3, U, V, W, P1, P, C, N, ⏚	M6	M8
L11, L21	M4	M4

< Mounting screw size >
M10

MR-J3-DU□B(4) Drive Unit Dimensions

(Unit: mm)

● MR-J3-DU30KB, DU37KB, DU45KB4, DU55KB4 (Note 2)



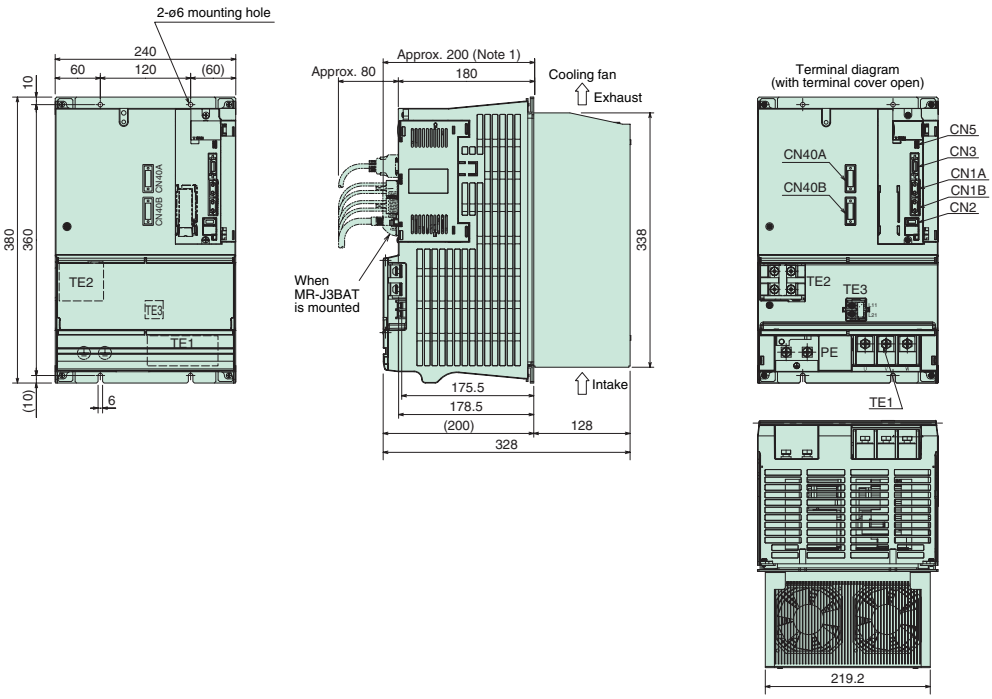
< Terminal screw size >
TE1: M10
TE2-1: M6
TE3: M4
PE: M10
< Mounting screw size >
M6

< Terminal arrangement >

TE2-1					
L+					
L–					

PE		TE1			TE3	
⏚	⏚	U	V	W	L11	L21

● MR-J3-DU30KB4, DU37KB4 (Note 2)



< Terminal screw size >
TE1: M8
TE2: M6
TE3: M4
PE: M8
< Mounting screw size >
M5

< Terminal arrangement >

TE2		TE3	
L+		L11	
L–		L21	

PE		TE1		
⏚	⏚	U	V	W

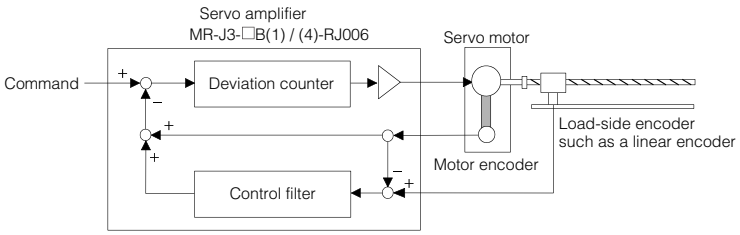
Notes: 1. The dimension is applicable when MR-J3BAT is mounted.
2. For the converter unit dimensions and the panel-cut dimensions for converter unit and drive unit, refer to the section “Converter unit dimensions”.

Retaining the high performance, functionality and usability of the MELSERVO-J3 Series, MR-J3-B-RJ006 is able to read position feedback signals from a load-side encoder such as a linear encoder. MR-J3-B-RJ006 has realized less installation space and reduced wiring as compared to the MR-J2S Series.

Features: MR-J3-B-RJ006 (Fully Closed Loop Control Compatible)

- High accuracy position control is possible with the fully closed loop control system.
- Dual feedback control provides the highest possible positioning response by using the position feedback signals from the motor encoder during high-speed rotation, and from the load-side encoder, such as a linear encoder, when positioning (stopping).
- Fast, accurate and reliable system can be configured with a serial interface linear encoder for MELSERVO-J3 Series.
- Absolute position detection system is easily configured without a battery by using an absolute type linear encoder with compatible serial interface.

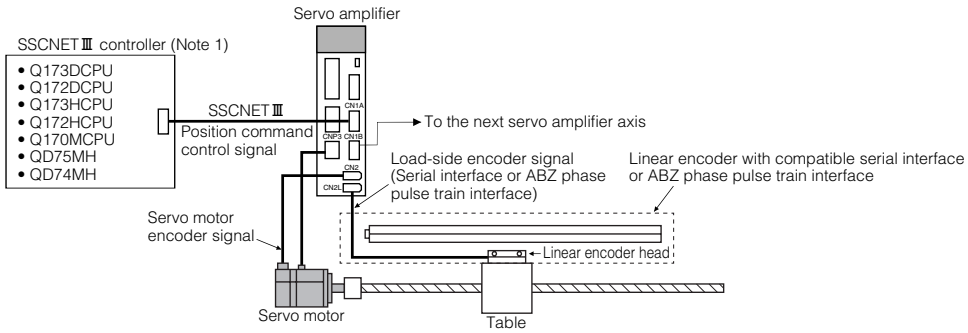
<Simple overview of Dual feedback control block>



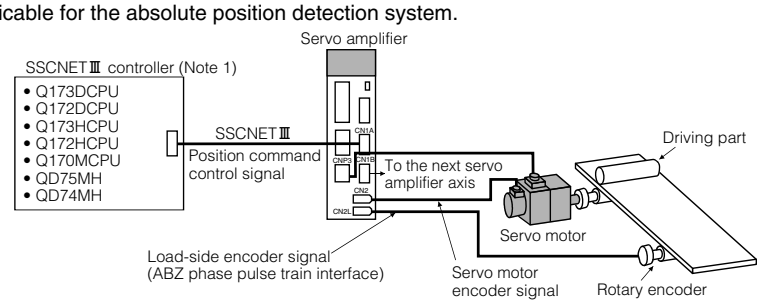
System Configurations

Fully closed loop control system can be easily configured by connecting a load-side encoder to CN2L connector (load-side encoder interface). Select a load-side encoder in accordance with the following:
4096(2^{12}) ≤ the number of the load-side encoder pulses per servo motor rotation ≤ 67108864(2^{26})

(1) When using a linear encoder with compatible serial interface or ABZ phase pulse train interface:
Applicable for the absolute position detection system when an absolute type encoder is used. A battery (MR-J3BAT) is not required.
For linear encoders, refer to the section "MR-J3-□B□-RJ006 compatible linear encoders" in this catalog.



(2) When using a rotary encoder with compatible ABZ phase pulse train interface:
Not applicable for the absolute position detection system.

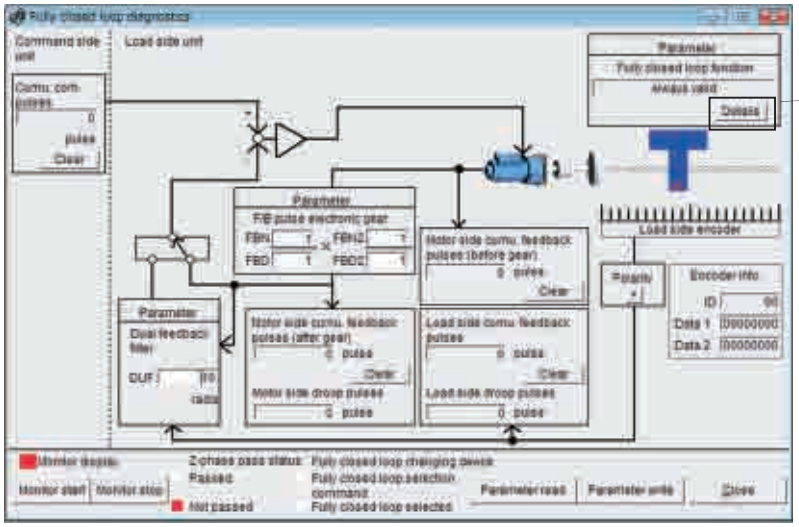


Notes: 1. For details on the controllers, refer to relevant programming manual or user's manual.

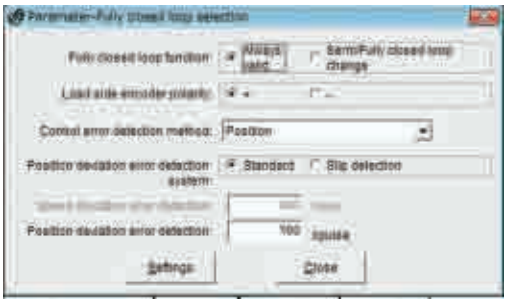
Fully Closed Loop Diagnostic Functions of MR Configurator (Setup Software)

With the fully closed loop diagnostic functions, monitoring and reading/writing of parameters related to the fully closed loop function are possible.

[Fully closed diagnostics] window



[Parameter-Fully closed selection] window



Note: The screens shown on this page are for reference and may differ from the actual screens.

● Items displayed in the [Fully closed diagnostics] window

Item	Description
Cumu. com. pulses	Counts and displays the position command input pulses. Resets to 0 by pressing the “Clear” button.
Motor side cumu. feedback pulses (before gear)	Counts and displays the feedback pulses from the servo motor encoder. (Motor encoder unit) Resets to 0 by pressing the “Clear” button.
Motor side cumu. feedback pulses (after gear)	Counts and displays the feedback pulses from the servo motor encoder. (Load-side encoder unit) Resets to 0 by pressing the “Clear” button.
Load side cumu. feedback pulses	Counts and displays the feedback pulses from the load-side encoder. Resets to 0 by pressing the “Clear” button.
Motor side droop pulses	Displays the difference between the motor-side position and the commanded position.
Load side droop pulses	Displays the difference between the load-side position and the commanded position.
Polarity	Displays “+” or “-” according to the load-side encoder polarity.
Encoder info.	Displays information about the load-side encoder. The displayed items vary depending on the type of the load-side encoder.
Z-phase pass status	Displays Z-phase pass status of the motor encoder when the fully closed loop system is “Invalid”. Displays Z-phase pass status of the load-side encoder when the fully closed loop system is “Valid” or in “Semi closed loop control/Fully closed loop switching”.
Fully closed loop changing device	Displays only when “Semi closed loop control/Fully closed loop control switching” is selected for the fully closed loop system. Displays state of the Semi closed loop control/Fully closed loop control switching bit and internal state selected.
Monitor display	Starts monitoring by pressing the “Monitor start” button. Stops monitoring by pressing the “Monitor stop” button.
Parameter read	Reads all parameters displayed on the window from the servo amplifier and displays them.
Parameter write	Writes all parameters displayed on the window into the servo amplifier.

● Items displayed in the [Parameter-Fully closed selection] window

Displays the [Parameter-Fully closed selection] window by pressing the “Details” button in the [Fully closed diagnostics] window.

Item	Description
Fully closed loop function	Selects the fully closed loop function from “Always valid” or “Semi/Fully closed loop change”. When using this function, validate the fully closed loop system with parameter No. PA01.
Load side encoder polarity	Selects the load-side encoder polarity with “+” or “-”.
Control error detection method	Selects the fully closed loop control error detection method.
Position deviation error detection system	Selects the detection system regarding to the position deviation error of the fully closed loop control error detection function.
Speed deviation error detection	Specifies the speed deviation error detection level used in the fully closed loop control error detection function.
Position deviation error detection	Specifies the position deviation error detection level used in the fully closed loop control error detection function.

MR-J3-B-RJ006 Servo Amplifier Specifications: 100VAC/200VAC

Servo amplifier model MR-J3-□-RJ006			10B	20B	40B	60B	70B	100B	200B	350B	500B	700B	11KB	15KB	22KB	10B1	20B1	40B1
Output	Rated voltage		3-phase 170VAC															
	Rated current (A)		1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0	1.1	1.5	2.8
Main circuit power supply	Voltage/frequency (Note 1, 2)		3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz (Note 10)					3-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)		0.9	1.5	2.6	3.2	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0	3.0	5.0	9.0
	Permissible voltage fluctuation		For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC (Note 10)					3-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation		±5% maximum															
Control circuit power supply	Voltage/frequency		1-phase 200 to 230VAC 50/60Hz (Note 10)					1-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)		0.2								0.3					0.4		
	Permissible voltage fluctuation		1-phase 170 to 253VAC (Note 10)					1-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation		±5% maximum															
	Power consumption (W)		30								45					30		
Interface power supply			24VDC ±10% (required current capacity: 0.15A (Note 7))															
Load-side encoder interface	Serial interface		Mitsubishi high-speed serial communication															
	Pulse train interface	Input signal	ABZ phase differential input signal															
		Minimum phase difference	200ns															
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor		—	10	10	10	20	20	100	100	130	170	—	—	—	—	10	10
	External regenerative resistor (Standard accessory) (Note 5, 6)		—	—	—	—	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)	—	—	—
Control system			Sine-wave PWM control/current control system															
Dynamic brake			Built-in (Note 8, 11)										External option (Note 12)			Built-in (Note 8, 11)		
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			Natural-cooling open (IP00)					Fan cooling open (IP00)								Natural-cooling open (IP00)		
Environment	Ambient temperature (Note 9)		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 maximum (non condensing), storage: 90% RH maximum (non condensing)															
	Atmosphere		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust															
	Elevation		1000m or less above sea level															
	Vibration		5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)															
Mass (kg [lb])			0.8 (1.8)	0.8 (1.8)	1.0 (2.2)	1.0 (2.2)	1.4 (3.1)	1.4 (3.1)	2.3 (5.1)	2.3 (5.1)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)	0.8 (1.8)	0.8 (1.8)	1.0 (2.2)

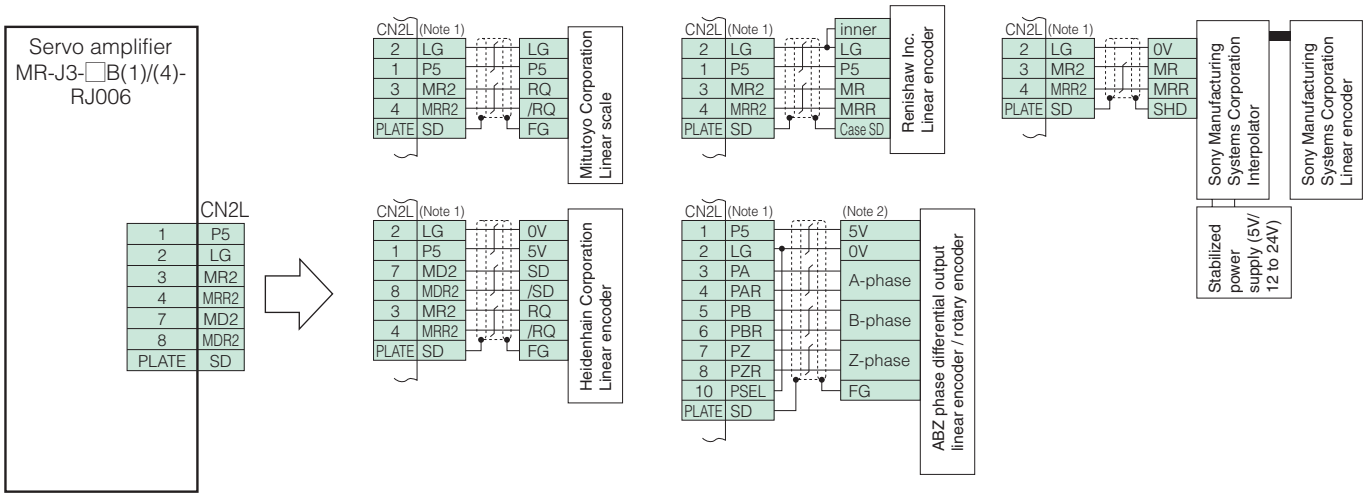
Notes: 1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section “Servo motor torque characteristics” in this catalog.
3. Optimal regenerative resistor varies for each system.
4. Refer to the section “Options ●Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “Servo Amplifier Model Configurations” for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to “MR-J3-□B-RJ006 SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□B(1)-RU006. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. MR-J3-350B-RJ006 or smaller servo amplifiers can be mounted closely. In this case, operate them at the ambient temperature of 0 to 45°C (32 to 113°F) or at 75% or less of the effective load ratio.
10. Special specification servo amplifiers for 1-phase 200 to 240VAC are also available: MR-J3-□B-RJ006U004. The permissible voltage fluctuation for MR-J3-□B-RJ006U004 is 1-phase 170 to 264VAC.
11. When using the built-in dynamic brake, refer to “MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL” for the permissible load inertia moment ratio.
12. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-B-RJ006 Servo Amplifier Specifications: 400VAC

Servo amplifier model MR-J3-□-RJ006			60B4	100B4	200B4	350B4	500B4	700B4	11KB4	15KB4	22KB4
Output	Rated voltage		3-phase 323VAC								
	Rated current (A)		1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply	Voltage/frequency (Note 1, 2)		3-phase 380 to 480VAC 50/60Hz								
	Rated current (A)		1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation		3-phase 323 to 528VAC								
	Permissible frequency fluctuation		±5% maximum								
Control circuit power supply	Voltage/frequency		1-phase 380 to 480VAC 50/60Hz								
	Rated current (A)		0.1			0.2					
	Permissible voltage fluctuation		1-phase 323 to 528VAC								
	Permissible frequency fluctuation		±5% maximum								
	Power consumption (W)		30			45					
Interface power supply			24VDC ±10% (required current capacity: 0.15A (Note 7))								
Load-side encoder interface	Serial interface		Mitsubishi high-speed serial communication								
	Pulse train interface	Input signal	ABZ phase differential input signal								
		Minimum phase difference	200ns								
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor		15	15	100	100	130 (Note 9)	170 (Note 9)	—	—	—
	External regenerative resistor (Standard accessory) (Note 5, 6)		—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)
Control system			Sine-wave PWM control/current control system								
Dynamic brake			Built-in (Note 8, 10)						External option (Note 11)		
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			Natural-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 maximum (non condensing), storage: 90% RH maximum (non condensing)								
	Atmosphere		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Elevation		1000m or less above sea level								
	Vibration		5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)								
Mass (kg [lb])			1.7 (3.7)	1.7 (3.7)	2.1 (4.6)	4.6 (10)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)

Notes: 1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section “Servo motor torque characteristics” in this catalog.
3. Optimal regenerative resistor varies for each system.
4. Refer to the section “Options ●Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “Servo Amplifier Model Configurations” for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to “MR-J3-□B-RJ006 SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□B4-RU006. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. The amplifier built-in resistor is compatible with the maximum torque deceleration when the motor is used within the rated speed and the recommended load to motor inertia moment ratio. Contact your local sales office if the operating motor speed and the load to motor inertia moment ratio exceed the rated speed and the recommended ratio.
10. When using the built-in dynamic brake, refer to “MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL” for the permissible load inertia moment ratio.
11. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

CN2L Connector Connection Examples

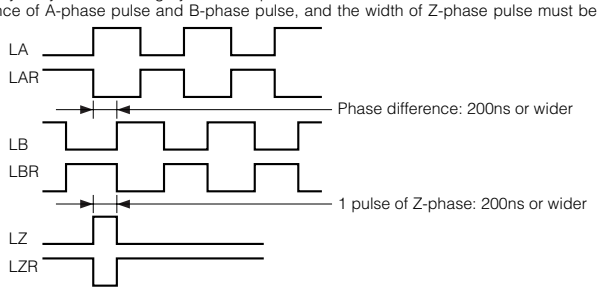


Notes: 1. When manufacturing the linear encoder connection cable, use an optional CN2L connector set (MR-J3CN2). Refer to "MR-J3-□B-RJ006 SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the wiring.
2. If the encoder's current consumption exceeds 350mA, supply power from an external source.

MR-J3-□B□-RJ006 Compatible Linear Encoders (Note 1)

Linear encoder type		Manufacturer	Model	Resolution	Rated speed (Note 2)	Effective measurement length (maximum)	Communication method	Position detection system
Mitsubishi serial interface compatible	Absolute type	Mitutoyo Corporation	AT343A	0.05μm	2.0m/s	3000mm	2-wire type	Absolute
			AT543A-SC		2.5m/s	2200mm		
			ST741A	0.5μm	4.0m/s	6000mm		
			ST743A (Note 5)	0.1μm				
		Heidenhain Corporation	LC 493M	0.05μm/ 0.01μm	2.0m/s	2040mm	4-wire type	
			LC 193M		3.0m/s	4240mm		
	Incremental type	Sony Manufacturing Systems Corporation (Note 6)	SL710+PL101-R/RH +MJ830 or MJ831	0.2μm (Note 3)	6.4m/s	3000mm	2-wire type	Incremental
		Renishaw Inc.	RGH26P	5μm	4.0m/s	70000mm		
			RGH26Q	1μm	3.2m/s			
			RGH26R	0.5μm	1.6m/s			
		Heidenhain Corporation	LIDA 485+EIB 392M	0.0013μm (20/16384μm)	4.0m/s	30040mm	4-wire type	
			LIDA 487+EIB 392M			6040mm		
ABZ phase differential output type (Note 4)	Incremental type	Not designated	–	Within tolerable resolution range	Depends on linear encoder	Depends on linear encoder	Differential 3-pair type	

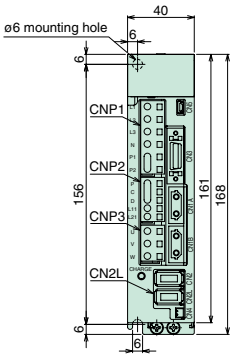
Notes: 1. Consult with the relevant linear encoder manufacturer for details on the linear encoder's working environment and specifications such as ambient temperature, vibration resistance and IP rating. Also, contact the manufacturer when using the linear encoder in high electrostatic noise environment.
2. The indicated values are the linear encoder's rated speed when used in combination with the Mitsubishi fully closed loop compatible servo amplifier. The values may differ from the manufacturers' specifications.
3. The resolution differs according to the setting value of the interpolator, MJ830/MJ831 manufactured by Sony Manufacturing Systems Corporation.
4. Output the A-phase, B-phase and Z-phase signals in the differential line driver. The phase difference of A-phase pulse and B-phase pulse, and the width of Z-phase pulse must be 200ns or wider. Home position return is not possible with a linear encoder without a Z-phase.
5. Servo amplifier with software version A1 or above is compatible with this linear scale.
6. Sony manufacturing systems corporation's SH13 is out of production. Contact the manufacturer for more details.

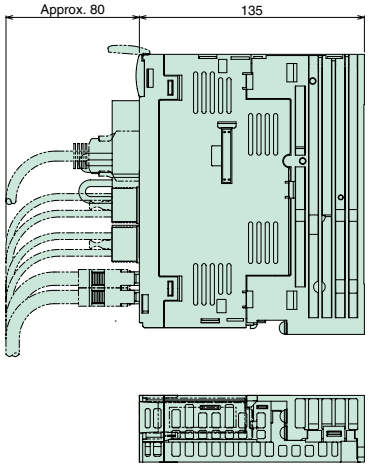


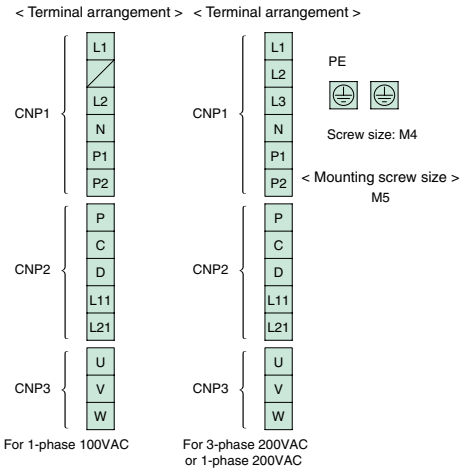
MR-J3-□B□-RJ006 Servo Amplifier Dimensions

(Unit: mm)

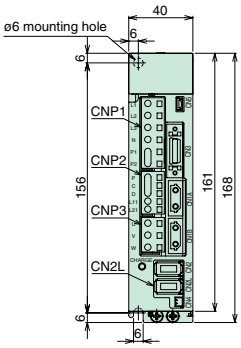
● MR-J3-10B-RJ006, 20B-RJ006, 10B1-RJ006, 20B1-RJ006 (Note 1)

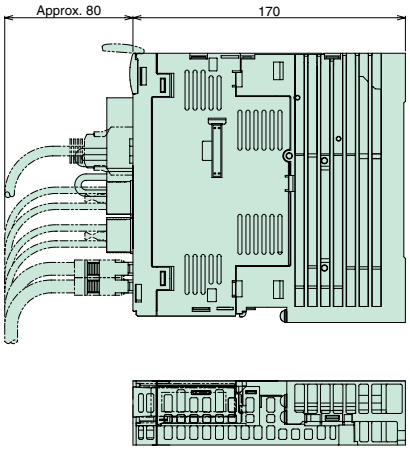


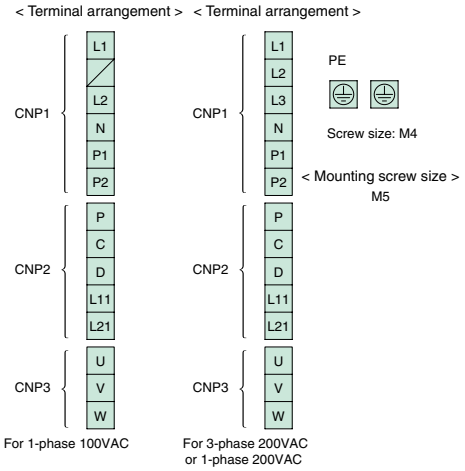




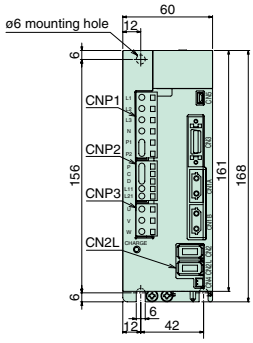
● MR-J3-40B-RJ006, 60B-RJ006, 40B1-RJ006 (Note 1)

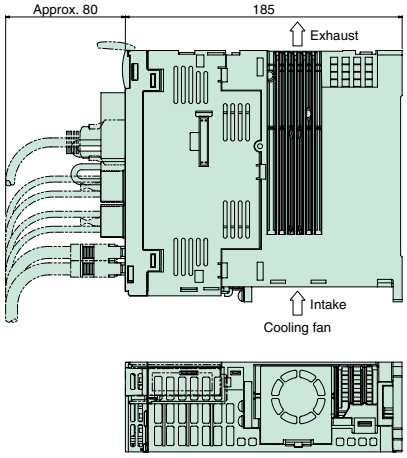


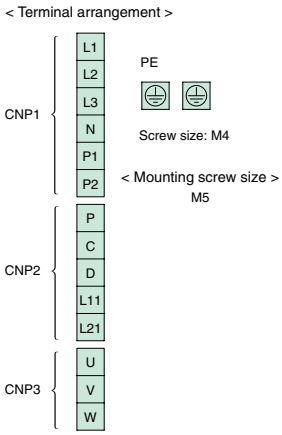




● MR-J3-70B-RJ006, 100B-RJ006 (Note 1)





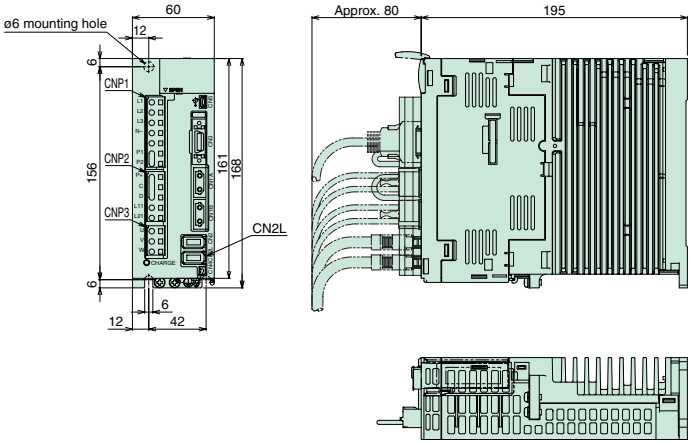


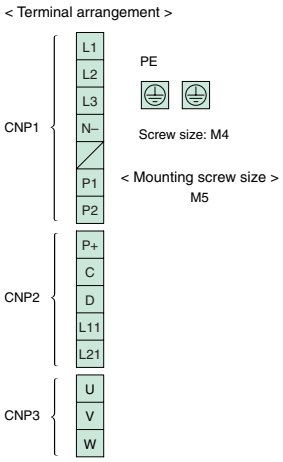
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.

MR-J3-□B□-RJ006 Servo Amplifier Dimensions

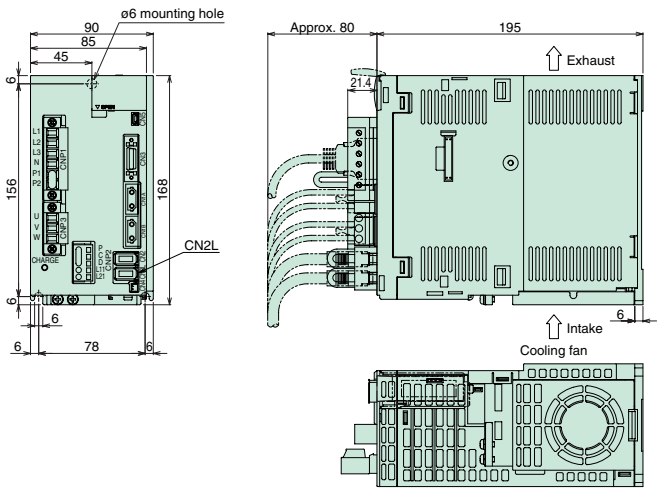
(Unit: mm)

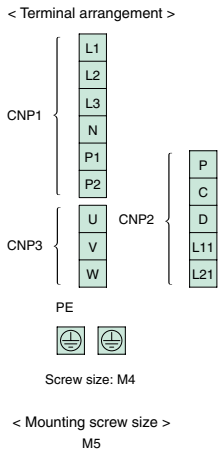
● MR-J3-60B4-RJ006, 100B4-RJ006 (Note 1)



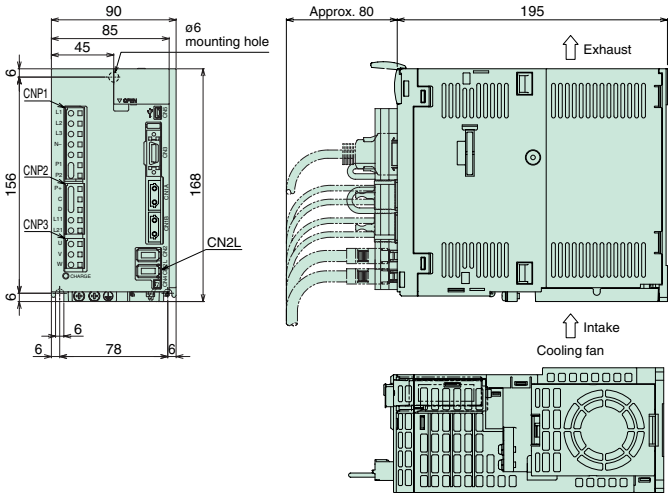


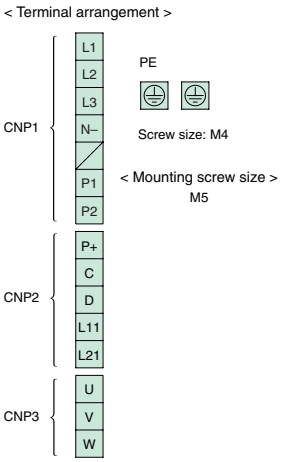
● MR-J3-200B-RJ006, 350B-RJ006 (Note 1)





● MR-J3-200B4-RJ006 (Note 1)

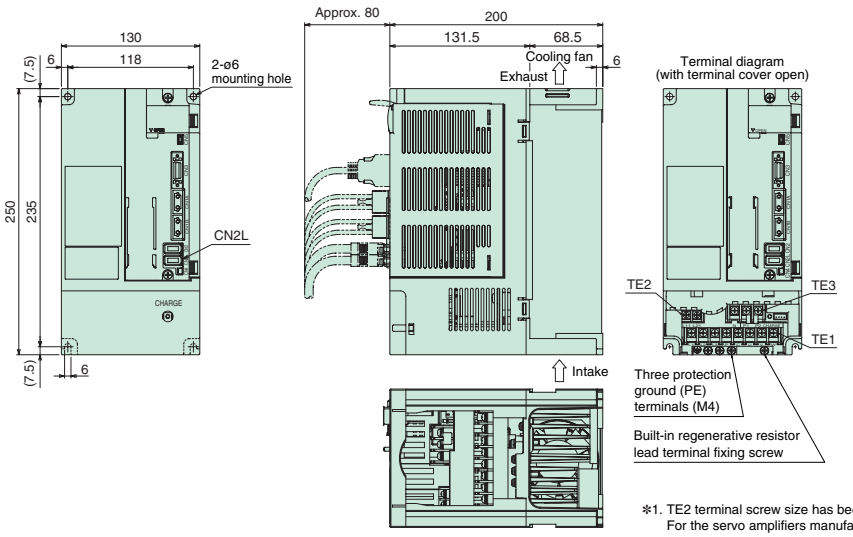




Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.

(Unit: mm)

● MR-J3-500B-RJ006, 350B4-RJ006, 500B4-RJ006



< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

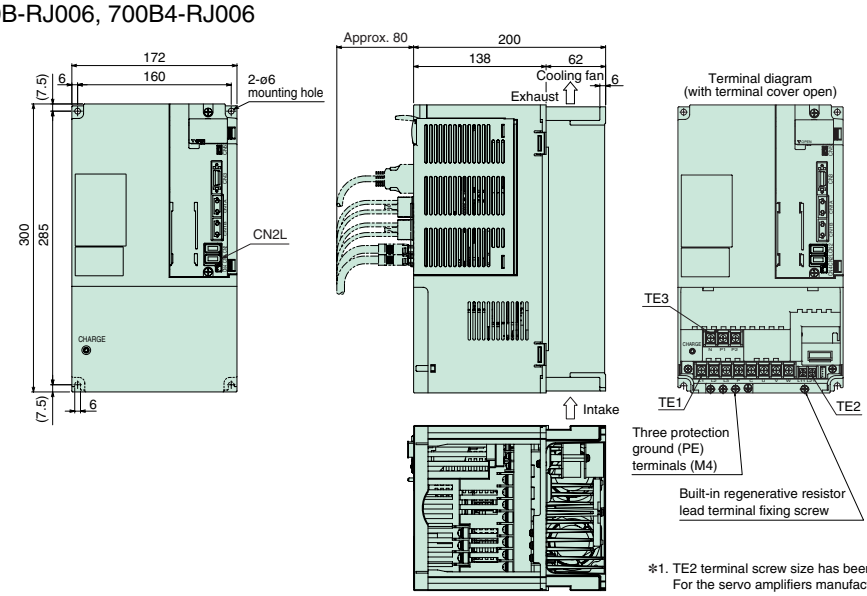
TE2		TE3		
L11	L21	N	P1	P2

TE1							
L1	L2	L3	P	C	U	V	W

PE

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-700B-RJ006, 700B4-RJ006



< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

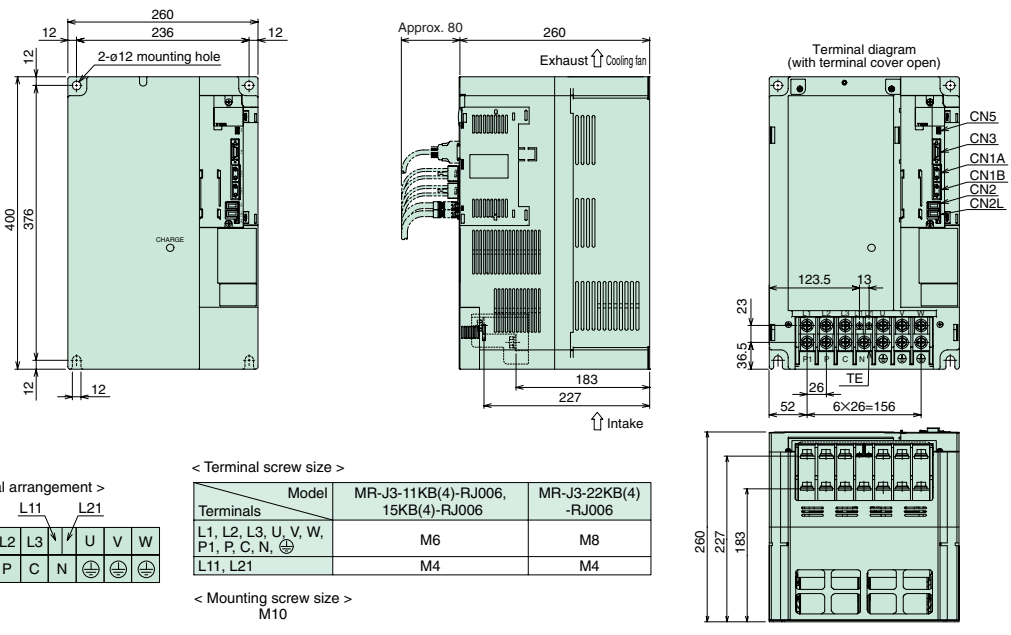
TE3		
N	P1	P2

TE1								TE2	
L1	L2	L3	P	C	U	V	W	L11	L21

PE

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-11KB-RJ006 to 22KB-RJ006, 11KB4-RJ006 to 22KB4-RJ006



< Terminal arrangement >

TE	L11		L21					
	L1	L2	L3		U	V	W	
	P1	P	C	N	⏚	⏚	⏚	

< Terminal screw size >

Terminals \ Model	MR-J3-11KB(4)-RJ006, 15KB(4)-RJ006	MR-J3-22KB(4) -RJ006
L1, L2, L3, U, V, W, P1, P, C, N, ⏚	M6	M8
L11, L21	M4	M4

< Mounting screw size >
M10

MR-J3-T: Connections with Peripheral Equipment (Note 1)

Peripheral equipment is connected to MR-J3-T as described below.
Connectors, options, and other necessary equipment are available so that users can set up MR-J3-T easily and start using it right away.

Display panel
Displays servo status and alarm number.

Setting section
Sets CC-Link communication baud rate, station number and the number of occupied station.

<With front cover open>

USB communication (CN5) (option)
Monitoring, batch parameter entry and saving, graph display and test operation can be performed with MR Configurator (setup software) when connecting to user's personal computer by an optional USB cable (MR-J3USBCBL3M).

RS-422 communication (CN3)
A personal computer can be connected, using a RS-422/RS-232C conversion cable. (Note 2)

Parameter unit (option)
The parameter unit can be connected by a commercial LAN cable.

MR-PRU03

CC-Link master controller

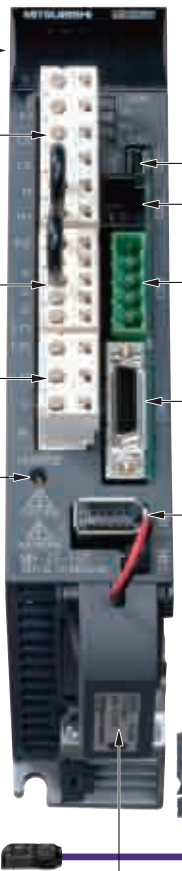
QJ61BT11N

FX2N-16CCL-M

Servo amplifier
MR-J3-□T□ (Note 3)

(Note 4)

(Note 4)

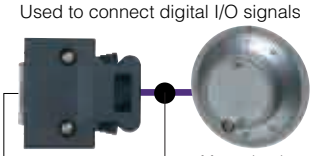


CNP1 connector
(For main circuit power supply)

CNP2 connector
(For control circuit power supply)

CNP3 connector
(For motor power supply)

CN6 for input/output signal (option)
Used to connect digital I/O signals



Manual pulse generator
(MR-HDP01) (Note 5)

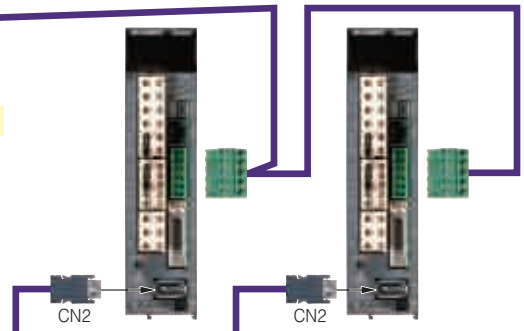
Charge lamp
Illuminates when the main circuit power supply is charged.

Junction terminal block (option)
All signals can be received with this junction terminal block without connecting the signals to the connector.

CN2

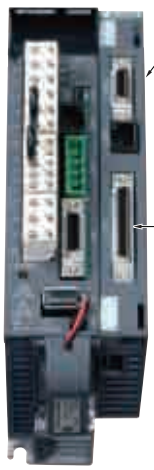
Servo motor
(The picture is of HF-KP13.)

Battery (option)
The battery (MR-J3BAT) is required for absolute position detection system.



CN2

CN2



Extension IO unit
MR-J3-D01 (Note 5)

Positioning with DI/O is possible when MR-J3-D01 (optional) is connected.

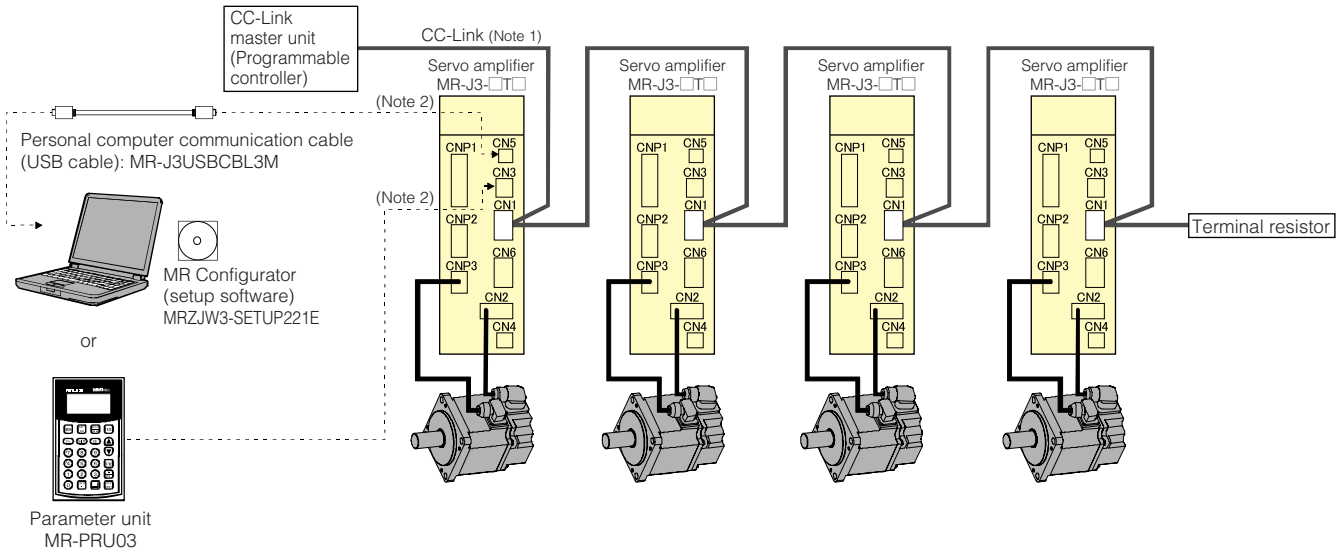
Junction terminal block (option)
All signals can be received with this terminal block without connecting the signals to the connector.

Notes: 1. Refer to "MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL" for the actual connections.
2. A personal computer can be connected using a RS-422/RS-232C conversion cable (refer to the section "Ordering Information for Customers" in this catalog). In this case, some functions of MR Configurator (setup software) may be limited.
3. The connections with peripheral equipment shown above is for MR-J3-350T or smaller servo amplifier.
4. USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time.
5. The manual pulse generator and the extension IO unit cannot be used with indexer function or speed control operation.

Positioning operation can be performed just by setting position data (target positions), servo motor speeds, and acceleration/deceleration time constant, etc. in the point tables as if setting them in parameters. The AC servo can be used as the field network's drive source. This servo amplifier is the most appropriate when simplifying a system or configuring a simple positioning system without programs. Also, by using MR Configurator (setup software) together with the servo amplifier, easier operation with advanced functions can be possible.

Features: MR-J3-T (CC-Link Compatible Built-in Positioning Function)

- By using this servo amplifier with built-in positioning function, position and speed data, etc. can be set via CC-Link communication. (Applicable CC-Link version: Ver.1.10)
- Start, stop and monitor displays can be performed via CC-Link communication.
- Serial communication reduces wiring.
- CC-Link communication makes it possible to design the system with the servo amplifiers dispersed throughout.
- MR-PRU03 parameter unit (optional) enables easy parameter setting and operation monitoring.
- This servo amplifier is compatible with speed control operation. When two stations are occupied, speed command can be set directly with remote register.



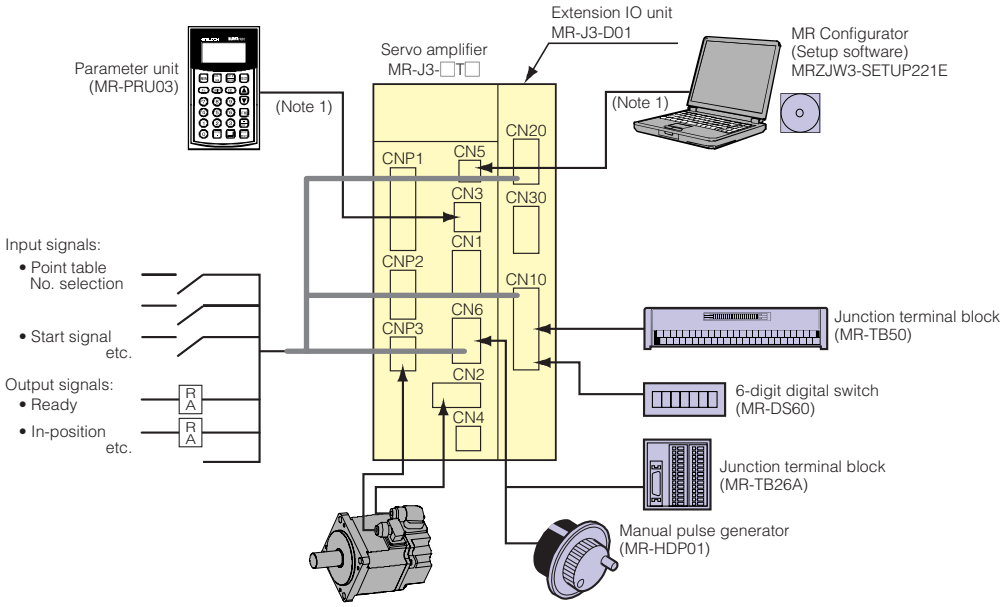
Notes: 1. When using only remote device stations, up to 42 servo amplifiers can be connected when 1 station is occupied by 1 servo amplifier, and up to 32 servo amplifiers when 2 stations are occupied by 1 servo amplifier.
2. USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time.

Features: MR-J3-T+MR-J3-D01 (DI/O Command)

- Positioning with DI/O command is possible by using MR-J3-D01 extension IO unit (optional). (Total digital input: 34 points. Total digital output: 19 points.)
- Up to 255 point tables can be used.

Simple positioning using DI/O (Note 2)

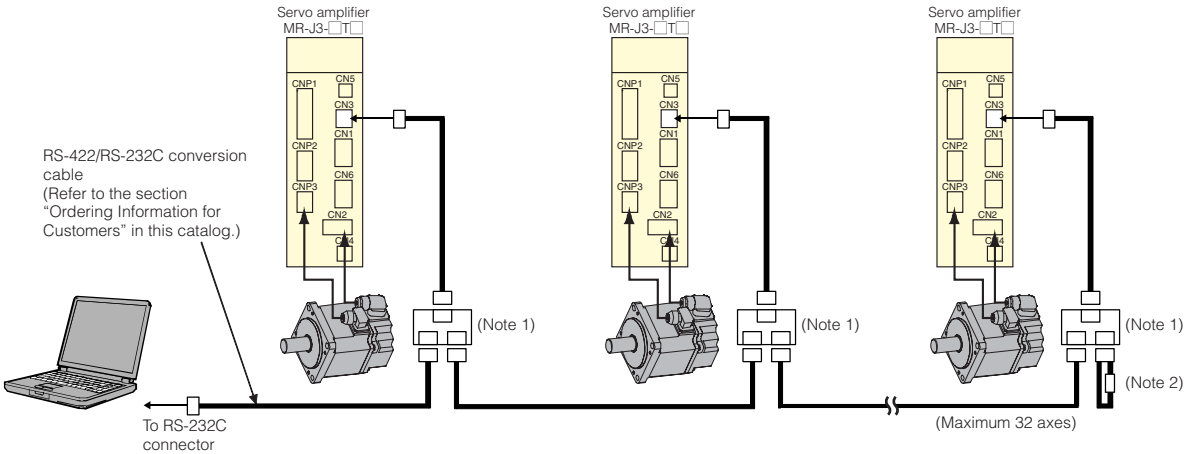
Positioning operation is performed with digital input/output signals.



Notes: 1. USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time.
2. MR-J3-D01 cannot be used with indexer function or speed control operation.

Serial Communication Operation

Positioning operation is performed by connecting servo amplifiers in the multi-drop configuration.
The RS-422 protocol communication specifications are disclosed, so the user can create a program.
The monitor and parameter settings can be made with the MR Configurator (setup software), MRZJW3-SETUP221E or above, using a personal computer.

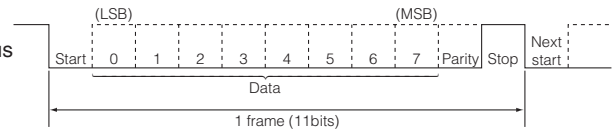


Notes: 1. Branch connector, BMJ-8 (HACHIKO ELECTRIC CO., LTD) is recommended. Refer to the section "Ordering Information for Customers" in this catalog.
2. Connect a 150Ω terminal resistor.

Communications specifications

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

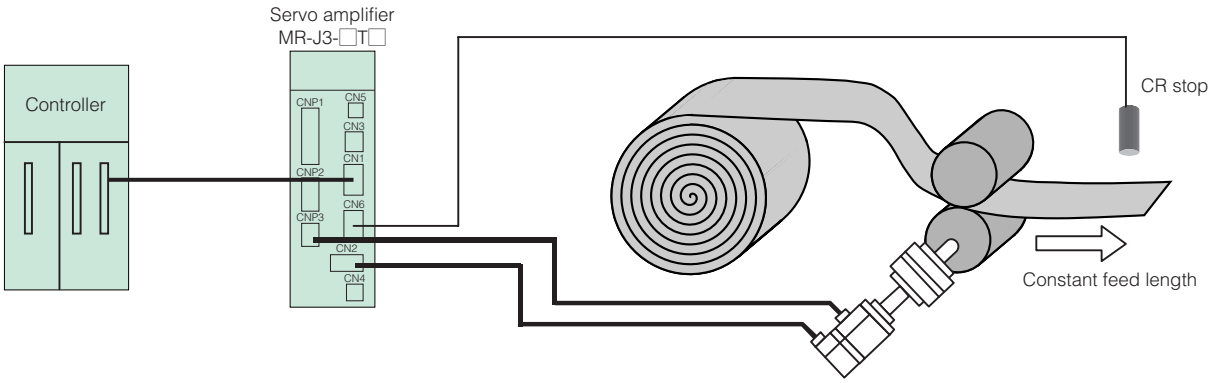
- Baud rate : 9600, 19200, 38400, 57600 or 115200 asynchronous
- Transfer code : 1 start bit, 8 data bits, 1 parity bit (even number), 1 stop bit
- Transfer protocol : Character system, half-duplex communication



MR-J3-T Operational Functions

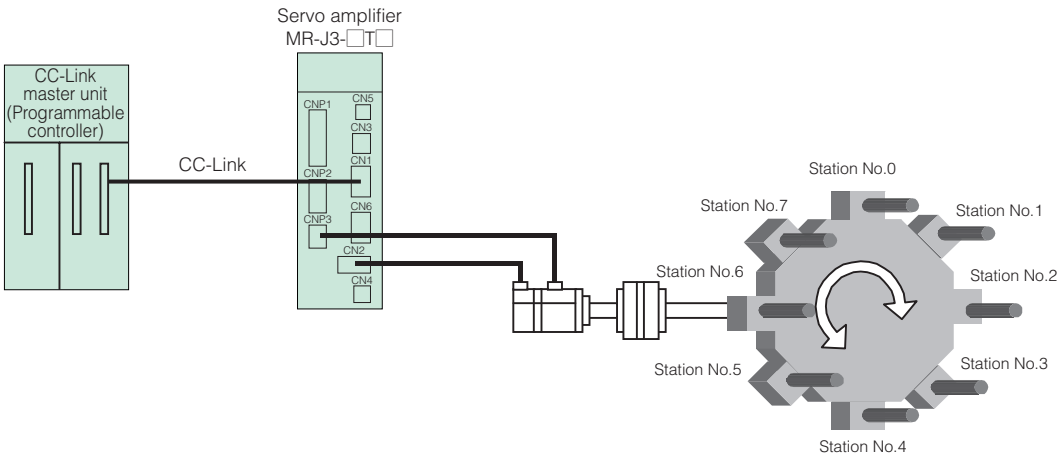
● Roll feed function

Capable of roll feeding operation (clear signal).
Speed and acceleration/deceleration time constant, and override can be set.
Position data can be set directly by remote register.



● Indexer function (Note 1)

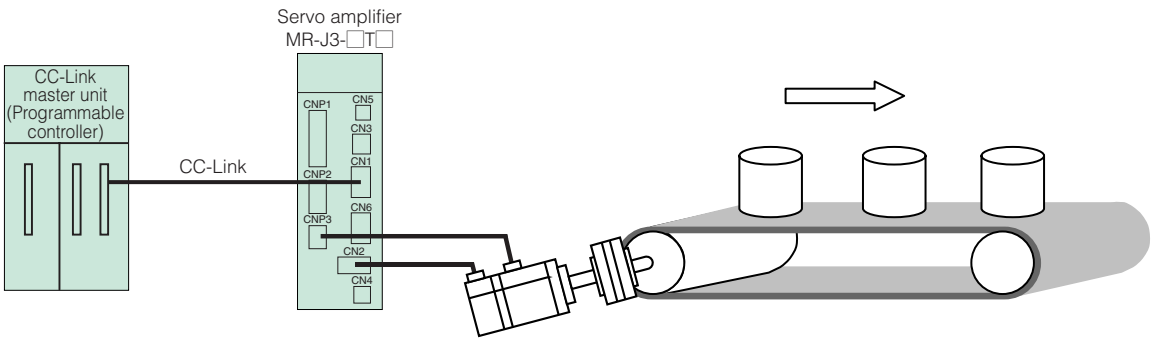
Positioning is performed by specifying stations (maximum of 255 stations).
Movement amount can be automatically calculated by setting the numbers of stations and gears on machine-side and motor-side in parameters.
Indexer function is available only with CC-Link communication.



Notes: 1. Servo amplifier with software version A4 or above is required for the indexer function.

● Speed command operation (Note 1)

Speed command is set by designating servo motor speed in the point table No. 1 to 8 by the speed selection devices (SP0 to SP2).
When two stations are occupied, speed command can be set directly with remote register.
Acceleration/deceleration time constant is selected from the point table No.1 or 2 by the speed acceleration/deceleration selection device (STAB).
This command is compatible only with CC-Link communication.



Notes: 1. Servo amplifier with software version A4 or above is required for the speed control operation.

MR-J3-T Positioning Command Method

The following two types of command methods are available.

Remote register (Note 1)	Sets position data and servo motor speed data directly in the remote register, and then executes positioning.
Point table No. input	Specifies position data and servo motor speed data set previously with the point table No., and then executes positioning.

Notes: 1. Setting range and description of position and servo motor speed data for the remote register are same as for the point table. Refer to the Point table below.

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

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

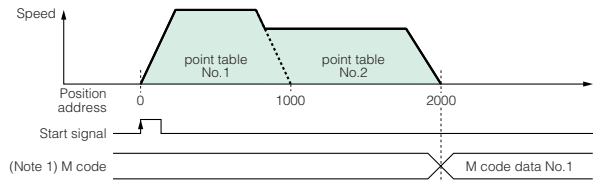
Item	Setting range	Unit	Description
Position data	–999999 to 999999	$\times 10^{STM}\mu m$	• **Absolute value command method** Sets the address. STM is the ratio to the data. • **Incremental value command method** Sets the movement amount. STM is the ratio to the data.
Servo motor speed	0 to permissible	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. (Note 2)
Deceleration time constant	0 to 20000	ms	Sets the deceleration time constant. (Note 2)
Dwell time	0 to 20000	ms	Runs the next point table after the set dwell time.
Auxiliary function	0 to 3	—	• **Absolute value command method** 0: Positions and stops (waits for start signal). 1: Continues operation for the next point table without stopping. • **Incremental value command method** 2: Positions and stops (waits for start signal). 3: Continues operation for the next point table without stopping.
M code (Note 1)	0 to 99	—	Sets output code when positioning completes.

(Example of setting point table data)

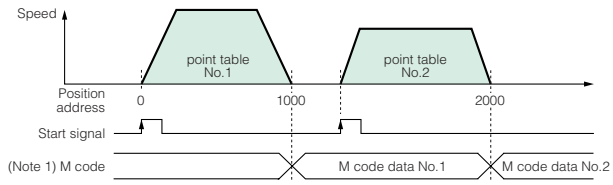
Point table No.	Position data	Servo motor speed	Acceler-ation time constant	Deceler-ation time constant	Dwell time	Auxiliary function	M code
1	1000	2000	200	200	0	1	1
2	2000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	3000	3000	100	100	0	2	99

If the point table No.1's auxiliary function is 1 or 3, continuous positioning operation 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



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

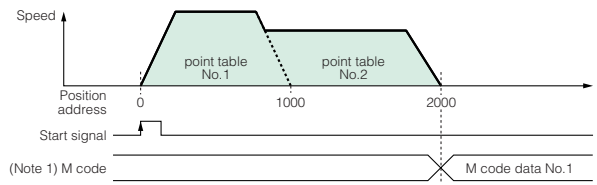
Item	Setting range	Unit	Description
Position data	0 to 999999	$\times 10^{STM}\mu m$	Sets the movement amount. STM is the ratio to the data.
Servo motor speed	0 to permissible	r/min	Sets the command speed for the servo motor used for positioning.
Acceleration time constant	0 to 20000	ms	Sets the acceleration time constant. (Note 2)
Deceleration time constant	0 to 20000	ms	Sets the deceleration time constant. (Note 2)
Dwell time	0 to 20000	ms	Runs the next point table after the set dwell time.
Auxiliary function	0 and 1	—	0: Positions and stops (waits for start signal). 1: Continues operation for the next point table without stopping.
M code (Note 1)	0 to 99	—	Sets output code when positioning completes.

(Example of setting point table data)

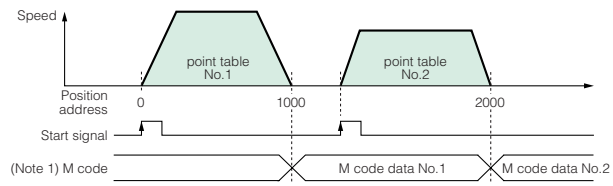
Point table No.	Position data	Servo motor speed	Acceler-ation time constant	Deceler-ation time constant	Dwell time	Auxiliary function	M code
1	1000	2000	200	200	0	1	1
2	1000	1600	100	100	0	0	2
:	:	:	:	:	:	:	:
255	500	3000	100	100	0	0	99

If the point table No.1's auxiliary function is 1, continuous positioning operation 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



Notes: 1. When using M code, MR-J3-D01 extension IO unit (optional) is required. M code is digitally-output from MR-J3-D01. Remote output is not possible.
2. S-pattern acceleration/deceleration time constant is set by the servo amplifier's parameters.

MR-J3-T Servo Amplifier Specifications: 100VAC/200VAC

Servo amplifier model MR-J3-		10T	20T	40T	60T	70T	100T	200T	350T	500T	700T	11KT	15KT	22KT	10T1	20T1	40T1
Output	Rated voltage	3-phase 170VAC															
	Rated current (A)	1.1	1.5	2.8	3.2	5.8	6.0	11.0	17.0	28.0	37.0	68.0	87.0	126.0	1.1	1.5	2.8
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz (Note 10)					3-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)	0.9	1.5	2.6	3.2	3.8	5.0	10.5	16.0	21.7	28.9	46.0	64.0	95.0	3.0	5.0	9.0
	Permissible voltage fluctuation	For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC (Note 10)					3-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation	±5% maximum															
Control circuit power supply	Voltage/frequency	1-phase 200 to 230VAC 50/60Hz (Note 10)					1-phase 200 to 230VAC 50/60Hz								1-phase 100 to 120VAC 50/60Hz		
	Rated current (A)	0.2								0.3					0.4		
	Permissible voltage fluctuation	1-phase 170 to 253VAC (Note 10)					1-phase 170 to 253VAC								1-phase 85 to 132VAC		
	Permissible frequency fluctuation	±5% maximum															
	Power consumption (W)	30								45					30		
Interface power supply		24VDC ±10% (required current capacity: 0.15A (Note 7))															
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	—	10	10	10	20	20	100	100	130	170	—	—	—	—	10	10
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)	—	—	—
Control system		Sine-wave PWM control/current control system															
Dynamic brake		Built-in (Note 8, 11)										External option (Note 12)			Built-in (Note 8, 11)		
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		Natural-cooling open (IP00)				Fan cooling open (IP00)									Natural-cooling open (IP00)		
Environment	Ambient temperature (Note 9)	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 maximum (non condensing), storage: 90% RH maximum (non condensing)															
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust															
	Elevation	1000m or less above sea level															
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)															
Mass (kg [lb])		0.8 (1.8)	0.8 (1.8)	1.0 (2.2)	1.0 (2.2)	1.4 (3.1)	1.4 (3.1)	2.1 (4.6)	2.3 (5.1)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)	0.8 (1.8)	0.8 (1.8)	1.0 (2.2)

Notes:
1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section "Servo motor torque characteristics" in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section "Options ●Optional regeneration unit" in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "Servo Amplifier Model Configurations" for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□T(1)-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. MR-J3-350T or smaller servo amplifiers can be mounted closely. In this case, operate them at the ambient temperature of 0 to 45°C (32 to 113°F) or at 75% or less of the effective load ratio.
10. Special specification servo amplifiers for 1-phase 200 to 240VAC are also available: MR-J3-□T-U004. The permissible voltage fluctuation for MR-J3-□T-U004 is 1-phase 170 to 264VAC.
11. When using the built-in dynamic brake, refer to "MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL" for the permissible load inertia moment ratio.
12. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-T Servo Amplifier Specifications: 400VAC

Servo amplifier model MR-J3-		60T4	100T4	200T4	350T4	500T4	700T4	11KT4	15KT4	22KT4
Output	Rated voltage	3-phase 323VAC								
	Rated current (A)	1.5	2.8	5.4	8.6	14.0	17.0	32.0	41.0	63.0
Main circuit power supply	Voltage/frequency (Note 1, 2)	3-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	1.4	2.5	5.1	7.9	10.8	14.4	23.1	31.8	47.6
	Permissible voltage fluctuation	3-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
Control circuit power supply	Voltage/frequency	1-phase 380 to 480VAC 50/60Hz								
	Rated current (A)	0.1			0.2					
	Permissible voltage fluctuation	1-phase 323 to 528VAC								
	Permissible frequency fluctuation	±5% maximum								
	Power consumption (W)	30			45					
Interface power supply		24VDC ±10% (required current capacity: 0.15A (Note 7))								
Tolerable regenerative power of regenerative resistor (W) (Note 3, 4)	Built-in regenerative resistor	15	15	100	100	130 (Note 9)	170 (Note 9)	—	—	—
	External regenerative resistor (Standard accessory) (Note 5, 6)	—	—	—	—	—	—	500 (800)	850 (1300)	850 (1300)
Control system		Sine-wave PWM control/current control system								
Dynamic brake		Built-in (Note 8, 10)						External option (Note 11)		
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		Natural-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 maximum (non condensing), storage: 90% RH maximum (non condensing)								
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust								
	Elevation	1000m or less above sea level								
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)								
Mass (kg [lb])		1.7 (3.7)	1.7 (3.7)	2.1 (4.6)	4.6 (10)	4.6 (10)	6.2 (14)	18 (40)	18 (40)	19 (42)

Notes: 1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a servo motor, refer to the section “Servo motor torque characteristics” in this catalog.
3. Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
4. Refer to the section “Options ●Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
5. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “Servo Amplifier Model Configurations” for details.
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min). Note that change in parameter No. PA02 is required.
7. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to “MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL” for details.
8. Special specification servo amplifiers without a dynamic brake are also available: MR-J3-□T4-ED. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
9. The amplifier built-in resistor is compatible with the maximum torque deceleration when the motor is used within the rated speed and the recommended load to motor inertia moment ratio. Contact your local sales office if the operating motor speed and the load to motor inertia moment ratio exceed the rated speed and the recommended ratio.
10. When using the built-in dynamic brake, refer to “MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL” for the permissible load inertia moment ratio.
11. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

MR-J3-T Command and Operation Mode (Point Table and Indexer)

Item					Description
Command interface					CC-Link communication (Ver.1.10), DIO command (extension IO unit MR-J3-D01 is required), or RS-422 communication
Operation system	Point table	Command method	Remote register		Possible with CC-Link communication when 2 stations occupied. Position command input: position command data is set with the remote register. Feed length input setting range: ±1μm to ±999.999mm. Speed command input: speed command data (rotating speed) is set with the remote register.
			Point table No. input		Possible with CC-Link communication, DIO command or RS-422 communication CC-Link communication (when 1 station occupied): 31 points CC-Link communication (when 2 stations occupied): 255 points DIO command: 255 points (extension IO unit MR-J3-D01 is required.) RS-422 communication: 255 points Position command input: selects from the point table. 1-point feed length setting range: ±1μm to ±999.999mm. Speed command input: selects speed and acceleration/deceleration time constant from the point table.
		Automatic operation mode	Point table		Point table No. input or point table data input system. Each positioning operation based on position and speed data. Speed changing operation (2 to 255 speeds). Automatic continuous positioning operation (2 to 255 points) Roll feed display is selectable. Clearing droop pulses with the clear (CR) signal is settable.
		Manual operation mode	JOG operation		Inches upon contact input, CC-Link communication or RS-422 communication based on speed data set by a parameter.
			Manual pulse generator		Manual feed with the manual pulse generator. Command pulse multiplication: ×1, ×10, ×100 is selectable with parameter.
	Indexer (Note 1)	Command method	Station position command input		Possible with CC-Link communication CC-Link communication (when 1 station occupied): 31 stations CC-Link communication (when 2 stations occupied): 255 stations
			Speed command input	Remote register	Possible with CC-Link communication when 2 stations occupied. Sets speed command data (rotating speed) with the remote register.
				Speed No. input	Selects speed and acceleration/deceleration time constant from the point table. (only when 2 stations occupied)
		Automatic operation mode	Rotating direction specified		Positions to the specified station. Rotating direction is settable.
			Shortest rotating direction		Positions to the specified station. Shorter rotating direction from the current point is selected.
		Manual operation mode	Index JOG operation		Rotates in a direction specified by rotating direction evaluation when the start signal (RYn1) turns ON. Positions to a nearest station where deceleration to a stop is possible when the start signal (RYn1) turns OFF.
			JOG operation		Inches upon CC-Link communication based on speed data set by a parameter.
Home position return mode	Dog system				Returns to home position upon Z-phase pulse count after passing through proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function.
	Count system				Returns to home position upon encoder pulse count after touching proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function.
	Data set system				Returns to home position without dog. Sets any position as home position using JOG operation, etc. Home position address settable.
	Stopper system				Returns to home position upon hitting end of stroke. Direction for return to home position selectable. Home position address settable.
	Ignore home (Servo-on position as home position)				Uses position where the servo on (SON) signal turns ON as home position. Home position address settable.
	Dog system rear end reference				Returns to home position with respect to the rear end of a proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. 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 proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function.
	Dog cradle system				Returns to home position upon the first Z-phase pulse with respect to the front end of a proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function.
	Dog system adjacent Z-phase reference				Returns to home position upon the Z-phase pulse right before a proximity dog with respect to the front end of a proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function.
	Dog system front end reference				Returns to home position to the front end of a point dog with respect to the front end of a proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function.
	Dog less Z-phase reference				Returns to home position to the first Z-phase pulse with respect to the first Z-phase pulse. Direction for return to home position selectable. Home position shift amount and home position address settable
	Torque limit switching dog system (Note 2)				Returns to home position upon Z-phase pulse count after passing through proximity dog. Direction for return to home position selectable. Home position shift amount and home position address settable. Automatic retreat on dog back to home position and automatic stroke retreat function. Torque limit automatic switching function.
	Torque limit switching data set system (Note 2)				Returns to home position without dog. Sets any position as home position. Home position address settable. Torque limit automatic switching function.
	Automatic positioning to home position function				High-speed automatic positioning to a defined home position

Notes: 1. Servo amplifier with software version A4 or above is required for the indexer function.
2. This mode is available only with the indexer function.

MR-J3-T Command and Operation Mode (Speed Control Operation)

Item			Description
Speed control operation (Note 1)	Command method	Remote register	Possible with CC-Link communication (when 2 stations occupied). Selects acceleration/deceleration time constant in the point table. Acceleration/deceleration time constant: 2 points
		Speed No. input	Possible with CC-Link communication (when 2 stations occupied). Selects acceleration/deceleration time constant in the point table. Speed command: 8 speeds Acceleration/deceleration time constant: 2 points
	Speed command data setting range		When setting in unit of 1 [r/min]: 0 to servo motor's permissible speed [r/min] When setting in unit of 0.1 [r/min]: 0 to servo motor's permissible speed [r/min], or 0 to 6553.5 [r/min] (Note 2)

Notes: 1. Servo amplifier with software version A4 or above is required for the speed control operation.
2. When using a servo motor with the instantaneous permissible speed of 6553.5 [r/min] or faster, the maximum setting value is limited to 6553.5[r/min].

MR-J3-D01 Specifications

Item		Description
Model		MR-J3-D01
Power supply for interface		24VDC ±10% (required current capacity: 0.8A (Note 1, 2))
Digital input		30 points, photocoupler insulation, sink/source compatible
Digital output		16 points, photocoupler insulation, sink/source compatible
Analog input		2ch, 0 to ±10VDC (input impedance: 10 to 12kΩ)
Analog output		2ch, 0 to ±12VDC
Power supply for analog input signal		P15R: DC+15V, permissible current: 30mA N12R: DC–12V, permissible current: 30mA (Note 5)
Structure		Natural-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 maximum (non condensing), storage: 90% RH maximum (non condensing)
	Atmosphere	Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
	Elevation	1000m or less above sea level
	Vibration	5.9m/s^2 or less at 10 to 55Hz (direction of X, Y and Z axes)
Mass (g [lb])		140 (0.31)

<Functions connecting to MR-J3-□T□ (Note 7)>

Function	Description
Digital input	Point table No. selection 1 to 8 (DI0 to DI7), Servo on (SON), Reset (RES), External torque limit selection (TL), Internal torque limit selection (TL1), Manual pulse generator multiplication 1 and 2 (TP0 and TP1), Override selection (OVR), Automatic/manual selection (MD0), Temporary stop/restart (TSTP), Proportional control (PC), Forward rotation start (ST1), Reverse rotation start (ST2), Position data input 1 to 12 (POS00 to POS03, POS10 to POS13, POS20 to POS23), Position data input symbol+ (POSP), Clear (CR), Position data input symbol– (POSN), Strobe (STRB), Speed selection 1 to 3 (SP0 to SP2), Gain changing (CDP) (Note3)
Digital output	Alarm code (ACD0 to ACD3), M code (MCD00 to MCD03, MCD10 to MCD13), Temporary stop (PUS), Positioning complete (MEND), Phase match (CPO), In-position (INP), Position data request 1 and 2 (PRQ1 and PRQ2), Zero speed (ZSP), Torque limit in effect (TLC), Warning (WNG), Electromagnetic brake interlock (MBR), Dynamic brake interlock (DB), Battery warning (BWNG), Positioning range output (POT), Variable gain selection (CDPS), Command speed reached (SA), Point table No. output 1 to 8 (PT0 to PT7) (Note3)
Analog input	Override (VC) (–10 to +10VDC/0 to 200%) Analog torque limit (TLA) (0 to ±10VDC/maximum torque)
Analog output	Analog monitor output (MO1 and MO2) (Note 4)

<Functions connecting to MR-J3-□A□-RJ040 (Note 6)>

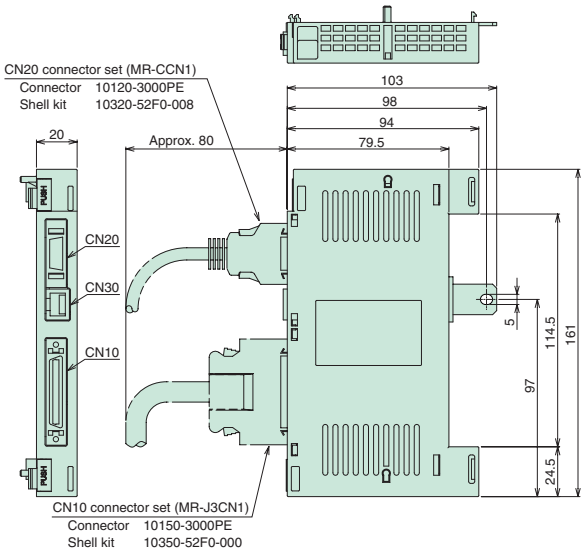
Function		Description
Position control mode	Electric gear numerator digital input	The electric gear numerator can be set arbitrarily in 5-digit BCD or 16-bit binary.
	High resolution analog torque limit	The torque limit can be set according to the rotating direction. TLAP: 0 to +10VDC/maximum torque, resolution: 12-bit (Standard: 10-bit) TLAN: 0 to –10VDC/maximum torque, resolution: 12-bit (Standard: 10-bit)
Speed control mode	Digital speed command input	The speed command can be set arbitrarily in 5-digit BCD or 12-bit (or settable in 16-bit) binary.
	High resolution analog torque limit	The torque limit can be set according to the rotating direction. TLAP: 0 to +10VDC/maximum torque, resolution: 16-bit (Standard: 14-bit) TLAN: 0 to –10VDC/maximum torque, resolution: 16-bit (Standard: 14-bit)
Torque control mode	Digital speed limit input	The speed limit can be set arbitrarily in 5-digit BCD or 12-bit (or settable in 16-bit) binary.
	High resolution torque command input	External analog torque command (OTC) 0 to ±8VDC/maximum torque, resolution: 12-bit (Standard: 10-bit)

Notes: 1. 0.8A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□T MR-J3-D01 SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
2. A 24VDC power supply for input/output signals can be shared by the servo amplifier and MR-J3-D01. In this case, secure the power supply capacity corresponding to the points of the input/output signals to be used.
3. Signal assignment can be changed by setting parameters. Refer to "MR-J3-□T MR-J3-D01 SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
4. Analog monitor output can be selected by setting parameter. Refer to "MR-J3-□T MR-J3-D01 SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
5. P15R can be used as a power supply for TLA and VC. N12R can be used as a power supply for VC. Note that the power voltage varies between –12V to –15V.
6. MR-J3-□A□-RJ040 is available for 100V, 200V 22kW or smaller, and 400V 11kW to 22kW.
7. MR-J3-D01 cannot be used with indexer function or speed control operation.

Extension IO Unit Dimensions

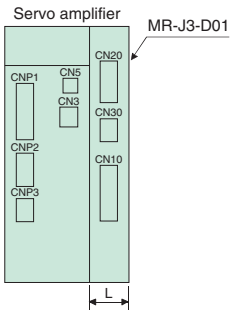
(Unit: mm)

● MR-J3-D01

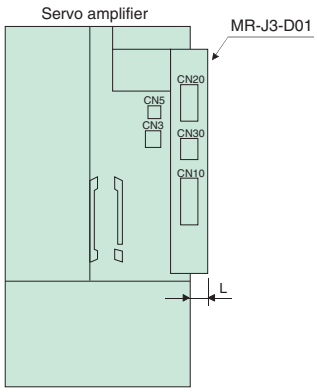


● Dimensions when MR-J3-D01 is installed

● 100V/200V 0.1kW to 3.5kW
● 400V 0.6kW to 2kW



● 200V 5kW, 7kW
● 400V 3.5kW to 7kW



Servo amplifier model	Variable dimension
	L
MR-J3-10T(1) to 100T(4) MR-J3-10A(1)-RJ040 to 100A-RJ040	20
MR-J3-200T(4), 350T MR-J3-200A-RJ040, 350A-RJ040	15
MR-J3-350T4, 500T(4), 700T(4) MR-J3-500A-RJ040, 700A-RJ040	10

Note: For servo amplifier 200V/400V 11kW to 22kW, MR-J3-D01 will be built into the servo amplifier.

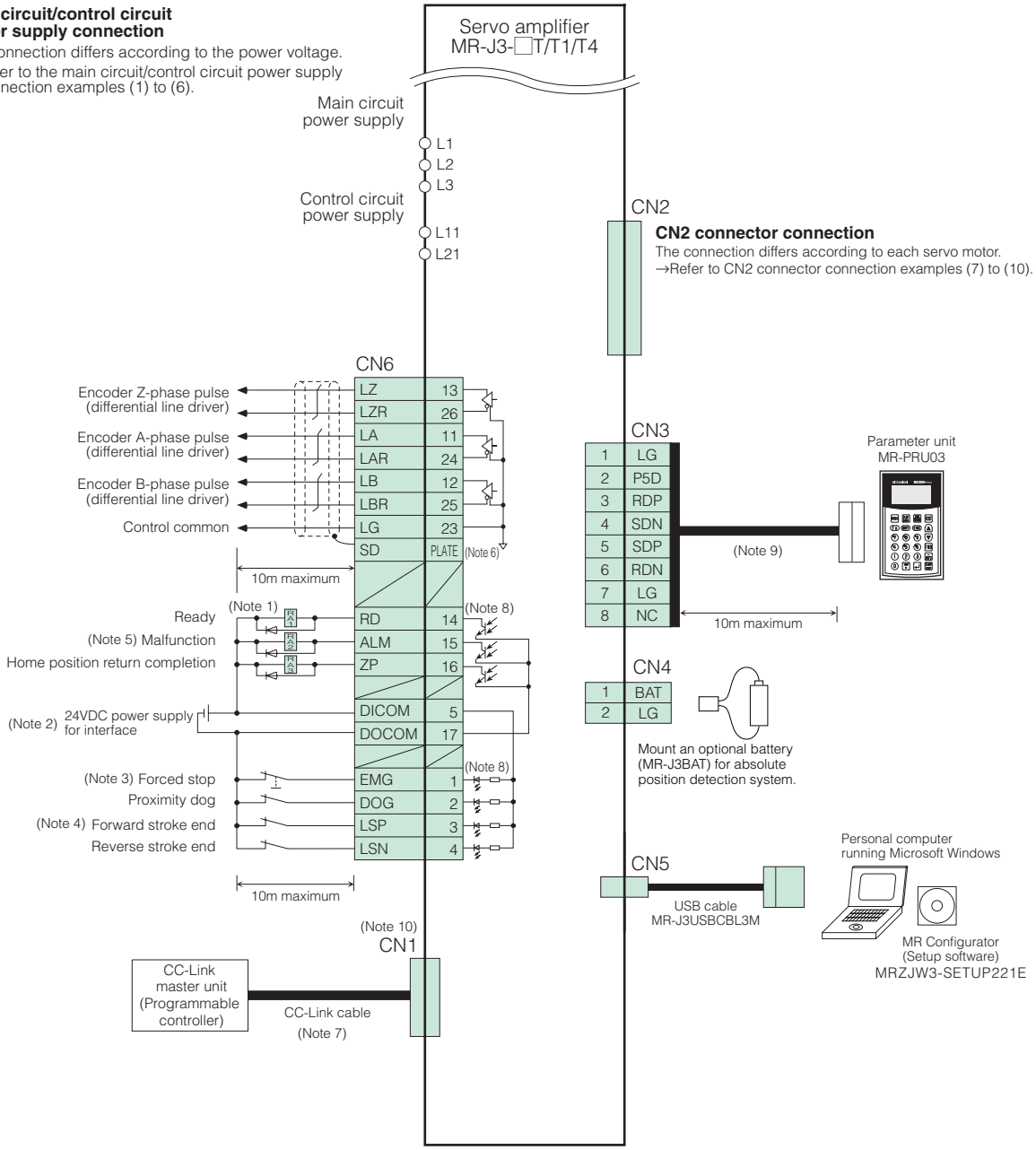
MR-J3-□T□ Standard Wiring Diagram

● Connection example

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 (6).

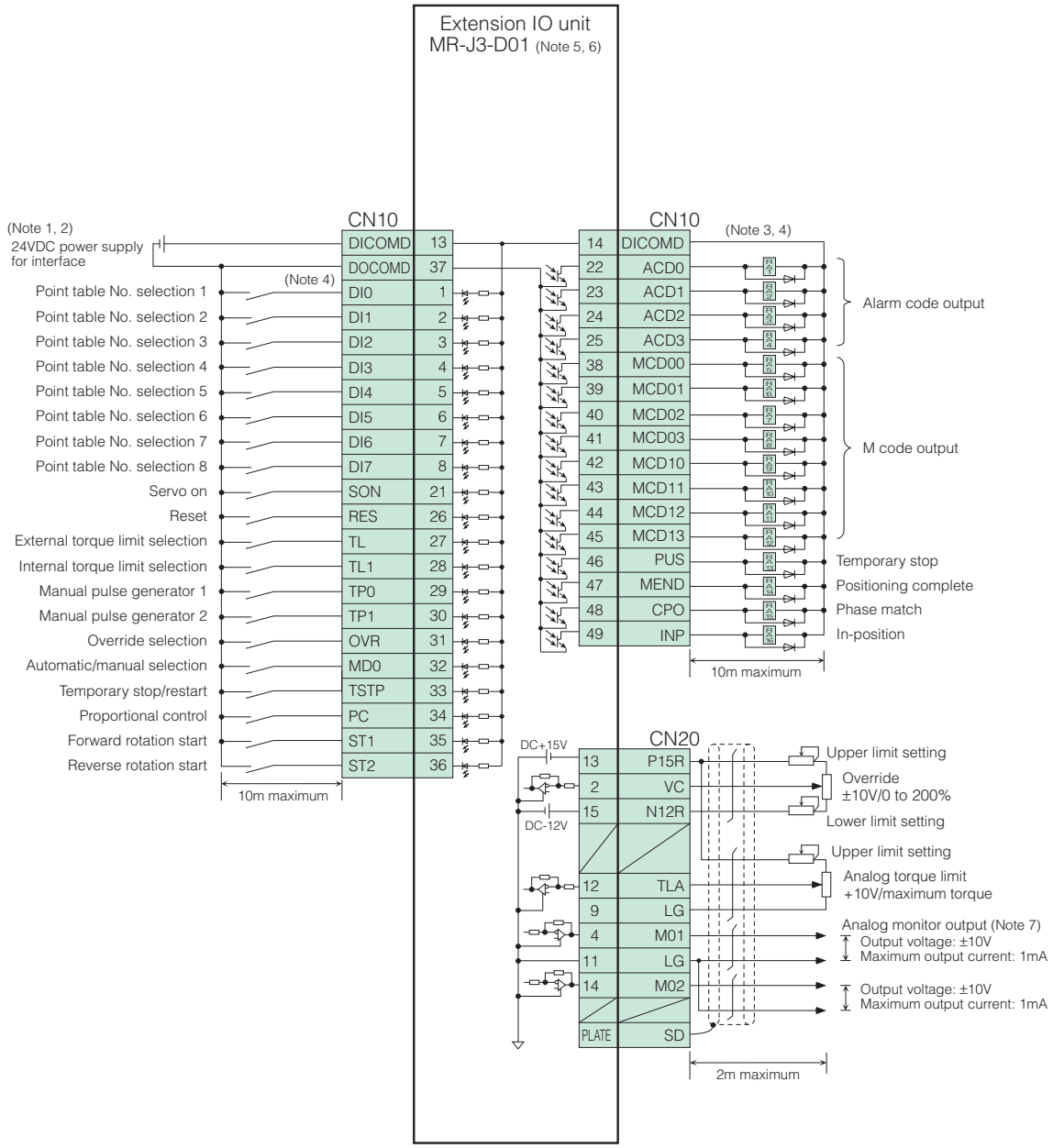


Notes:

1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the forced stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.15A). 0.15A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. Turn on the forced stop (EMG) signal (normally closed contact) before starting the operation, or cancel the forced stop signal with parameter No. PD01.
4. Close the forward and reverse stroke end (LSP, LSN) signals (normally closed contact) or turn on the forward and reverse stroke end signals with parameter No. PD01 before starting the operation.
5. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
6. Connect the shield wire securely to the plate inside the connector (ground plate).
7. For the CC-Link cable, refer to the section "Ordering Information for Customers" in this catalog for details.
8. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□T SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
9. Use a commercial LAN cable (EIA568 compliant). A personal computer can be connected using a RS-422/RS-232C conversion cable. Note that USB interface (CN5 connector) and RS-422 interface (CN3 connector) are mutually exclusive. They cannot be used at the same time. Refer to the section "Ordering Information for Customers" in this catalog for the RS-422/RS-232C conversion cable.
10. CN1 connector is used only when operated with CC-Link communication. Manufacture a CC-Link cable that fits to a CN1 connector supplied with the servo amplifier.

MR-J3-D01 (Optional) Standard Wiring Diagram

● Connection example (Point table positioning operation)

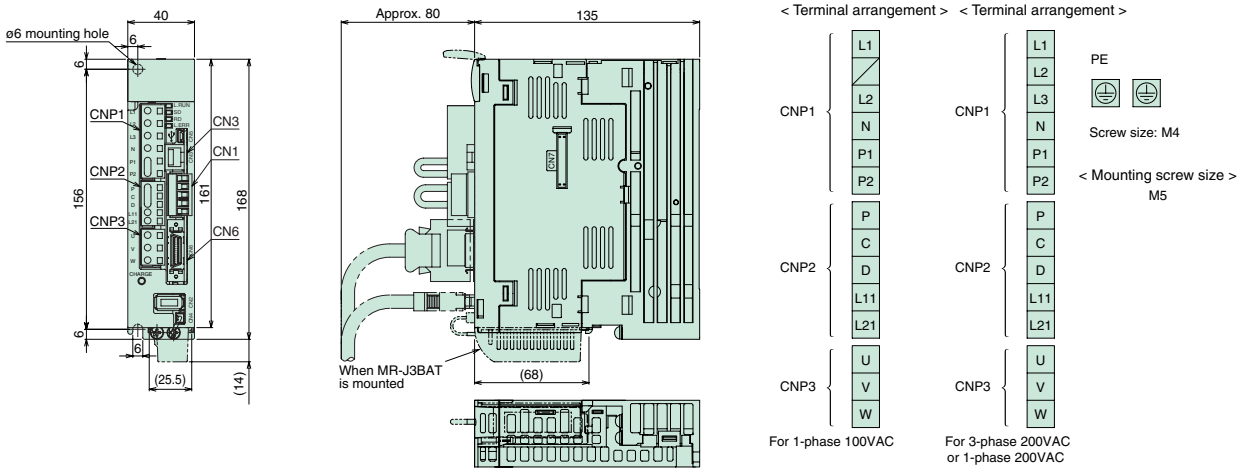


Notes:
1. Use the power supply 24VDC±10% (required current capacity: 0.8A). 0.8A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□T MR-J3-D01 SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
2. A 24VDC power supply for input/output signals can be shared by the servo amplifier and MR-J3-D01. In this case, secure the power supply capacity corresponding to the points of the input/output signals to be used.
3. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier and/or MR-J3-D01 to malfunction such that the signals are not output, and the forced stop and other safety circuits are inoperable.
4. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□T MR-J3-D01 SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
5. MR-J3-D01 connects directly to CN7 connector of the servo amplifier, MR-J3-□T□ or MR-J3-□A□-RJ040.
6. MR-J3-D01 is not available with the indexer function.
7. Output voltage range varies depending on the monitored signal.

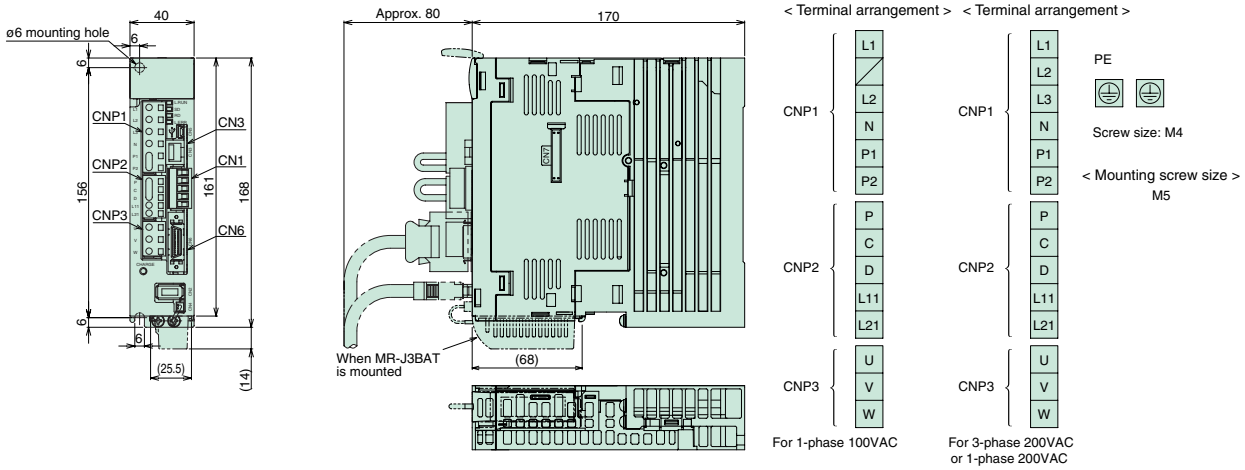
MR-J3-□T□ Servo Amplifier Dimensions

(Unit: mm)

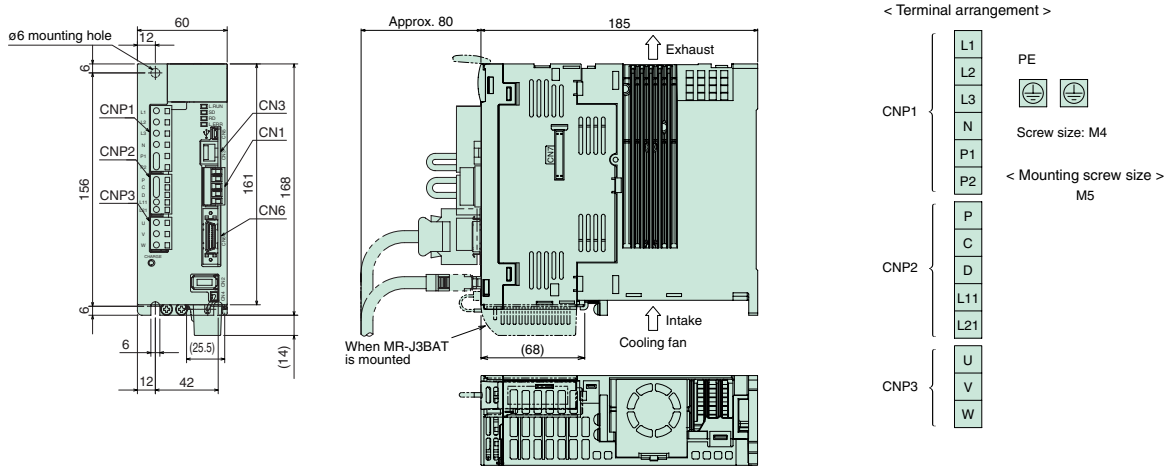
● MR-J3-10T, 20T, 10T1, 20T1 (Note 1)



● MR-J3-40T, 60T, 40T1 (Note 1)



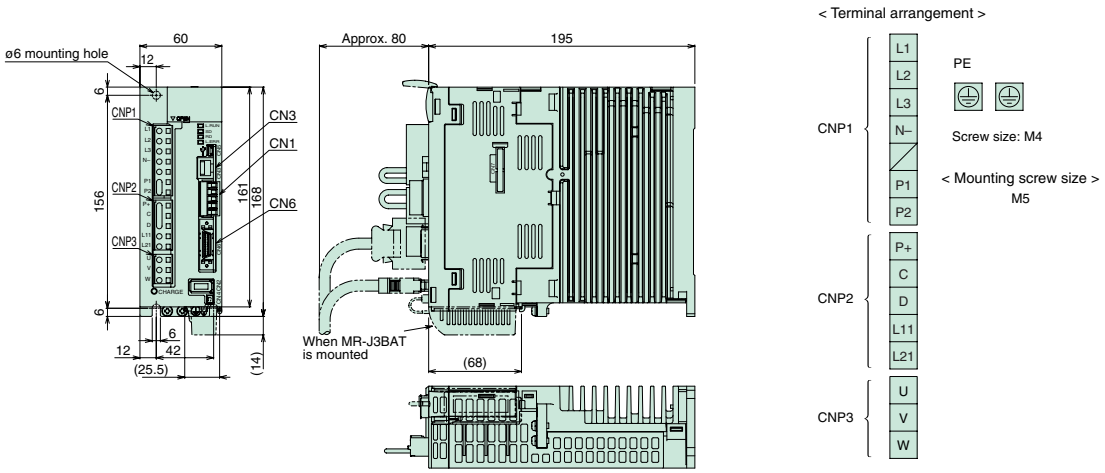
● MR-J3-70T, 100T (Note 1)



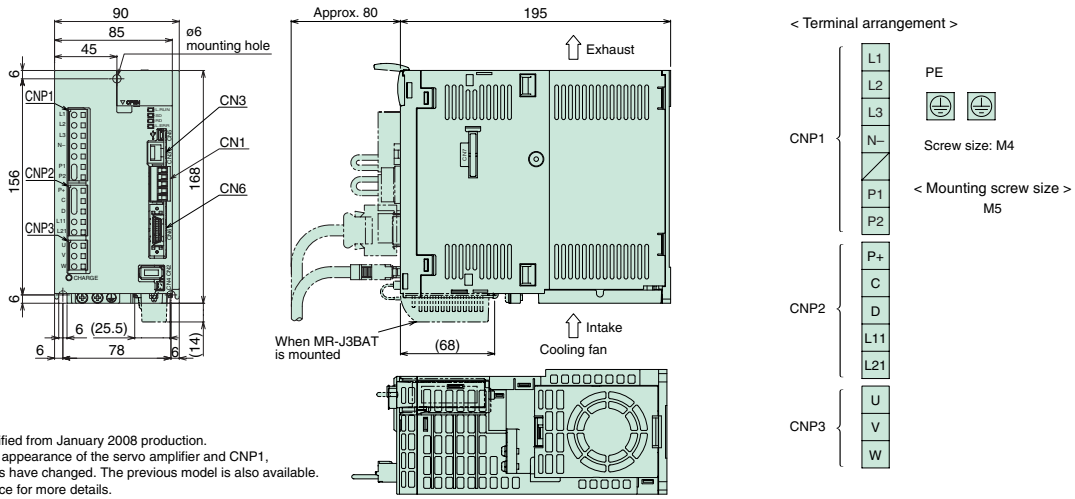
Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) and CN1 connector are supplied with the servo amplifier.

(Unit: mm)

● MR-J3-60T4, 100T4 (Note 1)

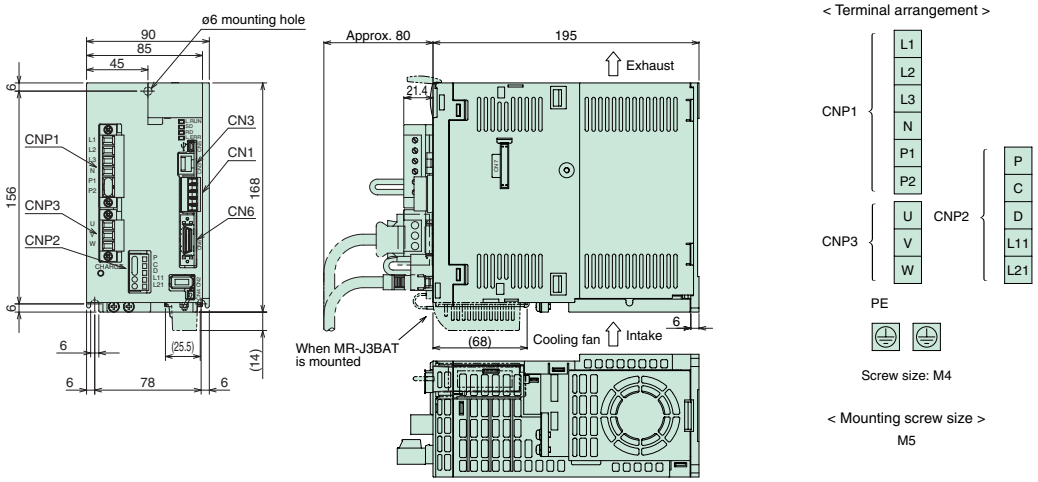


● MR-J3-200T*, 200T4 (Note 1)



* MR-J3-200T has been modified from January 2008 production.
Due to the modification, the appearance of the servo amplifier and CNP1, CNP2 and CNP3 connectors have changed. The previous model is also available. Contact your local sales office for more details.

● MR-J3-350T (Note 1)

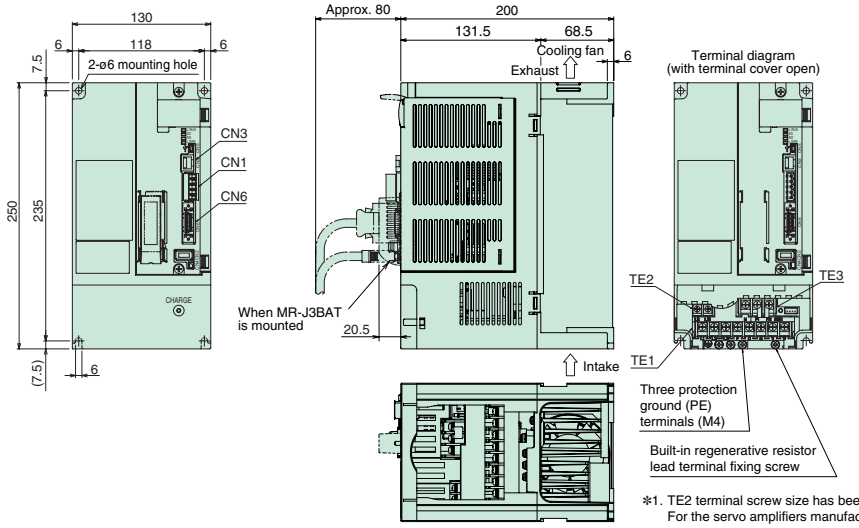


Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) and CN1 connector are supplied with the servo amplifier.

MR-J3-□T□ Servo Amplifier Dimensions

(Unit: mm)

● MR-J3-500T, 350T4, 500T4 (Note 1)



< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

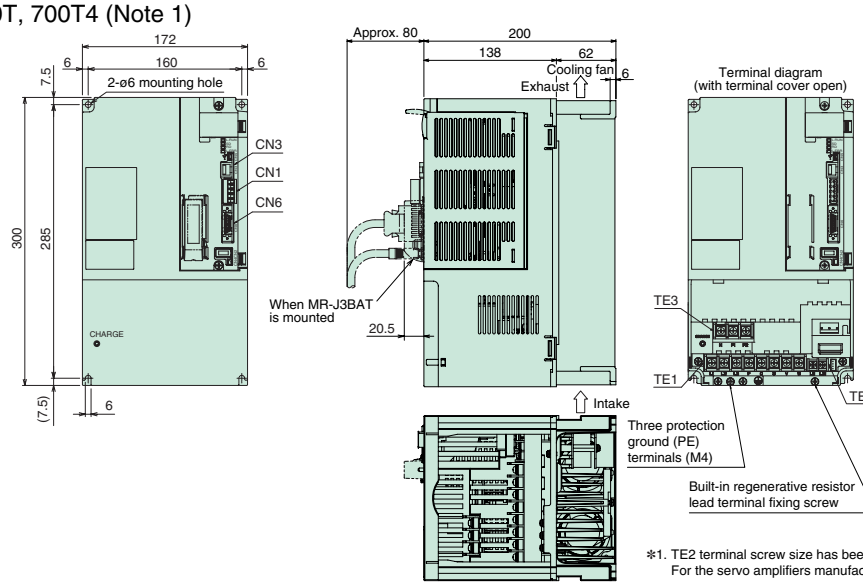
TE2		TE3		
L11	L21	N	P1	P2

TE1							
L1	L2	L3	P	C	U	V	W

PE ⏚ ⏚ ⏚

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-700T, 700T4 (Note 1)



< Terminal screw size >
TE1: M4
TE2: M3.5 (*1)
TE3: M4
PE: M4

< Mounting screw size >
M5

< Terminal arrangement >

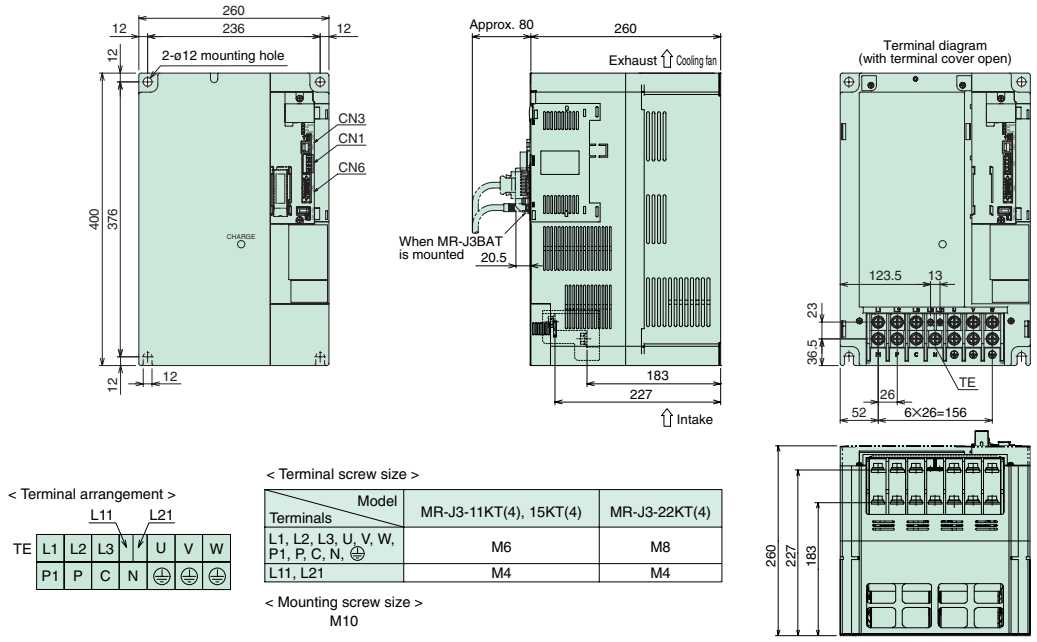
TE3		
N	P1	P2

TE1								TE2	
L1	L2	L3	P	C	U	V	W	L11	L21

PE ⏚ ⏚ ⏚

*1. TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

● MR-J3-11KT to 22KT, 11KT4 to 22KT4 (Note 1)



< Terminal arrangement >

	L11	L21					
TE	L1	L2	L3		U	V	W
	P1	P	C	N	⏚	⏚	⏚

< Terminal screw size >

Terminals \ Model	MR-J3-11KT(4), 15KT(4)	MR-J3-22KT(4)
L1, L2, L3, U, V, W, P1, P, C, N, ⏚	M6	M8
L11, L21	M4	M4

< Mounting screw size >
M10

Notes: 1. CN1 connector is supplied with the servo amplifier.

Options

● Dynamic brake

Use an optional external dynamic brake with the 11kW or larger servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

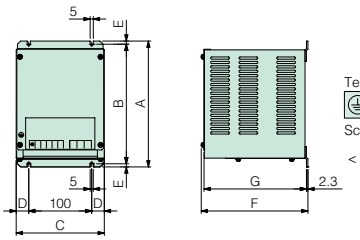
Model	Servo amplifier	Fig.
DBU-11K	MR-J3-11KA/B/T	A
DBU-15K	MR-J3-15KA/B/T	
DBU-22K	MR-J3-22KA/B/T	
DBU-11K-4	MR-J3-11KA4/B4/T4	B
DBU-22K-4	MR-J3-15KA4/B4/T4 MR-J3-22KA4/B4/T4	

Model	Drive unit	Fig.
DBU-37K	MR-J3-DU30KA/B MR-J3-DU37KA/B	C
DBU-55K-4	MR-J3-DU30KA4/B4 MR-J3-DU37KA4/B4 MR-J3-DU45KA4/B4 MR-J3-DU55KA4/B4	

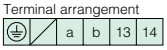
External dimensions (Unit: mm)

Connections

A



Terminal arrangement

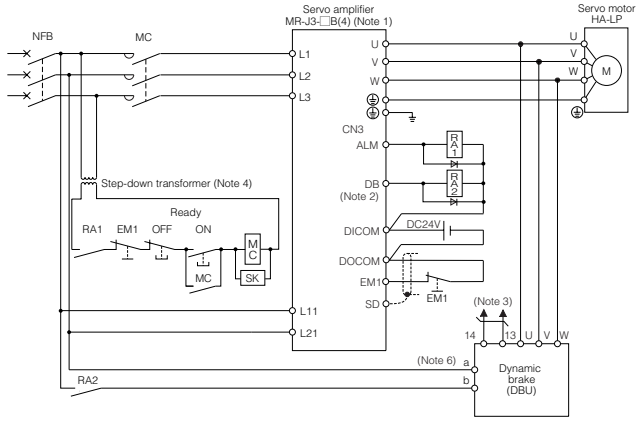


Screw size: M3.5

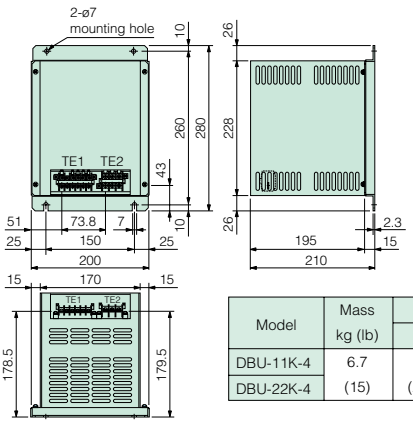
Screw size: M4

< Mounting screw size >
M4

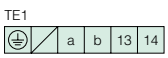
Model	A	B	C	D	E	F	G	Mass kg (lb)	Electrical wire size (mm²)
DBU-11K	200	190	140	20	5	170	163.5	2 (4.4)	5.5 (AWG10)
DBU-15K DBU-22K	250	238	150	25	6	235	228	6 (13)	5.5 (AWG10)



B



TE1



Screw size: M3.5

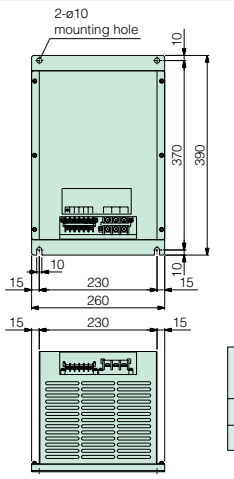
TE2

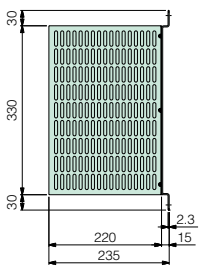
Screw size: M4

< Mounting screw size >
M6

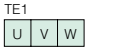
Model	Mass kg (lb)	Electrical wire size (mm²)	
		U, V, W	Other than U, V, W
DBU-11K-4 DBU-22K-4	6.7 (15)	5.5 (AWG10)	2 (AWG14)

C



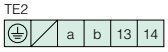


TE1



Screw size: M5

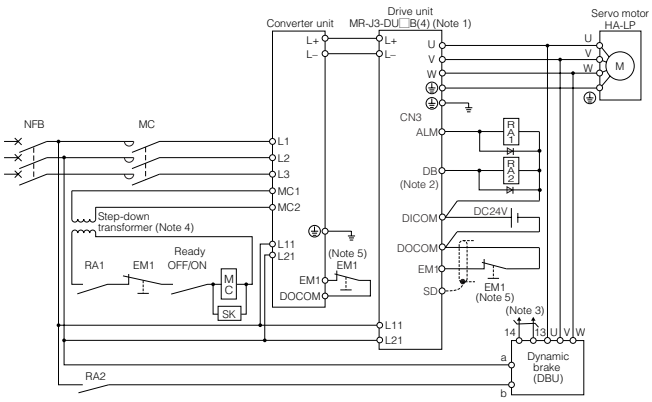
TE2



Screw size: M3.5

< Mounting screw size >
M8

Model	Mass kg (lb)	Electrical wire size (mm²)	
		U, V, W	Other than U, V, W
DBU-37K DBU-55K-4	8 (18) 11 (24)	14 (AWG6)	2 (AWG14)



Notes: 1. The connection diagrams Fig.A and B are for MR-J3-□B(4) and Fig.C for MR-J3-DU□B(4). For connection diagram for MR-J3-□A(4) or MR-J3-DU□A(4), refer to "MR-J3-□A SERVO AMPLIFIER INSTRUCTION MANUAL".
2. Validate the dynamic brake interlock (DB) signal with parameter No. PD07 to PD09 for MR-J3-□B(4) or MR-J3-DU□B(4).
3. The terminals 13 and 14 are normally opened outputs. If the dynamic brake is welded, the terminals 13 and 14 will be opened. So, create the external sequence circuit that the servo on (SON) signal does not turn on when the terminals 13 and 14 are opened.
4. A step-down transformer is required when coil voltage of the magnetic contactor (MC) is 200V class, and the servo amplifier, the converter unit and the drive unit are 400V class.
5. Create a circuit that validates the forced stop (EM1) signals of the drive unit and the converter unit at the same time.
6. When using DBU-11K-4 or DBU-22K-4, the power supply must be between 1-phase 380VAC to 463VAC 50/60Hz. Refer to "MR-J3 SERVO AMPLIFIER MANUAL" for details.

MR-J3 Basic Configurations

Necessary optional cables and connectors vary depending on the servo amplifier type and the servo motor series.
Refer to the following tables for necessary options.

● Selecting options for servo amplifier

Servo amplifier/drive unit			Reference
General-purpose interface	MR-J3-□A/A1/A4, MR-J3-DU□A/A4		P.101 to 102 in this catalog
SSCNETⅢ compatible	MR-J3-□B/B1/B4, MR-J3-DU□B/B4		P.103 to 104 in this catalog
Positioning function	MR-J3-□T/T1/T4	CC-Link command	P.105 to 106 in this catalog
		DI/O command (MR-J3-D01 is required.)	P.105 to 106 in this catalog

● Selecting options for servo motor

Use the cables in the following tables.
For the cable descriptions, refer to the relevant numbers in each list.

Capacity	Servo motor	Reference list		
		Encoder cable	Servo motor power supply cable	Electromagnetic brake cable (Note 1)
Small capacity	HF-KP□(B)	Column A in encoder cable list	Column A in servo motor power supply cable list	Column A in electromagnetic brake cable list
	HF-MP□(B)	Column A in encoder cable list	Column A in servo motor power supply cable list	Column A in electromagnetic brake cable list
Medium capacity	HF-SP□(B)	Column B in encoder cable list	Column B in servo motor power supply cable list	Column B in electromagnetic brake cable list
	HF-JP□(B) 5kW or smaller	Column B in encoder cable list	Column B in servo motor power supply cable list	Column B in electromagnetic brake cable list
	HC-LP□(B)	Column B in encoder cable list	Column C in servo motor power supply cable list	Column C in electromagnetic brake cable list (Note 2)
	HC-RP□(B)	Column B in encoder cable list	Column C in servo motor power supply cable list	— (Note 2)
	HC-UP□(B)	Column B in encoder cable list	Column C in servo motor power supply cable list	Column C in electromagnetic brake cable list (Note 2)
	HA-LP502	Column B in encoder cable list	Column C in servo motor power supply cable list	
	HA-LP702	Column B in encoder cable list	Column B in servo motor power supply cable list	
Large capacity	HF-JP□(B) 11kW or larger	Column C in encoder cable list	Column B in servo motor power supply cable list	Column C in electromagnetic brake cable list
	HA-LP□(B)	Column B in encoder cable list		Column C in electromagnetic brake cable list

Notes: 1. An electromagnetic cable is required only for servo motor with an electromagnetic brake.
2. An electromagnetic cable is not required for HC-RP series and 1.5kW or smaller of HC-LP/HC-UP series as the power supply connector has electromagnetic brake terminals.

● Encoder cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10m or shorter (Direct connection type)	IP65	Motor shaft side	Long bending life	MR-J3ENCBL□M-A1-H	① on P.109 in this catalog.	Select one from the list.
				Standard	MR-J3ENCBL□M-A1-L		
			Opposite of motor shaft	Long bending life	MR-J3ENCBL□M-A2-H	② on P.109 in this catalog.	
				Standard	MR-J3ENCBL□M-A2-L		
	Exceeding 10m (Relay type)	IP20	Motor shaft side	Long bending life	Two types of cables are required: MR-J3JCBL03M-A1-L and MR-EKCBL□M-H	③ and ⑤ on P.109 in this catalog.	
				Standard	Two types of cables are required: MR-J3JCBL03M-A1-L and MR-EKCBL□M-L		
			Opposite of motor shaft	Long bending life	Two types of cables are required: MR-J3JCBL03M-A2-L and MR-EKCBL□M-H	④ and ⑤ on P.109 in this catalog.	
				Standard	Two types of cables are required: MR-J3JCBL03M-A2-L and MR-EKCBL□M-L		
		IP65	Motor shaft side	Long bending life	Two types of cables are required: MR-J3JSCBL03M-A1-L and MR-J3ENSCBL□M-H	⑦ and ⑨ on P.109 in this catalog.	
				Standard	Two types of cables are required: MR-J3JSCBL03M-A1-L and MR-J3ENSCBL□M-L		
			Opposite of motor shaft	Long bending life	Two types of cables are required: MR-J3JSCBL03M-A2-L and MR-J3ENSCBL□M-H	⑧ and ⑨ on P.109 in this catalog.	
				Standard	Two types of cables are required: MR-J3JSCBL03M-A2-L and MR-J3ENSCBL□M-L		
B	2 to 50m	IP67	—	Long bending life	MR-J3ENSCBL□M-H	⑨ on P.109 in this catalog.	Select one from the list.
	2 to 30m			Standard	MR-J3ENSCBL□M-L		
C	2 to 50m	IP67	—	Long bending life	MR-ENECBL□M-H	⑫ on P.110 in this catalog.	—

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

● Servo motor power supply cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10m or shorter (Direct connection type)	IP65	Motor shaft side	Long bending life	MR-PWS1CBL□M-A1-H	⑮ on P.110 in this catalog.	Select one from the list.
				Standard	MR-PWS1CBL□M-A1-L		
			Opposite of motor shaft	Long bending life	MR-PWS1CBL□M-A2-H	⑯ on P.110 in this catalog.	
				Standard	MR-PWS1CBL□M-A2-L		
	Exceeding 10m (Relay type)	IP55	Motor shaft side	Standard	Connect a user-manufactured cable to MR-PWS2CBL03M-A1-L (optional cable).	⑰ on P.110 in this catalog.	
			Opposite of motor shaft		Connect a user-manufactured cable to MR-PWS2CBL03M-A2-L (optional cable).	⑱ on P.110 in this catalog.	

	IP rating (Note 1)	Servo motor	Model	Reference	Note
B	IP67	HF-SP51, 81 HF-SP52(4), 102(4), 152(4) HF-JP53(4), 73(4), 103(4), 153(4), 203(4), 3534, 5034	Manufacture a cable that fits to MR-PWCNS4 (optional connector set).	⑲ on P.110 in this catalog.	Select one that is compatible with the servo motor.
		HF-SP121, 201, 301 HF-SP202(4), 352(4), 502(4) HF-JP353, 503	Manufacture a cable that fits to MR-PWCNS5 (optional connector set).	⑳ on P.110 in this catalog.	
		HF-SP421, 702(4) HF-JP11K1M(4), 15K1M(4) HA-LP702	Manufacture a cable that fits to MR-PWCNS3 (optional connector set).	㉑ on P.111 in this catalog.	
C	IP67	HC-LP52, 102, 152 HC-RP103, 153, 203 HC-UP72, 152	Manufacture a cable that fits to MR-PWCNS1 (optional connector set).	㉒ on P.111 in this catalog.	
		HC-LP202, 302 HC-RP353, 503 HC-UP202, 352, 502 HA-LP502	Manufacture a cable that fits to MR-PWCNS2 (optional connector set).	㉓ on P.111 in this catalog.	

● Electromagnetic brake cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10m or shorter (Direct connection type)	IP65	Motor shaft side	Long bending life	MR-BKS1CBL□M-A1-H	㉔ on P.111 in this catalog.	Select one from the list.
				Standard	MR-BKS1CBL□M-A1-L		
			Opposite of motor shaft	Long bending life	MR-BKS1CBL□M-A2-H	㉕ on P.111 in this catalog.	
				Standard	MR-BKS1CBL□M-A2-L		
	Exceeding 10m (Relay type)	IP55	Motor shaft side	Standard	Connect a user-manufactured cable to MR-BKS2CBL03M-A1-L (optional cable).	㉖ on P.111 in this catalog.	
			Opposite of motor shaft		Connect a user-manufactured cable to MR-BKS2CBL03M-A2-L (optional cable).	㉗ on P.111 in this catalog.	

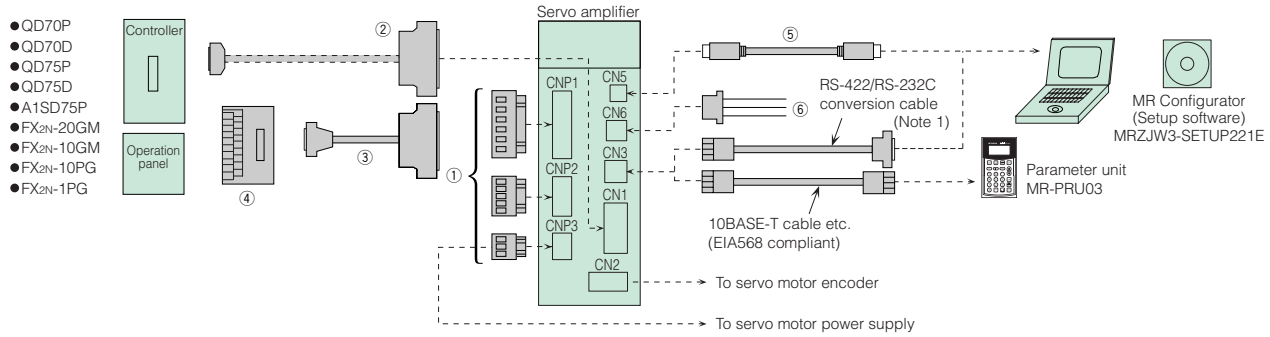
	IP rating (Note 1)	Servo motor	Model	Reference	Note
B	IP67	HF-SP series HF-JP53(4)B, 73(4)B, 103(4)B, 153(4)B, 203(4)B, 353(4)B, 503(4)B	Manufacture a cable that fits to MR-BKCNS1 (optional connector set) (straight type).	㉘ on P.111 in this catalog.	Select one that is compatible with the servo motor.
			Manufacture a cable that fits to MR-BKCNS1A (optional connector set) (angled type).	㉙ on P.111 in this catalog.	
C	IP67	HF-JP11K1M(4)B, 15K1M(4)B HC-LP202B, 302B HC-UP202B, 352B, 502B HA-LP601(4)B, 801(4)B, 12K1(4)B, 701M(4)B, 11K1M(4)B, 15K1M(4)B, 11K2(4)B, 15K2(4)B, 22K2(4)B	Manufacture a cable that fits to MR-BKCN (optional connector set).	㉚ on P.111 in this catalog.	

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

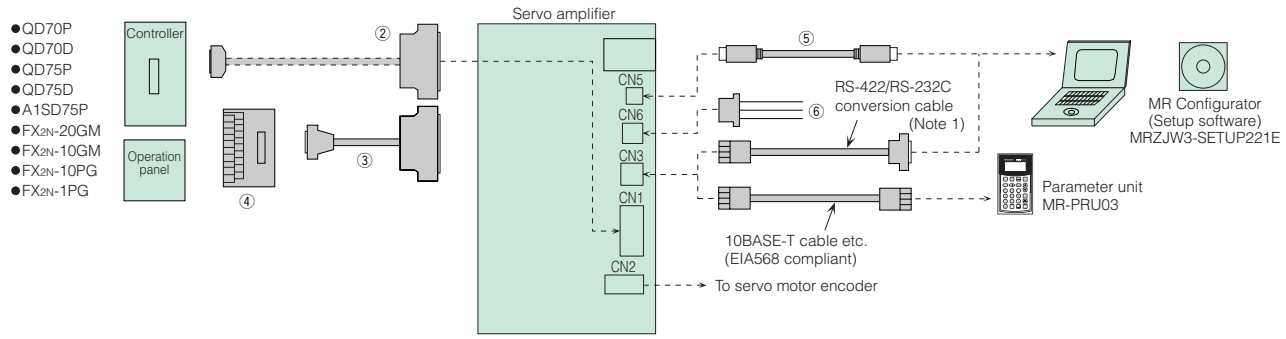
Options

● Cables and connectors for MR-J3-A

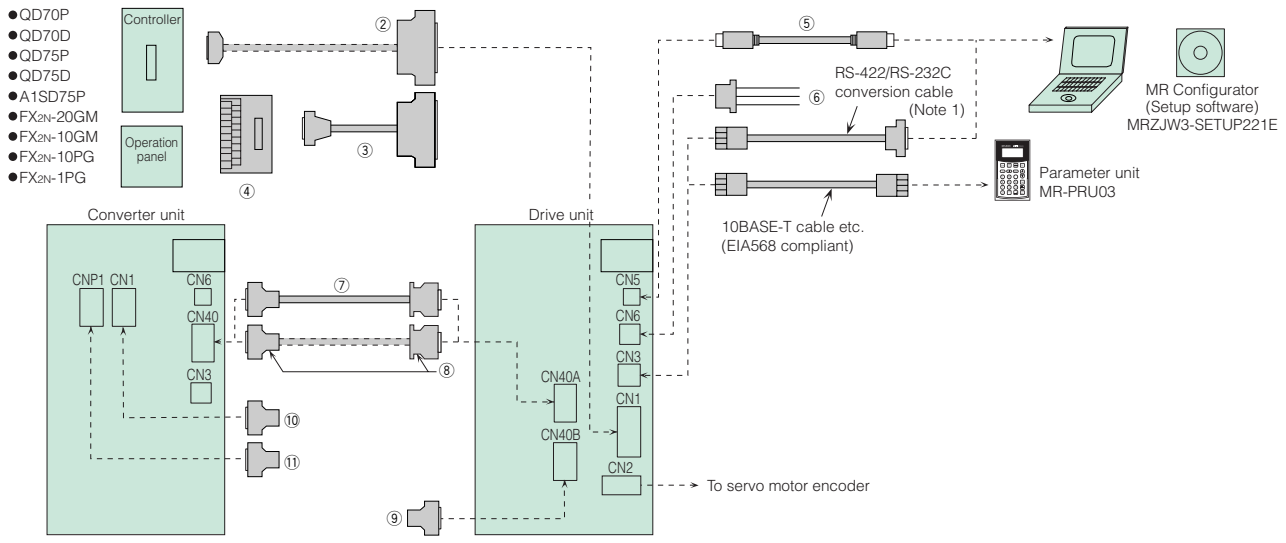
<For servo amplifier MR-J3-□A/A1/A4 3.5kW or smaller (200V) and 2kW or smaller (400V)>



<For servo amplifier MR-J3-□A/A4 5kW to 22kW (200V) and 3.5kW to 22kW (400V)>



<For drive unit MR-J3-DU□A/A4>



Notes: 1. Refer to “Ordering Information for Customers” in this catalog.

● Cables and connectors for MR-J3-A

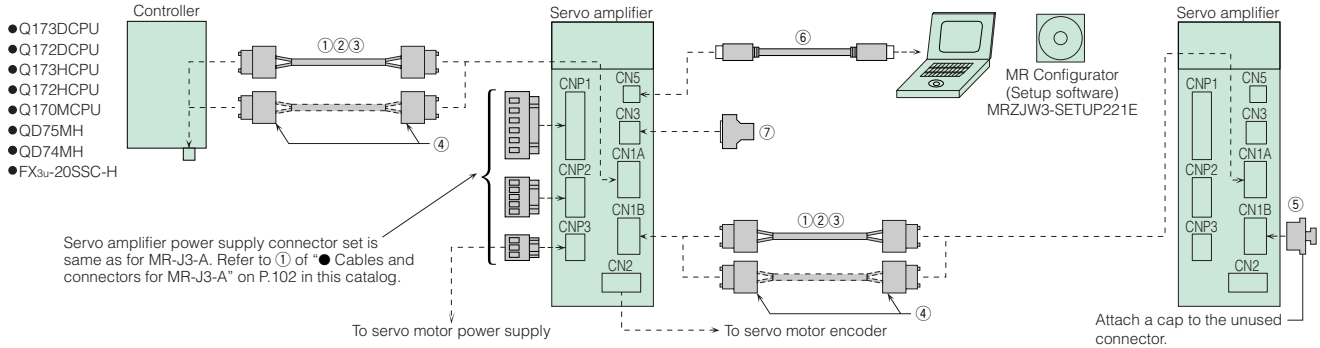
Item				Model	IP rating	Description
For CNP1, CNP2 and CNP3	①	Servo amplifier power supply connector set (Note 4)	For MR-J3-100A/B (-RJ006)/T or smaller MR-J3-40A1/B1 (-RJ006)/T1 or smaller	(Standard accessory: Insertion type)	—	CNP1 connector: 54928-0670 (connector) (Molex or an equivalent product) CNP2 connector: 54927-0520 (connector) (Molex or an equivalent product) CNP3 connector: 54928-0370 (connector) (Molex or an equivalent product) Insertion tool: 54932-0000 (Molex or an equivalent product) <Applicable cable example> (Note 3) Wire size: 0.14mm² (AWG26) to 2.5mm² (AWG14) Completed cable outer diameter: up to ϕ3.8mm
			For MR-J3-350A MR-J3-350B MR-J3-200B-RJ006 MR-J3-350B-RJ006 MR-J3-350T			CNP1 connector: PC 4/ 6-STF-7,62-CRWH (connector) (PHOENIX or an equivalent product) CNP2 connector: 54927-0520 (connector) (Molex or an equivalent product) CNP3 connector: PC 4/ 3-STF-7,62-CRWH (connector) (PHOENIX or an equivalent product) Insertion tool: 54932-0000 (Molex or an equivalent product) <Applicable cable example> (Note 3) Wire size: 0.2mm² (AWG24) to 5.5mm² (AWG10) Completed cable outer diameter: up to ϕ5mm
			For MR-J3-200A (Note 5) MR-J3-200B (Note 5) MR-J3-200T (Note 5) MR-J3-200A4 or smaller MR-J3-200B4 or smaller MR-J3-200B4-RJ006 or smaller MR-J3-200T4 or smaller			CNP1 connector: 721-207/026-000 (plug) (WAGO or an equivalent product) CNP2 connector: 721-205/026-000 (plug) (WAGO or an equivalent product) CNP3 connector: 721-203/026-000 (plug) (WAGO or an equivalent product) Insertion tool: 231-131 (WAGO or an equivalent product) <Applicable cable example> (Note 3) Wire size: 0.08mm² (AWG28) to 2.5mm² (AWG12) Completed cable outer diameter: up to ϕ4.1mm
For CN1	②	CN1 connector set		MR-J3CN1	—	Amplifier connector (3M or an equivalent product) 10150-3000PE (connector) 10350-52F0-008 (shell kit)
	③	Junction terminal block cable		MR-J2M-CN1TBL□M □=cable length: 0.5, 1m	—	Junction terminal block connector (3M) D7950-B500FL (connector) Amplifier connector (3M or an equivalent product) 10150-6000EL (connector) 10350-3210-000 (shell kit) (Note 1)
	④	Junction terminal block		MR-TB50	—	
For CN5	⑤	Personal computer communication cable	USB cable	MR-J3USBCBL3M Cable length: 3m	—	Amplifier connector mini-B connector (5 pins) Personal computer connector A connector
For CN6	⑥	Monitor cable		MR-J3CN6CBL1M Cable length: 1m	—	Amplifier connector (Molex) 51004-0300 (housing) 50011-8100 (terminal)
For drive unit CN40A and converter unit CN40	⑦	Protection coordination cable		MR-J3CDL05M Cable length: 0.5m	—	Converter unit connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 2) Drive unit connector (HONDA TSUSHIN KOGYO) PCR-S20FS+(connector) PCR-LS20LA1 (case)
	⑧	Connector set		MR-J2CN1-A	—	Converter unit connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 2) Drive unit connector (HONDA TSUSHIN KOGYO) PCR-S20FS+(connector) PCR-LS20LA1 (case)
For drive unit CN40B	⑨	Terminal connector		MR-J3-TM	—	Terminal connector
For converter unit	⑩	Control signal connector (for CN1)		(Standard accessory)	—	Converter unit connector (DDK) 17JE23090-02(D8A)K11-CG (connector)
	⑪	Magnetic contactor control connector (for CNP1)		(Standard accessory)	—	Converter unit connector (PHOENIX) GFKC 2,5/ 2-STF-7,62 (socket)

Notes: 1. The connector and the shell kit are of press bonding type. Models for soldered type are 10150-3000PE (connector) and 10350-52F0-008 (shell kit).
2. The connector and the shell kit are of soldered type. Models for press bonding type are 10120-6000EL (connector) and 10320-3210-000 (shell kit).
3. Refer to "Peripheral Equipment ● Electrical wires, circuit breakers, magnetic contactors (example of selection)" in this catalog for details on examples of wire size selection.
4. This connector set is not required for 200V 5kW or larger and 400V 3.5kW or larger servo amplifiers since terminal blocks are mounted. Refer to "Servo Amplifier Dimensions" in this catalog for more details.
5. MR-J3-200A/B/T have been modified from January 2008 production. Due to the modification, the appearance of the servo amplifier and CNP1, CNP2 and CNP3 connectors have changed. The previous model is also available. Contact your local sales office for more details.

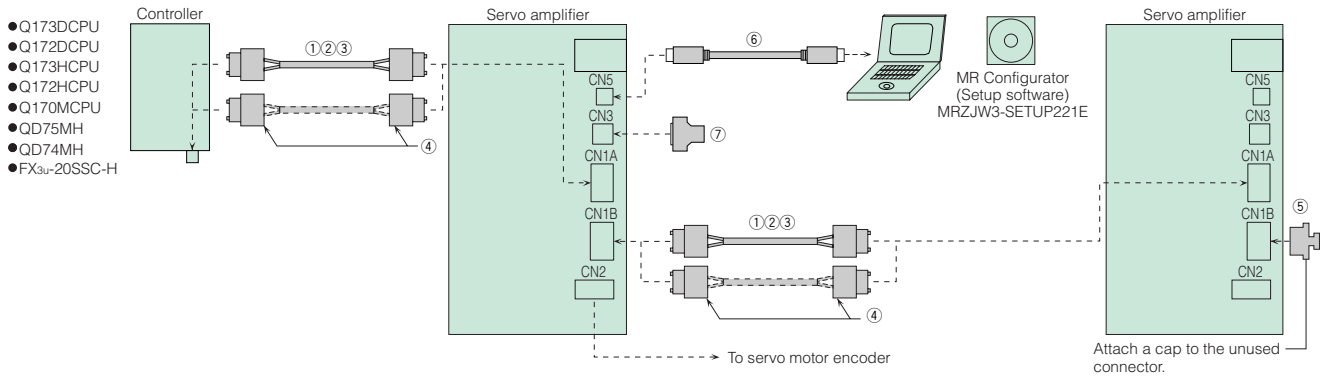
Options

● Cables and connectors for MR-J3-B

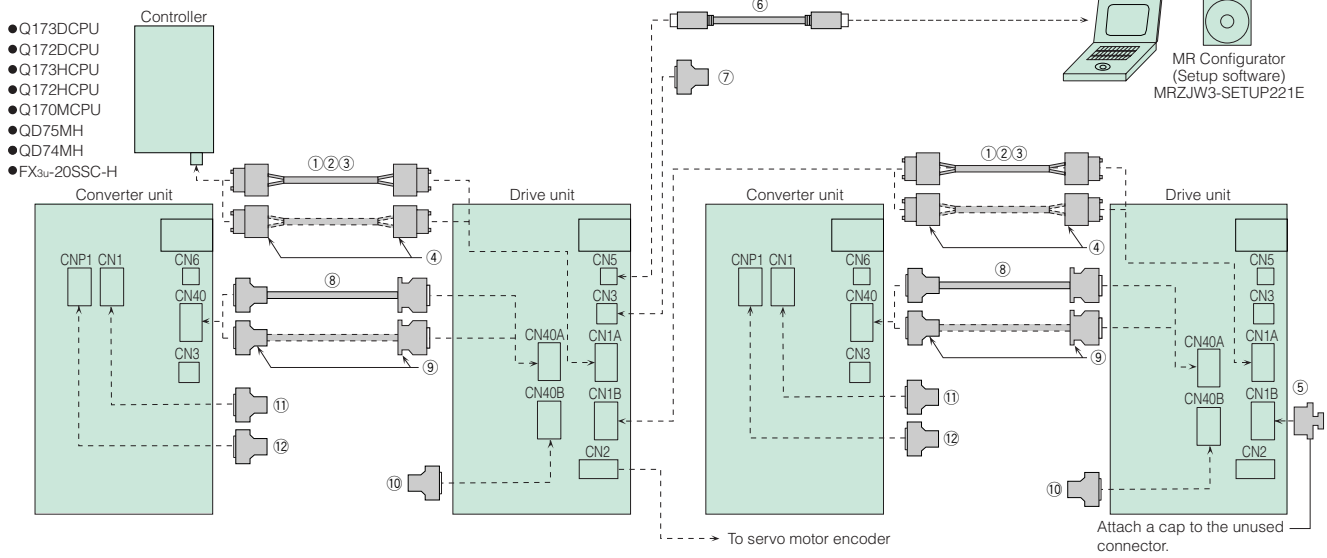
<For servo amplifier MR-J3-□B/B1/B4 3.5kW or smaller (200V) and 2kW or smaller (400V)>



<For servo amplifier MR-J3-□B/B4 5kW to 22kW (200V) and 3.5kW to 22kW (400V)>

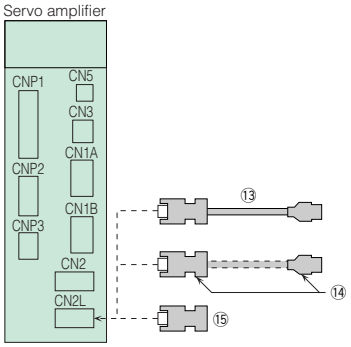


<For drive unit MR-J3-DU□B/B4>



<For Servo amplifier MR-J3-□B/B1/B4-RJ006>

Options other than for CN2L connector are same as those for MR-J3-B. Refer to the above illustrations.



Necessary options for CN2L connector vary depending on a linear encoder.
Refer to "MR-J3-□B-RJ006 SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

● Cables and connectors for MR-J3-B

Servo amplifier power supply connector set is same as for MR-J3-A. Refer to ① of "● Cables and connectors for MR-J3-A" on P.102 in this catalog.

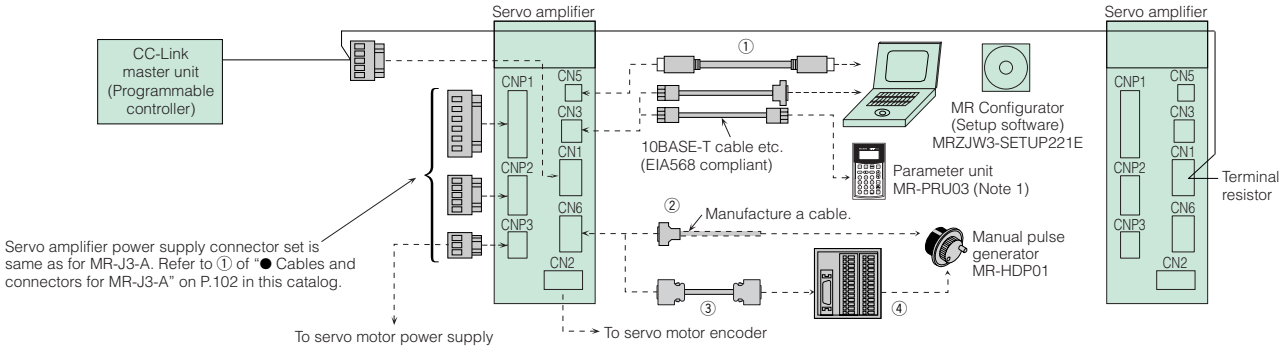
Item				Model	IP rating (Note 5)	Description
For controller, CN1A and CN1B	①	SSCNET Ⅲ cable (Note 4) (Standard cord for inside panel)		MR-J3BUS□M □=cable length: 0.15, 0.3, 0.5, 1, 3m	—	Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) — Connector (Japan Aviation Electronics Industry) PF-2D103 (connector)
	②	SSCNET Ⅲ cable (Note 4) (Standard cable for outside panel)		MR-J3BUS□M-A □=cable length: 5, 10, 20m	—	
	③	SSCNET Ⅲ cable (Note 4) (Long distance cable, long bending life)		MR-J3BUS□M-B □=cable length: 30, 40, 50m (Note 2)	—	Connector (Japan Aviation Electronics Industry) CF-2D103-S (connector) — Connector (Japan Aviation Electronics Industry) CF-2D103-S (connector)
	④	Connector set for SSCNET Ⅲ (Note 4)		MR-J3BCN1 (Note 3)	—	Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) — Connector (Japan Aviation Electronics Industry) PF-2D103 (connector)
For CN1B	⑤	Connector cap for SSCNET Ⅲ		(Standard accessory)	—	
For CN5	⑥	Personal computer communication cable	USB cable	MR-J3USBCBL3M Cable length: 3m	—	Amplifier connector mini-B connector (5 pins) — Personal computer connector A connector Note: This cable cannot be used with the SSCNET Ⅲ compatible controller.
For CN3	⑦	Input/output signal connector set		MR-CCN1	—	Amplifier connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 1)
For drive unit CN40A and converter unit CN40	⑧	Protection coordination cable		MR-J3CDL05M Cable length: 0.5m	—	Converter unit connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 1) Drive unit connector (HONDA TSUSHIN KOGYO) PCR-S20FS+(connector) PCR-LS20LA1 (case)
	⑨	Connector set		MR-J2CN1-A	—	Converter unit connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 1) Drive unit connector (HONDA TSUSHIN KOGYO) PCR-S20FS+(connector) PCR-LS20LA1 (case)
For drive unit CN40B	⑩	Terminal connector		MR-J3-TM	—	Terminal connector
For converter unit	⑪	Control signal connector (for CN1)		(Standard accessory)	—	Converter unit connector (DDK) 17JE23090-02(D8A)K11-CG (connector)
	⑫	Magnetic contactor control connector (for CNP1)		(Standard accessory)	—	Converter unit connector (PHOENIX) GFKC 2,5/ 2-STF-7,62 (socket)
For CN2L	⑬	CN2L cable		MR-EKCBL□M-H □=cable length: 2, 5,10m	IP20	Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Junction connector (Tyco Electronics) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)
	⑭	Junction connector set (for CN2L)		MR-ECNM	IP20	Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Junction connector (Tyco Electronics) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL) <Applicable cable example> Wire size: 0.3mm² (AWG22) Completed cable outer diameter: ϕ8.2mm Crimping tool (91529-1) is required.
	⑮	Connector set (for CN2L)		MR-J3CN2	—	Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)

Notes: 1. The connector and the shell kit are of soldered type. Models for press bonding type are 10120-6000EL (connector) and 10320-3210-000 (shell kit).
2. For the ultra-long bending life cables and/or for unlisted lengths which are 20m or shorter (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
3. Special tools are required. Contact your local sales office for details.
4. Look carefully through the precautions enclosed with the options before use.
5. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

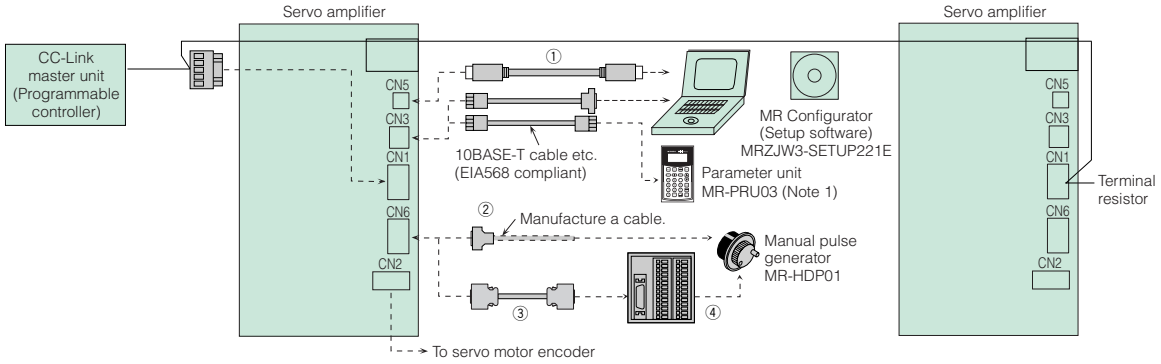
Options

● Cables and connectors for MR-J3-T

<For servo amplifier MR-J3-□T/T1/T4 3.5kW or smaller (200V) and 2kW or smaller (400V)>

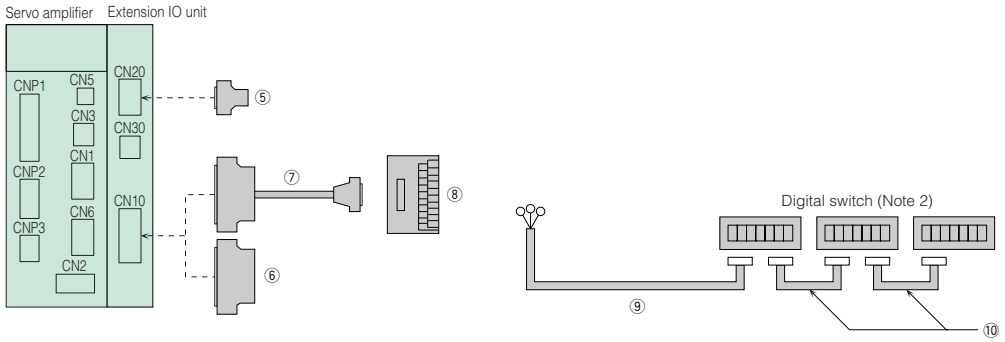


<For servo amplifier MR-J3-□T/T4 5kW to 22kW (200V) and 3.5kW to 22kW (400V)>



<Using MR-J3-D01 extension IO unit>

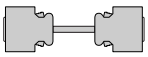
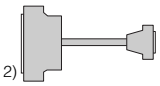
Options for the servo amplifier are same as when the MR-J3-D01 is not used. Refer to the above illustrations.



Notes: 1. Refer to "Options ● Parameter unit (MR-PRU03)" for details.
2. Refer to "Options ● 6-digit digital switch (MR-DS60)" for details.

● Cables and connectors for MR-J3-T

Servo amplifier power supply connector set is same as for MR-J3-A. Refer to ① of "● Cables and connectors for MR-J3-A" on P.102 in this catalog.

Item				Model	IP rating	Description
For CN5	①	Personal computer communication cable	USB cable	MR-J3USBCBL3M Cable length: 3m	—	Amplifier connector mini-B connector (5 pins) Personal computer connector A connector 
For CN6	②	Connector set (for CN6)		MR-J2CMP2	—	 Amplifier connector (3M or an equivalent product) 10126-3000PE (connector) 10326-52F0-008 (shell kit)
	③	Junction terminal block cable		MR-TBNATBL□M □=cable length: 0.5, 1m	—	Junction terminal block connector (3M or an equivalent product) 10126-6000EL (connector) 10326-3210-000 (shell kit)  Amplifier connector (3M or an equivalent product) 10126-6000EL (connector) 10326-3210-000 (shell kit)
	④	Junction terminal block		MR-TB26A	—	
For CN20	⑤	Input/output signal connector set		MR-CCN1	—	 Amplifier connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 1)
For CN10	⑥	Input/output signal connector set		MR-J3CN1	—	 Amplifier connector (3M or an equivalent product) 10150-3000PE (connector) 10350-52F0-008 (shell kit)
	⑦	Junction terminal block cable		MR-J2M-CN1TBL□M □=cable length: 0.5, 1m	—	Amplifier connector (3M or an equivalent product) 10150-6000EL (connector) 10350-3210-000 (shell kit) (Note 2)  Junction terminal block connector (3M) D7950-B500FL (connector)
	⑧	Junction terminal block		MR-TB50	—	
	⑨	Digital switch cable (for between MR-DS60 and MR-J3-D01)		MR-DSCBL□M-G □=cable length: 3, 5, 10m	—	
	⑩	Digital switch cable (for between each MR-DS60)		MR-DSCBL□ □=cable length: 25, 100cm	—	

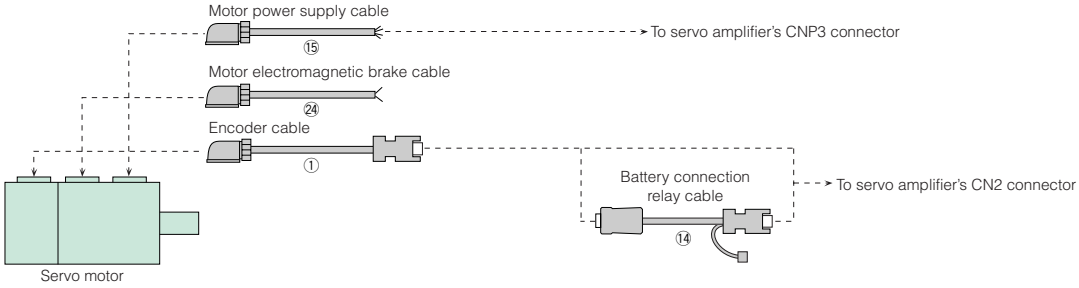
Notes: 1. The connector and the shell kit are of soldered type. Models for press bonding type are 10120-6000EL (connector) and 10320-3210-000 (shell kit).
2. The connector and the shell kit are of press bonding type. Models for soldered type are 10150-3000PE (connector) and 10350-52F0-008 (shell kit).

Options

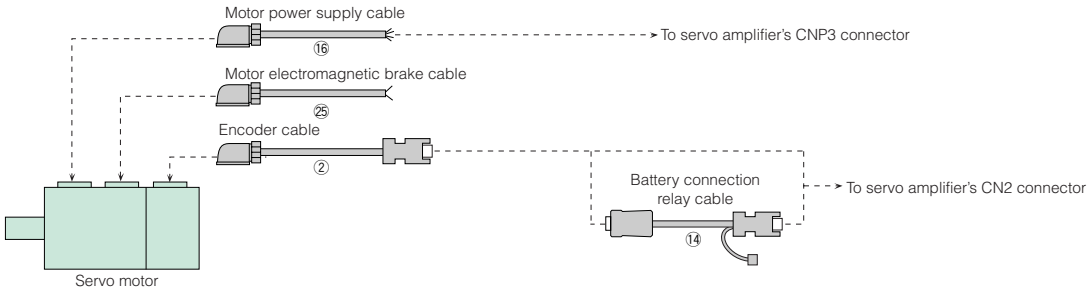
● Cables and connectors for servo motor

<For HF-KP/HF-MP servo motor series: encoder cable length 10m or shorter>

● For leading the cables out in a direction of the motor shaft

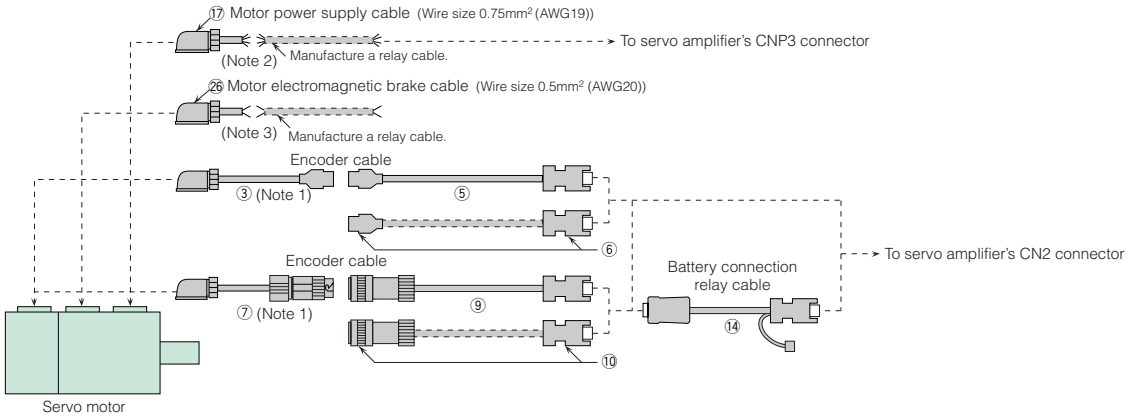


● For leading the cables out in an opposite direction of the motor shaft

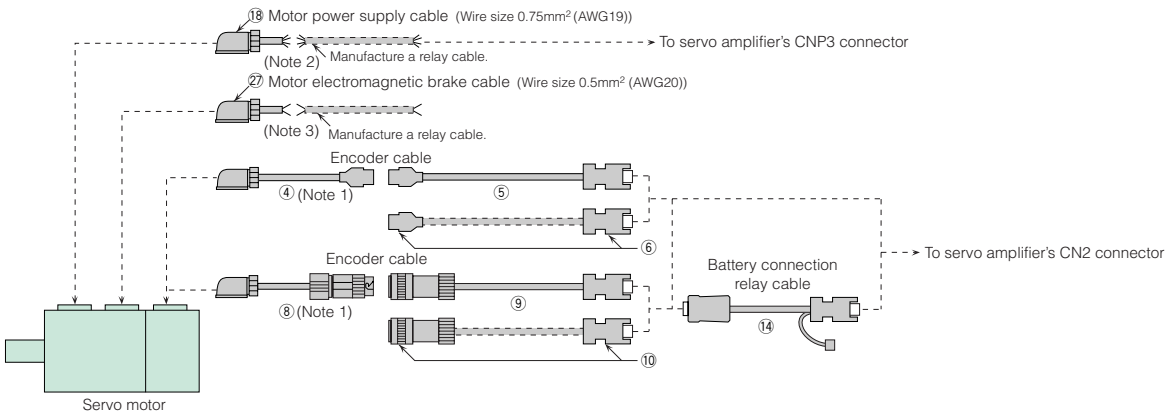


<For HF-KP/HF-MP servo motor series: encoder cable length over 10m>

● For leading the cables out in a direction of the motor shaft

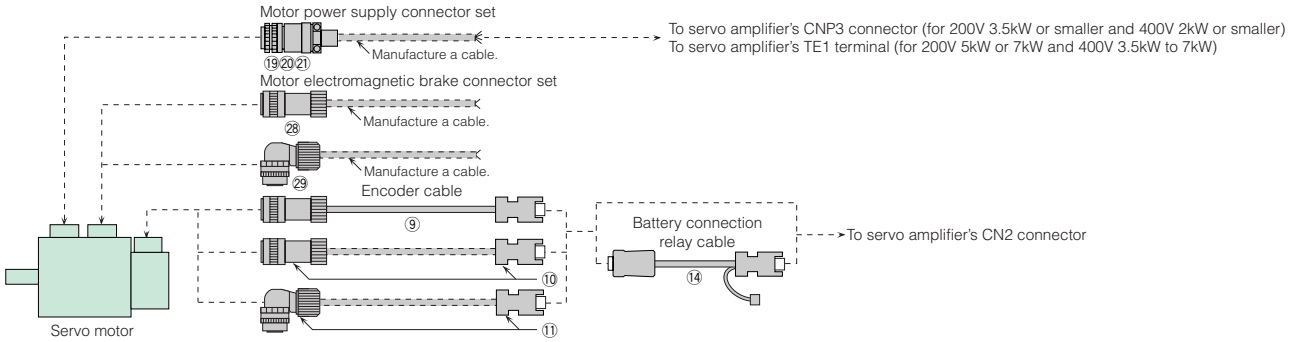


● For leading the cables out in an opposite direction of the motor shaft

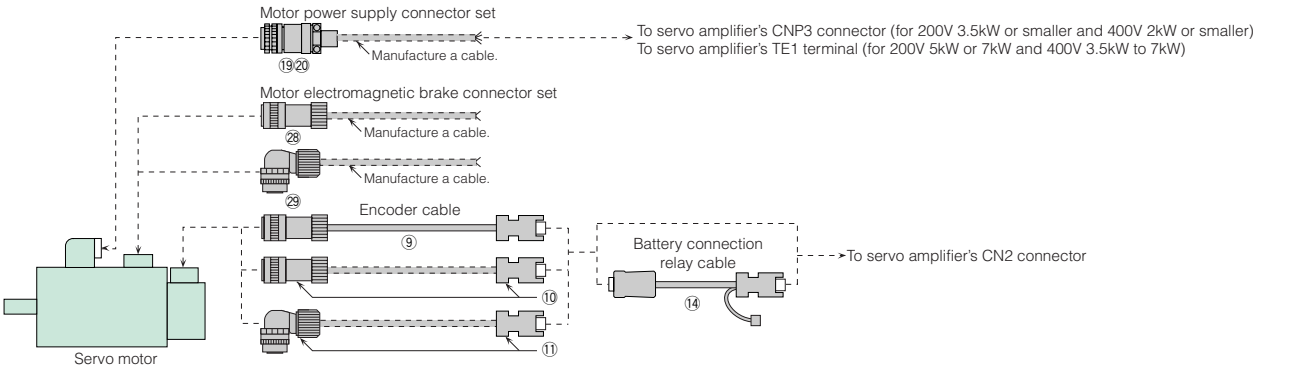


Notes: 1. This cable does not have a long bending life, so always fix the cable before using.
2. If the length exceeds 10m, relay a cable using MR-PWS2CBL03M-A1-L/-A2-L cable. This cable does not have a long bending life, so always fix the cable before using. Refer to "MR-J3 SERVO AMPLIFIER INSTRUCTION MANUAL" for details on manufacturing the relay cable.
3. If the length exceeds 10m, relay a cable using MR-BKS2CBL03M-A1-L/-A2-L cable. This cable does not have a long bending life, so always fix the cable before using. Refer to "MR-J3 SERVO AMPLIFIER INSTRUCTION MANUAL" for details on manufacturing the relay cable.

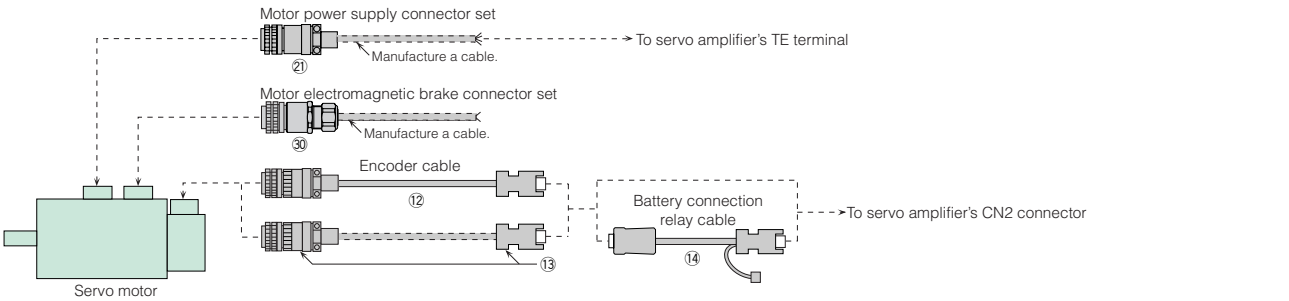
<For HF-SP servo motor series>



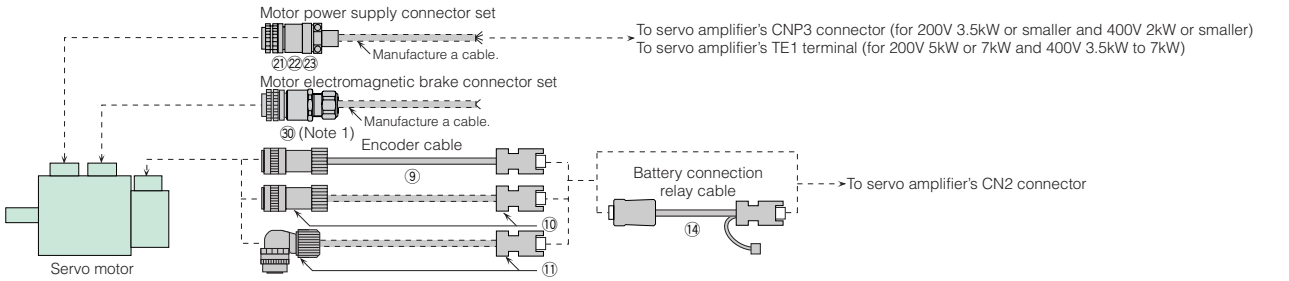
<For HF-JP servo motor series 5kW or smaller>



<For HF-JP servo motor series 11kW and 15kW>

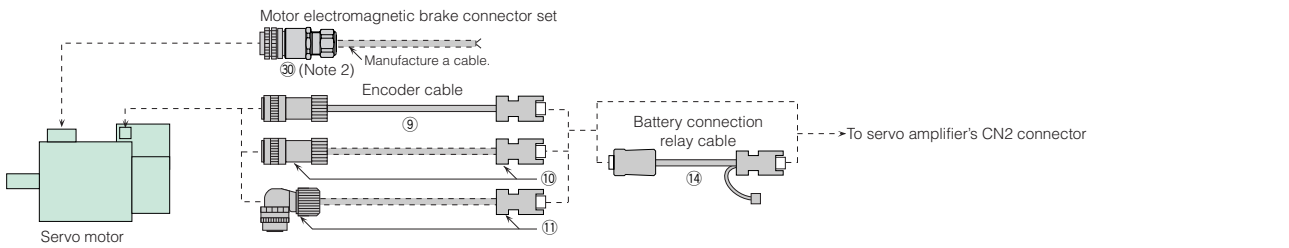


<For HC-LP/HC-RP/HC-UP servo motor series or HA-LP502/702>



Notes: 1. An electromagnetic brake connector set is not required for HC-RP series and 1.5kW or smaller of HC-LP/HC-UP series as the power supply connector has electromagnetic brake terminals.

<For HA-LP servo motor series (Note 1)>



Notes: 1. HA-LP502 and 702 are excluded.
2. Servo motors with an electromagnetic brake are available in 12kW or smaller for HA-LP 1000r/min series, 15kW or smaller for HA-LP 1500r/min series and 11kW to 22kW for HA-LP 2000r/min series.

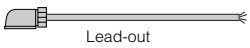
Options

● Cables and connectors for servo motor

Item				Model	IP rating (Note 2)	Description
For encoder	①	10m or shorter (Direct connection type)	Encoder cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-J3ENCBL□M-A1-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	Encoder connector (Tyco Electronics) 1674320-1  Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)
				MR-J3ENCBL□M-A1-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	②		Encoder cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-J3ENCBL□M-A2-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	
				MR-J3ENCBL□M-A2-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	③	Exceeding 10m (Relay type)	Motor-side encoder cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-J3JCBL03M-A1-L Cable length: 0.3m (Note 1)	IP20	Encoder connector (Tyco Electronics) 1674320-1  Use this in combination of ⑤ or ⑥. Junction connector (Tyco Electronics) 1473226-1 (with ring) (contact) 1-172169-9 (housing) 316454-1 (cable clamp)
	④		Motor-side encoder cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-J3JCBL03M-A2-L Cable length: 0.3m (Note 1)	IP20	
	⑤		Amplifier-side encoder cable for HF-KP/HF-MP series	MR-EKCBL□M-H □=cable length: 20, 30, 40, 50m (Note 1, 3)	IP20	Junction connector (Tyco Electronics) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)  Use this in combination of ③ or ④. Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)
				MR-EKCBL□M-L □=cable length: 20, 30m (Note 1)	IP20	
	⑥		Junction connector set for HF-KP/HF-MP series	MR-ECNM	IP20	Junction connector (Tyco Electronics) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)  <Applicable cable example> Wire size: 0.3mm² (AWG22) Completed cable outer diameter: ϕ8.2mm Crimping tool (91529-1) is required. Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Use these in combination of ③ or ④.
	⑦		Motor-side encoder cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-J3JSCBL03M-A1-L Cable length: 0.3m (Note 1)	IP65 (Note 5)	Encoder connector (Tyco Electronics) 1674320-1  Use these in combination of ⑨ or ⑩. Junction connector (DDK) CM10-CR10P-M (cable receptacle)
	⑧		Motor-side encoder cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-J3JSCBL03M-A2-L Cable length: 0.3m (Note 1)	IP65 (Note 5)	
	⑨	Encoder cable for HF-KP/HF-MP/HF-SP/HC-LP/ HC-RP/HC-UP/HA-LP series HF-JP53, 73, 103, 153, 203, 353, 503, 534, 734, 1034, 1534, 2034, 3534, 5034		MR-J3ENSCBL□M-H □=cable length: 2, 5, 10, 20, 30, 40, 50m (Note 1, 3, 4)	IP67	 Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) <For 10m or shorter cable> CM10-SP10S-M (D6) (straight plug) CM10-#22SC(C1) (D8)-100 (socket contact) <For exceeding 10m> CM10-SP10S-M (D6) (straight plug) CM10-#22SC(C2) (D8)-100 (socket contact) Use these in combination of ⑦ or ⑧ for HF-KP/HF-MP series.
				MR-J3ENSCBL□M-L □=cable length: 2, 5, 10, 20, 30m (Note 1, 4)	IP67	
	⑩	Encoder connector set for HF-KP/HF-MP/HF-SP/HC-LP/ HC-RP/HC-UP/HA-LP series HF-JP53, 73, 103, 153, 203, 353, 503, 534, 734, 1034, 1534, 2034, 3534, 5034		MR-J3SCNS (Note 4)	IP67	 Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) CM10-SP10S-M (D6) (straight plug) CM10-#22SC(S1) (D8)-100 (socket contact) <Applicable cable example> Wire size: 0.5mm² (AWG20) or smaller Completed cable outer diameter: ϕ6.0mm to ϕ9.0mm Use these in combination of ⑦ or ⑧ for HF-KP/HF-MP series.
	⑪	Encoder connector set for HF-SP/HC-LP/HC-RP/HC-UP/ HA-LP series HF-JP53, 73, 103, 153, 203, 353, 503, 534, 734, 1034, 1534, 2034, 3534, 5034		MR-J3SCNSA (Note 4)	IP67	 Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) CM10-AP10S-M(D6) (angled plug) CM10-#22SC(S1)(D8)-100 (socket contact) <Applicable cable example> Wire size: 0.5mm² (AWG20) or smaller Completed cable outer diameter: ϕ6.0mm to ϕ9.0mm

Notes: 1. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
2. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
3. For the ultra-long bending life cables and/or for unlisted lengths (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
4. Select from below if there is a potential risk that a high vibration may be applied to connectors.
Encoder cable: MR-J3ENSCBL□M-H-S06 (long bending life) or MR-J3ENSCBL□M-L-S06 (standard bending life)
Encoder connector set: MR-J3SCNS-S06 (straight type) or MR-J3SCNSA-S06 (angled type)
Connector cover: MR-J3ENS-CVR (straight type) or MR-J3ENSA-CVR (angled type)
Be sure to use this connector cover when using the encoder cable or the encoder connector set in the table.
Contact your local sales office for more details.
5. The encoder cable is rated IP65 while the junction connector is rated IP67.

● Cables and connectors for servo motor

Item				Model	IP rating (Note 2)	Description
For encoder	⑫	Encoder cable for HF-JP11K1M, 15K1M, 11K1M4, 15K1M4		MR-ENECBL□M-H □=cable length: 2, 5, 10, 20, 30, 40, 50m (Note 1, 4)	IP67	Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) D/MS3106A20-29S(D190) (plug) CE02-20BS-S-D (backshell) (straight) CE3057-12A-3-D (cable clamp) 
	⑬	Encoder connector set for HF-JP11K1M, 15K1M, 11K1M4, 15K1M4		MR-ENECNS	IP67	Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) D/MS3106A20-29S(D190) (plug) CE02-20BS-S-D (backshell) (straight) CE3057-12A-3-D (cable clamp) 
	⑭	Battery connection relay cable		MR-J3BTCBL03M Cable length: 0.3m (Note 3)	—	Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)  Junction connector (3M) 36110-3000FD (plug) 36310-F200-008 (shell kit) Battery connector (HIROSE ELECTRIC) DF3-2EP-2C (plug) DF3-EP2428PCA (Crimping terminal for plug) 2 pcs. Not required when the servo system is used in incremental mode. Refer to "Options ● Battery connection relay cable" for details.
For servo motor power supply	⑮	10m or shorter (Direct connection type)	Power supply cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-PWS1CBL□M-A1-H □=cable length: 2, 5, 10m (Note 1, 4)	IP65	Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04SJ1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
				MR-PWS1CBL□M-A1-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	⑯		Power supply cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-PWS1CBL□M-A2-H □=cable length: 2, 5, 10m (Note 1, 4)	IP65	
				MR-PWS1CBL□M-A2-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	⑰	Exceeding 10m (Relay type)	Power supply cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-PWS2CBL03M-A1-L Cable length: 0.3m (Note 1)	IP55	Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04SJ2-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
	⑱		Power supply cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-PWS2CBL03M-A2-L Cable length: 0.3m (Note 1)	IP55	
	⑲	Power supply connector set for HF-SP51, 81, 52, 102, 152, 524, 1024, 1524 HF-JP53, 73, 103, 153, 203, 534, 734, 1034, 1534, 2034, 3534, 5034		MR-PWCNS4 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A18-10SD-D-BSS (plug) (straight) CE3057-10A-1-D (cable clamp) <Applicable cable example> Wire size: 2mm² (AWG14) to 3.5mm² (AWG12) Completed cable outer diameter: ϕ10.5mm to ϕ14.1mm
	⑳	Power supply connector set for HF-SP121, 201, 301, 202, 352, 502, 2024, 3524, 5024 HF-JP353, 503		MR-PWCNS5 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A22-22SD-D-BSS (plug) (straight) CE3057-12A-1-D (cable clamp) <Applicable cable example> Wire size: 5.5mm² (AWG10) to 8mm² (AWG8) Completed cable outer diameter: ϕ12.5mm to ϕ16mm

Notes: 1. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
2. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
3. The battery connection relay cable (MR-J3BTCBL03M) has a diode built-in. Do not manufacture this cable. This optional cable must be used.
4. For the ultra-long bending life cables and/or for unlisted lengths (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp

Options

● Cables and connectors for servo motor

Item				Model	IP rating (Note 2)	Description
For servo motor power supply	㉑	Power supply connector set for HF-SP421, 702, 7024 HF-JP11K1M, 15K1M, 11K1M4, 15K1M4 HA-LP702		MR-PWCNS3 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A32-17SD-D-BSS (plug) (straight) CE3057-20A-1-D (cable clamp) <Applicable cable example> Wire size: 14mm² (AWG6) to 22mm² (AWG4) Completed cable outer diameter: ϕ22mm to ϕ23.8mm
	㉒	Power supply connector set for HC-LP52, 102, 152 HC-RP103, 153, 203 HC-UP72, 152		MR-PWCNS1 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A22-23SD-D-BSS (plug) (straight) CE3057-12A-2-D (cable clamp) <Applicable cable example> Wire size: 2mm² (AWG14) to 3.5mm² (AWG12) Completed cable outer diameter: ϕ9.5mm to ϕ13mm
	㉓	Power supply connector set for HC-LP202, 302 HC-RP353, 503 HC-UP202, 352, 502 HA-LP502		MR-PWCNS2 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A24-10SD-D-BSS (plug) (straight) CE3057-16A-2-D (cable clamp) <Applicable cable example> Wire size: 5.5mm² (AWG10) to 8mm² (AWG8) Completed cable outer diameter: ϕ13mm to ϕ15.5mm
For servo motor electromagnetic brake	㉔	10m or shorter (Direct connection type)	Brake cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-BKS1CBL□M-A1-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	Motor brake connector (Japan Aviation Electronics Industry) JN4FT02SJ1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
				MR-BKS1CBL□M-A1-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	㉕		Brake cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-BKS1CBL□M-A2-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	
				MR-BKS1CBL□M-A2-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	㉖	Exceeding 10m (Relay type)	Brake cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-BKS2CBL03M-A1-L Cable length: 0.3m (Note 1)	IP55	Motor brake connector (Japan Aviation Electronics Industry) JN4FT02SJ2-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
	㉗		Brake cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-BKS2CBL03M-A2-L Cable length: 0.3m (Note 1)	IP55	
	㉘	Brake connector set for HF-SP series HF-JP53B, 73B, 103B, 153B, 203B, 353B, 503B, 534B, 734B, 1034B, 1534B, 2034B, 3534B, 5034B		MR-BKCNS1 (Note 4) (Straight type)	IP67	 Motor brake connector (DDK) (soldered type) CM10-SP2S-L(D6)(straight plug) CM10-#22SC(S2)(D8)-100(socket contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) or smaller Completed cable outer diameter: ϕ9.0mm to ϕ11.6mm
	㉙	Brake connector set for HF-SP series HF-JP53B, 73B, 103B, 153B, 203B, 353B, 503B, 534B, 734B, 1034B, 1534B, 2034B, 3534B, 5034B		MR-BKCNS1A (Note 4) (Angled type)	IP67	 Motor brake connector (DDK) (soldered type) CM10-AP2S-L(D6) (angled plug) CM10-#22SC(S2)(D8)-100 (socket contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) or smaller Completed cable outer diameter: ϕ9.0mm to ϕ11.6mm
	㉚	Brake connector set for HF-JP11K1MB, 15K1MB, 11K1M4B, 15K1M4B HC-LP202B, 302B HC-UP202B, 352B, 502B HA-LP601B, 801B, 12K1B, 6014B, 8014B, 12K14B, 701MB, 11K1MB, 15K1MB, 701M4B, 11K1M4B, 15K1M4B, 11K2B, 15K2B, 22K2B, 11K24B, 15K24B, 22K24B		MR-BKCN (Straight type)	IP67	 Motor brake connector D/MS3106A10SL-4S(D190) (plug, DDK) YSO10-5 to 8 (cable clamp (straight), Daiwa Dengyo) <Applicable cable example> Wire size: 0.3mm² (AWG22) to 1.25mm² (AWG16) Completed cable outer diameter: ϕ5mm to ϕ8.3mm

Notes: 1. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
2. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
3. For the ultra-long bending life cables and/or for unlisted lengths (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
4. Select from below if there is a potential risk that a high vibration may be applied to connectors.
Brake connector set: MR-BKCNS1-S06 (straight type) or MR-BKCNS1A-S06 (angled type)
Connector cover: MR-J3ENS-CVR (straight type) or MR-J3ENSA-CVR (angled type)
Be sure to use this connector cover when using the brake connector set in the table.
Contact your local sales office for more details.

Ordering Information for Customers

To order the following products, contact the relevant manufacturers directly.
When manufacturing a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.

● Personal computer communication cable

Item	Model	Description
RS-422/RS-232C conversion cable	DSV-CABV	Amplifier connector — Personal computer connector  Manufacturer: Diatrend Corp.

● RS-422 connector

Item	Model	Description
RS-422 connector	TM10P-88P	 Manufacturer: HIROSE ELECTRIC CO., LTD.

● RS-422 branch connector (for multi-drop)

Item	Model	Description
Branch connector	BMJ-8	 Manufacturer: HACHIKO ELECTRIC CO., LTD.

● CC-Link twisted cable

Item	Model	Description
CC-Link twisted cable	FANC-110SBH	Manufacturer: Mitsubishi Electric System & Service Co., Ltd. (Note 2)

● Servo amplifier power supply connectors (press bonding type) ··· For 1kW or smaller

Item	Model	Description	Applicable cable example
Amplifier CNP1 connector	51241-0600 (connector) 56125-0128 (terminal)	 Manufacturer: Molex	Wire size: 0.75mm² (AWG18) to 2.5mm² (AWG14) Completed cable outer diameter: up to ϕ3.8mm Crimping tool (CNP57349-5300) is required.
Amplifier CNP2 connector	51240-0500 (connector) 56125-0128 (terminal)	 Manufacturer: Molex	
Amplifier CNP3 connector	51241-0300 (connector) 56125-0128 (terminal)	 Manufacturer: Molex	

● Encoder connectors
<Encoder connector (servo amplifier-side connector)>

Item	Model	Description
Servo amplifier CN2 connector set (Note 1)	54599-1019 (connector set) (gray)	 Manufacturer: Molex
	54599-1016 (connector set) (black)	

<For HF-KP/HF-MP series>

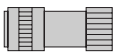
Servo motor	Model	Feature	Description	Applicable cable example
HF-KP/HF-MP series	1674320-1	IP65 (Note 3)	 Manufacturer: Tyco Electronics Corporation	Wire size: 0.14mm² (AWG26) to 0.3mm² (AWG22) Completed cable outer diameter: ϕ7.1 ± 0.3mm Crimping tools, 1596970-1 (for ground clip) and 1596847-1 (for receptacle contact), are required.

Notes: 1. 3M also manufactures a connector compatible with the servo amplifier's CN2 connector.
Model: 36210-0100PL (receptacle), 36310-3200-008 (shell kit).
2. Contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
3. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

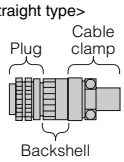
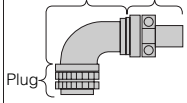
Ordering Information for Customers

● Encoder connectors

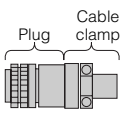
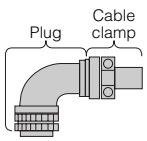
<For HF-SP/HF-JP (5kW or smaller)/HC-LP/HC-RP/HC-UP/HA-LP series>

Servo motor	Connector			Contact	Feature	Description	Applicable cable example	
	Type	Plug (Note 2)	Socket contact				Wire size	Completed cable outer diameter
HF-SP/HC-LP/ HC-RP/HC-UP/ HA-LP series/ HF-JP53, 73, 103, 153, 203, 353, 503, HF-JP534, 734, 1034, 1534, 2034, 3534, 5034	Straight	CM10-SP10S-M(D6)	CM10-#22SC(C1)(D8)-100	Press bonding type	IP67 (Note 1)	<Straight type>  Manufacturer: DDK Ltd.	0.3mm² (AWG22) to 0.5mm² (AWG20) Crimping tool (357J-50446T) is required.	ϕ6.0mm to ϕ9.0mm
			CM10-#22SC(C2)(D8)-100				0.08mm² (AWG28) to 0.25mm² (AWG23) Crimping tool (357J-50447T) is required.	
			CM10-#22SC(S1)(D8)-100	Soldered type			0.5mm² (AWG20) or smaller	
	Angled	CM10-AP10S-M(D6)	CM10-#22SC(C1)(D8)-100	Press bonding type	IP67 (Note 1)	<Angled type>  Manufacturer: DDK Ltd.	0.3mm² (AWG22) to 0.5mm² (AWG20) Crimping tool (357J-50446T) is required.	
			CM10-#22SC(C2)(D8)-100				0.08mm² (AWG28) to 0.25mm² (AWG23) Crimping tool (357J-50447T) is required.	
			CM10-#22SC(S1)(D8)-100	Soldered type			0.5mm² (AWG20) or smaller	

<For HF-JP (11kW and 15kW) series (IP67 rated)>

Servo motor	Plug	Backshell		Cable clamp	Feature	Description	Applicable cable example	
	Model	Type	Model	Model			Wire size	Completed cable outer diameter
HF-JP11K1M, 15K1M, HF-JP11K1M4, 15K1M4	D/MS3106A20-29S(D190)	Straight	CE02-20BS-S-D	CE3057-12A-3-D	IP67 (Note 1)	<Straight type>  Manufacturer: DDK Ltd.	0.3mm² (AWG22) to 1.25mm² (AWG16)	ϕ6.8mm to ϕ10mm
		Angled	CE-20BA-S-D			<Angled type>  Manufacturer: DDK Ltd.		

<For HF-JP (11kW and 15kW) series (general environment)>

Servo motor	Plug (with backshell)		Cable clamp	Feature	Description	Applicable cable example	
	Type	Model	Model			Wire size	Completed cable outer diameter
HF-JP11K1M, 15K1M, HF-JP11K1M4, 15K1M4	Straight	D/MS3106B20-29S	D/MS3057-12A	General environment	<Straight type>  Manufacturer: DDK Ltd.	0.3mm² (AWG22) to 1.25mm² (AWG16)	ϕ15.9mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B20-29S			<Angled type>  Manufacturer: DDK Ltd.		

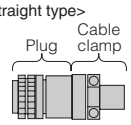
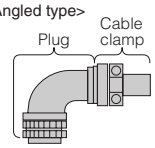
Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. Select from below if there is a potential risk that a high vibration may be applied to connectors.
CM10-SP10S-VP-M (straight type) or CM10-AP10S-VP-M (angled type)

● Motor power supply connectors

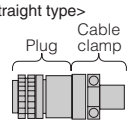
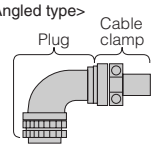
<For HF-KP/HF-MP series>

Servo motor	Model	Feature	Description	Applicable cable example
HF-KP, HF-MP series	JN4FT04SJ1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)	IP65 (Note 1)	 Manufacturer: Japan Aviation Electronics Industry, Ltd.	Wire size: 0.75mm² (AWG19) Completed cable outer diameter: ϕ6.2 ± 0.3mm Fluoric resin wire (Vinyl jacket cable FV4C <UL Style 2103> (SP3866W-X), KURABE INDUSTRIAL CO., LTD. or an equivalent product) Crimping tool (CT160-3-TMH5B) is required.

<For HF-SP/HF-JP series>

Servo motor	Plug (with backshell)		Cable clamp	Feature	Description	Applicable cable example	
	Type	Model	Model			Wire size	Completed cable outer diameter
HF-SP51, 81 HF-SP52, 102, 152 HF-SP524, 1024, 1524 HF-JP53, 73, 103, 153, 203, HF-JP534, 734, 1034, 1534, 2034, 3534, 5034	Straight	CE05-6A18-10SD-D-BSS	CE3057-10A-2-D	IP67 (Note 1) EN standards	<Straight type>  Manufacturer: DDK Ltd. <Angled type>  Manufacturer: DDK Ltd.	2mm² (AWG14) to 3.5mm² (AWG12)	ϕ8.5mm to ϕ11mm
			CE3057-10A-1-D				ϕ10.5mm to ϕ14.1mm
	Angled	CE05-8A18-10SD-D-BAS	CE3057-10A-2-D				ϕ8.5mm to ϕ11mm
			CE3057-10A-1-D				ϕ10.5mm to ϕ14.1mm
	Straight	D/MS3106B18-10S	D/MS3057-10A	General environment (Note 2)			ϕ14.3mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B18-10S	D/MS3057-10A				
HF-SP121, 201, 301 HF-SP202, 352, 502 HF-SP2024, 3524, 5024 HF-JP353, 503	Straight	CE05-6A22-22SD-D-BSS	CE3057-12A-2-D	IP67 (Note 1) EN standards		3.5mm² (AWG12) to 8mm² (AWG8)	ϕ9.5mm to ϕ13mm
			CE3057-12A-1-D				ϕ12.5mm to ϕ16mm
	Angled	CE05-8A22-22SD-D-BAS	CE3057-12A-2-D				ϕ9.5mm to ϕ13mm
			CE3057-12A-1-D				ϕ12.5mm to ϕ16mm
	Straight	D/MS3106B22-22S	D/MS3057-12A	General environment (Note 2)			ϕ15.9mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B22-22S	D/MS3057-12A				
HF-SP421, 702 HF-SP7024 HF-JP11K1M, 15K1M, 11K1M4, 15K1M4	Straight	CE05-6A32-17SD-D-BSS	CE3057-20A-1-D	IP67 (Note 1) EN standards		14mm² (AWG6) to 22mm² (AWG4)	ϕ22mm to ϕ23.8mm
	Angled	CE05-8A32-17SD-D-BAS	CE3057-20A-1-D				ϕ22mm to ϕ23.8mm
	Straight	D/MS3106B32-17S	D/MS3057-20A	General environment (Note 2)			ϕ23.8mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B32-17S	D/MS3057-20A				

<For HC-LP/HC-RP/HC-UP series or HA-LP502/702>

Servo motor	Plug (with backshell)		Cable clamp	Feature	Description	Applicable cable example	
	Type	Model	Model			Wire size	Completed cable outer diameter
HC-LP52, 102, 152 HC-RP103, 153, 203 HC-UP72, 152	Straight	CE05-6A22-23SD-D-BSS	CE3057-12A-2-D	IP67 (Note 1) EN standards	<Straight type>  Manufacturer: DDK Ltd. <Angled type>  Manufacturer: DDK Ltd.	2mm² (AWG14) to 3.5mm² (AWG12)	ϕ9.5mm to ϕ13mm
			CE3057-12A-1-D				ϕ12.5mm to ϕ16mm
	Angled	CE05-8A22-23SD-D-BAS	CE3057-12A-2-D				ϕ9.5mm to ϕ13mm
			CE3057-12A-1-D				ϕ12.5mm to ϕ16mm
	Straight	D/MS3106B22-23S	D/MS3057-12A	General environment (Note 2)			ϕ15.9mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B22-23S	D/MS3057-12A				
HC-LP202, 302 HC-RP353, 503 HC-UP202, 352, 502 HA-LP502	Straight	CE05-6A24-10SD-D-BSS	CE3057-16A-2-D	IP67 (Note 1) EN standards		5.5mm² (AWG10) to 8mm² (AWG8)	ϕ13mm to ϕ15.5mm
			CE3057-16A-1-D				ϕ15mm to ϕ19.1mm
	Angled	CE05-8A24-10SD-D-BAS	CE3057-16A-2-D				ϕ13mm to ϕ15.5mm
			CE3057-16A-1-D				ϕ15mm to ϕ19.1mm
	Straight	D/MS3106B24-10S	D/MS3057-16A	General environment (Note 2)			ϕ19.1mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B24-10S	D/MS3057-16A				
HA-LP702	Straight	CE05-6A32-17SD-D-BSS	CE3057-20A-1-D	IP67 (Note 1) EN standards		14mm² (AWG6) to 22mm² (AWG4)	ϕ22mm to ϕ23.8mm
	Angled	CE05-8A32-17SD-D-BAS	CE3057-20A-1-D				ϕ22mm to ϕ23.8mm
	Straight	D/MS3106B32-17S	D/MS3057-20A	General environment (Note 2)			ϕ23.8mm or smaller (Inner diameter of bushing)
	Angled	D/MS3108B32-17S	D/MS3057-20A				

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. Not compliant with EN standards.

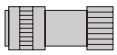
Ordering Information for Customers

● Motor brake connectors

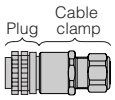
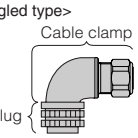
<For HF-KP/HF-MP series>

Servo motor	Model	Feature	Description	Applicable cable example
HF-KP, HF-MP series	JN4FT02SJ1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)	IP65 (Note 1)	 Manufacturer: Japan Aviation Electronics Industry, Ltd.	Wire size: 0.5mm² (AWG20) Completed cable outer diameter: ϕ4.5 ± 0.3mm Fluoric resin wire (Vinyl jacket cable FV2C <UL Style 2103> (SP3866U-X), KURABE INDUSTRIAL CO., LTD. or an equivalent product) Crimping tool (CT160-3-TMH5B) is required.

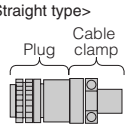
<For HF-SP/HF-JP (5kW or smaller) series>

Servo motor	Connector			Contact	Feature	Description	Applicable cable example	
	Type	Plug (Note 2)	Socket contact				Wire size	Completed cable outer diameter
HF-SP series HF-JP53B, 73B, 103B, 153B, 203B, 353B, 503B HF-JP534B, 734B, 1034B, 1534B, 2034B, 3534B, 5034B	Straight	CM10-SP2S-S(D6)	CM10-#22SC(S2)(D8)-100	Soldered type	IP67 (Note 1)	<Straight type>  Manufacturer: DDK Ltd.	1.25mm² (AWG16) or smaller	ϕ4.0mm to ϕ6.0mm
		CM10-SP2S-M(D6)						ϕ6.0mm to ϕ9.0mm
		CM10-SP2S-L(D6)						ϕ9.0mm to ϕ11.6mm
		CM10-SP2S-S(D6)	CM10-#22SC(C3)(D8)-100	Press bonding type			0.5mm² (AWG20) to 1.25mm² (AWG16) Crimping tool (357J-50448T) is required.	ϕ4.0mm to ϕ6.0mm
		CM10-SP2S-M(D6)						ϕ6.0mm to ϕ9.0mm
		CM10-SP2S-L(D6)						ϕ9.0mm to ϕ11.6mm
	Angled	CM10-AP2S-S(D6)	CM10-#22SC(S2)(D8)-100	Soldered type	IP67 (Note 1)	<Angled type>  Manufacturer: DDK Ltd.	1.25mm² (AWG16) or smaller	ϕ4.0mm to ϕ6.0mm
		CM10-AP2S-M(D6)						ϕ6.0mm to ϕ9.0mm
		CM10-AP2S-L(D6)						ϕ9.0mm to ϕ11.6mm
		CM10-AP2S-S(D6)	CM10-#22SC(C3)(D8)-100	Press bonding type			0.5mm² (AWG20) to 1.25mm² (AWG16) Crimping tool (357J-50448T) is required.	ϕ4.0mm to ϕ6.0mm
		CM10-AP2S-M(D6)						ϕ6.0mm to ϕ9.0mm
		CM10-AP2S-L(D6)						ϕ9.0mm to ϕ11.6mm

<HF-JP(11kW and 15kW)/HC-LP/HC-UP/HA-LP series (IP67 rated)>

Servo motor	Plug	Cable clamp (with backshell)			Feature	Description	Applicable cable example	
	Model · Manufacturer	Type	Model	Manufacturer			Wire size	Completed cable outer diameter
HF-JP11K1MB, 15K1MB HF-JP11K1M4B, 15K1M4B HC-LP202B, 302B HC-UP202B, 352B, 502B HA-LP601B, 801B, 12K1B, 6014B, 8014B, 12K14B HA-LP701MB, 11K1MB, 15K1MB, 701M4B, 11K1M4B, 15K1M4B HA-LP11K2B, 15K2B, 22K2B, 11K24B, 15K24B, 22K24B	D/MS3106A10SL-4S(D190) Manufacturer: DDK Ltd.	Straight	ACS-08RL-MS10F	NIPPON FLEX CO., LTD.	IP67 (Note 1)	<Straight type>  <Angled type>  	0.3mm² (AWG22) to 1.25mm² (AWG16)	ϕ4mm to ϕ8mm
			ACS-12RL-MS10F					ϕ8mm to ϕ12mm
			YSO10-5 to 8	DAIWA DENGYO CO., LTD.				ϕ5mm to ϕ8.3mm
		Angled	ACA-08RL-MS10F	NIPPON FLEX CO., LTD.				ϕ4mm to ϕ8mm
			ACA-12RL-MS10F					ϕ8mm to ϕ12mm
			YLO10-5 to 8	DAIWA DENGYO CO., LTD.				ϕ5mm to ϕ8.3mm

<HF-JP(11kW and 15kW)/HC-LP/HC-UP/HA-LP series (general environment)>

Servo motor	Plug (with backshell)		Cable clamp	Feature	Description	Applicable cable example	
	Type	Model	Model			Wire size	Completed cable outer diameter
HF-JP11K1MB, 15K1MB HF-JP11K1M4B, 15K1M4B HC-LP202B, 302B HC-UP202B, 352B, 502B HA-LP601B, 801B, 12K1B, 6014B, 8014B, 12K14B HA-LP701MB, 11K1MB, 15K1MB, 701M4B, 11K1M4B, 15K1M4B HA-LP11K2B, 15K2B, 22K2B, 11K24B, 15K24B, 22K24B	Straight	D/MS3106A10SL-4S	D/MS3057-4A	General environment	<Straight type>  Manufacturer: DDK Ltd.	0.3mm² (AWG22) to 1.25mm² (AWG16)	ϕ5.6mm or smaller (Inner diameter of bushing)

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. Select from below if there is a potential risk that a high vibration may be applied to connectors.
CM10-SP2S-VP-S/M/L (straight type) or CM10-AP2S-VP-S/M/L (angled type)

RoHS Compliant Connectors

● Optional connector set for servo amplifier

The following connector sets have been changed to RoHS compliant since September 2006.
RoHS compliant and non-RoHS compliant connector sets may be mixed based on availability.
Only the components of the connector set that have changed are listed below.

Connector set	Non-RoHS compliant component	RoHS compliant component
MR-J3SCNS MR-ECNM MR-J3CN2	36210-0100JL (receptacle) (Note 1) (3M or an equivalent product)	36210-0100PL (receptacle) (3M or an equivalent product)
MR-PWCNS4	CE05-6A18-10SD-B-BSS (connector and backshell) (DDK) CE3057-10A-1(D265) (cable clamp) (DDK)	CE05-6A18-10SD-D-BSS (connector and backshell) (DDK) CE3057-10A-1-D (cable clamp) (DDK)
MR-PWCNS5	CE05-6A22-22SD-B-BSS (connector and backshell) (DDK) CE3057-12A-1(D265) (cable clamp) (DDK)	CE05-6A22-22SD-D-BSS (connector and backshell) (DDK) CE3057-12A-1-D (cable clamp) (DDK)
MR-PWCNS3	CE05-6A32-17SD-B-BSS (connector and backshell) (DDK) CE3057-20A-1(D265) (cable clamp) (DDK)	CE05-6A32-17SD-D-BSS (connector and backshell) (DDK) CE3057-20A-1-D (cable clamp) (DDK)
MR-PWCNS1	CE05-6A22-23SD-B-BSS (connector and backshell) (DDK) CE3057-12A-2(D265) (cable clamp) (DDK)	CE05-6A22-23SD-D-BSS (connector and backshell) (DDK) CE3057-12A-2-D (cable clamp) (DDK)
MR-PWCNS2	CE05-6A24-10SD-B-BSS (connector and backshell) (DDK) CE3057-16A-2(D265) (cable clamp) (DDK)	CE05-6A24-10SD-D-BSS (connector and backshell) (DDK) CE3057-16A-2-D (cable clamp) (DDK)
MR-BKCN	MS3106A10SL-4S(D190) (plug) (DDK)	D/MS3106A10SL-4S(D190) (plug) (DDK)
MR-CCN1	10120-3000VE (connector) (3M or an equivalent product)	10120-3000PE (connector) (3M or an equivalent product)
MR-J3CN1	10150-3000VE (connector) (3M or an equivalent product)	10150-3000PE (connector) (3M or an equivalent product)
MR-J2CMP2	10126-3000VE (connector) (3M or an equivalent product)	10126-3000PE (connector) (3M or an equivalent product)
MR-J2CN1-A	10120-3000VE (connector) (3M or an equivalent product) PCR-S20FS (connector) (HONDA TSUSHIN KOGYO)	10120-3000PE (connector) (3M or an equivalent product) PCR-S20FS + (connector) (HONDA TSUSHIN KOGYO)

Notes: 1. RoHS compliant 36210-0100FD is partly packed.

● Recommended connectors

The following recommended connectors have been changed to RoHS compliant. Contact the manufacturers for more details.

Connectors		Non-RoHS compliant product	RoHS compliant product	Manufacture
Amplifier power supply connector (for CNP1, CNP2, CNP3)		56125-0118 (terminal)	56125-0128 (terminal)	Molex
Servo motor power supply connector	Plug	JN4FT04SJ1	JN4FT04SJ1-R	Japan Aviation Electronics Industry
	Plug (straight)	CE05-6A18-10SD-B-BSS	CE05-6A18-10SD-D-BSS	DDK
		CE05-6A22-22SD-B-BSS	CE05-6A22-22SD-D-BSS	
		CE05-6A22-23SD-B-BSS	CE05-6A22-23SD-D-BSS	
		CE05-6A32-17SD-B-BSS	CE05-6A32-17SD-D-BSS	
		CE05-6A24-10SD-B-BSS	CE05-6A24-10SD-D-BSS	
		MS3106B18-10S	D/MS3106B18-10S	
		MS3106B22-22S	D/MS3106B22-22S	
		MS3106B22-23S	D/MS3106B22-23S	
		MS3106B24-10S	D/MS3106B24-10S	
		MS3106B32-17S	D/MS3106B32-17S	
	Plug (angled)	CE05-8A18-10SD-B-BAS	CE05-8A18-10SD-D-BAS	
		CE05-8A22-22SD-B-BAS	CE05-8A22-22SD-D-BAS	
		CE05-8A32-17SD-B-BAS	CE05-8A32-17SD-D-BAS	
		CE05-8A22-23SD-B-BAS	CE05-8A22-23SD-D-BAS	
		CE05-8A24-10SD-B-BAS	CE05-8A24-10SD-D-BAS	
		MS3108B18-10S	D/MS3108B18-10S	
		MS3108B22-22S	D/MS3108B22-22S	
		MS3108B22-23S	D/MS3108B22-23S	
		MS3108B24-10S	D/MS3108B24-10S	
		MS3108B32-17S	D/MS3108B32-17S	
	Cable clamp	CE3057-10A-1(D265)	CE3057-10A-1-D	
		CE3057-10A-2(D265)	CE3057-10A-2-D	
		CE3057-12A-1(D265)	CE3057-12A-1-D	
		CE3057-12A-2(D265)	CE3057-12A-2-D	
		CE3057-16A-1(D265)	CE3057-16A-1-D	
		CE3057-16A-2(D265)	CE3057-16A-2-D	
		CE3057-20A-1(D265)	CE3057-20A-1-D	
		MS3057-10A	D/MS3057-10A	
		MS3057-12A	D/MS3057-12A	
		MS3057-16A	D/MS3057-16A	
		MS3057-20A	D/MS3057-20A	
Servo motor electromagnetic brake connector	Plug	MS3106A10SL-4S(D190)	D/MS3106A10SL-4S(D190)	
		MS3106A10SL-4S	D/MS3106A10SL-4S	
		JN4FT02SJ1	JN4FT02SJ1-R	Japan Aviation Electronics Industry
	Cable clamp	MS3057-4A	D/MS3057-4A	DDK

Options

● Optional regeneration unit (200VAC)

Servo amplifier/drive unit model (MR-J3-)	Tolerable regenerative power of built-in regenerative resistor (W)	Tolerable regenerative power of standard accessory (external regenerative resistor) (W) (Note 4)				Tolerable regeneration power of optional regeneration unit (W) (Note 4)											
		GRZG400-				MR-RB											
		1.5Ω × 4 (Note 2)	0.8Ω × 4 (Note 2)	0.9Ω × 5 (Note 2)	0.6Ω × 5 (Note 2)	032 [40Ω]	12 [40Ω]	30 [13Ω]	31 [6.7Ω]	32 [40Ω]	50 [13Ω] (Note 1)	51 [6.7Ω] (Note 1)	5E [6Ω] (Note 2)	5R [3.2Ω] (Note 2)	9P [4.5Ω] (Note 2)	9F [3Ω] (Note 2)	139 [1.3Ω]	137 [1.3Ω] (Note 3)
10A(1)/B(1)/T(1)	–	–	–	–	–	30	–	–	–	–	–	–	–	–	–	–	–	–
20A(1)/B(1)/T(1)	10	–	–	–	–	30	100	–	–	–	–	–	–	–	–	–	–	–
40A(1)/B(1)/T(1)	10	–	–	–	–	30	100	–	–	–	–	–	–	–	–	–	–	–
60A/B/T	10	–	–	–	–	30	100	–	–	–	–	–	–	–	–	–	–	–
70A/B/T	20	–	–	–	–	30	100	–	–	300	–	–	–	–	–	–	–	–
100A/B/T	20	–	–	–	–	30	100	–	–	300	–	–	–	–	–	–	–	–
200A/B/T	100	–	–	–	–	–	–	300	–	–	500	–	–	–	–	–	–	–
350A/B/T	100	–	–	–	–	–	–	300	–	–	500	–	–	–	–	–	–	–
500A/B/T	130	–	–	–	–	–	–	–	300	–	–	500	–	–	–	–	–	–
700A/B/T	170	–	–	–	–	–	–	–	300	–	–	500	–	–	–	–	–	–
11KA/B/T	–	500 (800)	–	–	–	–	–	–	–	–	–	–	500 (800)	–	–	–	–	–
11KA/B/T-LR	–	–	500 (800)	–	–	–	–	–	–	–	–	–	–	500 (800)	–	–	–	–
15KA/B/T	–	–	–	850 (1300)	–	–	–	–	–	–	–	–	–	–	850 (1300)	–	–	–
15KA/B/T-LR	–	–	–	–	850 (1300)	–	–	–	–	–	–	–	–	–	–	850 (1300)	–	–
22KA/B/T	–	–	–	–	850 (1300)	–	–	–	–	–	–	–	–	–	–	850 (1300)	–	–
DU30KA/B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300	3900
DU37KA/B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300	3900

Notes: 1. Be sure to install a cooling fan. The cooling fan must be prepared by user.
2. The values in ( ) indicate when cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min) are installed, and parameter No. PA02 is changed.
3. For MR-RB137, the value is applicable when 3 units of the regeneration units are used.
4. The power values in this table are resistor-generated powers, not rated powers.

● Optional regeneration unit (400VAC)

Servo amplifier/drive unit model (MR-J3-)	Tolerable regenerative power of built-in regenerative resistor (W)	Tolerable regenerative power of standard accessory (external regenerative resistor) (W) (Note 5)				Tolerable regeneration power of optional regeneration unit (W) (Note 5)											
		GRZG400-				MR-RB											
		5Ω × 4 (Note 2)	2.5Ω × 4 (Note 2)	2.5Ω × 5 (Note 2)	2Ω × 5 (Note 2)	1H-4 [82Ω]	3M-4 [120Ω] (Note 1)	3G-4 [47Ω] (Note 1)	34-4 [26Ω] (Note 1)	5G-4 [47Ω] (Note 1)	54-4 [26Ω] (Note 1)	5K-4 [10Ω] (Note 2)	6B-4 [20Ω] (Note 2)	60-4 [12.5Ω] (Note 2)	6K-4 [10Ω] (Note 2)	136-4 [5Ω]	138-4 [5Ω] (Note 3)
60A4/B4/T4	15	–	–	–	–	100	300	–	–	–	–	–	–	–	–	–	–
100A4/B4/T4	15	–	–	–	–	100	300	–	–	–	–	–	–	–	–	–	–
200A4/B4/T4	100	–	–	–	–	–	–	300	–	500	–	–	–	–	–	–	–
350A4/B4/T4	100	–	–	–	–	–	–	300	–	500	–	–	–	–	–	–	–
500A4/B4/T4	130 (Note 4)	–	–	–	–	–	–	–	300	–	500	–	–	–	–	–	–
700A4/B4/T4	170 (Note 4)	–	–	–	–	–	–	–	300	–	500	–	–	–	–	–	–
11KA4/B4/T4	–	500 (800)	–	–	–	–	–	–	–	–	–	–	500 (800)	–	–	–	–
11KA4/B4/T4-LR	–	–	500 (800)	–	–	–	–	–	–	–	–	500 (800)	–	–	–	–	–
15KA4/B4/T4	–	–	–	850 (1300)	–	–	–	–	–	–	–	–	–	850 (1300)	–	–	–
15KA4/B4/T4-LR	–	–	–	–	850 (1300)	–	–	–	–	–	–	–	–	–	850 (1300)	–	–
22KA4/B4/T4	–	–	–	–	850 (1300)	–	–	–	–	–	–	–	–	–	850 (1300)	–	–
DU30KA4/B4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300	3900
DU37KA4/B4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300	3900
DU45KA4/B4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300	3900
DU55KA4/B4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1300	3900

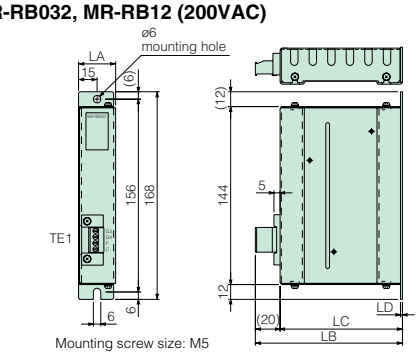
Notes: 1. Be sure to install a cooling fan. The cooling fan must be prepared by user.
2. The values in ( ) indicate when cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m^3/min) are installed, and parameter No. PA02 is changed.
3. For MR-RB138-4, the value is applicable when 3 units of the regeneration units are used.
4. The amplifier built-in resistor is compatible with the maximum toque deceleration when the motor is used within the rated speed and the recommended load to motor inertia moment ratio. Contact your local sales office if the operating motor speed and the load to motor inertia moment ratio exceed the rated speed and the recommended ratio.
5. The power values in this table are resistor-generated powers, not rated powers.

✱Cautions when connecting the optional regeneration unit

1. The optional regeneration unit causes a temperature rise of 100°C or more relative to the ambient temperature. Fully examine heat dissipation, installation position, wires used, etc. before installing the unit. Use flame-resistant wires or apply flame retardant on wires. Keep the wires clear of the unit.
2. Always use twisted wires, maximum length of 5m, to connect the optional regeneration unit with the servo amplifier.
3. Always use twisted wires for a thermal sensor, and make sure that the sensor does not fail to work properly due to inducted noise.

External dimensions (Unit: mm)

● MR-RB032, MR-RB12 (200VAC)



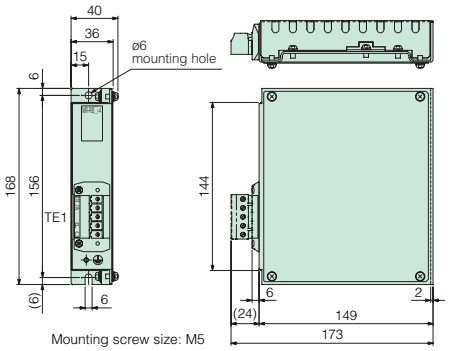
Mounting screw size: M5

<Terminal arrangement>

Applicable wire size:
0.2mm² (AWG24) to 2.5mm² (AWG12)

Model	Variable dimensions				Mass kg (lb)
	LA	LB	LC	LD	
MR-RB032	30	119	99	1.6	0.5 (1.1)
MR-RB12	40	169	149	2	1.1 (2.4)

● MR-RB1H-4 (400VAC)



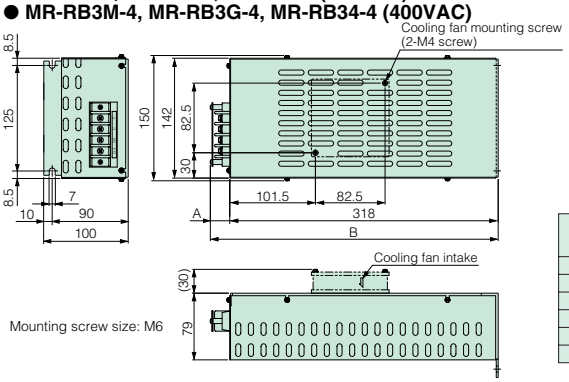
Mounting screw size: M5

<Terminal arrangement>

Applicable wire size:
0.2mm² (AWG24) to 4.0mm² (AWG10)

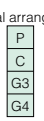
Model	Mass kg (lb)
MR-RB1H-4	1.1 (2.4)

● MR-RB30, MR-RB31, MR-RB32 (200VAC)
● MR-RB3M-4, MR-RB3G-4, MR-RB34-4 (400VAC)



Mounting screw size: M6

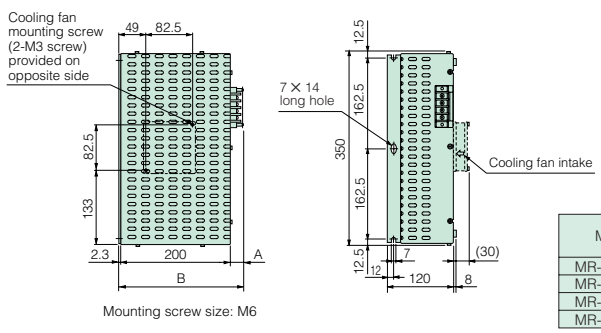
<Terminal arrangement>



Terminal screw size: M4

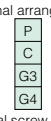
Model	Variable dimensions		Mass kg (lb)
	A	B	
MR-RB30	17	335	2.9 (6.4)
MR-RB31			
MR-RB32			
MR-RB3M-4	23	341	
MR-RB3G-4			
MR-RB34-4			

● MR-RB50, MR-RB51 (200VAC)
● MR-RB5G-4, MR-RB54-4 (400VAC)



Mounting screw size: M6

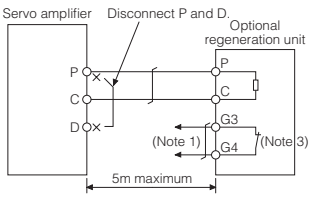
<Terminal arrangement>



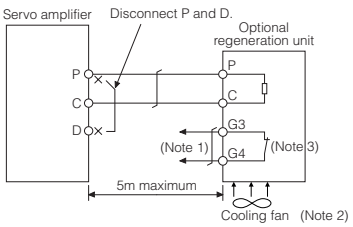
Terminal screw size: M4

Model	Variable dimensions		Mass kg (lb)
	A	B	
MR-RB50	17	217	5.6 (12)
MR-RB51			
MR-RB5G-4	23	223	
MR-RB54-4			

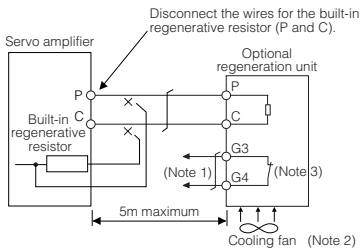
Connections



● MR-J3-350□ or smaller
● MR-J3-200□4 or smaller



● MR-J3-500□, 700□
● MR-J3-350□4 to 700□4



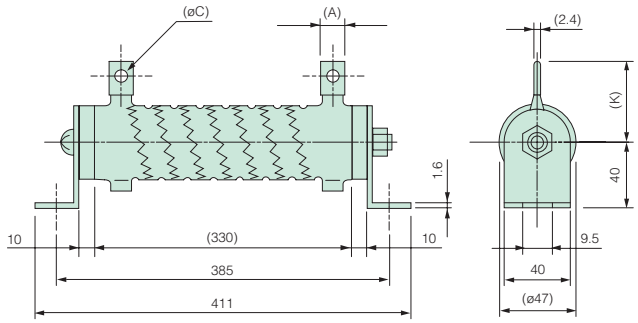
Notes: 1. Create a sequence circuit that turns off the magnetic contactor (MC) when abnormal overheating occurs.
2. When using MR-RB3M-4, MR-RB3G-4, MR-RB34-4, MR-RB50, MR-RB51, MR-RB5G-4 or MR-RB54-4, cool the unit forcibly with a cooling fan (92 × 92mm, minimum air flow: 1.0m³/min). The cooling fan must be prepared by user.
3. The G3 and G4 terminals are thermal sensor. G3-G4 opens when the regenerative unit overheats abnormally.

Options

● Optional regeneration unit

External dimensions (Unit: mm)

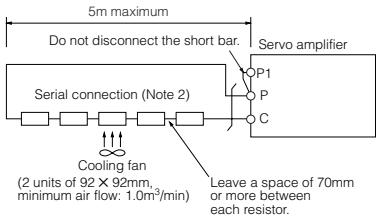
Standard accessory (Note 1)
● GRZG400-1.5Ω, GRZG400-0.8Ω, GRZG400-0.9Ω, GRZG400-0.6Ω (200VAC)
● GRZG400-5Ω, GRZG400-2.5Ω, GRZG400-2Ω (400VAC)



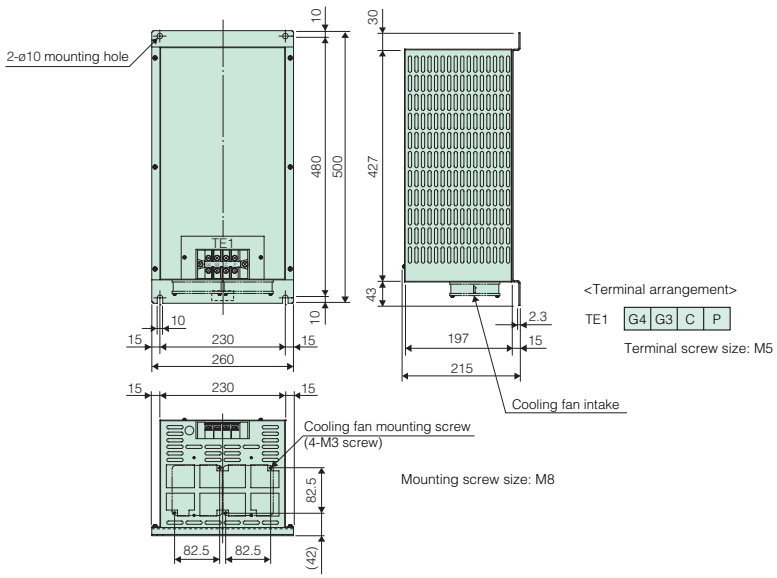
Mounting screw size: M8

Model	Qty.	Tolerable regenerative power (W)	With cooling fan (W)	Resistance value (Ω)	Variable dimensions A	C	K	Mass/unit kg (lb)
GRZG400-1.5Ω	4	500	800	6 (1.5Ω × 4)	10	5.5	39	0.8 (1.8)
GRZG400-0.8Ω	4	500	800	3.2 (0.8Ω × 4)				
GRZG400-0.9Ω	5	850	1300	4.5 (0.9Ω × 5)				
GRZG400-0.6Ω	5	850	1300	3 (0.6Ω × 5)	16	8.2	46	
GRZG400-5Ω	4	500	800	20 (5Ω × 4)	10	5.5	39	
GRZG400-2.5Ω	4	500	800	10 (2.5Ω × 4)				
GRZG400-2.5Ω	5	850	1300	12.5 (2.5Ω × 5)				
GRZG400-2Ω	5	850	1300	10 (2Ω × 5)				

Connections



● MR-RB5E, MR-RB5R, MR-RB9P, MR-RB9F (200VAC) (Note 1)
● MR-RB5K-4, MR-RB6B-4, MR-RB60-4, MR-RB6K-4 (400VAC) (Note 1)



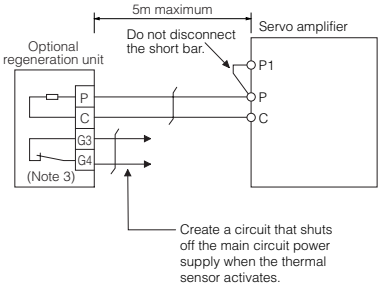
<Terminal arrangement>

TE1	G4	G3	C	P

Terminal screw size: M5

Mounting screw size: M8

Model	Tolerable regenerative power (W)	With cooling fan (W)	Description	Mass kg (lb)
MR-RB5E	500	800	GRZG400-1.5Ω × 4	10 (22)
MR-RB5R	500	800	GRZG400-0.8Ω × 4	11 (24)
MR-RB9P	850	1300	GRZG400-0.9Ω × 5	
MR-RB9F	850	1300	GRZG400-0.6Ω × 5	
MR-RB5K-4	500	800	GRZG400-2.5Ω × 4	10 (22)
MR-RB6B-4	500	800	GRZG400-5Ω × 4	
MR-RB60-4	850	1300	GRZG400-2.5Ω × 5	11 (24)
MR-RB6K-4	850	1300	GRZG400-2Ω × 5	

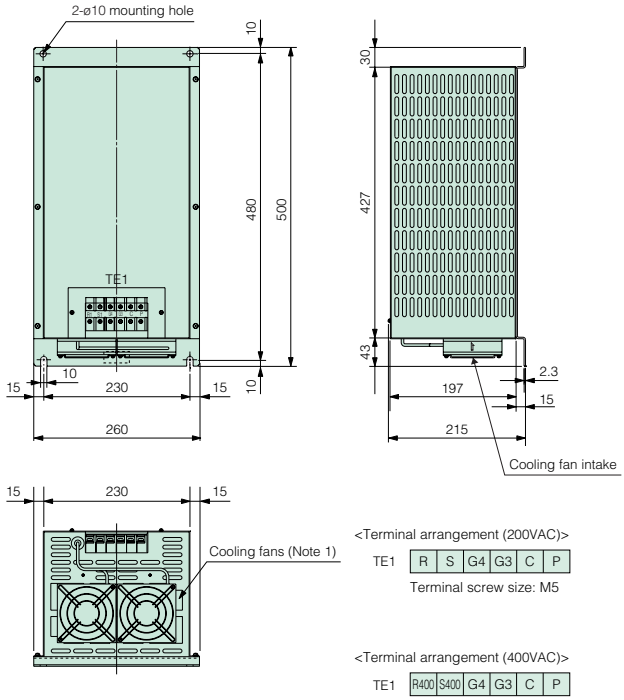


Notes: 1. To increase the regeneration braking frequency, install cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m³/min) and change parameter No. PA02. The cooling fans must be prepared by user.
2. By installing a thermal sensor, create a safety circuit that shuts off the main circuit power supply when abnormal overheating occurs.
3. The G3 and G4 terminals are thermal sensor. G3-G4 opens when the regenerative unit overheats abnormally.

● Optional regeneration unit

External dimensions (Unit: mm)

● **MR-RB139, MR-RB137 (200VAC)**
● **MR-RB136-4, MR-RB138-4 (400VAC)**



<Terminal arrangement (200VAC)>

TE1	R	S	G4	G3	C	P

Terminal screw size: M5

<Terminal arrangement (400VAC)>

TE1	R400	S400	G4	G3	C	P

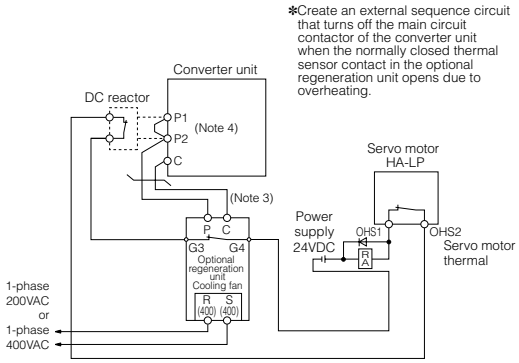
Terminal screw size: M5

Mounting screw size: M8

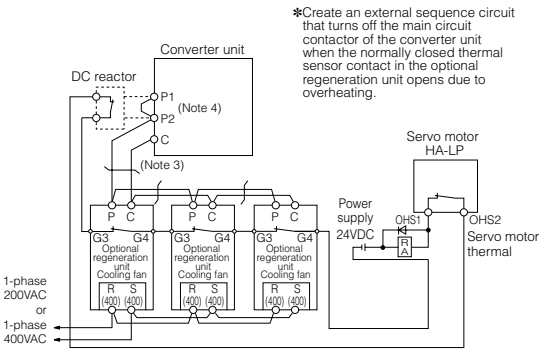
Model	Tolerable regenerative power (W)	Mass kg (lb)
MR-RB139	1300	10 (22)
MR-RB137	3900 (3 units are required.) (Note 2)	11 (24)
MR-RB136-4	1300	10 (22)
MR-RB138-4	3900 (3 units are required.) (Note 2)	11 (24)

Connections

● **MR-RB139**
● **MR-RB136-4**



● **MR-RB137**
● **MR-RB138-4**

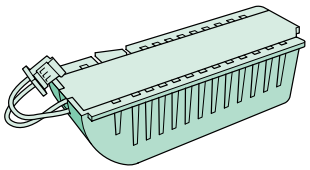
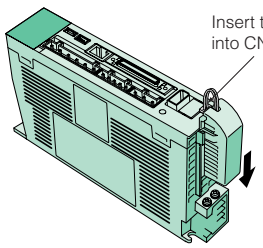
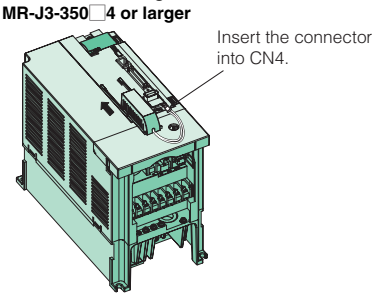


Notes: 1. One unit of cooling fan is attached for MR-RB136-4 or MR-RB138-4.
2. Three units of MR-RB137 or MR-RB138-4 are required per converter unit.
3. Connect the optional regenerative unit to the converter unit. The cable length between the regenerative unit and the converter unit must be 5m or shorter.
4. When using the DC reactor, disconnect the short bar between P1 and P2.

Options

● Battery (MR-J3BAT)

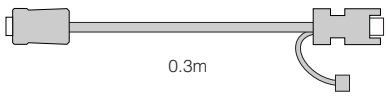
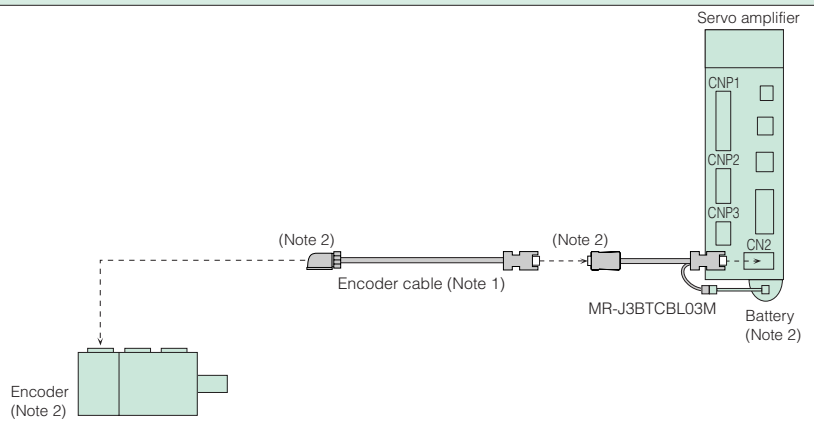
The absolute position data can be retained by mounting the battery on the servo amplifier.
The battery is not required when the servo system is used in incremental mode.

Appearance	Installation method
 Model: MR-J3BAT Nominal voltage: 3.6V Nominal capacity: 2000mAh Lithium content: 0.65g	● **MR-J3-350□ or smaller** ● **MR-J3-200□4 or smaller**  ● **MR-J3-500□ or larger** ● **MR-J3-350□4 or larger** 

Note: MR-J3BAT is a lithium metal battery. MR-J3BAT is not subject to the dangerous goods (Class 9) of the UN Recommendations.
To transport lithium metal batteries and lithium metal batteries contained in equipment by means of transport subject to the UN Recommendations, take actions to comply with the following regulations: the United Nations Recommendations on the Transport of Dangerous Goods, the Technical Instruction (ICAO-TI) by the International Civil Aviation Organization (ICAO), and the International Maritime Dangerous Goods Code (IMDG Code) by the International Maritime Organization (IMO). To transport the batteries, check the latest standards or the laws of the destination country and take actions. For more information, contact your local safes office. (As of February 2010)

● Battery connection relay cable (MR-J3BTCBL03M)

This relay cable is used to hold the absolute position data if the servo amplifier has to be removed from a machine for shipping. The servo motor does not have a super capacitor (for holding an absolute position data for short time) in the encoder. When this optional cable is used, the absolute position data can be held even when the encoder cable is disconnected from the servo amplifier, making it easy to do maintenance on the servo amplifier.

Appearance	Installation method
	

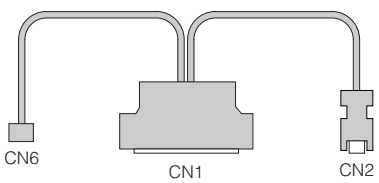
Notes: 1. The encoder cable varies depending on the motor series. Refer to "Options ● Cables and connectors" in this catalog.
2. To hold the absolute position data, the encoder, the encoder cable (s), the relay cable and the battery must be kept connected.

User's system		Battery (MR-J3BAT)	Battery connection relay cable (MR-J3BTCBL03M)
Incremental	—	Not required	Not required
Absolute	**Not Necessary** to hold an absolute position data after the encoder cable is disconnected from the servo amplifier	Required	Not required
	Necessary to hold an absolute position data after the encoder cable is disconnected from the servo amplifier (Note 1)	Required	Required

Notes: 1. Start up the absolute position detection system after connecting this optional cable.

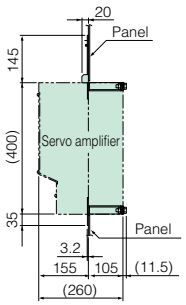
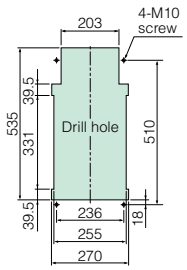
● Diagnostic cable (MR-J3ACHECK) : For MR-J3-□A□ and MR-J3-DU□A(4)

This cable is required when using the amplifier diagnostic function of MR Configurator (Setup software).

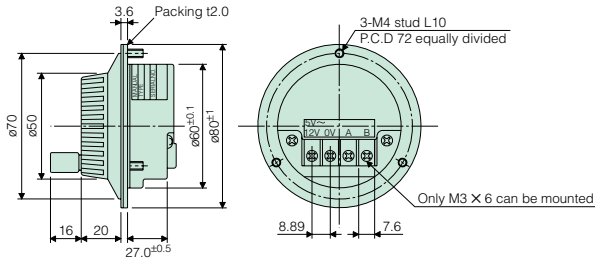
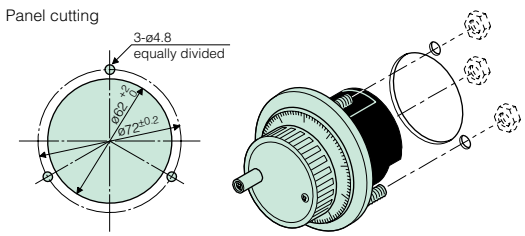


● Heat sink outside attachment (MR-J3ACN): For MR-J3-11K□(4) to MR-J3-22K□(4)

By mounting the heat sink outside attachment on the 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. Approximately 50% of the heating value can be dissipated with this method, and control box dimensions can be downsized.

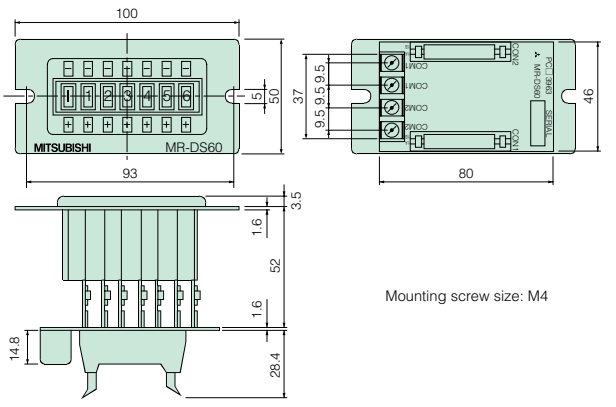
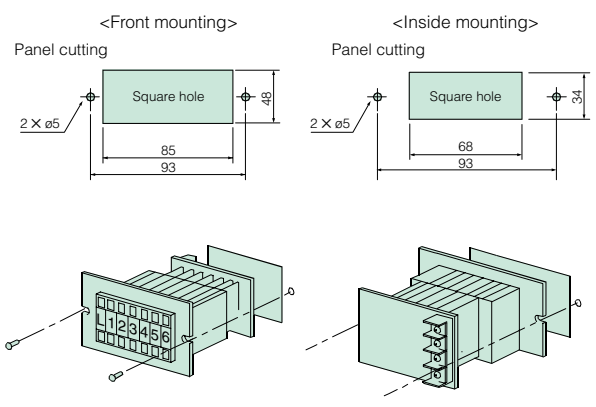
Mounting (Unit: mm)	Panel cut dimensions (Unit: mm)
	

● Manual pulse generator (MR-HDP01): For MR-J3-□T□

External dimensions (Unit: mm)	Mounting (Unit: mm)
	

● 6-digit digital switch (MR-DS60): For MR-J3-D01

By using the 6-digit digital switch, position data can be sent to the servo amplifier with BCD signal.

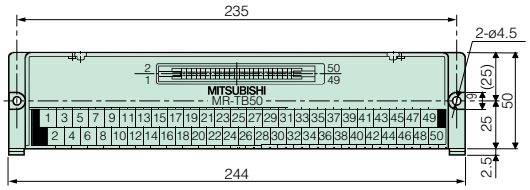
External dimensions (Unit: mm)	Mounting (Unit: mm)
	

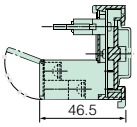
Options

● Junction terminal block (MR-TB50): For MR-J3-□A□, MR-J3-DU□A(4) and MR-J3-D01

All signals can be received with this junction terminal block without connecting the signals to the connector.

External dimensions (Unit: mm)



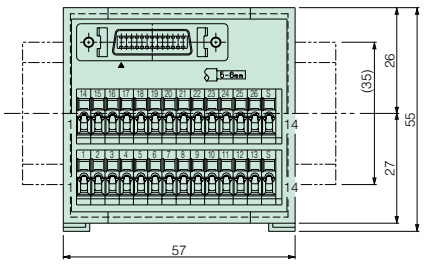


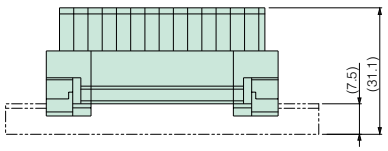
Terminal screw size: M3.5
Compatible wire: 2mm²
Crimping terminal width: 7.2mm maximum
Mounting screw size: M4

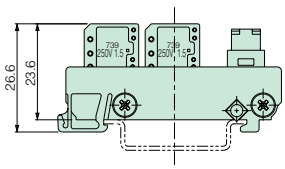
● Junction terminal block (MR-TB26A): For MR-J3-□T□

All signals can be received with this junction terminal block without connecting the signals to the connector.

External dimensions (Note 1) (Unit: mm)







Specifications

Rating		30V/0.5A
Applicable wire (terminal side)	Stranded wire	0.08mm² (AWG28) to 1.5mm² (AWG14)
	Solid wire	ø0.32mm to ø1.2mm
	Insulated outer diameter	ø3.4mm or smaller
Operating tool		210-619 (Wago) or equivalent 210-119SB (Wago) or equivalent
Strip length		5mm to 6mm

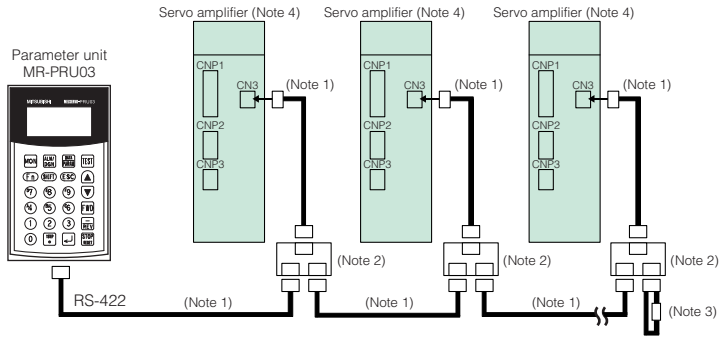
Notes: 1. The lengths in ( ) apply when the junction terminal box is mounted on a 35mm wide DIN rail.

● Parameter unit (MR-PRU03)

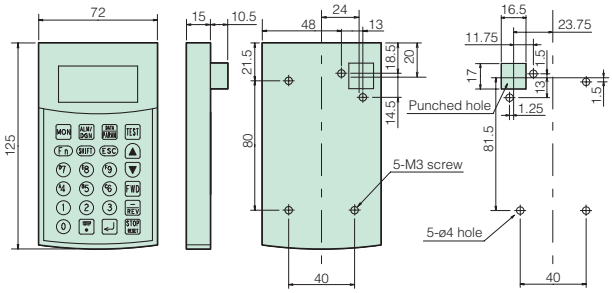
The parameter unit with a 16 characters × 4 lines display, is available as an option.
By connecting the parameter unit to the servo amplifier, data setting, test operation, parameter setting, etc. can be performed without using MR Configurator.
The parameter unit can be used with MR-J3-□A□, MR-J3-DU□A(4) or MR-J3-□T□.

<Wiring and communication method>

- RS-422 communication
- Connectable with one unit of the servo amplifier with the commercial LAN cable
- Connectable up to 32 axes with multi-drop system



<Dimensions>



(Unit: mm)

Notes: 1. Use 10BASE-T cable (EIA568 compliant), etc.
Keep the distance between the branch connector and servo amplifier as short as possible.
2. Branch connector, BMJ-8 (HACHIKO ELECTRIC CO., LTD) is recommended. Refer to "Ordering Information for Customers" in this catalog.
3. Connect a 150Ω terminal resistor.
4. The parameter unit can be connected to MR-J3-□A□ or MR-J3-□T□ servo amplifier, or MR-J3-DU□A (4) drive unit.

<Specifications>

Item			Description
Model			MR-PRU03
Power supply			Receives power from the servo amplifier or the drive unit
Functions	Parameter mode		Basic setting parameters, gain/filter parameters, extension setting parameters, input/output setting parameters
	Monitor mode	MR-J3-□A□ MR-J3-DU□A(4)	Cumulative feedback pulses, droop pulses, cumulative command pulses, command pulse frequency, analog speed command voltage/analog speed limit voltage, analog torque command voltage/analog torque limit voltage, regenerative load ratio, effective load ratio, peak load ratio, instantaneous torque, within one revolution position, ABS counter, servo motor speed, bus voltage, load inertia moment ratio
		MR-J3-□T□	Current position, command position, command remaining distance, point table No., cumulative feedback pulses, droop pulses, regenerative load ratio, effective load ratio, peak load ratio, instantaneous torque, within one revolution position, ABS counter, servo motor speed, bus voltage, load inertia moment ratio
	Diagnosis mode		External input/output display, motor information
	Alarm mode		Current alarm, alarm history
	Test operation mode		JOG operation, positioning operation, forced digital output, motor-less operation, single-step feed (Note 1)
	Point table mode (Note 1)		Position data, servo motor speed, acceleration/deceleration time constant, dwell time, auxiliary function, M code
Display			LCD system (16 characters × 4 lines)
Environment	Ambient temperature in operation		–10 to 55°C (14 to 131°F) (non freezing)
	Ambient humidity in operation		90%RH maximum (non condensing)
	Storage temperature		–20 to 65°C (–4 to 149°F) (non freezing)
	Storage humidity		90%RH maximum (non condensing)
	Atmosphere		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
Mass (g [lb])			130 (0.29)

Notes: 1. The point table mode and the single-step feed under the test operation mode are available only when connected to MR-J3-□T□.

Peripheral Equipment

● Electrical wires, circuit breakers and magnetic contactors (example of selection)

The following are examples of wire sizes when 600V polyvinyl chloride insulated wires (IV wires) with a length of 30m are used. Smaller size of wires may be applied by using 600V Grade heat-resistant polyvinyl chloride insulated wires (HIV wires). Note that HF-JP servo motor series require HIV wires.
Refer to "MR-J3 SERVO AMPLIFIER INSTRUCTION MANUAL" when using HIV wires or when using cables for supplying power (U, V, W) to HF-SP/HF-JP/HC-LP/HC-RP/HC-UP/HA-LP servo motor series.

<Servo amplifier 22kW or smaller>

<table>
<tr><th rowspan="2">Servo amplifier</th><th rowspan="2">Circuit breaker</th><th rowspan="2">Magnetic contactor (Note 7)</th><th colspan="8">Electrical wire size (mm²)</th></tr>
<tr><th>L1, L2, L3, ⏚ (Note 1)</th><th>L11, L21</th><th>U, V, W, ⏚</th><th>P, C (Note 1)</th><th>B1, B2</th><th>BU, BV, BW</th><th>OHS1, OHS2</th></tr>
<tr><td>MR-J3-10A(1)/B(1)/T(1)</td><td rowspan="2">30A frame 5A</td><td rowspan="6">S-N10</td><td rowspan="6">2 (AWG14)</td><td rowspan="15">1.25 (AWG16)</td><td rowspan="4">1.25 (AWG16) (Note 2)</td><td rowspan="6">2 (AWG14)</td><td rowspan="15">1.25 (AWG16) (Note 3)</td><td rowspan="6">—</td><td rowspan="6">—</td></tr>
<tr><td>MR-J3-20A/B/T</td></tr>
<tr><td>MR-J3-20A1/B1/T1</td><td rowspan="2">30A frame 10A</td></tr>
<tr><td>MR-J3-40A/B/T</td></tr>
<tr><td>MR-J3-40A1/B1/T1</td><td rowspan="4">30A frame 15A</td></tr>
<tr><td>MR-J3-60A/B/T</td></tr>
<tr><td>MR-J3-70A/B/T</td></tr>
<tr><td>MR-J3-100A/B/T</td></tr>
<tr><td>MR-J3-200A/B/T</td><td>30A frame 20A</td><td>S-N18</td><td>2 (AWG14)</td></tr>
<tr><td>MR-J3-350A/B/T</td><td>30A frame 30A</td><td>S-N20</td><td>3.5 (AWG12)</td><td>3.5 (AWG12)</td></tr>
<tr><td>MR-J3-500A/B/T (Note5)</td><td>50A frame 50A</td><td>S-N35</td><td>5.5 (AWG10)</td><td>5.5 (AWG10)</td></tr>
<tr><td>MR-J3-700A/B/T (Note5)</td><td>100A frame 75A</td><td>S-N50</td><td>8 (AWG8)</td><td>8 (AWG8)</td><td>3.5 (AWG12)</td><td>2 (AWG14) (Note 4)</td><td>1.25 (AWG16) (Note 4)</td></tr>
<tr><td>MR-J3-11KA/B/T (Note5)</td><td>100A frame 100A</td><td>S-N65</td><td>14 (AWG6)</td><td>22 (AWG4)</td><td rowspan="3">5.5 (AWG10)</td><td rowspan="3">2 (AWG14)</td><td rowspan="3">1.25 (AWG16)</td></tr>
<tr><td>MR-J3-15KA/B/T (Note5)</td><td>225A frame 125A</td><td>S-N95</td><td>22 (AWG4)</td><td>30 (AWG2)</td></tr>
<tr><td>MR-J3-22KA/B/T (Note5)</td><td>225A frame 175A</td><td>S-N125</td><td>50 (AWG1/0)</td><td>60 (AWG2/0)</td></tr>
<tr><td>MR-J3-60A4/B4/T4</td><td>30A frame 5A</td><td rowspan="3">S-N10</td><td rowspan="3">2 (AWG14)</td><td>1.25 (AWG16)</td><td rowspan="4">2 (AWG14)</td><td rowspan="5">—</td><td rowspan="5">—</td></tr>
<tr><td>MR-J3-100A4/B4/T4</td><td>30A frame 10A</td><td rowspan="2">2 (AWG14)</td></tr>
<tr><td>MR-J3-200A4/B4/T4</td><td>30A frame 15A</td></tr>
<tr><td>MR-J3-350A4/B4/T4</td><td>30A frame 20A</td><td rowspan="2">S-N18</td></tr>
<tr><td>MR-J3-500A4/B4/T4 (Note5)</td><td>30A frame 30A</td><td rowspan="2">5.5 (AWG10)</td><td rowspan="2">5.5 (AWG10)</td></tr>
<tr><td>MR-J3-700A4/B4/T4 (Note5)</td><td>50A frame 40A</td><td>S-N20</td><td>2 (AWG14) (Note 4)</td><td>1.25 (AWG16) (Note 4)</td></tr>
<tr><td>MR-J3-11KA4/B4/T4 (Note5)</td><td>60A frame 60A</td><td>S-N25</td><td>8 (AWG8)</td><td>8 (AWG8)</td><td>3.5 (AWG12)</td><td rowspan="3">2 (AWG14)</td><td rowspan="3">1.25 (AWG16)</td></tr>
<tr><td>MR-J3-15KA4/B4/T4 (Note5)</td><td>100A frame 75A</td><td>S-N35</td><td rowspan="2">14 (AWG6)</td><td rowspan="2">22 (AWG4)</td><td rowspan="2">5.5 (AWG10)</td></tr>
<tr><td>MR-J3-22KA4/B4/T4 (Note5)</td><td>225A frame 125A</td><td>S-N65</td></tr>
</table>

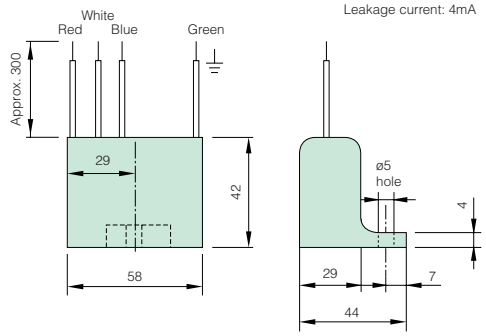
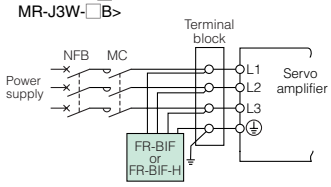
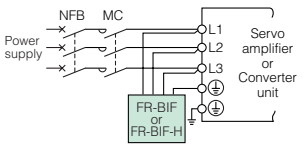
<Drive unit 30kW or larger>

<table>
<tr><th rowspan="2">Drive unit</th><th rowspan="2">Applicable converter unit</th><th rowspan="2">Circuit breaker</th><th rowspan="2">Magnetic contactor (Note 7)</th><th colspan="6">Electrical wire size (mm²)</th></tr>
<tr><th>L1, L2, L3, ⏚</th><th>L11, L21</th><th>U, V, W, ⏚</th><th>P2, C (Note 1)</th><th>BU, BV, BW</th><th>OHS1, OHS2</th></tr>
<tr><td>MR-J3-DU30KA/B (Note5)</td><td rowspan="2">MR-J3-CR55K</td><td>400A frame 250A</td><td>S-N150</td><td>50 (AWG1/0)</td><td rowspan="5">2 (AWG14)</td><td>60 (AWG2/0)</td><td rowspan="3">5.5 (AWG10)</td><td rowspan="2">2 (AWG14)</td><td rowspan="5">1.25 (AWG16)</td></tr>
<tr><td>MR-J3-DU37KA/B (Note5)</td><td>400A frame 300A</td><td>S-N180</td><td>60 (AWG2/0)</td><td>60 (AWG2/0) (Note 6)</td></tr>
<tr><td>MR-J3-DU30KA4/B4 (Note5)</td><td rowspan="4">MR-J3-CR55K4</td><td>225A frame 125A</td><td>S-N95</td><td>22 (AWG4)</td><td>30 (AWG2)</td><td rowspan="3">1.25 (AWG16)</td></tr>
<tr><td>MR-J3-DU37KA4/B4 (Note5)</td><td>225A frame 150A</td><td>S-N125</td><td>30 (AWG2)</td><td>38 (AWG2)</td></tr>
<tr><td>MR-J3-DU45KA4/B4 (Note5)</td><td>225A frame 175A</td><td>S-N150</td><td>38 (AWG2)</td><td>50 (AWG1/0)</td></tr>
<tr><td>MR-J3-DU55KA4/B4 (Note5)</td><td>400A frame 225A</td><td>S-N180</td><td>50 (AWG1/0)</td><td>60 (AWG2/0)</td></tr>
</table>

Notes: 1. Connect a reactor or an optional regeneration unit using the 5m or shorter length electrical wire. For the electrical wire size suitable for the power factor improvement DC reactor, refer to "Peripheral Equipment ● Power factor improvement DC reactor" in this catalog.
2. Use a fluoric resin wire (0.75mm² (AWG19)) when connecting to motor power supply connector. Refer to "SERVO AMPLIFIER INSTRUCTION MANUAL" for details on wiring cables.
3. Use a fluoric resin wire (0.5mm² (AWG20)) when connecting to motor electromagnetic brake connector. Refer to "SERVO AMPLIFIER INSTRUCTION MANUAL" for details on wiring cables.
4. The electrical wire size is for the servo motor with a cooling fan.
5. When connecting the wires to the terminal screws, be sure to use the screws attached to the terminal blocks.
6. This wire size applies when HIV wire (600V grade heat-resistant polyvinyl chloride insulated wire) with a length of 30m is used.
7. Be sure to use a magnetic contactor (MC) with an operation delay time of 80ms or less. The operation delay time is the time interval between current being applied to the coil until closure of contacts.

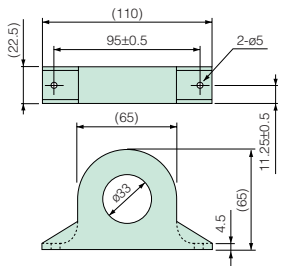
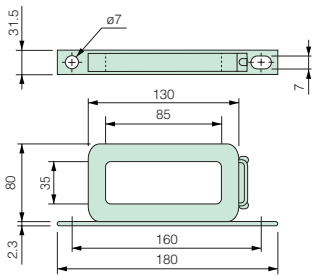
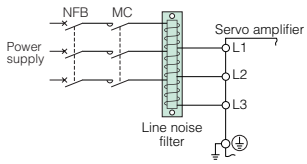
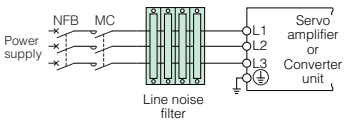
● Radio noise filter (FR-BIF, FR-BIF-H)

This filter effectively controls noise emitted from the power supply side of the servo amplifier or the converter unit and is especially effective for radio frequency bands 10MHz or lower. The FR-BIF is designed for the input only.

External dimensions (Unit: mm)	Connections
	This filter is not connectable to output side of the servo amplifier or the converter unit. Wiring should be as short as possible. Grounding is always required. Be sure to insulate the unused wire when using FR-BIF with 1-phase power. <For MR-J3-350□ or smaller, MR-J3-200□4 or smaller and MR-J3W-□B>  100VAC/200VAC class : FR-BIF 400VAC class : FR-BIF-H <For MR-J3-500□ or larger and MR-J3-350□4 or larger> 

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

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

External dimensions (Unit: mm)	Connections
<FR-BSF01> For electrical wire size of 3.5mm² (AWG12) or smaller  <FR-BLF> For electrical wire size of 5.5mm² (AWG10) or larger 	Use the line noise filter for wires of the main power supply (L1, L2, L3) of the servo amplifier or the converter unit, and of the motor power supply (U, V, W). Pass each of the wires through the line noise filter equal times in a same direction. For the main power supply, the effect of the filter rises as the number of passes increases, but generally four passes would be appropriate. For the motor power supply, passes must be four times or less. Do not pass the grounding (earth) wire through the filter, or the effect of the filter will drop. Wind the wires to pass through the filter as the required number of passes as shown in Fig.1. If the wires are too thick to wind, use two or more filters to have the required number of passes as shown in Fig.2. Place the line noise filters as close to the servo amplifier or the converter unit as possible for their best performance. <Fig.1>  <Fig.2> 

● Surge suppressor

Attach surge suppressors to AC relays and AC valves around the servo amplifier or the drive unit and the converter unit. Attach diodes to DC relays and DC valves.

Example
Surge suppressor: 972A-2003 504 11 (rated 200VAC, manufactured by Matsuo Electric Co., Ltd.)
Diode : A diode with breakdown voltage 4 or more times greater than the relay's drive voltage, and with current capacity 2 or more times greater than the relay's drive current.

● Data line filter

Noise can be prevented by attaching a data line filter to the pulse output cable of the pulse train output controller or the motor encoder cable.

Example
Data line filter: ESD-SR-250 (manufactured by NEC TOKIN Corporation) or ZCAT3035-1330 (manufactured by TDK Corporation)

Peripheral Equipment

● EMC filter

The following filters are recommended as a filter compliant with the EMC directive for the servo amplifier's and the drive unit's power supply. (Note 1)

Model	Applicable servo amplifier or drive unit	Applicable converter unit	Fig.
HF3010A-UN (Note 2)	MR-J3-10A/B/T to 100A/B/T MR-J3-10A1/B1/T1 to 40A1/B1/T1	–	A
HF3030A-UN (Note 2)	MR-J3-200A/B/T MR-J3-350A/B/T	–	B
HF3040A-UN (Note 2)	MR-J3-500A/B/T MR-J3-700A/B/T	–	
HF3100A-UN (Note 2)	MR-J3-11KA/B/T to 22KA/B/T	–	C
HF3200A-UN (Note 2)	MR-J3-DU30KA/B MR-J3-DU37KA/B	MR-J3-CR55K	D

Notes: 1. Manufactured by SOSHIN ELECTRIC CO., LTD.
2. A surge protector is separately required to use this EMC filter. Refer to "EMC Installation Guidelines".

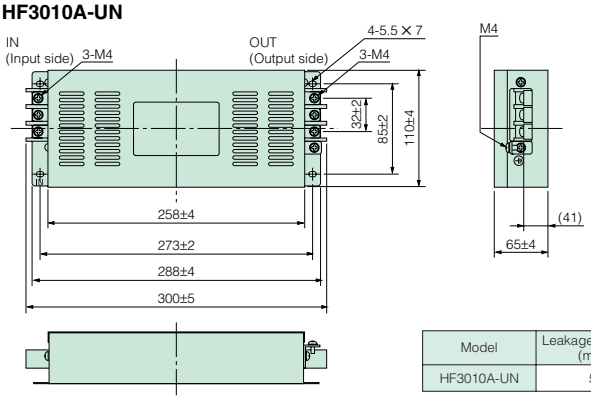
Model	Applicable servo amplifier or drive unit	Applicable converter unit	Fig.
TF3005C-TX	MR-J3-60A4/B4/T4 MR-J3-100A4/B4/T4	–	E
TF3020C-TX	MR-J3-200A4/B4/T4 MR-J3-350A4/B4/T4 MR-J3-500A4/B4/T4 MR-J3-700A4/B4/T4	–	
TF3030C-TX	MR-J3-11KA4/B4/T4	–	
TF3040C-TX	MR-J3-15KA4/B4/T4	–	F
TF3060C-TX	MR-J3-22KA4/B4/T4	–	
TF3150C-TX	MR-J3-DU30KA4/B4 MR-J3-DU37KA4/B4 MR-J3-DU45KA4/B4 MR-J3-DU55KA4/B4	MR-J3-CR55K4	G

External dimensions (Unit: mm)

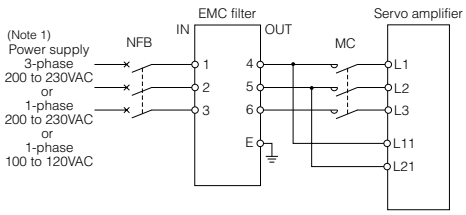
Connections

A

● HF3010A-UN

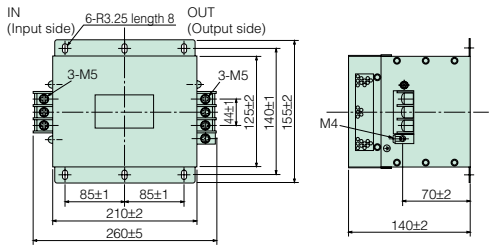


Model	Leakage current (mA)	Mass kg (lb)
HF3010A-UN	5	3 (6.6)



B

● HF3030A-UN, HF3040A-UN

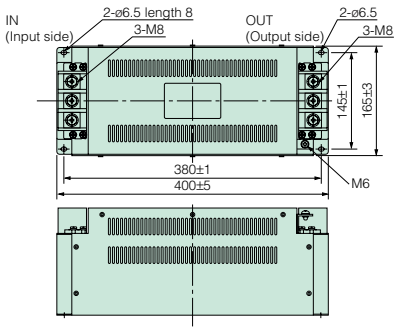


Model	Leakage current (mA)	Mass kg (lb)
HF3030A-UN	5	5.5 (12)
HF3040A-UN	1.5	6.0 (13)

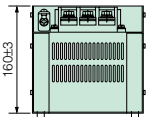
Notes: 1. When using a power supply, 1-phase 200VAC to 230VAC, connect the power supply to the L1 and L2 terminals.
Do not connect anything to L3. 1-phase 200VAC to 230VAC is available only for MR-J3-70□ or smaller servo amplifier.
There is no L3 for 1-phase 100VAC to 120VAC power supply.

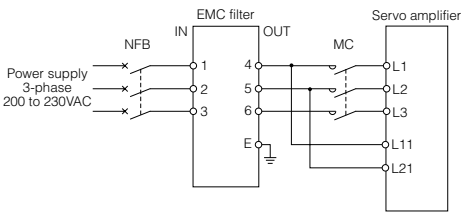
C

● HF3100A-UN



Model	Leakage current (mA)	Mass kg (lb)
HF3100A-UN	6.5	15 (33)

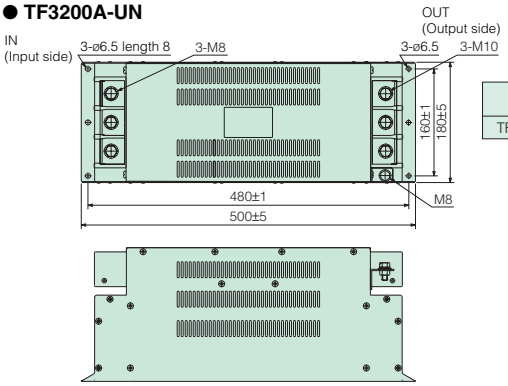




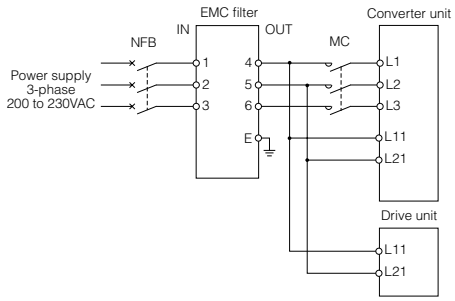
External dimensions (Unit: mm)	Connections

D

● TF3200A-UN

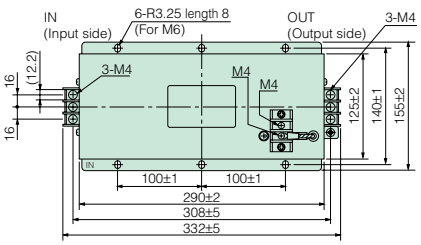


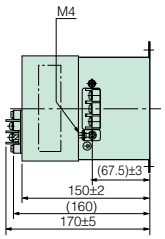
Model	Leakage current (mA)	Mass kg (lb)
TF3200A-UN	9.0	18 (40)



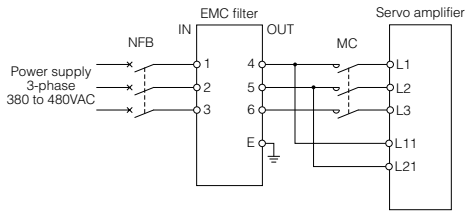
E

● TF3005C-TX, TF3020C-TX, TF3030C-TX



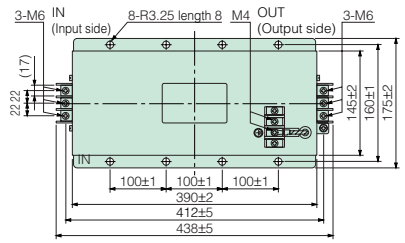


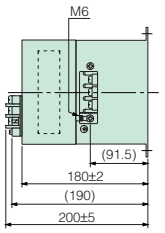
Model	Leakage current (mA)	Mass kg (lb)
TF3005C-TX	5.5	6.0 (13)
TF3020C-TX		
TF3030C-TX		7.5 (17)



F

● TF3040C-TX, TF3060C-TX

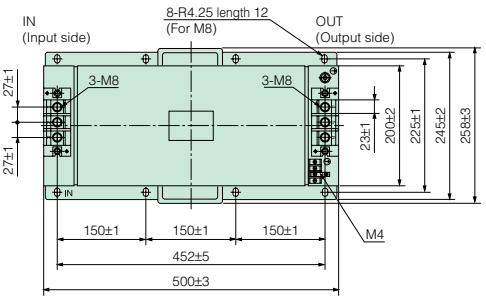


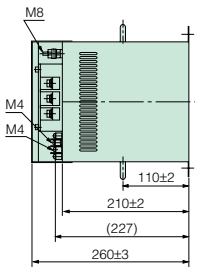


Model	Leakage current (mA)	Mass kg (lb)
TF3040C-TX	5.5	12.5 (28)
TF3060C-TX		

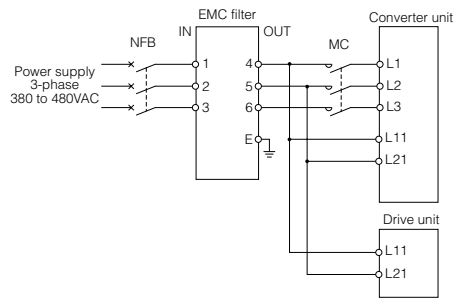
G

● TF3150C-TX





Model	Leakage current (mA)	Mass kg (lb)
TF3150C-TX	5.5	31 (68)



Peripheral Equipment

● Power factor improvement DC reactor (FR-BEL)

This reactor enables users to boost the servo amplifier's power factor and reduce its power supply capacity.
As compared to the AC reactor, the DC reactor is more recommended since the DC reactor is more effective in power factor improvement, smaller and lighter, and its wiring is easier. (The DC reactor uses 2 wires, while the AC reactor uses 6 wires.)

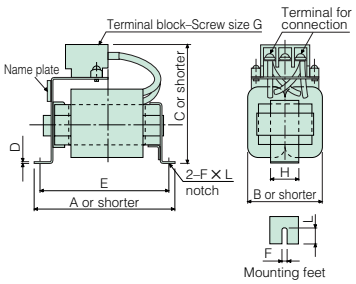
Model	Applicable servo amplifier	Fig.
FR-BEL-0.4K	MR-J3-10A/B/T MR-J3-20A/B/T	A
FR-BEL-0.75K	MR-J3-40A/B/T	
FR-BEL-1.5K	MR-J3-60A/B/T MR-J3-70A/B/T	
FR-BEL-2.2K	MR-J3-100A/B/T	
FR-BEL-3.7K	MR-J3-200A/B/T	
FR-BEL-7.5K	MR-J3-350A/B/T	
FR-BEL-11K	MR-J3-500A/B/T	
FR-BEL-H1.5K	MR-J3-60A4/B4/T4	
FR-BEL-H2.2K	MR-J3-100A4/B4/T4	
FR-BEL-H3.7K	MR-J3-200A4/B4/T4	
FR-BEL-H7.5K	MR-J3-350A4/B4/T4	
FR-BEL-H11K	MR-J3-500A4/B4/T4	

Model	Applicable servo amplifier or drive unit	Applicable converter unit	Fig.
FR-BEL-15K	MR-J3-700A/B/T MR-J3-11KA/B/T	—	B
FR-BEL-22K	MR-J3-15KA/B/T	—	
FR-BEL-30K	MR-J3-22KA/B/T	—	
FR-BEL-H15K	MR-J3-700A4/B4/T4 MR-J3-11KA4/B4/T4	—	
FR-BEL-H22K	MR-J3-15KA4/B4/T4	—	
FR-BEL-H30K	MR-J3-22KA4/B4/T4	—	
MR-DCL30K	MR-J3-DU30KA/B	MR-J3-CR55K	C
MR-DCL37K	MR-J3-DU37KA/B		
MR-DCL30K-4	MR-J3-DU30KA4/B4	MR-J3-CR55K4	
MR-DCL37K-4	MR-J3-DU37KA4/B4		
MR-DCL45K-4	MR-J3-DU45KA4/B4		
MR-DCL55K-4	MR-J3-DU55KA4/B4		

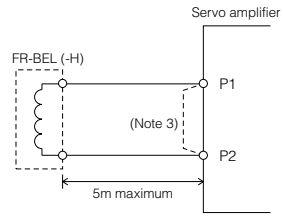
External dimensions (Unit: mm)

Connections

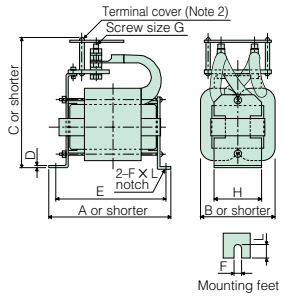
A



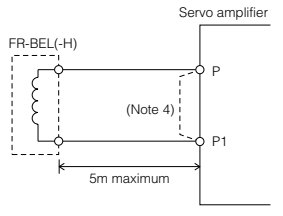
Model	Variable dimensions A	B	C	D	E	F×L	G	H	Mounting screw size	Mass kg (lb)	Wire size (mm²)
FR-BEL-0.4K	110	50	94	1.6	95	6 × 12	M3.5	25	M5	0.5 (1.1)	2 (AWG14)
FR-BEL-0.75K	120	53	102	1.6	105	6 × 12	M4	25	M5	0.7 (1.5)	
FR-BEL-1.5K	130	65	110	1.6	115	6 × 12	M4	30	M5	1.1 (2.4)	
FR-BEL-2.2K	130	65	110	1.6	115	6 × 12	M4	30	M5	1.2 (2.6)	
FR-BEL-3.7K	150	75	102	2.0	135	6 × 12	M4	40	M5	1.7 (3.7)	
FR-BEL-7.5K	150	75	126	2.0	135	6 × 12	M5	40	M5	2.3 (5.1)	3.5 (AWG12)
FR-BEL-11K	170	93	132	2.3	155	6 × 14	M5	50	M5	3.1 (6.8)	5.5 (AWG10)
FR-BEL-H1.5K	130	63	89	1.6	115	6 × 12	M3.5	32	M5	0.9 (2.0)	2 (AWG14)
FR-BEL-H2.2K	130	63	101	1.6	115	6 × 12	M3.5	32	M5	1.1 (2.4)	
FR-BEL-H3.7K	150	75	102	2.0	135	6 × 12	M4	40	M5	1.7 (3.7)	
FR-BEL-H7.5K	150	75	124	2.0	135	6 × 12	M4	40	M5	2.3 (5.1)	
FR-BEL-H11K	170	93	132	2.3	155	6 × 14	M5	50	M5	3.1 (6.8)	5.5 (AWG10)



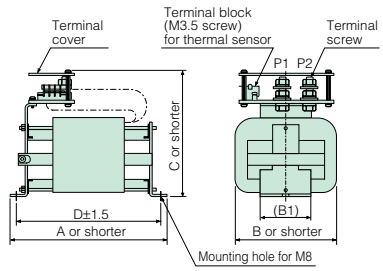
B



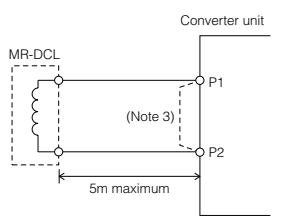
Model	Variable dimensions A	B	C	D	E	F×L	G	H	Mounting screw size	Mass kg (lb)	Wire size (mm²)
FR-BEL-15K	170	93	170	2.3	155	6 × 14	M8	56	M5	3.8 (8.4)	8 (AWG8) 22 (AWG4) (Note 1)
FR-BEL-22K	185	119	182	2.6	165	7 × 15	M8	70	M6	5.4 (12)	30 (AWG2)
FR-BEL-30K	185	119	201	2.6	165	7 × 15	M8	70	M6	6.7 (15)	60 (AWG2/0)
FR-BEL-H15K	170	93	160	2.3	155	6 × 14	M6	56	M5	3.7 (8.2)	8 (AWG8)
FR-BEL-H22K	185	119	171	2.6	165	7 × 15	M6	70	M6	5.0 (11)	22 (AWG4)
FR-BEL-H30K	185	119	189	2.6	165	7 × 15	M6	70	M6	6.7 (15)	22 (AWG4)



C



Model	Variable dimensions A	B	B1	C	D	Terminal screw size	Mass kg (lb)	Wire size (mm²)
MR-DCL30K	255	135	80	215	232	M12	9.5 (21)	60 (AWG2/0)
MR-DCL37K								80 (AWG3/0)
MR-DCL30K-4	205	135	75	200	175	M8	6.5 (14)	30 (AWG2)
MR-DCL37K-4	225	135	80	200	197	M8	7 (15)	38 (AWG2)
MR-DCL45K-4	240	135	80	200	212	M8	7.5 (17)	50 (AWG1/0)
MR-DCL55K-4	260	135	80	215	232	M8	9.5 (21)	60 (AWG2/0)



Notes: 1. When using FR-BEL15K, select a wire size 8mm² (AWG8) for MR-J3-700A/B/T; and 22mm² (AWG4) for MR-J3-11KA/B/T.
2. The terminal cover is supplied with the unit. Install the cover after connecting the wires.
3. When using the DC reactor, disconnect the short bar between P1 and P2.
4. When using the DC reactor, disconnect the short bar between P and P1.

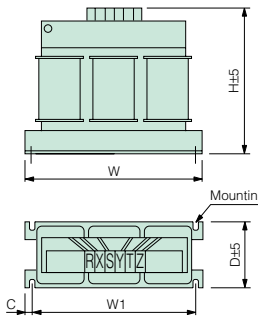
● Power factor improvement AC reactor (FR-BAL)

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

Model	Applicable servo amplifier
FR-BAL-0.4K	MR-J3-10A/B/T, MR-J3-10A1/B1/T1 MR-J3-20A/B/T
FR-BAL-0.75K	MR-J3-20A1/B1/T1 MR-J3-40A/B/T
FR-BAL-1.5K	MR-J3-40A1/B1/T1 MR-J3-60A/B/T MR-J3-70A/B/T
FR-BAL-2.2K	MR-J3-100A/B/T
FR-BAL-3.7K	MR-J3-200A/B/T
FR-BAL-7.5K	MR-J3-350A/B/T
FR-BAL-11K	MR-J3-500A/B/T
FR-BAL-15K	MR-J3-700A/B/T MR-J3-11KA/B/T
FR-BAL-22K	MR-J3-15KA/B/T
FR-BAL-30K	MR-J3-22KA/B/T

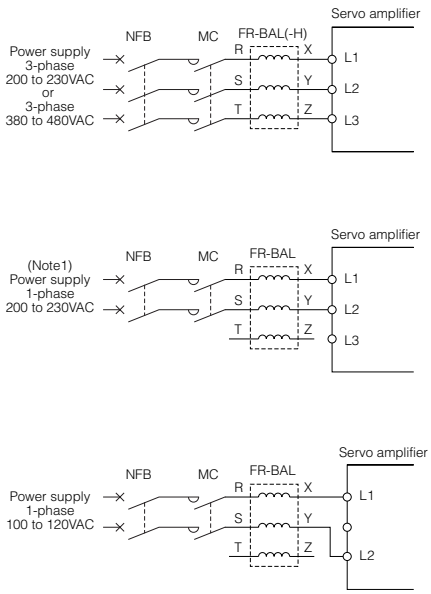
Model	Applicable servo amplifier
FR-BAL-H1.5K	MR-J3-60A4/B4/T4
FR-BAL-H2.2K	MR-J3-100A4/B4/T4
FR-BAL-H3.7K	MR-J3-200A4/B4/T4
FR-BAL-H7.5K	MR-J3-350A4/B4/T4
FR-BAL-H11K	MR-J3-500A4/B4/T4
FR-BAL-H15K	MR-J3-700A4/B4/T4 MR-J3-11KA4/B4/T4
FR-BAL-H22K	MR-J3-15KA4/B4/T4
FR-BAL-H30K	MR-J3-22KA4/B4/T4

External dimensions (Unit: mm)



Model	Variable dimensions						Mounting screw size	Terminal screw size	Mass kg (lb)
	W	W1	H	D	D1	C			
FR-BAL-0.4K	135	120	115	59	45 $^{0}_{-2.5}$	7.5	M4	M3.5	2.0 (4.4)
FR-BAL-0.75K	135	120	115	69	57 $^{0}_{-2.5}$	7.5	M4	M3.5	2.8 (6.2)
FR-BAL-1.5K	160	145	140	71	55 $^{0}_{-2.5}$	7.5	M4	M3.5	3.7 (8.2)
FR-BAL-2.2K	160	145	140	91	75 $^{0}_{-2.5}$	7.5	M4	M3.5	5.6 (12)
FR-BAL-3.7K	220	200	192	90	70 $^{0}_{-2.5}$	10	M5	M4	8.5 (19)
FR-BAL-7.5K	220	200	194	120	100 $^{0}_{-2.5}$	10	M5	M5	14.5 (32)
FR-BAL-11K	280	255	220	135	100 $^{0}_{-2.5}$	12.5	M6	M6	19 (42)
FR-BAL-15K	295	270	275	133	110 $^{0}_{-2.5}$	12.5	M6	M6	27 (60)
FR-BAL-22K	290	240	301	199	170 ±5	25	M8	M8	35 (77)
FR-BAL-30K	290	240	301	219	190 ±5	25	M8	M8	43 (95)
FR-BAL-H1.5K	160	145	140	87	70 $^{0}_{-2.5}$	7.5	M4	M3.5	5.3 (12)
FR-BAL-H2.2K	160	145	140	91	75 $^{0}_{-2.5}$	7.5	M4	M3.5	5.9 (13)
FR-BAL-H3.7K	220	200	190	90	70 $^{0}_{-2.5}$	10	M5	M3.5	8.5 (19)
FR-BAL-H7.5K	220	200	192	120	100 ±5	10	M5	M4	14 (31)
FR-BAL-H11K	280	255	226	130	100 ±5	12.5	M6	M5	18.5 (41)
FR-BAL-H15K	295	270	244	130	110 ±5	12.5	M6	M5	27 (60)
FR-BAL-H22K	290	240	269	199	170 ±5	25	M8	M8	35 (77)
FR-BAL-H30K	290	240	290	219	190 ±5	25	M8	M8	43 (95)

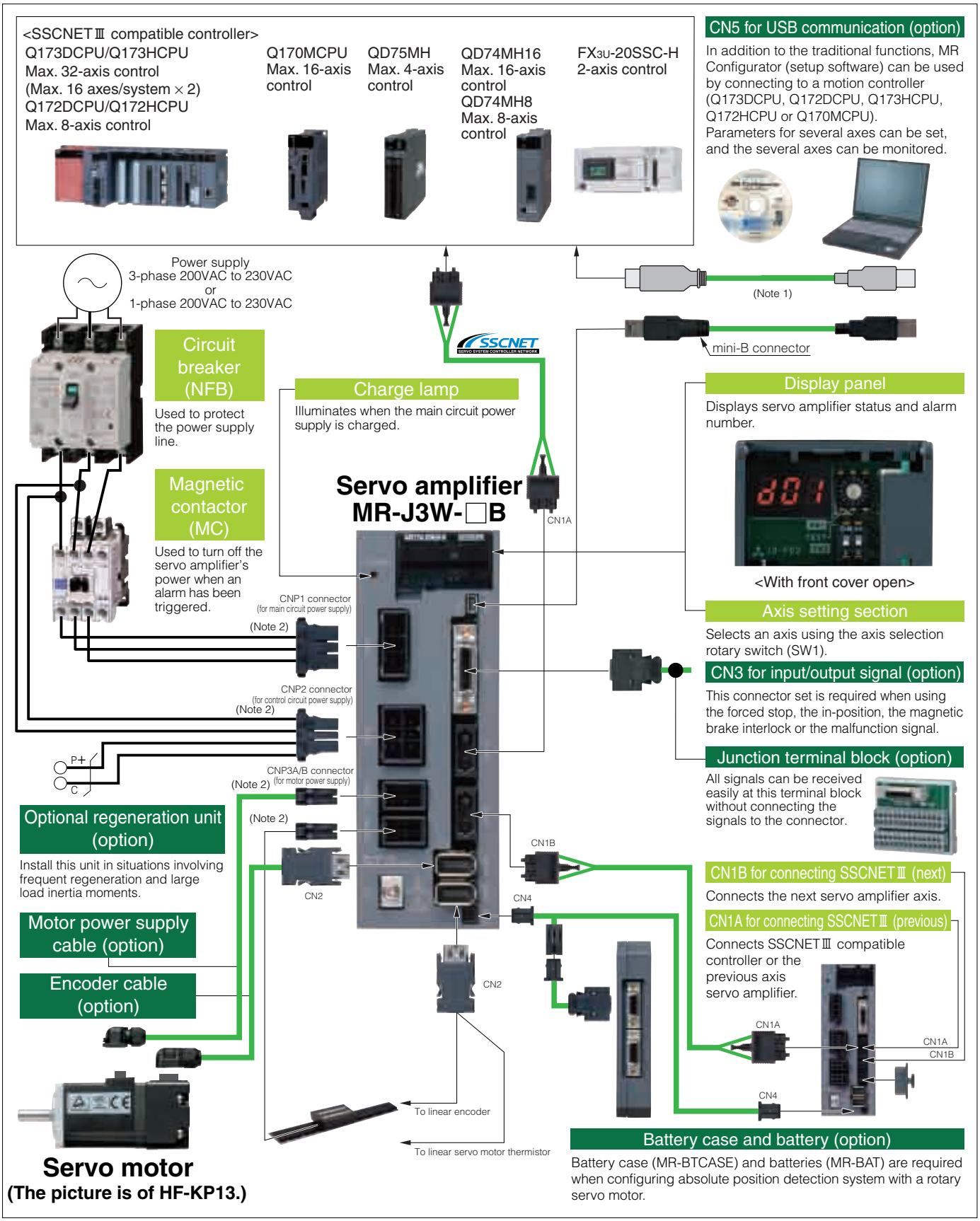
Connections



Notes: 1. When using a power supply, 1-phase 200VAC to 230VAC, connect the power supply to the L1 and L2 terminals.
Do not connect anything to L3. 1-phase 200VAC to 230VAC is available only for the MR-J3-70□ or smaller servo amplifier.

Connections with Peripheral Equipment

Peripheral equipment is connected to MR-J3W-B as described below.
Connectors, cables, options, and other necessary equipment are available so that users can set up MR-J3W-B easily and start using it right away.



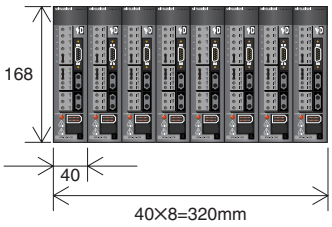
Notes: 1. Cable for connecting a controller and a personal computer must be prepared by the user. Refer to relevant User's Manual for details.
2. CNP1, CNP2 and CNP3A/B connector sets are not included with the servo amplifier. Please purchase them separately. Crimping tools are also required for wiring. Refer to "Option ●Cables and connectors for MR-J3W series" for more details.

MR-J3W-B (2-axis Servo Amplifier) Features

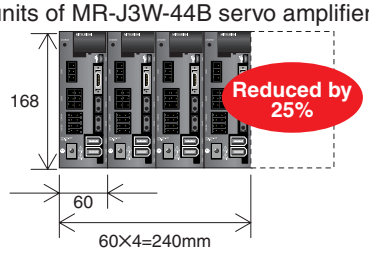
- With the same high performance, functionality and usability of the MR-J3-B servo amplifier, one unit of MR-J3W-B servo amplifier operates any combination of two rotary/linear servo motors.
- Mounting area can be reduced by approximately 17% to 25% as compared to that of 2 units of MR-J3-B servo amplifiers; thus, a more compact system can be realized.

400W 8-axis system example

8 units of MR-J3-40B servo amplifiers



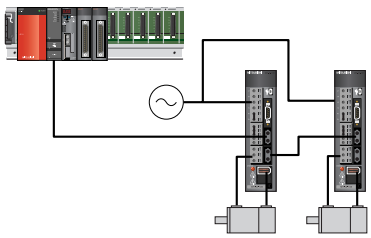
4 units of MR-J3W-44B servo amplifiers



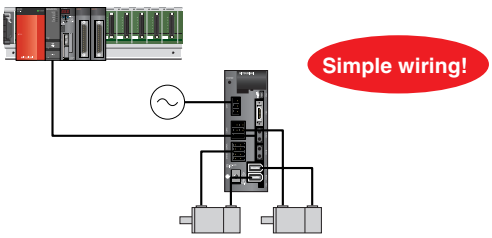
- The two axes use the same main and control supply, and SSCNET Ⅲ cables. Thus, wiring is greatly reduced.

2-axis system example

2 units of MR-J3-□B

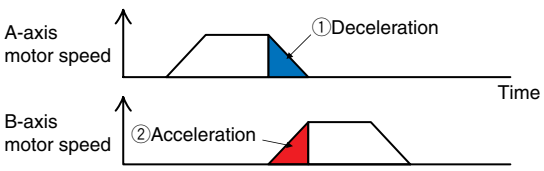


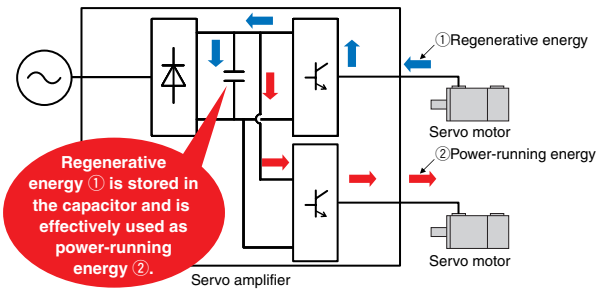
1 unit of MR-J3W-□B



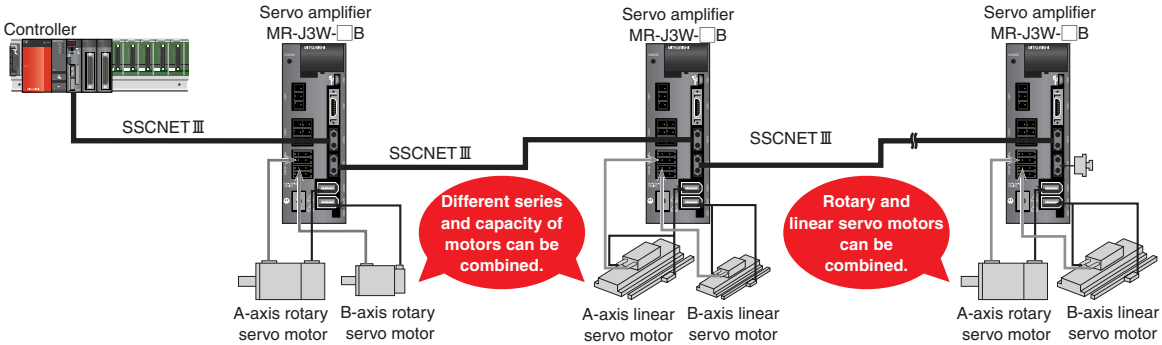
- Reusable regenerative energy stored in the capacitor is increased by 189% to 256% as compared to MR-J3-B servo amplifier. Regenerative energy of 17J to 46J can be reused, contributing to energy-saving.

Operation pattern





- Rotary or linear servo motor can be selected using the rotary/linear select switch, which is located on the bottom of the servo amplifier.
  Available rotary servo motor series : HF-KP/HF-MP/HF-SP/HC-LP/HC-UP
  Available linear servo motor series : LM-H2/LM-U2
- Any combination of two rotary/linear servo motors of various series and/or capacity can be connected with MR-J3W-B servo amplifier.



Servo Amplifier Model Configurations

MR-J3W-□B-□

Mitsubishi general-purpose AC servo amplifier MELSERVO-J3W Series (2-axis AC servo amplifier)

B: SSCNET Ⅲ compatible

Symbol	Rated output (W)	
	A-axis	B-axis
22	200	200
44	400	400
77	750	750

Symbol	Special specifications
ED	Without a dynamic brake (Note 1)

Notes: 1. Dynamic brake does not work at alarm occurrence or power failure. Take measures to ensure safety on the entire system.

✶The servo amplifiers above conform to EN, UL and CSA standards.

List of compatible motors

Symbol	Axis	Rotary servo motor (Note 1)					Linear servo motor (Note 1, 3)			
							LM-H2		LM-U2	
		HF-KP	HF-MP	HF-SP	HC-LP	HC-UP	Primary side	Secondary side	Primary side	Secondary side
22	A	053	053	—	—	—	—	—	PAB-05M-0SS0	SA0-□-0SS0
	B	13 23	13 23						PBB-07M-1SS0	SB0-□-1SS0
44	A	053 (Note 2, 3) 13 (Note 2, 3)	053 (Note 2, 3) 13 (Note 2, 3)	—	—	—	P1A-06M-4SS0	S10-□-4SS0	PAD-10M-0SS0	SA0-□-0SS0
	B	23 43	23 43				P2A-12M-1SS0	S20-□-1SS0	PAF-15M-0SS0	SA0-□-0SS0
77	A	43 (Note 2, 3)	43 (Note 2, 3)	51 (Note 2, 3)	52 (Note 2, 3)	72 (Note 2, 3)	P1A-06M-4SS0 (Note 2)	S10-□-4SS0 (Note 2)	PAD-10M-0SS0 (Note 2)	SA0-□-0SS0 (Note 2)
	B	73	73	52 (Note 2, 3)			P2A-12M-1SS0 (Note 2)	S20-□-1SS0 (Note 2)	PAF-15M-0SS0 (Note 2)	SA0-□-0SS0 (Note 2)
							P2B-24M-1SS0	S20-□-1SS0	PBD-15M-1SS0	SB0-□-1SS0
							P3A-24M-1SS0	S30-□-1SS0	PBF-22M-1SS0	SB0-□-1SS0

Notes: 1. Refer to “Servo Motor Specifications” in this catalog for specifications of rotary servo motors, and “LINEAR SERVO LM Series catalog L(NA)03026” for specifications of linear servo motors.
2. These motors can be used by setting parameter No.Po04 to “□□1□”.
3. These motors are not compatible with FX3U-20SSC-H controller.

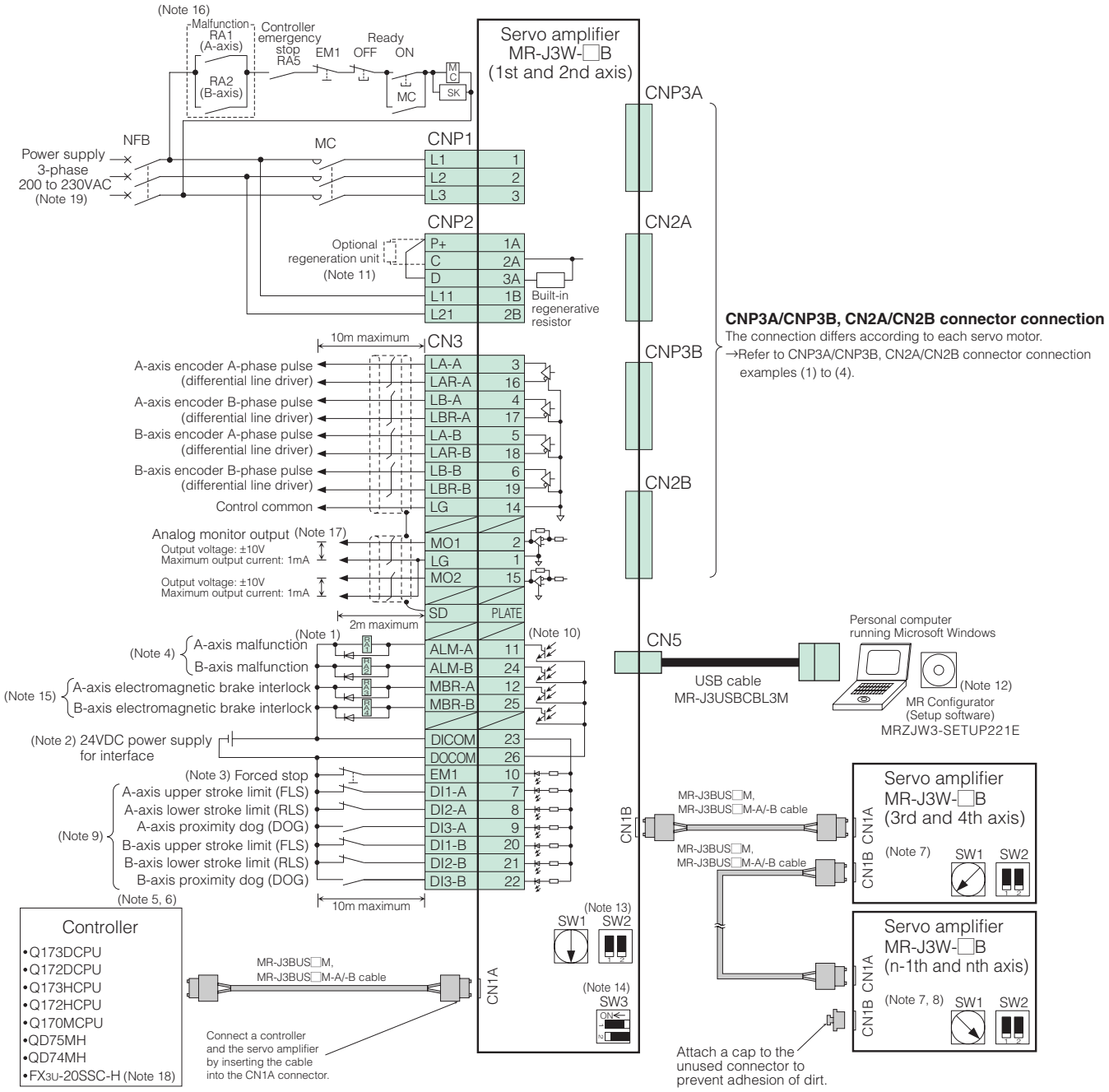
MR-J3W-B Servo Amplifier Specifications

Servo amplifier model			MR-J3W-22B		MR-J3W-44B		MR-J3W-77B	
Rated output capacity			A-axis 200W	B-axis 200W	A-axis 400W	B-axis 400W	A-axis 750W	B-axis 750W
Output	Rated voltage		3-phase 170VAC					
	Rated current (A)		1.5	1.5	2.8	2.8	5.8	5.8
Main circuit power supply (Note 10)	Voltage/frequency (Note 1, 2)		3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz				3-phase 200 to 230VAC 50/60Hz	
	Rated current (A)		3.5		6.1		10.4	
	Permissible voltage fluctuation		For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC				3-phase 170 to 253VAC	
	Permissible frequency fluctuation		±5% maximum					
Control circuit power supply	Voltage/frequency		1-phase 200 to 230VAC 50/60Hz					
	Rated current (A)		0.4					
	Permissible voltage fluctuation		1-phase 170 to 253VAC					
	Permissible frequency fluctuation		±5% maximum					
	Power consumption (W)		55					
Interface power supply			24VDC ±10% (required current capacity: 0.25A (Note 3))					
Capacitor's charging energy	Reusable regenerative energy (Note 7) (J)		17		22		46	
	Rotary servo motor's moment of inertia equivalent to permissible charging amount (Note 8) J($\times 10^{-4}$kg·m^2) [J (oz·in^2)]		3.45 (18.9)		4.46 (24.4)		9.32 (51.0)	
	Linear servo motor's mass equivalent to permissible charging amount (Note 9) (kg [lb])		8.5 (19)		11.0 (24.0)		23.0 (51.0)	
Tolerable regenerative power of regenerative resistor (W)	Built-in regenerative resistor		10				100	
	Optional regeneration unit	MR-RB14	100				—	
		MR-RB34	—				300	
Control system			Sine-wave PWM control/current control system					
Dynamic brake			Built-in (Note 4, 5)					
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			Natural cooling open (IP00)		Fan cooling open (IP00)			
Environment	Ambient temperature (Note 6)		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 maximum (non condensing), storage: 90% RH maximum (non condensing)					
	Atmosphere		Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust					
	Elevation		1000m or less above sea level					
	Vibration		5.9m/s^2 maximum or less at 10 to 55Hz (direction of X, Y and Z axes)					
Mass (kg [lb])			1.4 (3.1)				2.3 (5.1)	

Notes:1. Rated output and speed of a rotary servo motor; and rated thrust and speed of a linear servo motor are applicable when the servo amplifier, combined with the rotary servo motors or the linear servo motors, is operated within the specified power supply voltage and frequency. Torque drops when the power supply voltage is below the specified value.
2. For torque characteristics when combined with a rotary servo motor, refer to the section "Servo motor torque characteristics" in this catalog. For thrust characteristics when combined with a linear servo motor, refer to "LINEAR SERVO LM Series catalog L(NA)03026".
3. 0.25A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use.
4. When using the built-in dynamic brake, refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for permissible load inertia moment ratio.
5. Special specification servo amplifiers without a dynamic brake are also available: MR-J3W-□B-ED. When using the servo amplifier without a dynamic brake, the rotary and linear servo motors do not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system.
6. MR-J3W-□B servo amplifiers can be mounted closely. In the case of MR-J3-44B, however, operate them at 90% or less of the effective load ratio.
7. For rotary servo motors, "reusable regenerative energy" is the energy generated when a machine, which has a moment of inertia equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
For linear servo motors, "reusable regenerative energy" is the energy generated when a machine, which has mass equivalent to the permissible charging amount, decelerates from the maximum speed to a stop.
8. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total moments of inertia of both axes. Otherwise, the permissible charging amount is equivalent to the moment of inertia of each axis.
9. Mass of primary side (coil) is included. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total masses of both axes. Otherwise, the permissible charging amount is equivalent to the mass of each axis.
10. Refer to the following for power supply capacity.
• For rotary servo motor: "Servo Motor Specifications" in this catalog
• For linear servo motor: "LINEAR SERVO LM Series catalog L(NA)03026"
Power supply capacity for this servo amplifier is equivalent to the total power supply capacities of each motor.

MR-J3W-□B Standard Wiring Diagram

● Connection example

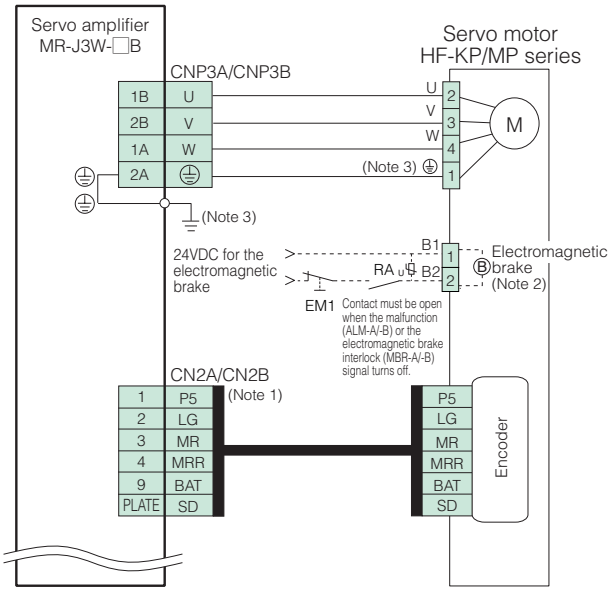


Notes:

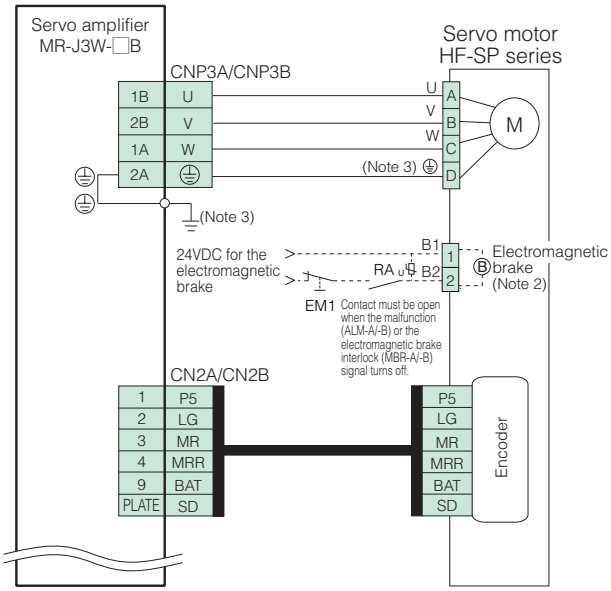
1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the forced stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.25A). 0.25A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. The forced stop signal is issued for both axes of the servo amplifier. For overall system, apply the emergency stop on the controller side.
4. The malfunction (ALM-A/-B) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
5. Select the following servo amplifier in the system setting of the controller's programming software package.
   MR-J3-B for a rotary servo motor and MR-J3-B Linear for a linear servo motor
6. For details on the controllers, refer to relevant programming manual or user's manual.
7. Connections for the third and following axes are omitted.
8. Up to 16 axes (n=2 to 16) can be set using the axis selection rotary switch (SW1).
9. Devices can be assigned for DI1, DI2 and DI3 with controller setting. Refer to the controller's instruction manuals for details on setting. These devices can be assigned with the controller, Q173DCPU, Q172DCPU, Q173HCPU, Q172HCPU, Q170MCPU, QD75MH or QD74MH.
10. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
11. When not using an optional regeneration unit, connect P+ and D to use the internal regenerative resistor. When using an optional regenerative unit, disconnect P+ and D, and then connect the optional regenerative unit to P+ and C.
12. MRZJW3-SETUP221E software version C0 or above is compatible with the MR-J3W servo amplifiers. Contact your local sales office before using MR Configurator.
13. Test operation select switch (SW2-1) is used to perform test operation mode with MR Configurator. SW2-2 is for manufacturer setting.
14. Rotary/linear select switch (SW3) is located on the bottom of the servo amplifier. SW3-1 is for A-axis and SW3-2 for B-axis. Select a servo motor as follows:
    OFF: rotary servo motor, ON: linear servo motor
15. The electromagnetic brake interlock (MBR-A/-B) signal is for a rotary servo motor.
16. This connection is for continuing operation with one axis when an alarm occurs on the other axis. To stop the operation of the both axes with an alarm on one axis, connect RA1 and RA2 in series.
17. Output voltage range varies depending on the monitored signal.
18. Refer to "Servo Amplifier Model Configurations ● Compatible motor list" in this catalog for motors compatible with FX3U-20SSC-H.
19. When using a 1-phase 200VAC to 230VAC, connect the power supply to the L1 and L2 terminals. Do not connect anything to L3.

CNP3A/CNP3B and CN2A/CN2B Connectors Connection Examples

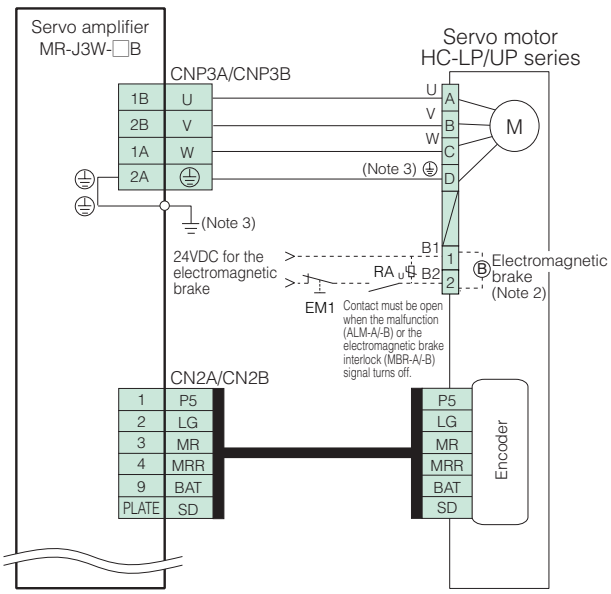
(1) HF-KP/HF-MP series (Note 6)



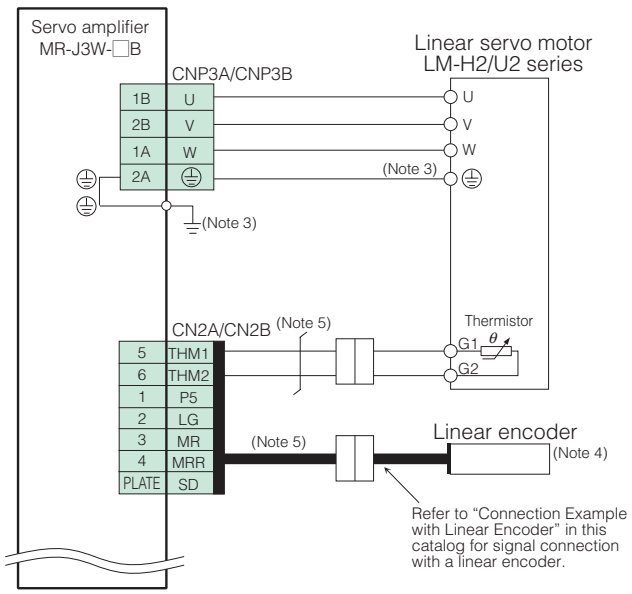
(2) HF-SP series (Note 6)



(3) HC-LP/HC-UP series (Note 6)

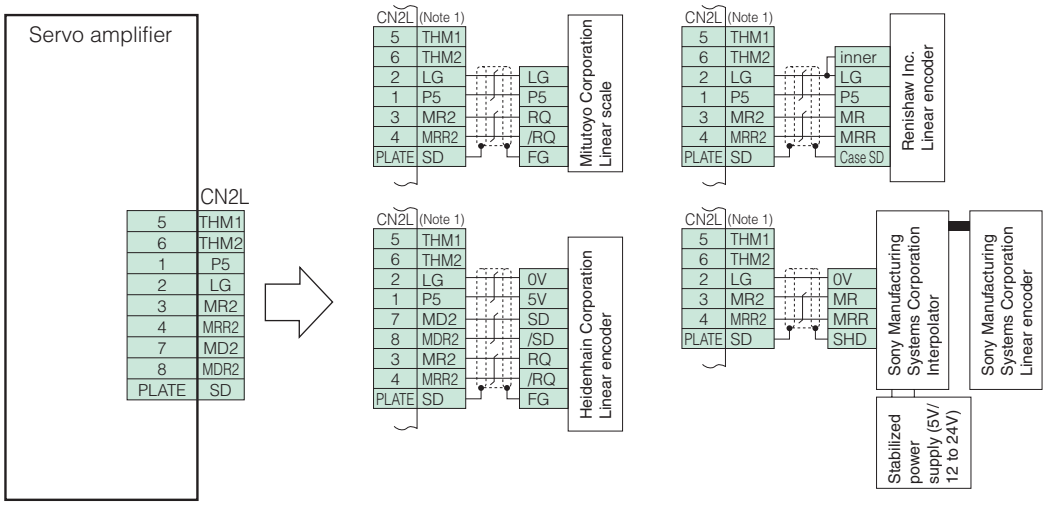


(4) LM-H2/LM-U2 series (Note 6)



Notes:
1. The signals shown is applicable when using a two-wire type encoder cable. When using a four-wire type encoder cable for HF-KP/HF-MP series, refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
2. This is for the motor with an electromagnetic brake. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. For grounding, connect the ground wire to the control box's protection ground (PE) terminal via the servo amplifier's protection ground (PE) terminal.
4. Refer to "Compatible Linear Encoder" in the following page for details on linear encoders.
5. Manufacture these cables. The signal assignments shown is applicable when using a two-wire type encoder cable. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for manufacturing the cables.
6. Refer to "Servo Amplifier Model Configurations ● Compatible motor list" in this catalog for motors compatible with FX3U-20SSC-H.

Connection Examples with Linear Encoder



Notes: 1. When manufacturing the linear encoder connection cable, use an optional CN2L connector (MR-J3CN2). Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the wiring.

Compatible Linear Encoders (Note 1)

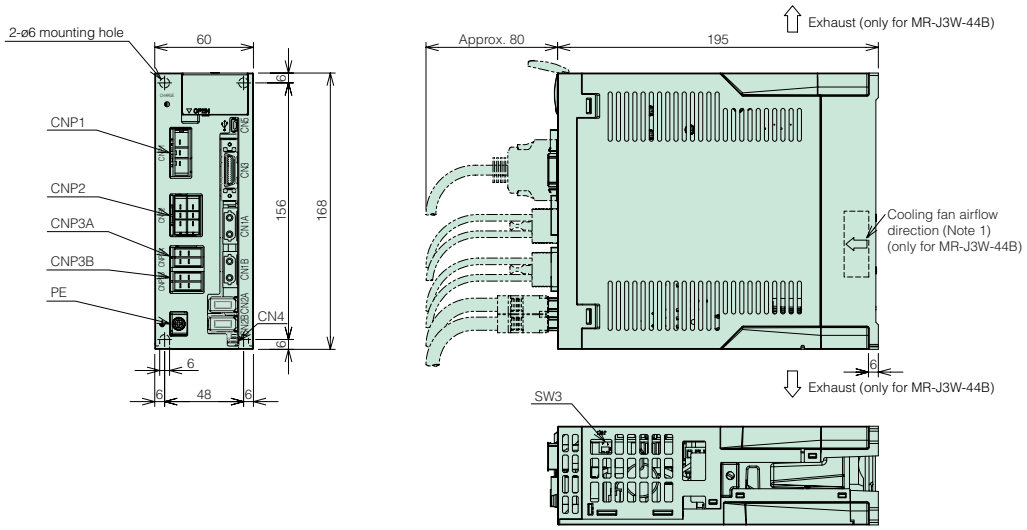
Linear encoder type		Manufacturer	Model	Resolution	Rated speed (Note 2)	Effective measurement length (maximum)	Communication method	Position detection system
Mitsubishi serial interface compatible	Absolute type	Mitutoyo Corporation	AT343A	0.05μm	2.0m/s	3000mm	2-wire type	Absolute
			AT543A-SC		2.5m/s	2200mm		
			ST741A	0.5μm	4.0m/s	6000mm		
			ST743A	0.1μm				
		Heidenhain Corporation	LC 493M	0.05μm/ 0.01μm	2.0m/s	2040mm	4-wire type	
			LC 193M		3.0m/s	4240mm		
	Incremental type	Sony Manufacturing Systems Corporation (Note 4)	SL710+PL101-R/RH +MJ830 or MJ831	0.2μm (Note 3)	6.4m/s	3000mm	2-wire type	Incremental
		Renishaw Inc.	RGH26P	5μm	4.0m/s	70000mm		
			RGH26Q	1μm	3.2m/s			
			RGH26R	0.5μm	1.6m/s			
		Heidenhain Corporation	LIDA 485+EIB 392M	0.0013μm (20/16384μm)	4.0m/s	30040mm	4-wire type	
			LIDA 487+EIB 392M			6040mm		

Notes: 1. Consult with the relevant linear encoder manufacturer for details on the linear encoder's working environment and specifications such as ambient temperature, vibration resistance and protection level. Also, contact the manufacturer when using the linear encoder in high electrostatic noise environment.
2. The indicated values are the linear encoder's rated speed when used in combination with the Mitsubishi 2-axis servo amplifier. The values may differ from the manufacturers' specifications.
3. The resolution differs according to the setting value of the interpolator, MJ830/MJ831 manufactured by Sony Manufacturing Systems Corporation.
4. Sony manufacturing systems corporation's SH13 is out of production. Contact the manufacturer for more details.

MR-J3W-□B Servo Amplifier Dimensions

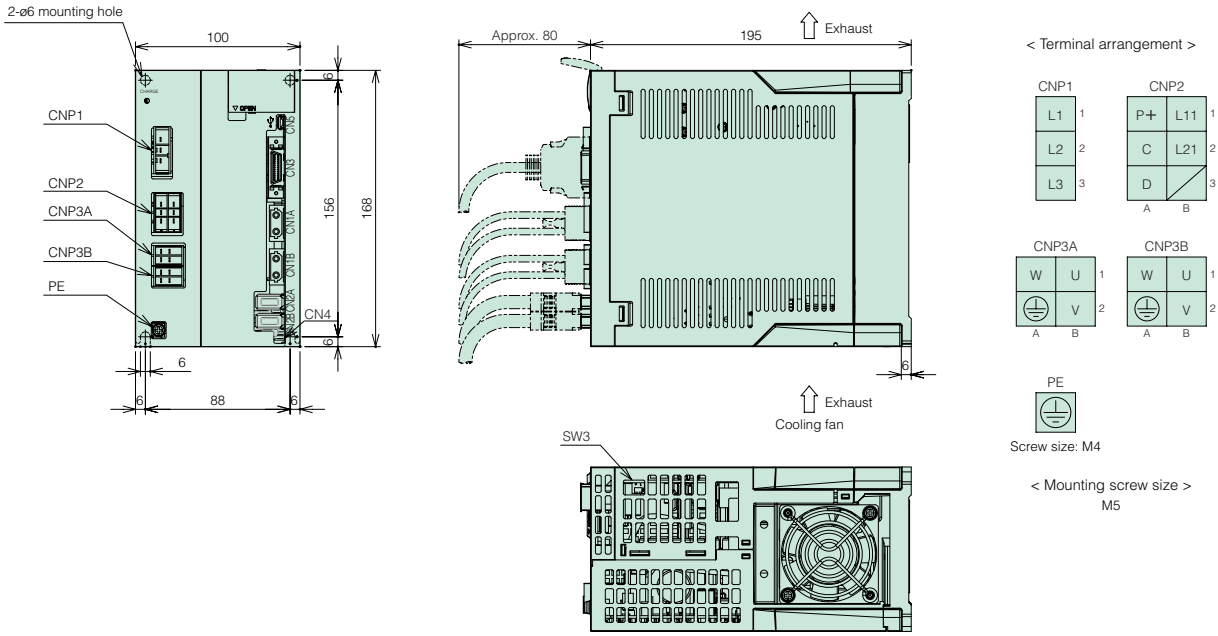
(Unit: mm)

● MR-J3W-22B, MR-J3W-44B



Notes: 1. Not necessary to open an air hole for the cooling fan on control box.

● MR-J3W-77B



MR-J3W Basic Configurations

Necessary optional cables and connectors vary depending on the servo motor series.
Refer to the following tables for necessary options.

● Selecting options for servo amplifier

Servo amplifier		Reference
SSCNETⅢ compatible	MR-J3W-□B	P.141 to 142 in this catalog

● Selecting options for servo motor

Use the cables in the following tables.
For the cable descriptions, refer to the relevant numbers in each list.

Capacity	Servo motor	Reference list		
		Encoder cable	Servo motor power supply cable	Electromagnetic brake cable (Note 1)
Rotary servo motor	HF-KP□(B)	Column A in encoder cable list	Column A in servo motor power supply cable list	Column A in electromagnetic brake cable list
	HF-MP□(B)	Column A in encoder cable list	Column A in servo motor power supply cable list	Column A in electromagnetic brake cable list
	HF-SP□(B)	Column B in encoder cable list	Column B in servo motor power supply cable list	Column B in electromagnetic brake cable list
	HC-LP□(B)	Column B in encoder cable list	Column C in servo motor power supply cable list	— (Note 2)
	HC-UP□(B)	Column B in encoder cable list	Column C in servo motor power supply cable list	— (Note 2)
Linear servo motor	LM-H2 series LM-U2 series	Column C in encoder cable list		

Notes: 1. An electromagnetic cable is required only for servo motor with an electromagnetic brake.
2. An electromagnetic cable is not required for HC-LP52B and HC-UP72B as the power supply connector has electromagnetic brake terminals.

● Encoder cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10m or shorter (Direct connection type)	IP65	Motor shaft side	Long bending life	MR-J3ENCBL□M-A1-H	① on P.145 in this catalog.	Select one from the list.
				Standard	MR-J3ENCBL□M-A1-L		
			Opposite of motor shaft	Long bending life	MR-J3ENCBL□M-A2-H	② on P.145 in this catalog.	
				Standard	MR-J3ENCBL□M-A2-L		
	Exceeding 10m (Relay type)	IP20	Motor shaft side	Long bending life	Two types of cables are required: MR-J3JCBL03M-A1-L and MR-EKCBL□M-H	③ and ⑤ on P.145 in this catalog.	
				Standard	Two types of cables are required: MR-J3JCBL03M-A1-L and MR-EKCBL□M-L		
			Opposite of motor shaft	Long bending life	Two types of cables are required: MR-J3JCBL03M-A2-L and MR-EKCBL□M-H	④ and ⑤ on P.145 in this catalog.	
				Standard	Two types of cables are required: MR-J3JCBL03M-A2-L and MR-EKCBL□M-L		
		IP65	Motor shaft side	Long bending life	Two types of cables are required: MR-J3JSCBL03M-A1-L and MR-J3ENSCBL□M-H	⑦ and ⑨ on P.145 in this catalog.	
				Standard	Two types of cables are required: MR-J3JSCBL03M-A1-L and MR-J3ENSCBL□M-L		
			Opposite of motor shaft	Long bending life	Two types of cables are required: MR-J3JSCBL03M-A2-L and MR-J3ENSCBL□M-H	⑧ and ⑨ on P.145 in this catalog.	
				Standard	Two types of cables are required: MR-J3JSCBL03M-A2-L and MR-J3ENSCBL□M-L		
B	2 to 50m	IP67	—	Long bending life	MR-J3ENSCBL□M-H	⑨ on P.145 in this catalog.	Select one from the list.
	2 to 30m			Standard	MR-J3ENSCBL□M-L		
C	—	—	—	—	Manufacture a cable that fits to MR-J3THMCN2 (optional connector set).	㉔ on P.146 in this catalog.	—

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

● Servo motor power supply cable list

	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10m or shorter (Direct connection type)	IP65	Motor shaft side	Long bending life	MR-PWS1CBL□M-A1-H	⑫ on P.146 in this catalog.	Select one from the list.
				Standard	MR-PWS1CBL□M-A1-L		
			Opposite of motor shaft	Long bending life	MR-PWS1CBL□M-A2-H	⑬ on P.146 in this catalog.	
				Standard	MR-PWS1CBL□M-A2-L		
	Exceeding 10m (Relay type)	IP55	Motor shaft side	Standard	Connect a user-manufactured cable to MR-PWS2CBL03M-A1-L (optional cable).	⑭ on P.146 in this catalog.	
			Opposite of motor shaft		Connect a user-manufactured cable to MR-PWS2CBL03M-A2-L (optional cable).	⑮ on P.146 in this catalog.	

	IP rating (Note 1)	Servo motor	Model	Reference	Note
B	IP67	HF-SP51, 52	Manufacture a cable that fits to MR-PWCNS4 (optional connector).	⑯ on P.146 in this catalog.	Select one that is compatible with the servo motor.
C	IP67	HC-LP52 HC-UP72	Manufacture a cable that fits to MR-PWCNS1 (optional connector).	⑰ on P.146 in this catalog.	

● Electromagnetic brake cable list

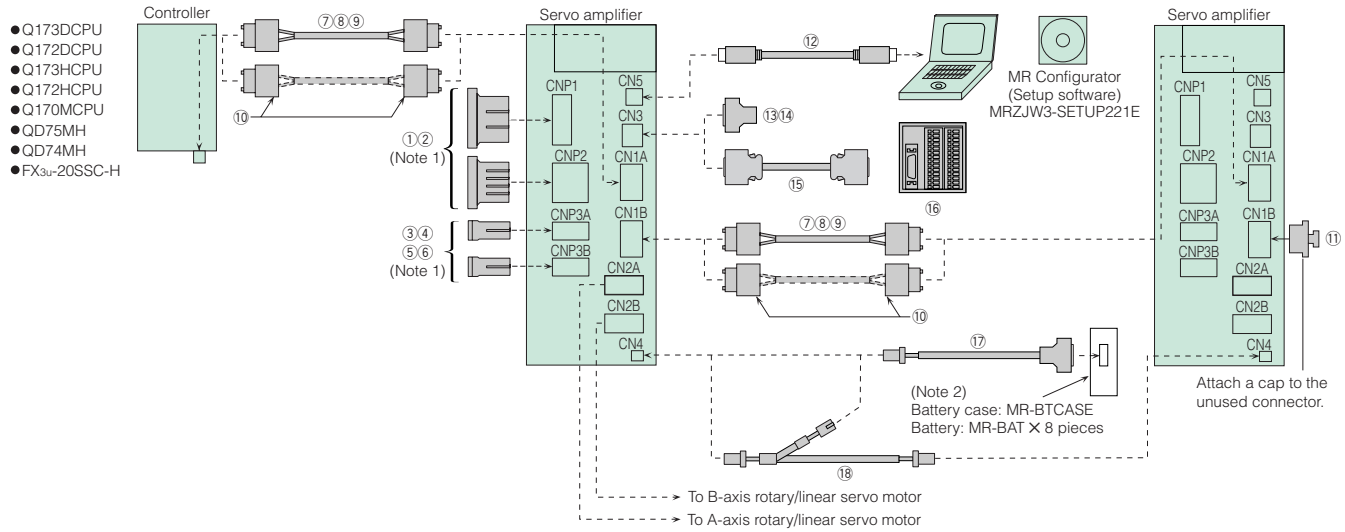
	Cable length	IP rating (Note 1)	Cable lead out direction	Bending life	Model	Reference	Note
A	10m or shorter (Direct connection type)	IP65	Motor shaft side	Long bending life	MR-BKS1CBL□M-A1-H	⑱ on P.146 in this catalog.	Select one from the list.
				Standard	MR-BKS1CBL□M-A1-L		
			Opposite of motor shaft	Long bending life	MR-BKS1CBL□M-A2-H	⑲ on P.146 in this catalog.	
				Standard	MR-BKS1CBL□M-A2-L		
	Exceeding 10m (Relay type)	IP55	Motor shaft side	Standard	Connect a user-manufactured cable to MR-BKS2CBL03M-A1-L (optional cable).	⑳ on P.146 in this catalog.	
			Opposite of motor shaft		Connect a user-manufactured cable to MR-BKS2CBL03M-A2-L (optional cable).	㉑ on P.146 in this catalog.	

	IP rating (Note 1)	Servo motor	Model	Reference	Note
B	IP67	HF-SP51B, 52B	Manufacture a cable that fits to MR-BKCNS1 (optional connector set) (straight type).	㉒ on P.146 in this catalog.	Select one that is compatible with the servo motor.
			Manufacture a cable that fits to MR-BKCNS1A (optional connector set) (angled type).	㉓ on P.146 in this catalog.	

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.

Options

● Cables and connectors for MR-J3W-B



Notes: 1. These connector sets are not included with the servo amplifier. Please purchase them separately.
2. Battery case (MR-BTCASE) and batteries (MR-BAT) are not required when configuring absolute position detection system with linear servo motor.

*Crimping tools are required for the following connector sets.

		Item	Model	IP rating	Description
For CNP1 and CNP2	①	CNP1/CNP2 connector set (Qty: 1pc each)	MR-J3WCNP12-DM	—	 CNP1 main power supply connector set (JST Mfg.) J43FSS-03V-KX (receptacle housing) BJ4F-71GF-M3.0 (receptacle contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.0mm to ϕ3.8mm Crimping tool (YRF-1130) is required.  CNP2 main power supply connector set (JST Mfg.) F32FMS-06V-KXY (receptacle housing) BF3F-71GF-P2.0 (receptacle contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.4mm to ϕ3.4mm Crimping tool (YRF-1070) is required.
	②	CNP1/CNP2 connector set (Qty: 10pcs each)	MR-J3WCNP12-DM-10P	—	
For CNP3A and CNP3B	③	CNP3A/CNP3B motor power supply connector set (Qty: 1pc) (for narrow wires)	MR-J3WCNP3-DL	—	Use this connector set when connecting a rotary servo motor and servo amplifier with MR-PWS1CBL□M-□ cable.  CNP3A/CNP3B motor power supply connector set (JST Mfg.) F35FDC-04V-K (receptacle housing) LF3F-41GF-P2.0 (receptacle contact) <Applicable cable example> Wire size: 0.75mm² (AWG19) to 1.25mm² (AWG16) Insulated outer diameter: ϕ1.8mm to ϕ2.8mm Crimping tool (YRF-880) is required.
	④	CNP3A/CNP3B motor power supply connector set (Qty: 20pc) (for narrow wires)	MR-J3WCNP3-DL-20P	—	
	⑤	CNP3A/CNP3B motor power supply connector set (Qty: 1pc) (for thick wires)	MR-J3WCNP3-D2L	—	Use this connector set when using HF-SP/HC-LP/HC-UP servo motor series or when using a junction cable for HF-KP/HF-MP servo motor series.  CNP3A/CNP3B motor power supply connector set (JST Mfg.) F35FDC-04V-K (receptacle housing) BF3F-71GF-P2.0 (receptacle contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.4mm to ϕ3.3mm Crimping tool (YRF-1070) is required.
	⑥	CNP3A/CNP3B motor power supply connector set (Qty: 20pc) (for thick wires)	MR-J3WCNP3-D2L-20P	—	

● Cables and connectors for MR-J3W-B

		Item		Model	IP rating	Description
For controller, CN1A and CN1B	⑦	SSCNET Ⅲ cable (Note 4) (Standard cord for inside panel)		MR-J3BUS□M □=cable length: 0.15, 0.3, 0.5, 1, 3m	—	Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) Connector (Japan Aviation Electronics Industry) PF-2D103 (connector)
	⑧	SSCNET Ⅲ cable (Note 4) (Standard cable for outside panel)		MR-J3BUS□M-A □=cable length: 5, 10, 20m	—	
	⑨	SSCNET Ⅲ cable (Note 4) (Long distance cable, long bending life)		MR-J3BUS□M-B □=cable length: 30, 40, 50m (Note 2)	—	Connector (Japan Aviation Electronics Industry) CF-2D103-S (connector) Connector (Japan Aviation Electronics Industry) CF-2D103-S (connector)
	⑩	Connector set for SSCNET Ⅲ (Note 4)		MR-J3BCN1 (Note 3)	—	Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) Connector (Japan Aviation Electronics Industry) PF-2D103 (connector)
For CN1B	⑪	Connector cap for SSCNET Ⅲ		(Standard accessory)	—	
For CN5	⑫	Personal computer communication cable	USB cable	MR-J3USBCBL3M Cable length: 3m	—	Amplifier connector mini-B connector (5 pins) Personal computer connector A connector Note: This cable cannot be used with the SSCNET Ⅲ compatible controller.
For CN3A/CN3B	⑬	Connector set (for CN3)		MR-J2CMP2 (Qty: 1pc)	—	Amplifier connector (3M or an equivalent product) 10126-3000PE (connector) 10326-52F0-008 (shell kit)
	⑭			MR-ECN1 (Qty: 20pcs)		
	⑮	Junction terminal block cable		MR-TBNATBL□M □=cable length: 0.5, 1m	—	Junction terminal block connector (3M or an equivalent product) 10126-6000EL (connector) 10326-3210-000 (shell kit) Amplifier connector (3M or an equivalent product) 10126-6000EL (connector) 10326-3210-000 (shell kit)
	⑯	Junction terminal block		MR-TB26A	—	
For CN4	⑰	Battery connection cable		MR-J3BT1CBL□M □=cable length: 0.3, 1m	—	Amplifier connector (HIROSE ELECTRIC) DF3-2428SC(F)C (socket contact) DF3-2S-2C (socket) Battery case connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) (Note 1)
	⑱	Battery connection relay cable (Note 5)		MR-J3BT2CBL□M □=cable length: 0.3, 1m	—	Junction connector (HIROSE ELECTRIC) DF3-EP2428PC(F)A (plug contact) DF3-2EP-2C (junction plug) Amplifier connector (HIROSE ELECTRIC) DF3-2428SC(F)C (socket contact) DF3-2S-2C (socket)

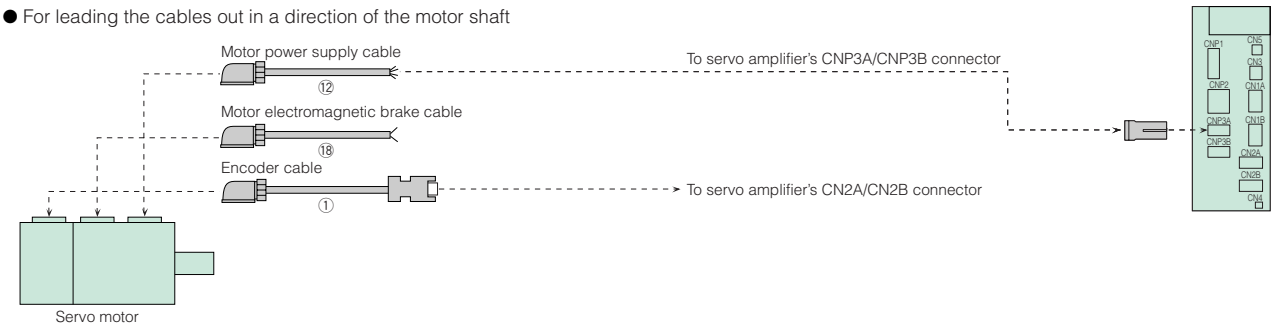
Notes: 1. The connector and the shell kit are of soldered type. Models for press bonding type are 10120-6000EL (connector) and 10320-3210-000 (shell kit).
2. For the ultra-long bending life cables and/or for unlisted lengths which are 20m or shorter (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
3. Special tools are required. Contact your local sales office for details.
4. Look carefully through the precautions enclosed with the options before use.
5. Up to 4 units (8 axes) of MR-J3W-□B servo amplifiers are connectable by using this cable. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for more details.

Options

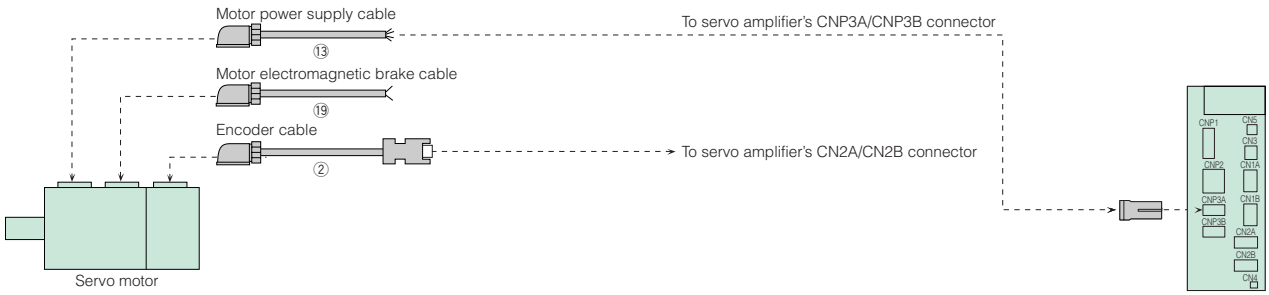
● Cables and connectors for servo motor

<For HF-KP/HF-MP servo motor series: encoder cable length 10m or shorter>

● For leading the cables out in a direction of the motor shaft

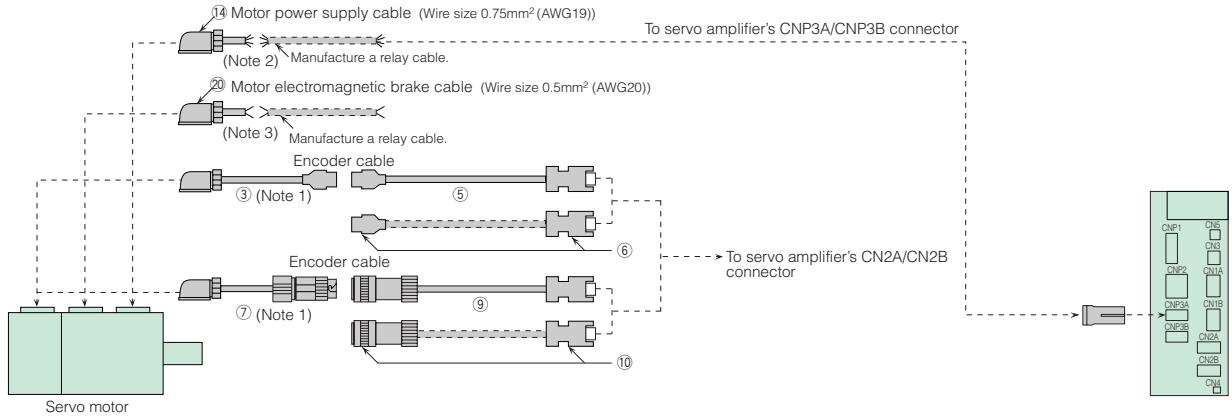


● For leading the cables out in an opposite direction of the motor shaft

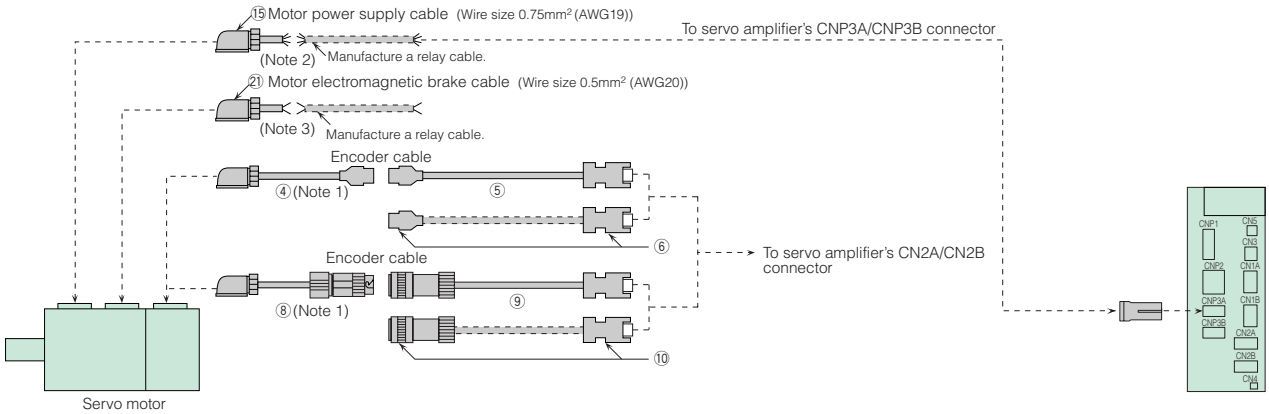


<For HF-KP/HF-MP servo motor series: encoder cable length over 10m>

● For leading the cables out in a direction of the motor shaft

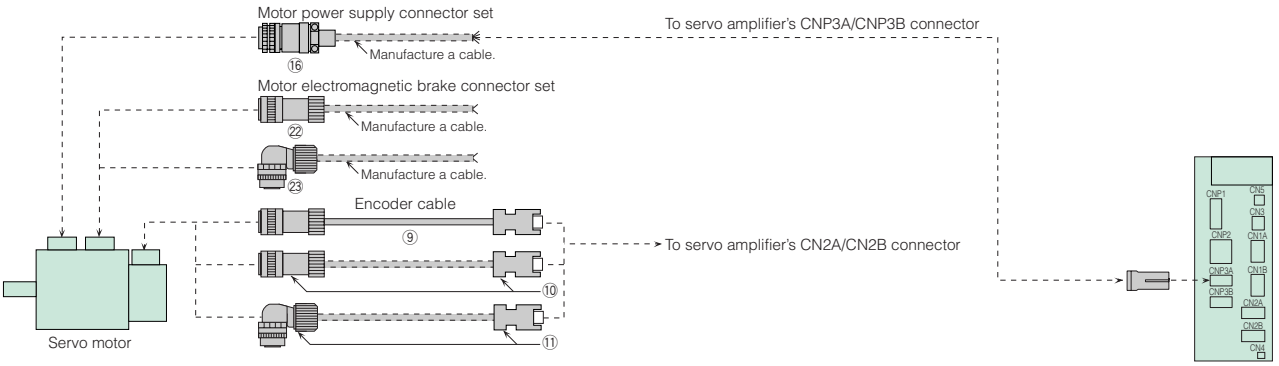


● For leading the cables out in an opposite direction of the motor shaft

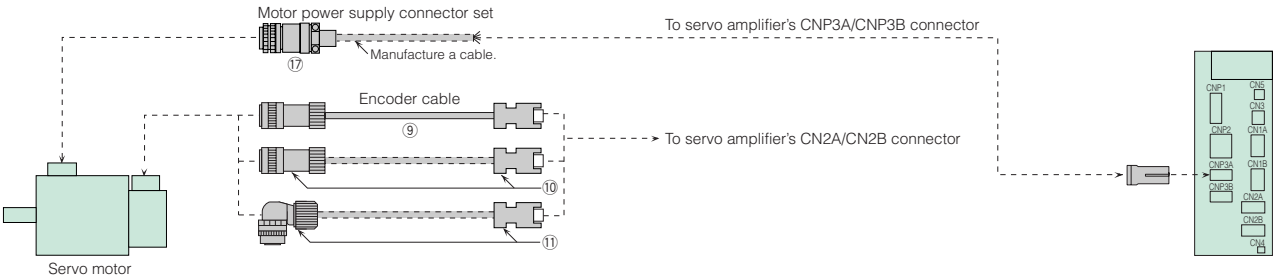


Notes: 1. This cable does not have a long bending life, so always fix the cable before using.
2. If the length exceeds 10m, relay a cable using MR-PWS2CBL03M-A1-L/-A2-L cable. This cable does not have a long bending life, so always fix the cable before using. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on manufacturing the relay cable.
3. If the length exceeds 10m, relay a cable using MR-BKS2CBL03M-A1-L/-A2-L cable. This cable does not have a long bending life, so always fix the cable before using. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on manufacturing the relay cable.

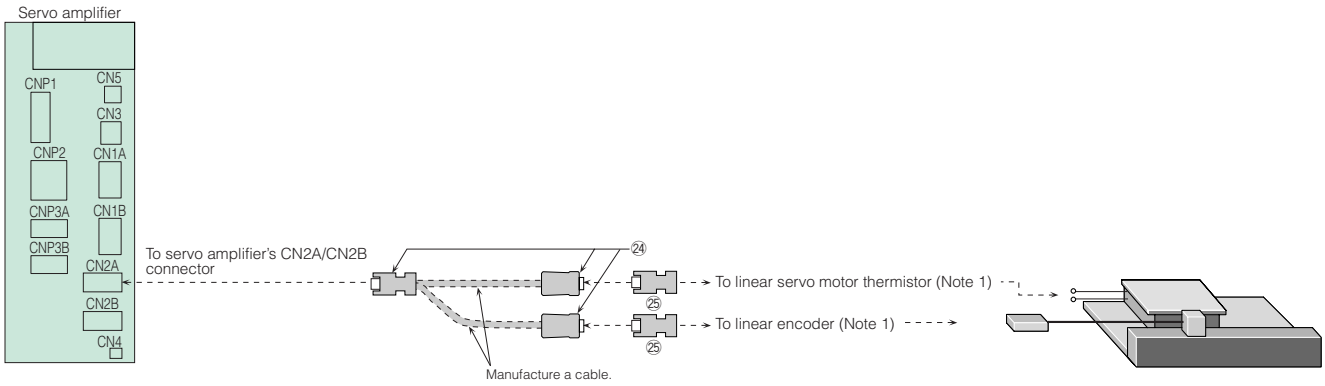
<For HF-SP servo motor series>



<For HC-LP/HC-UP servo motor series>



<For LM-H2/LM-U2 linear servo motor series>



Notes: 1. Necessary options vary depending on a linear encoder. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.

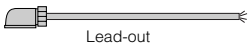
Options

● Cables and connectors for servo motor

Item				Model	IP rating (Note 2)	Description
For rotary servo motor encoder	①	10m or shorter (Direct connection type)	Encoder cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-J3ENCBL□M-A1-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	Encoder connector (Tyco Electronics) 1674320-1  Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)
				MR-J3ENCBL□M-A1-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	②		Encoder cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-J3ENCBL□M-A2-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	
				MR-J3ENCBL□M-A2-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	③		Motor-side encoder cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-J3JCBL03M-A1-L Cable length: 0.3m (Note 1)	IP20	Encoder connector (Tyco Electronics) 1674320-1  Junction connector (Tyco Electronics) 1473226-1 (with ring) (contact) 1-172169-9 (housing) 316454-1 (cable clamp) Use this in combination of ⑤ or ⑥.
	④		Motor-side encoder cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-J3JCBL03M-A2-L Cable length: 0.3m (Note 1)	IP20	
	⑤		Amplifier-side encoder cable for HF-KP/HF-MP series	MR-EKCBL□M-H □=cable length: 20, 30, 40, 50m (Note 1, 3)	IP20	Junction connector (Tyco Electronics) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)  Use this in combination of ③ or ④. Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)
				MR-EKCBL□M-L □=cable length: 20, 30m (Note 1)	IP20	
	⑥	Exceeding 10m (Relay type)	Junction connector set for HF-KP/HF-MP series	MR-ECNM	IP20	Junction connector (Tyco Electronics) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)  <Applicable cable example> Wire size: 0.3mm² (AWG22) Completed cable outer diameter: ϕ8.2mm Crimping tool (91529-1) is required. Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Use these in combination of ③ or ④.
	⑦		Motor-side encoder cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-J3JSCBL03M-A1-L Cable length: 0.3m (Note 1)	IP65 (Note 5)	Encoder connector (Tyco Electronics) 1674320-1  Junction connector (DDK) CM10-CR10P-M (cable receptacle) Use these in combination of ⑨ or ⑩.
	⑧		Motor-side encoder cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-J3JSCBL03M-A2-L Cable length: 0.3m (Note 1)	IP65 (Note 5)	
	⑨	Encoder cable for HF-KP/HF-MP/HF-SP/HC-LP/ HC-UP series		MR-J3ENSCBL□M-H □=cable length: 2, 5, 10, 20, 30, 40, 50m (Note 1, 3, 4)	IP67	 Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) <For 10m or shorter cable> CM10-SP10S-M (D6) (straight plug) CM10-#22SC(C1) (D8)-100 (socket contact) <For exceeding 10m> CM10-SP10S-M (D6) (straight plug) CM10-#22SC(C2) (D8)-100 (socket contact) Use these in combination of ⑦ or ⑧ for HF-KP/HF-MP series.
				MR-J3ENSCBL□M-L □=cable length: 2, 5, 10, 20, 30m (Note 1, 4)	IP67	
	⑩	Encoder connector set for HF-KP/HF-MP/HF-SP/HC-LP/ HC-UP series		MR-J3SCNS (Note 4)	IP67	  Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) CM10-SP10S-M (D6) (straight plug) CM10-#22SC(S1) (D8)-100 (socket contact) <Applicable cable example> Wire size: 0.5mm² (AWG20) or smaller Completed cable outer diameter: ϕ6.0mm to ϕ9.0mm Use these in combination of ⑦ or ⑧ for HF-KP/HF-MP series.
	⑪	Encoder connector set for HF-SP/HC-LP/HC-UP series		MR-J3SCNSA (Note 4)	IP67	  Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Encoder connector (DDK) CM10-AP10S-M(D6) (angled plug) CM10-#22SC(S1)(D8)-100 (socket contact) <Applicable cable example> Wire size: 0.5mm² (AWG20) or smaller Completed cable outer diameter: ϕ6.0mm to ϕ9.0mm

Notes:
1. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
2. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
3. For the ultra-long bending life cables and/or for unlisted lengths (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
4. Select from below if there is a potential risk that a high vibration may be applied to connectors.
   Encoder cable: MR-J3ENSCBL□M-H-S06 (long bending life) or MR-J3ENSCBL□M-L-S06 (standard bending life)
   Encoder connector set: MR-J3SCNS-S06 (straight type) or MR-J3SCNSA-S06 (angled type)
   Connector cover: MR-J3ENS-CVR (straight type) or MR-J3ENSA-CVR (angled type)
   Be sure to use this connector cover when using the encoder cable or the encoder connector set in the table.
   Contact your local sales office for more details.
5. The encoder cable is rated IP65 while the junction connector is rated IP67.

● Cables and connectors for servo motor

Item				Model	IP rating (Note 2)	Description
For rotary servo motor power supply	⑫	10m or shorter (Direct connection type)	Power supply cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-PWS1CBL□M-A1-H □=cable length: 2, 5, 10m (Note 1, 4)	IP65	Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04SJ1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
				MR-PWS1CBL□M-A1-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	⑬		Power supply cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-PWS1CBL□M-A2-H □=cable length: 2, 5, 10m (Note 1)	IP65	
				MR-PWS1CBL□M-A2-L □=cable length: 2, 5, 10m (Note 1, 4)	IP65	
	⑭	Exceeding 10m (Relay type)	Power supply cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-PWS2CBL03M-A1-L Cable length: 0.3m (Note 1)	IP55	Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04SJ2-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
	⑮		Power supply cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-PWS2CBL03M-A2-L Cable length: 0.3m (Note 1)	IP55	
	⑯	Power supply connector set for HF-SP51, 52		MR-PWCNS4 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A18-10SD-D-BSS (plug) (straight) CE3057-10A-1-D (cable clamp) <Applicable cable example> Wire size: 2mm² (AWG14) to 3.5mm² (AWG12) Completed cable outer diameter: ϕ10.5mm to ϕ14.1mm
	⑰	Power supply connector set for HC-LP52, HC-UP72		MR-PWCNS1 (Straight type)	IP67	 Motor power supply connector (DDK) CE05-6A22-23SD-D-BSS (plug) (straight) CE3057-12A-2-D (cable clamp) <Applicable cable example> Wire size: 2mm² (AWG14) to 3.5mm² (AWG12) Completed cable outer diameter: ϕ9.5mm to ϕ13mm
For rotary servo motor electromagnetic brake	⑱	10m or shorter (Direct connection type)	Brake cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-BKS1CBL□M-A1-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	Motor brake connector (Japan Aviation Electronics Industry) JN4FT02SJ1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
				MR-BKS1CBL□M-A1-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	⑲		Brake cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-BKS1CBL□M-A2-H □=cable length: 2, 5, 10m (Note 1, 3)	IP65	
				MR-BKS1CBL□M-A2-L □=cable length: 2, 5, 10m (Note 1)	IP65	
	⑳	Exceeding 10m (Relay type)	Brake cable for HF-KP/HF-MP series Lead out in direction of motor shaft	MR-BKS2CBL03M-A1-L Cable length: 0.3m (Note 1)	IP55	Motor brake connector (Japan Aviation Electronics Industry) JN4FT02SJ2-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact)  Lead-out *The cable is not shielded.
	㉑		Brake cable for HF-KP/HF-MP series Lead out in opposite direction of motor shaft	MR-BKS2CBL03M-A2-L Cable length: 0.3m (Note 1)	IP55	
	㉒	Brake connector set for HF-SP51B, 52B		MR-BKCNS1 (Note 4) (Straight type)	IP67	 Motor brake connector (DDK) (soldered type) CM10-SP2S-L(D6)(straight plug) CM10-#22SC(S2)(D8)-100(socket contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) or smaller Completed cable outer diameter: ϕ9.0mm to ϕ11.6mm
	㉓	Brake connector set for HF-SP51B, 52B		MR-BKCNS1A (Note 4) (Angled type)	IP67	 Motor brake connector (DDK) (soldered type) CM10-AP2S-L(D6) (angled plug) CM10-#22SC(S2)(D8)-100 (socket contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) or smaller Completed cable outer diameter: ϕ9.0mm to ϕ11.6mm
For linear servo motor	㉔	Connector set (for linear encoder and thermistor)		MR-J3THMCN2	—	 Junction connector (3M) 36110-3000FD (plug) 36310-F200-008 (shell kit)  Amplifier connector 36210-0100PL (receptacle, 3M), 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex)
	㉕	Connector set (for linear encoder and thermistor connection)		MR-J3CN2	—	 Linear encoder and thermistor connection connector 36210-0100PL (receptacle, 3M), 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex)

Notes: 1. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
2. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/servo motor. If the IP rating of the servo amplifier/servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
3. Contact your local sales office for the cables with ultra-long bending life and/or for unlisted lengths.
4. Select from below if there is a potential risk that a high vibration may be applied to connectors.
Brake connector set: MR-BKCNS1-S06 (straight type) or MR-BKCNS1A-S06 (angled type)
Connector cover: MR-J3ENS-CVR (straight type) or MR-J3ENSA-CVR (angled type)
Be sure to use this connector cover when using the brake connector set in the table.
Contact your local sales office for more details.

Ordering Information for Customers

To order the following products, contact the relevant manufacturers directly.
When manufacturing a cable with the following connectors, refer to the relevant manufacturers' instruction manuals for wiring and assembling procedures.
Furthermore, refer to "Ordering Information for Customers" on page 112 to 115 in this catalog for encoder, power supply and electromagnetic brake cables.

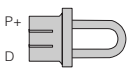
● Main circuit power supply cable (for CNP1)

Model	Description	Wire size
SC-EMP01CBL□M-L □= cable length: 2, 5m (Note 2, 3)	 Mitsubishi Electric System & Service Co., Ltd. (Note 1)	AWG14

● Control circuit power supply cable (for CNP2-B(Y))

Model	Description	Wire size
SC-ECP01CBL□M-L □= cable length: 2, 5m (Note 2, 3)	 Mitsubishi Electric System & Service Co., Ltd. (Note 1)	AWG16

● Built-in regenerative resistor short connector (for CNP2-A(X))

Model	Description	Wire size
SC-ERG02CBL01M-L	 Mitsubishi Electric System & Service Co., Ltd. (Note 1)	AWG14

● Optional regeneration unit cable (for CNP2-A(X))

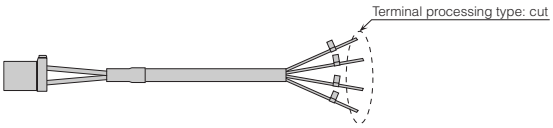
Model	Description	Wire size
SC-ERG01CBL□M-L □= cable length: 2, 5m (Note 2, 3)	 Mitsubishi Electric System & Service Co., Ltd. (Note 1)	AWG14

● Power supply cable for HF-KP/HF-MP rotary servo motor series (direct connection type)

Model		Description	Wire size
SC-EPWS1CBL□M-A1-L □= cable length: 2, 5, 10m (Note 2, 3)	Lead out in direction of motor shaft Standard bending life	 Mitsubishi Electric System & Service Co., Ltd. (Note 1)	AWG18X4C
SC-EPWS1CBL□M-A2-L □= cable length: 2, 5, 10m (Note 2, 3)	Lead out in opposite direction of motor shaft Standard bending life		
SC-EPWS1CBL□M-A1-H □= cable length: 2, 5, 10m (Note 2, 3)	Lead out in direction of motor shaft Long bending life		AWG19X4C
SC-EPWS1CBL□M-A2-H □= cable length: 2, 5, 10m (Note 2, 3)	Lead out in opposite direction of motor shaft Long bending life		

Notes: 1. Contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
2. Unlisted lengths are also available per meter: up to 10m for servo amplifier power supply cable and up to 30m for motor power supply cable.
3. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.

● Power supply cable for HF-KP/HF-MP rotary servo motor series (junction type)
● Power supply cable for HF-SP/HC-LP/HC-UP rotary servo motor series (Note 4)
● Power supply cable for LM-H2/LM-U2 linear servo motor

Model		Description	Wire size
SC-EPWS2CBL□M-L □= cable length: 2, 5, 10, 20, 30m (Note 2, 3)	Standard bending life	 Mitsubishi Electric System & Service Co., Ltd. (Note 1)	AWG18X4C (2, 5, 10m)
			AWG16X4C (20, 30m)
SC-EPWS2CBL□M-H □= cable length: 2, 5, 10, 20, 30m (Note 2, 3)	Long bending life		AWG19X4C (2, 5, 10m)
			AWG14X4C (20, 30m)

Notes: 1. Contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
2. Unlisted lengths are also available per meter: up to 30m for motor power supply cable.
3. -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
4. A separate motor-side power supply connector is required for HF-SP/HC-LP/HC-UP rotary servo motor series.

● Servo amplifier main circuit power supply connector (CNP1) *A crimping tool is required.

Model		Description	Applicable wire example
Receptacle housing	Receptacle contact		
J43FSS-03V-KX	BJ4F-71GF-M3.0	 JST Mfg. Co., Ltd.	Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.0mm to ϕ3.8mm Crimping tool (YRF-1130) is required.

● Servo amplifier main circuit power supply connector (CNP2) *A crimping tool is required.

Model		Description	Applicable wire example
Receptacle housing	Receptacle contact		
F32FMS-06V-KXY	BF3F-71GF-P2.0	 JST Mfg. Co., Ltd.	Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.4mm to ϕ3.4mm Crimping tool (YRF-1070) is required.
	LF3F-41GF-P2.0		Wire size: 0.75mm² (AWG19) to 1.25mm² (AWG16) Insulated outer diameter: ϕ1.8mm to ϕ2.8mm Crimping tool (YRF-880) is required.
3-178129-6	917511-2	 Tyco Electronics Corporation	Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.2mm to ϕ2.8mm Crimping tool (91560-1) is required.
	353717-2		Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ3.3mm to ϕ3.8mm Crimping tool (91561-1) is required.

● Motor power supply connector (CNP3A/CNP3B) *A crimping tool is required.

Model		Description	Applicable wire example
Receptacle housing	Receptacle contact		
F35FDC-04V-K	BF3F-71GF-P2.0	 JST Mfg. Co., Ltd.	Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.4mm to ϕ3.4mm Crimping tool (YRF-1070) is required.
	LF3F-41GF-P2.0		Wire size: 0.75mm² (AWG19) to 1.25mm² (AWG16) Mitsubishi optional cable: MR-PWS1CBL□M-A□-□ Insulated outer diameter: ϕ1.8mm to ϕ2.8mm Crimping tool (YRF-880) is required.
175363-1	917511-2	 Tyco Electronics Corporation	Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.2mm to ϕ2.8mm Crimping tool (91560-1) is required.
	353717-2		Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ3.3mm to ϕ3.8mm Crimping tool (91561-1) is required.
	175218-2		Mitsubishi optional cable: MR-PWS1CBL□M-A□-□ Crimping tool (PEW12) and die assembly (1762957-1) are required.

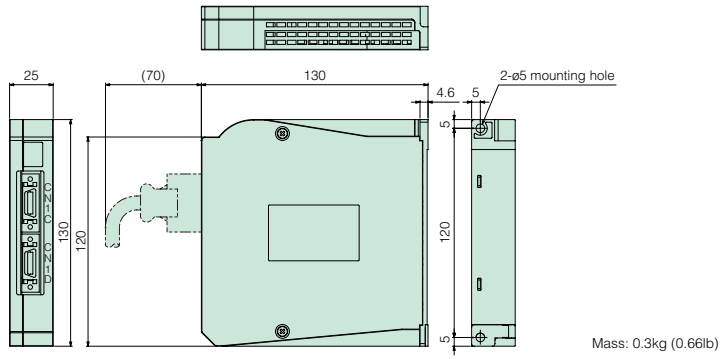
Options

● Battery case (MR-BTCASE) and battery (MR-BAT)

MR-BTCASE is a case that stores 8 pieces of batteries (MR-BAT) by connecting the connectors. Up to 4 units (8 axes) of MR-J3W servo amplifiers can be connected to this battery case. When using the battery case with two or more servo amplifiers, use an optional cable, MR-J3BT2CBL□M.

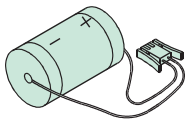
Rotary servo motor's absolute position data can be retained by using the battery case and batteries. They are not required when the servo system is used in incremental mode or when configuring absolute position detection system with the linear servo motor. The batteries are not included with the battery case. Please purchase the batteries separately.

External dimensions (assembled) (Unit: mm)



Mass: 0.3kg (0.66lb)

MR-BAT



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

Note: MR-BAT is a lithium metal battery. MR-BAT is not subject to the dangerous goods (Class 9) of the UN Recommendations.
To transport lithium metal batteries and lithium metal batteries contained in equipment by means of transport subject to the UN Recommendations, take actions to comply with the following regulations: the United Nations Recommendations on the Transport of Dangerous Goods, the Technical Instruction (ICAO-TI) by the International Civil Aviation Organization (ICAO), and the International Maritime Dangerous Goods Code (IMDG Code) by the International Maritime Organization (IMO). To transport the batteries, check the latest standards or the laws of the destination country and take actions. For more information, contact your local sales office. (As of February 2010)

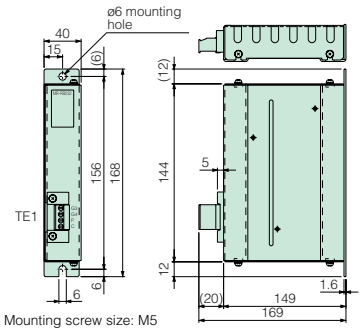
● Optional regeneration unit (MR-RB14, MR-RB34)

Servo amplifier	Tolerable regeneration power of optional regeneration unit (W) (Note)	
	MR-RB14 [26Ω]	MR-RB34 [26Ω]
MR-J3W-22B MR-J3W-44B	100	–
MR-J3W-77B	–	300

Note: The power values in this table are resistor-generated powers, not rated powers.

External dimensions (Unit: mm)

● MR-RB14



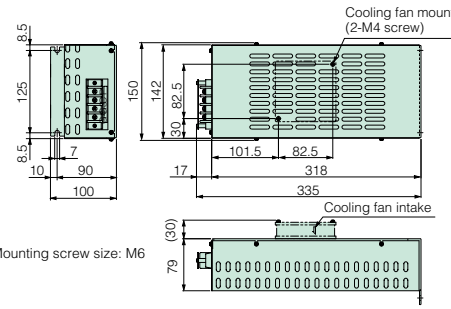
Mounting screw size: M5

<Terminal arrangement>

Applicable wire size:
0.2mm² (AWG24) to 2.5mm² (AWG12)

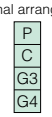
Model	Mass kg (lb)
MR-RB14	1.1 (2.4)

● MR-RB34



Mounting screw size: M6

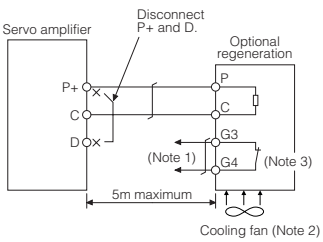
<Terminal arrangement>



Terminal screw size: M4

Model	Mass kg (lb)
MR-RB34	2.9 (6.4)

Connections

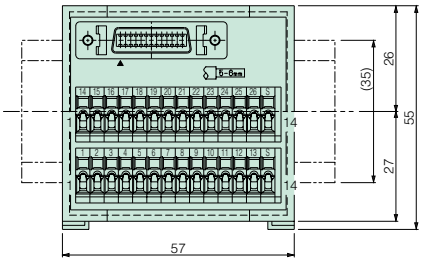


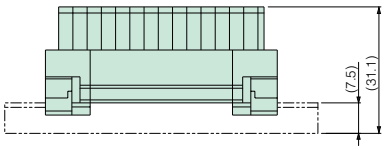
Notes: 1. Create a sequence circuit that turns off the magnetic contactor (MC) when abnormal overheating occurs.
2. When the ambient temperature of the optional regeneration unit is 55°C or higher, and regenerative load ratio exceeds 60%, cool the unit forcibly with a cooling fan (92×92mm, minimum air flow: 1.0m³/min). Cooling fan is not required when the ambient temperature is 35°C or lower. The cooling fan must be prepared by user.
3. The G3 and G4 terminals are thermal sensor. G3-G4 opens when the regenerative unit overheats abnormally.

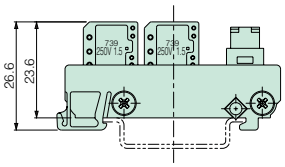
● Junction terminal block (MR-TB26A)

All signals can be received with this junction terminal block without connecting the signals to the connector.

External dimensions (Note 1) (Unit: mm)







Specifications

Rating		30V/0.5A
Applicable wire (terminal side)	Stranded wire	0.08mm² (AWG28) to 1.5mm² (AWG14)
	Solid wire	ø0.32mm to ø1.2mm
	Insulated outer diameter	ø3.4mm or smaller
Operating tool		210-619 (Wago) or equivalent 210-119SB (Wago) or equivalent
Strip length		5mm to 6mm

Notes: 1. The lengths in ( ) apply when the junction terminal box is mounted on a 35mm wide DIN rail.

Peripheral Equipment

● Electrical wires and magnetic contactors (example of selection)

The following are examples of wire sizes when 600V polyvinyl chloride insulated wires (IV wires) or 600V Grade heat-resistant polyvinyl chloride insulated wires (HIV wires) with a length of 30m are used.

Servo amplifier	Circuit breaker (Note 3)	Electrical wire size (mm²)						
		L1, L2, L3, ⏚	L11, L21	U, V, W, ⏚ (Note 1)	P+, C	P+, D	B1, B2 (Note 2)	THM1, THM2
MR-J3W-22B	S-N10	2 (AWG14)					1.25 (AWG16)	0.2 (AWG24)
MR-J3W-44B								
MR-J3W-77B	S-N18							

Notes: 1. Use a fluoric resin wire (0.75mm² (AWG19)) when connecting to a rotary servo motor power supply connector. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on wiring cables.
2. Use a fluoric resin wire (0.5mm² (AWG20)) when connecting to a rotary servo motor electromagnetic brake connector. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on wiring cables.
3. Be sure to use a magnetic contactor (MC) with an operation delay time of 80ms or less. The operation delay time is the time interval between current being applied to the coil until closure of contacts.

● Circuit breakers (example of selection)

Total output of rotary/linear servo motors	Circuit breaker
300W or less	30A frame 5A
Over 300W to 600W	30A frame 10A
Over 600W to 1kW	30A frame 15A
Over 1kW to 1.5kW	30A frame 20A

Peripheral Equipment

● Power factor improvement AC reactor (FR-BAL)

Refer to P.130 in this catalog.

Model	Total output of rotary/ linear servo motors
FR-BAL-0.4K	300W or less
FR-BAL-0.75K	Over 300W to 450W
FR-BAL-1.5K	Over 450W to 600W
FR-BAL-2.2K	Over 600W to 1kW
FR-BAL-3.7K	Over 1kW to 1.5kW

● EMC filter (HF3010A-UN, HF3030A-UN)

The following filters are recommended as a filter compliant with the EMC directive for the servo amplifier's power supply.
Refer to P.127 in this catalog.

Model	Applicable servo amplifier
HF3010A-UN (Note 1)	MR-J3W-22B MR-J3W-44B
HF3030A-UN (Note 1)	MR-J3W-77B

Notes: 1. A surge protector is separately required to use this EMC filter.
Refer to "EMC Installation Guidelines".

● Radio noise filter (FR-BIF)

Refer to P.126 in this catalog.

● Line noise filter (FR-BSF01)

Refer to P.126 in this catalog.

● Surge suppressor

Refer to P.126 in this catalog.

● Data line filter

Refer to P.126 in this catalog.

Servo support software

Capacity selection software MRZJW3-MOTSZ111E

● Specifications

Item		Description
Types of machine component		Horizontal ball screws, vertical ball screws, rack and pinions, roll feeds, rotating tables, dollies, elevators, material handling systems, linear servo (Note 1) and other (direct inertia input) devices
Output of results	Items	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 power ratio
	Printing	Prints input specifications, operation pattern, calculation process, graph of selection process feedrate (or motor speed) and torque, 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. "Linear servo" is available with MRZJW3-MOTSZ111E software version C0 or above.

MR Configurator (Setup software) MRZJW3-SETUP221E

● Specifications

Main menu	Functions
Monitors	Batch display, input/output I/F display, high speed monitor, graph display
Alarms	Alarm display, alarm history, display of data that generated alarm
Diagnostics	Reason for rotation failure display, system information display, tuning data display, absolute data display, axis name setting, amplifier diagnostic (Note 1)
Parameters	Parameter setting, device setting, tuning, display of change list, display of detailed information, converter, parameter copy
Test operations	JOG operation, positioning operation, motor-less operation, forced digital output, program operation using simple language
Advanced function	Machine analyzer, gain search, machine simulation, robust disturbance compensation, advanced gain search
Project	Project creation, reading or saving, various data reading, saving or printing
Others	Automatic operation, help display

Notes: 1. The amplifier diagnostic function is available only for MR-J3-□A□ with servo amplifier's software version A1 or above and MR-J3-DU□A(4).

Compatible personal computer

IBM PC/AT compatible model running with the following operation conditions.

● Operation conditions

Components		Capacity selection software MRZJW3-MOTSZ111E	MR Configurator (Setup software) MRZJW3-SETUP221E
Personal computer (Note 1, 2, 4)	OS (Note 3)	Windows® 98, Windows® Me, Windows® 2000 Professional, Windows® XP Professional, Windows® XP Home Edition, Windows Vista® Home Basic, Windows Vista® Home Premium, Windows Vista® Business, Windows Vista® Ultimate, Windows Vista® Enterprise	
	Processor	Pentium®133MHz or more (Windows® 98, Windows® 2000 Professional) Pentium®150MHz or more (Windows® Me) Pentium®300MHz or more (Windows® XP Professional, Windows® XP Home Edition) 1GHz 32-bit (x86) (Windows Vista® Home Basic, Windows Vista® Home Premium, Windows Vista® Business, Windows Vista® Ultimate, Windows Vista® Enterprise)	
	Memory	24MB or more (Windows® 98) 32MB or more (Windows® Me, Windows® 2000 Professional) 128MB or more (Windows® XP Professional, Windows® XP Home Edition) 512MB or more (Windows Vista® Home Basic) 1GB or more (Windows Vista® Home Premium, Windows Vista® Business, Windows Vista® Ultimate, Windows Vista® Enterprise)	
	Free hard disk space	40MB or more	130MB or more
	Communication interface	—	Use serial port or USB port
Browser		Internet Explorer 4.0 or above	
Monitor		Resolution 800×600 or more, 16-bit high color	Resolution 1024×768 or more, 16-bit high color
Keyboard		Compatible with above personal computers.	
Mouse		Compatible with above personal computers.	
Printer		Compatible with above personal computers.	
Communication cable		Not required	MR-J3USBCBL3M

Notes: 1. Pentium is registered trademark of Intel Corporation. Windows and Windows Vista are registered trademarks of Microsoft Corporation in the United States and other countries.
2. This software may not run correctly, depending on a personal computer being used.
3. MRZJW3-SETUP221E software version C1 and MRZJW3-MOTSZ111E software version C0 are compatible with Windows Vista®.
4. These software are not compatible with 64-bit Windows® XP and 64-bit Windows Vista®.

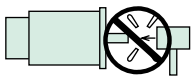
To ensure safe use

- To use the products given in this catalog properly, always read the “Installation Guide” and “MR-J3 INSTRUCTION MANUAL” before starting to use them.

Cautions concerning use

Transport and installation of motor

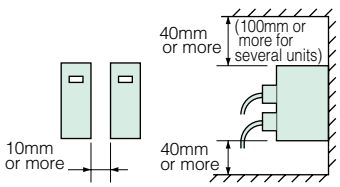
- Protect the motor or encoder from impact during handling. When installing a pulley or a coupling to the shaft, do not hammer on the shaft-end. Impact may damage the encoder. When installing the pulley or the coupling to the servo motor which has a key way on the shaft, use the screw hole on the shaft-end. Use a pulley extractor when removing the pulley.



- Do not apply a load exceeding the tolerable load onto the servo motor shaft. The shaft may 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 servo amplifier vertically on a wall.
- Do not block intake and exhaust areas of the servo amplifier. Doing so may cause the servo amplifier to malfunction.
- When installing several amplifiers in a row in a sealed panel, leave 10mm or more open between each amplifier. MR-J3-350□ or smaller servo amplifier can be installed closely. In this case, keep the ambient temperature within 0°C to 45°C (32°F to 113°F), or use them with 75% or less of the effective load rate.
  When using one amplifier, always leave 40mm or more open in the upward and downward directions.
  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.



- Be sure to use the servo motor within the specified ambient temperature. Torque may drop due to temperature increase of the servo motor.
- For a single servo motor, the servo motor can be mounted horizontally or vertically. When mounting vertically (shaft-up), take measures on the machine-side to ensure that oil from the gear box does not get into the servo motor.
- Do not touch the servo motor during or after operation until it has had sufficient time to cool. The motor can be very hot, and severe burns may result from touching the motor.
- The optional regeneration unit becomes hot (the temperature rise of 100°C or more) with frequent use. Do not install within flammable objects or objects subject to thermal deformation. Take care to ensure that electrical wires do not come into contact with the unit.
- Carefully consider the cable clamping method, and make sure that bending stress and 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.

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 grounding terminals of each unit, and ground from the servo amplifier side.
- Faults such as a deviation in position may occur if the grounding is insufficient.

Wiring

- When a commercial power supply is applied to the amplifier’s output terminals (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 terminals (U, V, W), the motor will be damaged. Connect the motor to the amplifier’s output terminals (U, V, W).
- Match the phase of the motor’s input terminals (U, V, W) to the amplifier’s output terminals (U, V, W) when connecting. If they do not match, the motor control cannot be performed.
- Validate the stroke end signals (LSP, LSN) in position control or speed control mode.
  The motor will not start if the signals are invalid.
- Do not apply excessive tension on the fiber-optic cable when cabling.
- The minimum bending radius of the fiber-optic cable is 25mm for MR-J3BUS□M and 50mm for MR-J3BUS□M-A/-B.
  If using these cables under the minimum bending radius, performance cannot be guaranteed.
- If the ends of the fiber-optic cable are dirty, the light will be obstructed, resulting malfunctions. Always clean the ends if dirty.
- Do not tighten the fiber-optic cable with cable ties, etc.
- Do not look directly at the light when the fiber-optic cable is not connected.

Factory settings

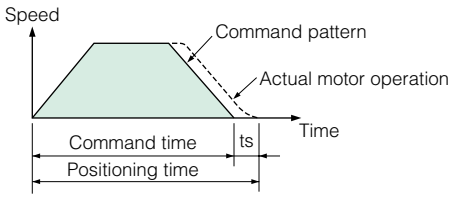
- All available motor and amplifier combinations are predetermined. Confirm the models of the motor and the amplifier to be used before installation.
- For MR-J3-A, select a control mode of position, speed or torque control with parameter PA01. Position control mode is selected as default. Change the parameter setting when using the other control modes.
  For MR-J3-B, the control mode is selected by the controller.
- When using the optional regeneration unit, change parameter No.PA02. The optional regeneration unit is disabled as 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 may cause the amplifier to fail.
- When trouble occurs, the amplifier's safety features will be activated, halting output, and the dynamic brake instantly stops the motor. If free run is required, contact your local sales office about solutions involving servo amplifiers where the dynamic brake is not activated.
- When using the servo motor with an electromagnetic brake, do not apply the electromagnetic brake when the servo is on. Doing so may cause the servo amplifier overload or shorten the brake life. Apply the electromagnetic brake when the servo is off.

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.

Warranty

1. Warranty period and coverage

We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arisen during warranty period at no charge due to causes for which we are responsible through the distributor from which you purchased the Product or our service provider. However, we will charge the actual cost of dispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for any on-site readjustment and/or trial run that may be required after a defective unit is repaired or replaced.

[Term]

The term of warranty for Product is twelve (12) months after your purchase or delivery of the Product to a place designated by you or eighteen (18) months from the date of manufacture whichever comes first ("Warranty Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work.

[Limitations]

(1) You are requested to conduct an initial failure diagnosis by yourself, as a general rule. It can also be carried out by us or our service company upon your request and the actual cost will be charged. However, it will not be charged if we are responsible for the cause of the failure.

(2) This limited warranty applies only when the condition, method, environment, etc. of use are in compliance with the terms and conditions and instructions that are set forth in the instruction manual and user manual for the Product and the caution label affixed to the Product.

(3) Even during the term of warranty, the repair cost will be charged on you in the following cases;

(i) a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem

(ii) a failure caused by any alteration, etc. to the Product made on your side without our approval

(iii) a failure which may be regarded as avoidable, if your equipment in which the Product is incorporated is equipped with a safety device required by applicable laws and has any function or structure considered to be indispensable according to a common sense in the industry

(iv) a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced

(v) any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)

(vi) a failure caused by external factors such as inevitable accidents, including without limitation fire and abnormal fluctuation of voltage, and acts of God, including without limitation earthquake, lightning and natural disasters

(vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company

(viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

2. Term of warranty after the stop of production

(1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.

(2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

3. Service in overseas countries

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA Center for details.

4. Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

5. Change of Product specifications

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

6. Application and use of the Product

(1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.

(2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.

In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.

We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

Global FA Centers

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

Empowering Industries
SSCNET SERVO SYSTEM CONTROLLER NETWORK
MELSOFT

⚠ 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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