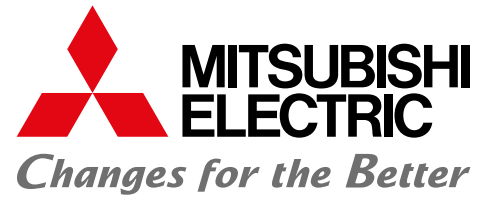




for a greener tomorrow



FACTORY AUTOMATION

MR-FAMILY

Servo amplifiers and motors



- Industry leading performance
- Reliable
- High-speed
- User-friendly
- Designed for different network solutions
- Flexible

Global impact of Mitsubishi Electric



Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximising the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and electric systems

A wide range of power and electrical products from generators to large-scale displays.

Electronic devices

A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home appliance

Dependable consumer products like air conditioners and home entertainment systems.



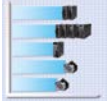









Information and communication systems

Commercial and consumer-centric equipment, products and systems.

Industrial automation systems

Maximising productivity and efficiency with cutting-edge automation technology.

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Use tomorrow's technology today



Maximized to the best advantage for the machinery

Mitsubishi Electric servo systems are globally renowned and respected. Offering a perfect combination of high-end performance and ease of use, they are now found in a huge range of applications – from single and multiple axis systems in mechanical engineering and other metal-working sectors to complex, fully-synchronised solutions in the semiconductor and motor industries.

Manufactured at the highest standards

Mitsubishi Electric automation products enjoy a global reputation for outstanding quality and reliability. The process starts at the design stage, where quality

is designed into even the smallest components. Our systematic pursuit of “best practice” means that Mitsubishi Electric products readily comply with product directives and global standards.

Meeting global norms and standards

Mitsubishi Electric's servo amplifiers and motors meet all the standards and specifications laid down in the EU Low Voltage Directive 73/23/EEC and the Machinery Directive 98/37/EC. Needless to say, all systems carry the CE mark and are certified as conforming to UL, cUL and GOST.



High-speed high-precision control that adapts itself to mechanical characteristics

What makes a good servo system



Cost effectiveness

Industry leading performance gives faster production cycles and reduced material wastage.

Plug and play

The availability of pre-made cables of different length means that connecting a servo motor to an amplifier or any other combination is quick and error free.

Simple networking

High-speed servo and motion applications need special high-speed networking. Mitsubishi Electric's Servo System Controller Network (SSCNETIII/H)

provides these system capabilities while the CC-Link IE Field network offers the communication between various automation components. The open industrial networks Modbus®, PROFINET, EtherCAT und EtherNet/IP™ are additionally supported.

Simple setup and tuning

In combination with the „One-Touch-Tuning“ of the MR-J4 and the software MRConfigurator2, the amplifier tunes itself for an easy and fast startup of the machine.

Functionality

The MR-J4 series has incorporated advanced control capabilities, that are able to maximize the best advantage from the machinery.

Compact & flexible

Mitsubishi Electric's servo systems are both compact and flexible. The reduced component size means more flexibility for installation and reduced enclosure sizes.

Not all features are available on all servos. Please check applicability.

The right solution every time

SERVO AMPLIFIERS & MOTORS

MR-J4-A/B/GF/TM

400 V, 0.6–22 kW



MR-J4-A/B/GF/TM

200 V, 0.1–22 kW



MR-JE-A/B

200 V, 0.1–3 kW



HG motor series

0.5–22 kW (400 V)



HG motor series

0.05–22 kW (200 V)



PERFORMANCE

A solution for every application

Mitsubishi Electric always has the right servo system for straightforward and complex applications alike. With so many motor types, different amplifier output performances and features, the right servo solution is available for every conceivable positioning requirement.

The MELSERVO MR-J4 series of servo amplifiers and the associated positioning units, motion modules and high-end motion control systems from Mitsubishi Electric enable machine builders and end customers to increase production safety and improve productivity. The MR-J4 amplifier range with its high performance potential and wide-ranging functionality scores in all areas thanks to simple operation and commissioning. The MR-J4 is of particular interest for manufacturers of packaging machines, traversing tables and handling systems.

The MR-JE series high performance servo amplifiers and servo motors combine proven reliability with a 2.0 kHz high-frequency response and an energy-saving design, they offer the best-in-class performance with the setup ease of advanced one-touch tuning. Fully compliant with global standards and ready for deployment worldwide, the MR-JE series is the right servo solution for all kinds of machines and applications.

A diverse product range helps you make the right product choice.



“Plug & play” technology

The ever-evolving new generation servo

Powerful amplifiers

The MR-J4 generation of servo drives delivers state-of-the-art technology and simple operation in a very compact package. Functions like the advanced vibration suppression system and the further improved real-time auto-tuning ensure maximum precision, very short positioning times and simple installation.

Mitsubishi Electric offers a wide spectrum of servo amplifiers to meet the demands of all types of applications. The MR-J4-A models are suitable for drive systems with conventional control and are designed for regulating speed, torque and position control tasks. The MR-J4-B models are specified for complex, multi-axis movement sequences and for use in networked automation systems.

The units configure themselves by Plug & Play for Mitsubishi Electric's motion control and positioning control systems, to which they are connected via the high-speed optical SSCNETIII/H network, which has a cycle period of just 0.22 milliseconds.

The MR-J4 is currently available with outputs from 50 W to 22 kW. Units with higher outputs are being added to the range at regular intervals.

Built-in positioning function

A simple positioning system can be configured without a controller such as positioning module since the positioning function (point table and program methods, and indexer positioning operation) is built into the MR-J4-A-RJ servo amplifier.



Handling systems require exceptional precision and dynamic response.

MR-J4 servos at a glance

POWER RANGE

MR-J4-A/B/GF/TM (200V type): 0.1–22 kW
 MR-J4-A/B/GF/TM (400V type): 0.1–22 kW
 MR-J4-W2-B: 0.2–1.0 kW
 MR-J4-W3-B: 0.2–0.4 kW

INPUT

MR-J4-A/B/GF/TM, MR-J4W2-B,
 MR-J4W3-B:
 200–230 V AC (50/60 Hz)
 MR-J4-A4/B4/GF4/TM4:
 380–480 V AC (50/60 Hz)

SPEED FREQUENCY RESPONSE

Up to 2500 Hz

CONTROL FUNCTIONS WITH ENHANCED TUNING TECHNOLOGY

Real-time auto-tuning and Model adaptive control; Advanced vibration suppression

INTEGRATED INTERFACES

RS422, Modbus RTU

NETWORK LINKS

MR-J4-B/MR-J4-W2-B/MR-J4-W3-B:
 SSCNETIII/H
 MR-J4-GF: CC-Link IE Field
 MR-J4-TM-ECT: EtherCAT
 MR-J4-TM-PNT: PROFINET
 MR-J4-TM-EIP: EtherNet/IP™

SAFETY SOLUTIONS

According to EN IEC 61800-5-2
 Safe Torque Off (STO)

SAFETY OPTION CARD

MR-D30 for SS1, SS2, SLS, SOS, SSM, SBC



The power to perform



Feed equipment is one of the servo's many applications.

Innovative and powerful

The MR-J4 amplifier series has been developed for the automation requirements of tomorrow. Mitsubishi Electric has incorporated numerous innovative and user-friendly functions to minimise the time-consuming and elaborate matching of mechanical and electronic systems.

The new one-touch tuning function minimises time consuming system adjustments between machine and electronics by touching one button. Control parameters are optimised and resonance frequencies of the machine and the mechanics are detected and filtered. An individual adjustment of single applications is not needed. The result is a vibration free, high precise und high speed positioning process – only by one click.

The system tunes itself quickly and easily thanks to "Real-time auto-tuning" and "Vibration suppression control". These functions are available both at start-up and during operation and thus reduce commissioning and parameterisation times.

The amplifiers also feature a "Life Diagnosis Function". This function checks the state and quality of the installed components, such as capacitors and relays, over the whole life cycle, and informs the user and operator of any abnormalities. This virtually eliminates failures and machine downtime.

Mechanical system characteristics are also monitored, and undesirable vibration and friction are checked and directly suppressed, thus preventing system resonance. This function not only damps drive train vibrations but also oscillations at the end of a tool arm.

The absolute encoder which is fitted as standard has a resolution of 22 bits. This corresponds to more than 4 million pulses/revolution. The result is excellent true-running characteristics and a maximum positioning accuracy and processing speed which more than satisfy the performance requirements of modern high-end machines.

Increased response speed

Three times faster communication speed

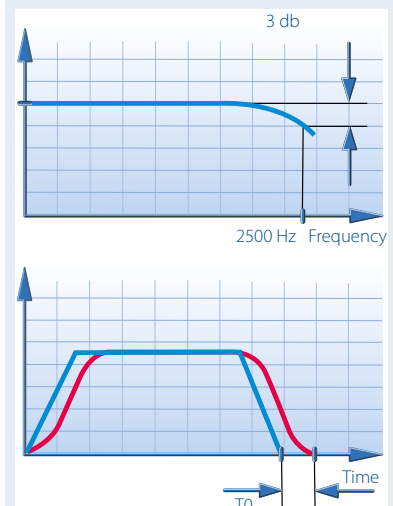
Communication speed is increased to 150 Mbps full duplex (equivalent to 300 Mbps half duplex), three times faster than the conventional speed. System response is dramatically improved.

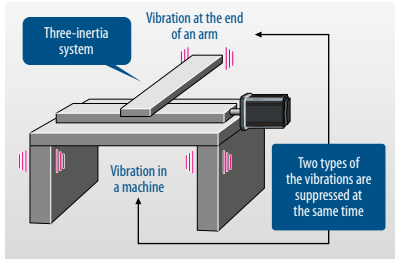
Cycle times as fast as 0.22 ms

Smooth control of machine is possible using high-speed serial communication with cycle times of 0.22 ms.

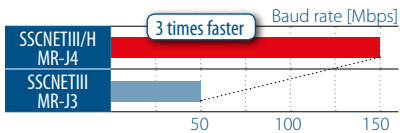
High speed response

It offers shortest settling times of 2500 Hz resulting in short cycle times

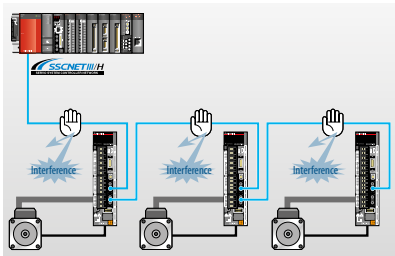




Automatic vibration suppression



Network communication speed



Reduction of interference by the SSCNETIII/H optical network

Firmware that delivers performance

All MR-J4 servo amplifiers use the very latest regulation and control technologies. These systems ensure fast installation and setup and make it possible to configure stable systems with very short response times – no matter what’s your application.

Real-time auto-tuning

The real-time auto-tuning function sets the servo’s control parameters automatically, eliminating the need to calibrate the system for each individual application. But that’s not all – auto-tuning also works continuously while the system is in operation, making constant adjustments to cater for applications with fluctuating moments of inertia. This makes it possible to use these servos in a much wider range of applications.

Precise tuning functions

Advanced suppression of mechanical vibration

Advanced vibration suppress control is designed to suppress the vibrations in Category 2 and above. It is effective in suppressing residual vibrations at the time of settling during positioning operation.

The primary control method of the MR-J4 is model adaptive control. In this method, the motor is driven in such a manner that the tip of the given machinery moves together with the reference model applied.

Under advanced vibration suppress control, it uses a mechanical vibration model from reference model to generate a drive pattern that prevents the tip of machinery from vibrating, thereby suppressing any residual vibration. Advanced vibration suppress control can extract vibration components from actual motor movements. It identifies the vibration characteristics of the machinery in real time, and automatically makes adjustment to the mechanical vibration model.

Adaptive filtering

The optimum machine resonance suppression filter is automatically set to suppress resonance without even measuring the machine system’s (drive shaft) frequency characteristics. The adaptive frequency range has been increased compared to the prior models, so resonance at the drive shaft can also be suppressed.

When a given machine has a mechanical resonance at a high frequency (in the range of several hundred Hz and above), increased control gain will cause the control system to oscillate in this vibration mode and subsequently lose control. In order to overcome the mechanical resonance, it is common practice to insert a machine resonance suppression filter into the control loop to prevent oscillation. Adaptive filter II is a function that automatically sets this machine resonance suppression filter in real time.

SSCNETIII/H – The benchmark standard

High-speed motion

In addition to conventional pulse train positioning, the MR-J4 series also supports the SSCNETIII/H high-speed motion control network. The SSCNETIII/H is a high-speed synchronous network using an optical fiber cable. The MR-J4-B servo amplifier is connected to a control device with SSCNETIII/H interface (e.g. FX5-40SSC-S/FX5-80SSC-S/LD77MS/QD77MS/RD77MS Simple Motion module, MR-MQ100/Q170MSCPU/Q172DSCPU/Q173DSCPU/R16MTCPU/R32MTCPU/R64MTCPU Motion Controller or FX3U-20SSC-H interface module). As for the communication specifications of SSCNETIII/H, it can control up to 64 axes per master interface.

Since long-distance wiring has become possible, it is possible to locate the controller’s control panel and drive units far apart and spread widely in a large-scale facility or a large-scale production line. This, in turn, will shorten the cable between amplifier and motor in machines where there is a relatively large amount of wiring.

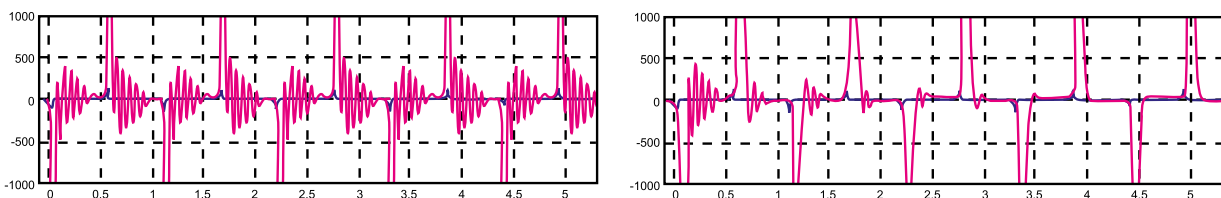
No transmission collision

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

Powerful setting tools

As for the parameterization of the servo setting and support tool, MR Configurator2 can be used over SSCNETIII/H, just simply connect a personal computer to the motion controller makes it possible to perform controller settings and servo parameters of all the connected axes to SSCNETIII/H.

The left figure shows vibrations of the motor shaft, such as generated in a ball screw, which are suppressed by the Adaptive filter.



Safety first



Maintain machine performance while meeting required safety standards

The safe choice for motion

Mitsubishi Electric's MR family has become the leading choice for motion applications world wide. Industry leading performance, flexible network connectivity, and patented technology like vibration suppression has lead to a significant global installed base. Mitsubishi Electric now takes this success one step further by adding safety functions to the MR-J4 line up.

Standards compliance

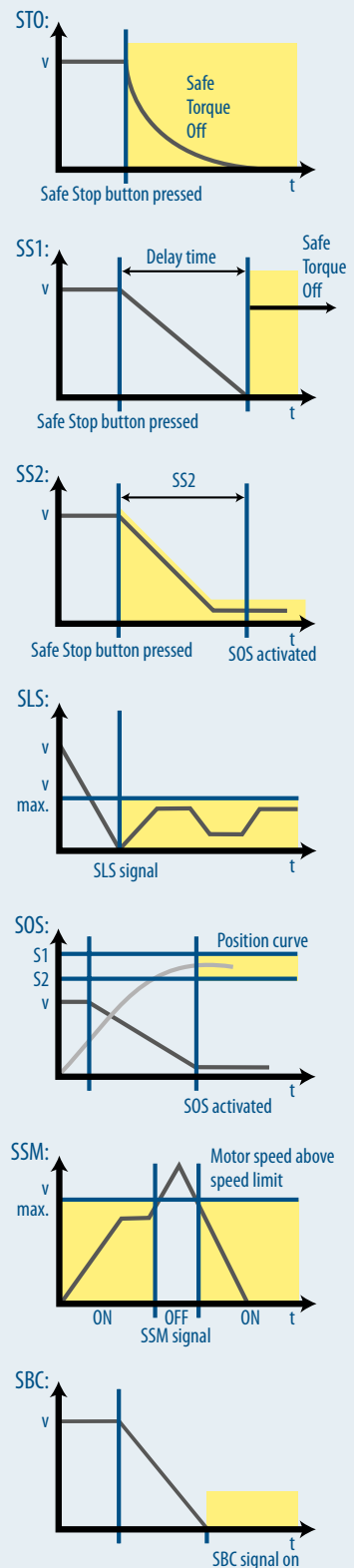
The MR-J4 motion safety solution is fully certified by third party accreditation organizations like TÜV. It complies with both EN 13849-1 for machine safety and ISO 61508 for functional safety. Hence specifying this solution in a motion system assists engineering staff to meet the requirements of mandatory certifications such as the EU Machinery Directive (2006/42/EC).

Comprehensive safety functions

Together, these devices offer a comprehensive motion safety solution. Implement safety functions using just the amplifier, or with both units, depending on system requirements. The MR-J4 amplifier by itself offers a Safe Torque Off (STO) function according to EN 60204-1 that prevents an unexpected re-start and complies with the safety integrity level 3 (SIL 3) of the functional safety standards IEC 61508: 2010. In conjunction with the MR-D30 safety unit, the MR-J4 series can be expanded by the addition of other EN 61800-5-2 safety function such as SS1, SBC, SSM and SLS. By using additionally the servo motors with safety certified encoder, the safety functions SOS and SS2 can be realized. Hence system designers can select an economical solution that provides only the functions they need.

Safe control

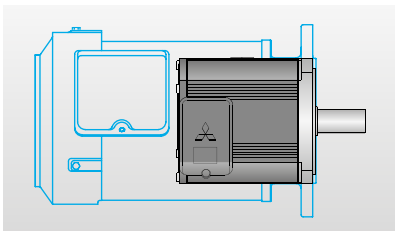
Maintain safe control of motor behaviour even in emergency situations



Servo motors to add movement



Large choice of different servo motors



Size comparison to conventional motors



Speed, accuracy and control, whenever you need it.

Motor solutions for all

Featuring the most advanced concentrated winding techniques and the latest technology, Mitsubishi Electric servo motors are the most compact in the market.

MR-J4 series servo amplifier operates rotary servo motors, linear servo motors and direct motors as standard.

Motors are available in a range of options from 50 W to 22 kW in different designs, including specialised motors such as hollow shaft and direct drive motors that suit most application needs.

All Mitsubishi Electric servo motors provide integrated ABS encoders. Additional return-to-origin routines, limit switches or other sensors are not required.

Moreover, Mitsubishi Electric's low, ultra low and medium inertia designs allow users to select the best motor characteristics for their application.

Advanced features

Increased motor speed

MR-J4 motors lead the market, combining speeds of up to 6,000 rpm with high torques. This makes it easier for designers to select the motors they need to meet tough performance criteria.

Increased encoder resolution

All MR-J4 encoders are 22 bit, delivering industry-leading 4,194,304 pulses per revolution. This high resolution makes it possible to detect and suppress mechanical vibrations. The non-volatile absolute encoder system has a backup battery, eliminating the need for time-wasting zero-point calibration routines.

Improved motor IP ratings

All MR-J4 motors are IP65 rated as standard (all 400 V motors are IP67). This means that MR-J4 systems can be used in heavy-duty industrial environments.



HG motor series – IP65/IP67 standard protection

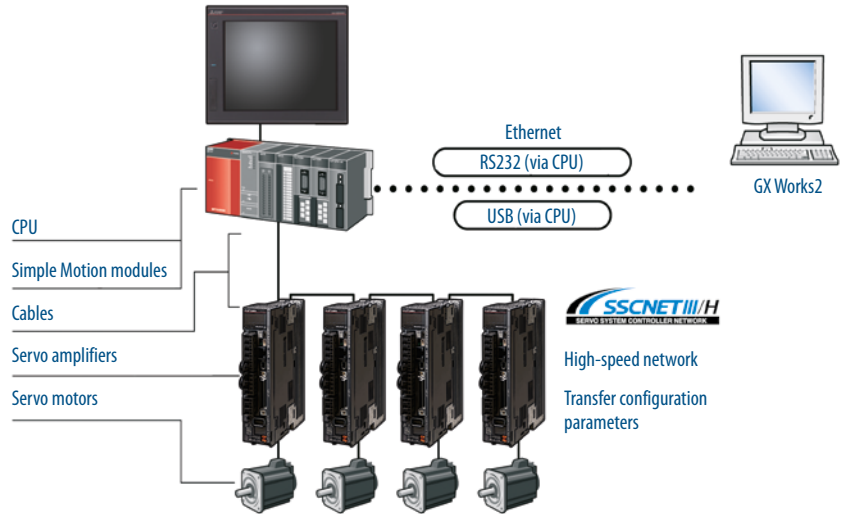
Increase the safety level

Optionally the HG-KR, HG-JR and HG-SR motors are available with functional safety encoder and the safety functions are compliant with Category 4 PL e, SIL 3.

Plug & play positioning solutions



Fast, high-precision positioning



SSCNETIII/H configuration

Using the right positioning solution can help increase the accuracy of the work process, reduce waste and rework as well as provide a higher quality of production.

The MR-J4 series together with SSCNETIII/H support a very broad spectrum of applications between 1 and 192 axes. Components with a variety of different PLC and positioning systems for a modular and fully-scalable configuration can be combined. This gives the user full control over the system and complete cost transparency, combined with the dependable controller performance of the MELSEC System Q, MELSEC iQ-R, MELSEC iQ-F- and MELSEC L-series with motion controllers.

The range starts from simple pulse train positioning controllers over dedicated motion cards to most complex applications with MELSEC System Q and MELSEC iQ-R motion CPUs.

Positioning modules

MELSEC FX positioning modules

High-speed counter and single axis positioning modules are available, which can be used in combination with the FX series PLCs. This provides a cost effective solution for small servo/motion applications. To archive a cost effective solution for high precision, the FX3U-20SSC-H module with SSCNETIII/H connection can be used.

MELSEC Simple Motion module

The MELSEC System Q, MELSEC iQ-F-, MELSEC iQ-R- and MELSEC L-series lineup includes Simple Motion modules for various control functions previously only possible with Motion Controllers, such as torque control, synchronous control and cam control. These functions can be realized with simple parameter adjustments and via the PLC program.

Mark sensors allow use in packaging industry, filling plants, etc., without additional optional modules. A function for automatic calculation of cam data for applications with rotating cutters is implemented – only by setting the length of the product and the synchronisation path. With positioning

functions, like linear interpolation (up to 4 axes), circular interpolation (2 axes) and path control it is easy to realize different applications, like X-Y tables, sealing, etc.

Motion control and PLC in perfect harmony

Motion control systems have huge potential for optimising production processes and improving product quality. To control these systems, MELSEC System Q and MELSEC iQ-R series offers solutions ranging from individual motion/positioning cards to advanced motion CPUs capable of synchronised operation across many axes.

The MELSEC System Q and MELSEC iQ-R series unique design allows users to select and use different combinations of CPUs from the same platform.

Thanks to the dedicated motion control network SSCNETIII/H, each motion CPU can connect up to 64 servo axes. In addition, three motion CPUs can be used in a single MELSEC System iQ-R solution to bring advanced motion control to 192 axes.

A whole solution for Motion control

Only use what you need

For most applications, a complete control platform of a PLC and motion controller will do the job. However, for smaller systems, this may not address competitive cost pressures. The MR-MQ100 allows a single axis to be completely controlled and synchronised to a separate encoder or virtual axis with no additional controller hardware. Hence applications such as rotary cutters, flying saws and labelling can be economically accomplished without exceeding a tight control budget.

Limit cost, not options

While the MR-MQ100 is an economical solution, this doesn't mean lacking in features. A complete range of essential functions are available, including encoder and virtual axis synchronization, registration, point to point positioning and user defined cam profiles. In addition, the hardware complements these powerful software features with built-in I/O and SSCNETIII motion networking capability as well as an Ethernet port.

Reduced wiring

The MR-MQ100 also helps keep system costs down with its use of SSCNETIII, Mitsubishi Electric's simple but rugged optical fiber motion network. A single fiber connection is all that's needed to provide full communication and control over all functions of the MR-J4B servo amplifier regardless of capacity. A standard Ethernet connection is also provided to link the MR-MQ100 to the MT Works2 software.

Fully integrated

The Q170MSPCU offers the ability to provide a complete automation solution with a single, compact device. Its main strength is the ability to control up to 16 axes over a single SSCNETIII/H



Apply the MR-MQ100 in a wide variety of motion applications



Program by creating virtual mechanical systems

connection. However, rather than just being a simple motion controller, a comprehensive PLC capability is also built in. Hence the Q170MSPCU offers the ability to address a range of applications such as more sophisticated packaging machinery, labelling and material handling applications.

Flexibility

Most motion systems offer sophisticated axis control functions. However, the Q170MSPCU also opens up a huge range of PLC application possibilities by being compatible with over 100 of the MELSEC System Q I/O modules. This means application challenges such as

analogue I/O, high density digital I/O, networking and others can easily be tackled by the Q170MSPCU. For companies already using MELSEC System Q, spare parts will be common to their other systems, reducing cost and administration tasks.

Fast, easy system set-up

High performance is less valuable if it's hard to use. The MR-MQ100 and Q170MSPCU avoids this with the intuitive MT Works2 software that replaces abstract programming with graphical models of the actual mechanical system. It's easy to create virtual clutches, gears and cam profiles by simple drag and drop selection.



Servo setting and support software

MR Configurator2 – a complete engineering environment

The MR Configurator2 software package makes configuration and diagnostics quick and easy and includes powerful graphical machine analysis and simulation functions. Machine analysis enables determination of the frequency response of the connected drive train without any additional instruments. If necessary, you can then make design changes or install filters to achieve better machine performance. The system can be connected to a personal computer with a standard USB port.

A wide range of automatic configuration assistants make it easy to set up your new servo systems correctly, even for less experienced users. The strong benefits are:

Preparation

Easy set up

MR Configurator2 allows for easy set up and tuning the servo system with a standard personal computer.

Servo assistant function

Complete setting up the servo amplifier just by following guidance displays. Setting parameters and tuning are easy since related functions are called up from shortcut buttons.

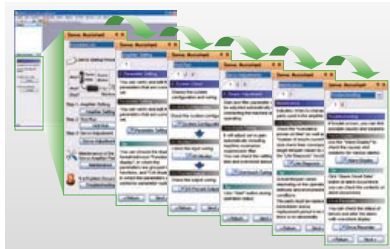
Startup

Multiple monitor functions

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

Parameter setting function

Display parameter setting in list or visual formats, and set parameters by selecting from the drop down list. Set in-position range in mechanical system unit (e.g. μm). Parameter read/write time is approximately one tenth of the conventional time.



Just follow the the guidance and setup is complete

Maintenance

Test operations with a personal computer

Test operation of the servo motors can be performed with a personal computer using multiple test mode menus.

Machine diagnosis function

This function estimates and displays machine friction and vibration in normal operation without any special measurement. Comparing the data of the first operation and after years of operation helps to find out the aging deterioration of machine and is beneficial for preventive maintenance.

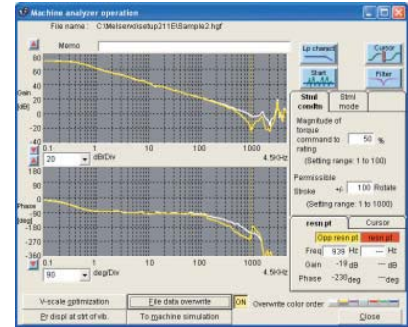
Servo adjustment

One-touch tuning function

Adjustments including estimating load to motor inertia ratio, adjusting gain, and suppressing machine resonance are automatically performed for the maximum servo performance just by clicking the start button. Check the adjustment results of the settling time and overshoot.

Graph function

The number of measurement channels is increased to 7 channels for analog, and 8 channels for digital. Display various servo statuses in the waveform at one measurement, supporting setting and adjustment. Convenient functions such as [Overwrite] for overwriting multiple data and [Graph history] for displaying graph history are available. Waveform measurement for the connected axes is



Monitoring and checking with the diagnostics features

simultaneously performed via controller communication.

Machine analyzer function

Input random torque to the servo motor automatically and analyze frequency characteristics (0.1 Hz to 4.5 kHz) of a machine system just by clicking the [Start] button. This function supports setting of machine resonance suppression filter, etc.

Improved usability

While automatically fluctuating the gain, the setup software MR Configurator2 searches for values with the shortest settling time and lowest overshooting or vibration.

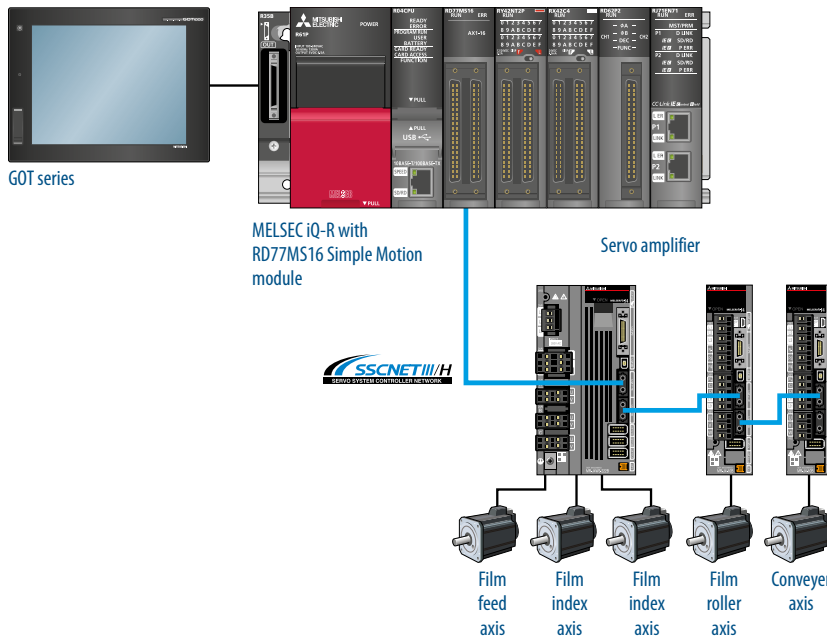
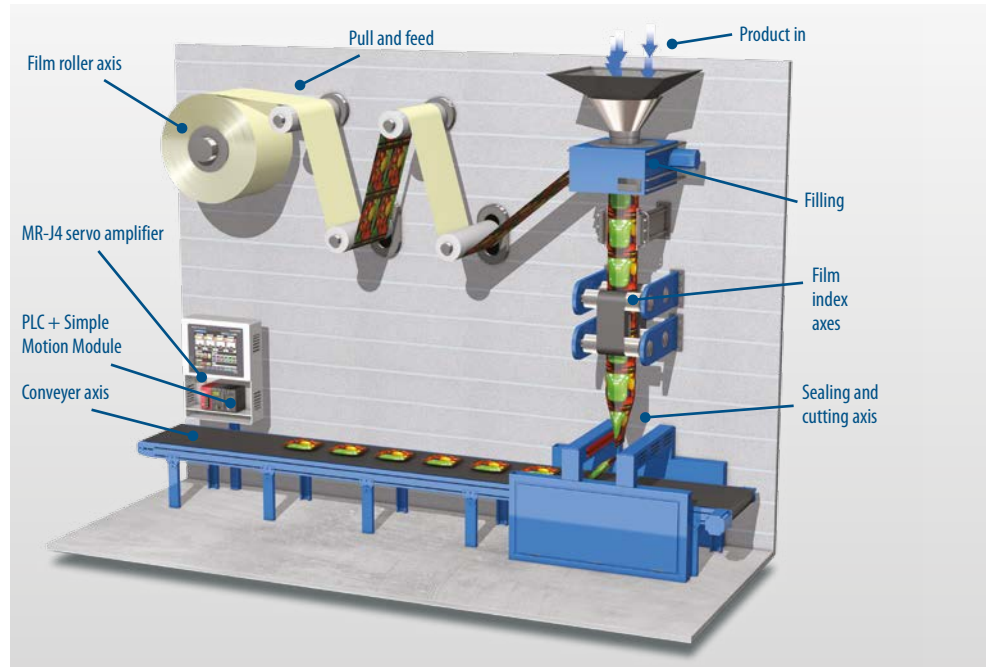
Basic setting parameters can be easily set in a selection format. Settings in the list format are also possible.



Vertical form fill & seal

Sealing packaging solutions

Vertical form fill & seal applications utilize servo motor technology to accurately pull and feed plastic film material from a roll stock to be heat formed, volume dosed with a product, and then sealed and cut to be carried away by an unloading conveyor. While the methods for filling and sealing vary from machine to machine, vertical form fill & seal applications are essentially organized into two categories: Continuous motion bagging machines and intermittent motion bagging machines. Product entering the feeder can vary from a viscous fluid to a solid material and will often play a key role in how the machine is designed.



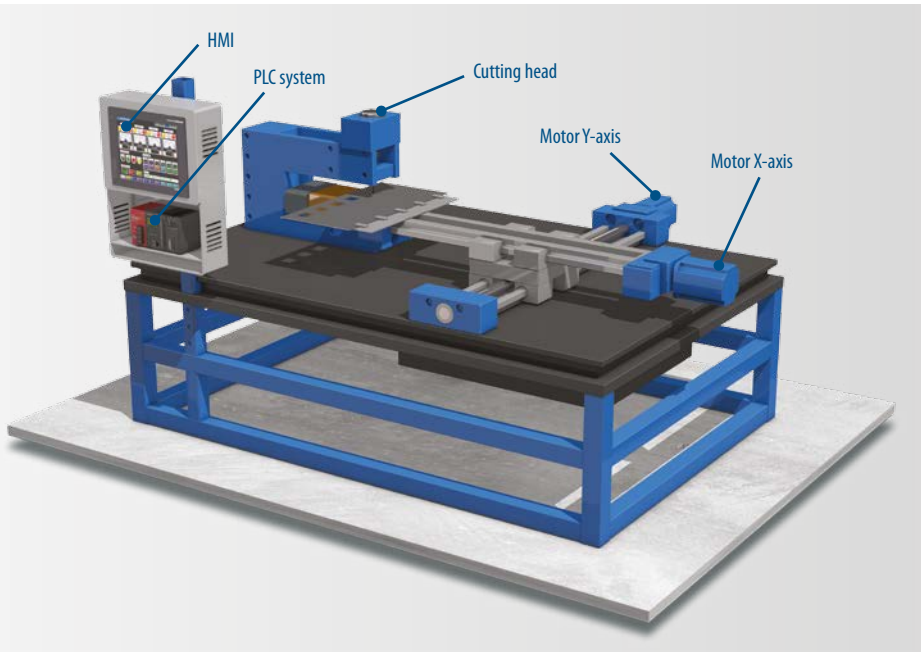
Which automation components are important

As part of the Simple Motion Module programming environment, virtual servo motor movement can be commanded through an electronic line shaft in order to ensure that each actual servo motor's movement begins at the same time. This control takes place through the Simple Motion module where the program is written in GX Works2 (which is a part of the iQ Works).

Application

Sealing takes place with absolute servo moves to seal the bottom of a bag, while simultaneously sealing the top of the bag that's already been filled. A blade moves to cut the material in order to release each finished bag from the tube. The bag then falls onto the exit belt to be carried away for boxing.

XY table application



Application

In general, XY tables do not require a lot of maintenance, and are considered to be highly accurate and easy-to-use. However, mechanical parts can still be a problem after time. Depending on the weight of the load, ball screws within XY tables and other mechanical components can acquire a significant amount of wear and may need to be renewed regularly. Therefore, Mitsubishi Electric developed new functions to estimate frictions & vibrations which support preventative maintenance of machine components. These functions are integrated in the new MR-J4 series.

Additionally the G-CAD converter software package allows the user to import directly CAD files and move any pattern without modifying the PLC program.

Overview

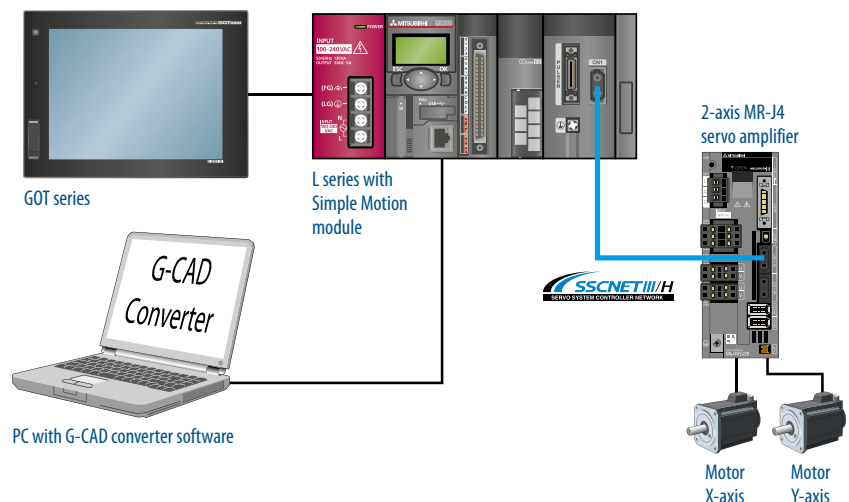
XY tables are used in a variety of applications with different positioning requirements. Usually horizontal motion involves 2 (or more) axes of servo performing linear or circular interpolation.

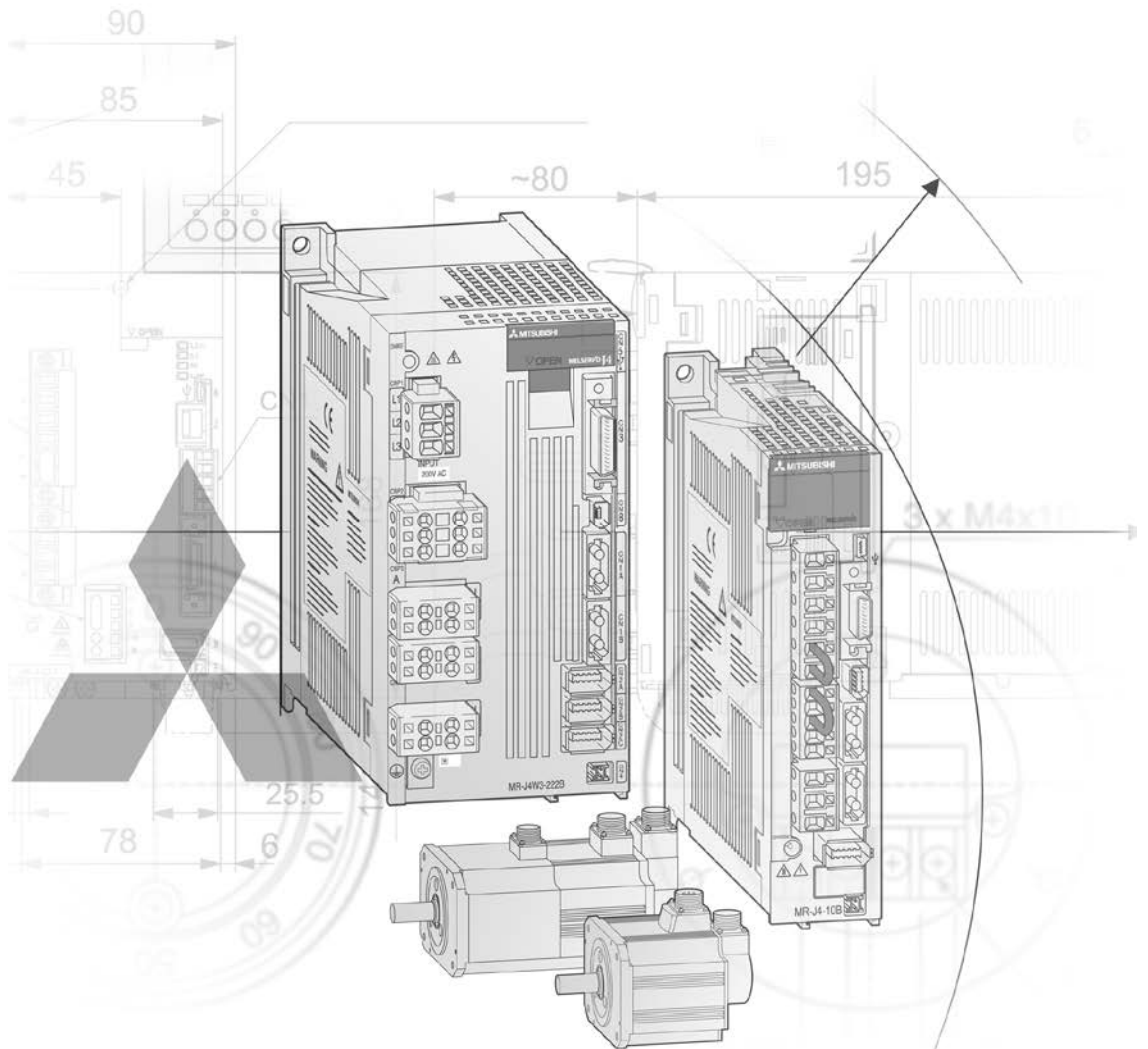
Which automation components are important

XY tables utilize servo motor technology for accurate positioning. The two servo motors are connected to a table to move the application in X and Y direction. The 2 motors are controlled by a MR-J4W2-B servo amplifier, which is the latest technology from Mitsubishi Electric. The movement and interpolation is calculated with the Simple Motion module.

In combination with a L series PLC and its built in features, a complete solution can be offered with less components. Thanks to the SSCNETIII/H Network, all internal servo parameters can be set directly from the PLC.

Often the pattern information will be drawn on a CAD package and exported as a DXF file. The DXF file can be read directly into the G-CAD converter software to create a Simple Motion program to follow the motion path.





Technical Catalogue

Further Publications within the Mitsubishi Electric family

Brochures

iQ-R/Q/L Family

Product catalogues for modular programmable logic controllers and accessories for the MELSEC iQ-R, MELSEC System Q and MELSEC L series

COMPACT PLC Family

Product catalogue for compact programmable logic controllers and accessories for the MELSEC FX family

HMI Family

Product catalogue for operator terminals, supervision software and accessories

FR Family

Product catalogue for frequency inverters and accessories

MELFA Family

Product catalogue for industrial robots and accessories

Low Voltage Switchgears

Product catalogue for low voltage switchgears, magnetic contactors and circuit breakers

Automation Book

Overview on all Mitsubishi Electric automation products, like frequency inverters, servo/motion, robots etc.

More information?

This product catalogue is designed to give an overview of the extensive range of MELSERVO amplifiers and motors. If you cannot find the information you require in this catalogue, there are a number of ways you can get further details on configuration and technical issues, pricing and availability.

For technical issues visit the <https://eu3a.mitsubishielectric.com> website. Our website provides a simple and fast way of accessing further technical data and up to the minute details on our products and services. Manuals and catalogues are available in several different languages and can be downloaded for free.

For technical, configuration, pricing and availability issues contact our distributors and partners. Mitsubishi Electric partners and distributors are only too happy to help answer your technical questions or help with configuration building. For a list of Mitsubishi Electric partners please see the back of this catalogue or alternatively take a look at the „contact us“ section of our website <https://eu3a.mitsubishielectric.com>.

About this product catalogue

This catalogue is a guide to the range of products available. For detailed configuration rules, system building, installation and configuration the associated product manuals must be read. You must satisfy yourself that any system you design with the products in this catalogue is fit for purpose, meets your requires and conforms to the product configuration rules as defined in the product manuals.

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The products of Mitsubishi Electric Europe B.V., that are listed and described in this document, are neither subject to approval for export nor subject to the Dual-Use List.

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Servo and Motion Systems

Mitsubishi Electric offers a variety of Servo and Motion system products providing solutions for applications covering point-to-point and synchronised systems. Systems can be built using a single axis or multi axes, for example when using a MELSEC System Q Motion CPU solution up to 192 axes can be controlled.

Therefore operation is possible by standard pulse train outputs as well as by different networks like SSCNETIII/H, CC-Link IE Field, EtherCAT, PROFINET und EtherNet/IP™.

The Servo motors and amplifiers take Mitsubishi Electric Motion Control to new levels of precision with a wide range of motors and a wide range of amplifiers (up to 110 kW). All MR-JE series motors are fitted

with 131072 pulse-per-revolution encoders, all MR-J3 series motors with 262144 pulse-per-revolution encoders, all MR-J4 series motors with 4194304 pulse-per-revolution encoders.

All Mitsubishi Electric Servo and Motion system hardware is complimented by a range of software packages allowing easy programming and set-up of the units.

What are the components of a MR-J4 servo system?

Servo motors

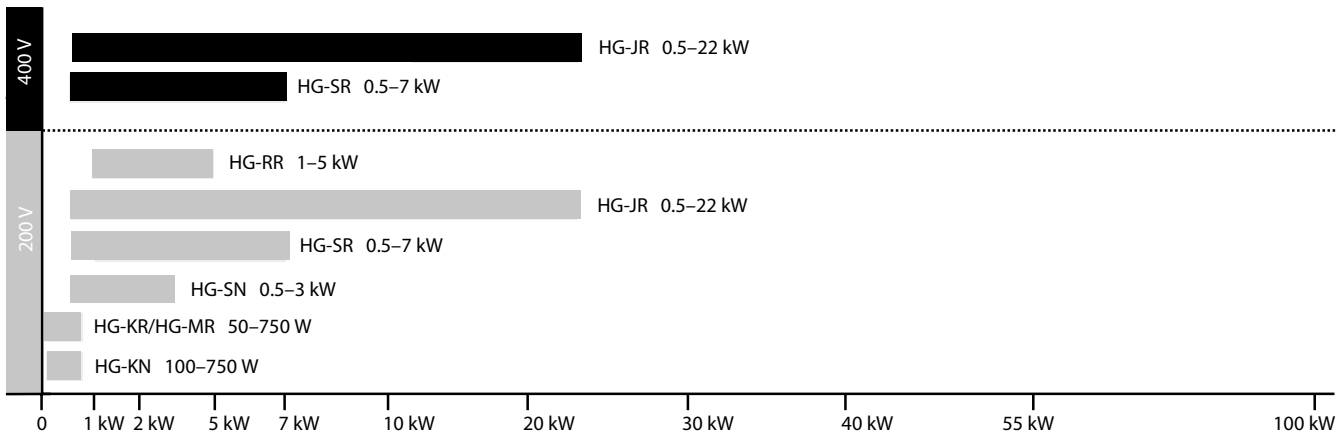
Utilising the most advanced concentrated winding techniques and latest technology, these brushless servo motors are among the most compact on the market.

Mitsubishi Electric Servo Motors are made to high standards and offer a wide range of power, speed and inertia ratings providing a motor

for all applications. With a range from 50 W to 110 kW and with a considerable number of motor types like rotary, linear and direct drive servo motors a complete line-up of products can be offered by Mitsubishi Electric.

Also, all motors in the MR-J4 series are fitted with absolute encoders as standard. Therefore,

an absolute position system can be created by simply providing power to Servo amplifier via a battery. Once this has been done the super capacitor inside the motor and back-up battery allow the Servomotor position to be constantly monitored.



Improving machine performance with high-performance motors

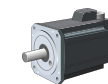
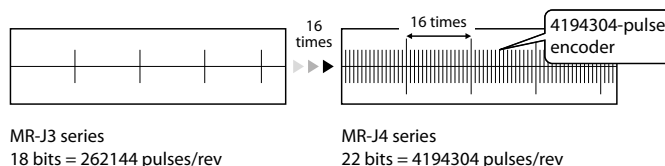
To raise your machine on a high productive level, you need not only powerful servo amplifiers but also high performance servo motors. These motors have to support the high encoder resolution of 22 bits with the MR-J4 series for improved accuracy and speed. Fully closed loop control is supported as standard. A variety of models is available to match various applications.

Rotary servo motors achieve high-accuracy, high-torque output during high speed positioning and smooth rotation with a high resolution encoder and improved processing speed. Linear servo motors support highly accurate tandem synchronous control. Direct drive motors are used for compact and rigid machine and high-torque operations.

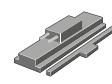
For rough environment conditions some motor series are also available with higher protection class like IP65 or IP67.

The MR-J4 series servo amplifiers are able to operate rotary servo motors, linear servo motors, and direct drive motors as standard.

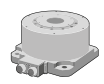
[Resolution comparison with the prior model]



Rotary servo motor



Linear servo motor



Direct drive motor

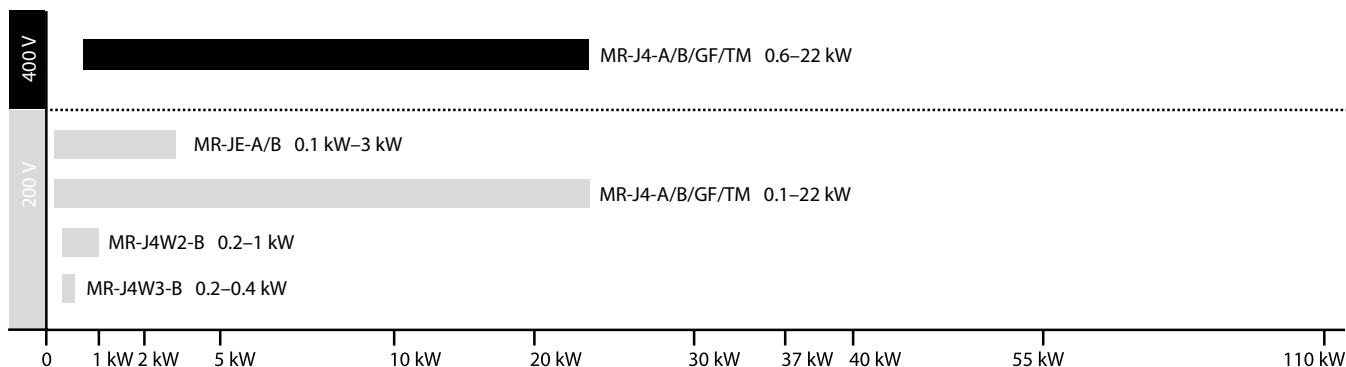
Servo amplifiers

Mitsubishi Electric offers a wide range of Servo amplifiers to meet the demands of all types of applications. From standard digital pulse and analogue controlled amplifiers through to dedicated network type amplifiers, there is a product for all circumstances.

Real Time Adaptive Tuning (RTAT) is a unique Mitsubishi Electric technology, enabling the servo to deliver maximum dynamic performance, even if the load keeps changing, by automatically tuning online (during operation) to the application.

The digital pulse-train and analogue units of the MR-JE and the MR-J4 series from 100 W to 22 kW. The SSCNETIII/H bus type amplifiers (type MR-J4-B) offer the user ease of connectivity, via SSCNETIII/H.

Whereby the MR-J4-TM supports Ethernet based open network communication.



Positioning controllers

For the compact, cost effective, FX range of PLCs, the FX2N-10PG unit provides single-axis control with built-in positioning tables, fast external start and an output pulse rate of up to 1 MHz. The module FX3U-20SSC-H is a positioning module for the MR-JE-B/MR-J4-B series. This module provides a quick and easy, but efficient positioning control system for simpler applications.

For larger and more complex applications the MELSEC iQ F series, MELSEC iQ-R series, MELSEC L series and MELSEC System Q provide numerous positioning and Simple motion modules (1, 2, 4 and 16 axes).

These are: open-collector output type (LD75P/QD75PN-/RD77P series), Differential output type (LD75D/QD75DN-/RD77D series) and SSCNETIII bus type (FX3U-20SSC-H), SSCNETIII/H bus type (LD77MS/QD77MS). Using the SSCNETIII system can provide much improved, easier to use positioning systems, with reduced wiring and better noise immunity. All positioning modules provide functions such as interpolation, speed control and positioning operations, etc. For advanced motion applications like axes synchronisation and CAM control the Simple Motion modules ((FX5-□SSC-S/LD77/QD77/RD77) are available.

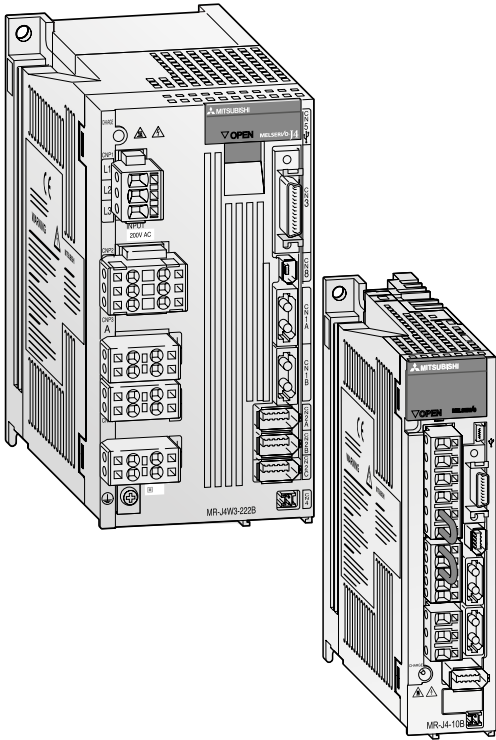
Additionally the simple motion modules of the MELSEC iQ-R series and MELSEC System Q provide a CC-Link IE Field interface.

Motion Controllers

For specialist applications requiring the highest level of control and precision, the dynamic servo technology provided by the iQ-R-Motion CPU is combined with the powerful processing power of the MELSEC iQ-R PLC CPU, creating a completely new generation of motion controller products.

This fully integrated and flexible system has the capability to control up to 192 axes using SSCNETIII/H, which is more than capable for handling any motion application.

MELSERVO MR-J4 Servo Amplifiers



MELSERVO

The MR-J4 servo drive systems from Mitsubishi Electric combine extremely dynamic response with ultra-fast positioning. In addition the servo amplifiers are also very simple to use and their advanced functionality make it possible to achieve maximum performance very quickly, even for users without special experience in calibrating drive applications. The significantly improved auto-tuning function reduces the need for the time-consuming trial-and-error approach. In combination with the setup software package (MR Configurator2) the MR-J4 series can be used to detect application mechanical critical frequencies. This enables notch filters to be set to avoid resonant frequencies enabling vibration-free operation.

When using amplifiers of competitors the controller response level has to be reduced for the entire operation range.

The MR-J4 servo amplifiers can be used for global applications with superb operation in the toughest environments.

Features

- High-performance CPU
- Adaptive vibration suppression control function for compensation for resonance up to five resonance frequencies
- Advanced vibration suppression control for compensation of motion overshoot
- Separate wiring of the control power supply
- High responsiveness
- One-Touch-Tuning
- Servo-lock anti-vibration function
- USB ports for connecting a PC (additional RS422 port at the MR-JE-A and MR-J4-A)
- Automatic motor recognition
- Network capability
- Complies with global industrial standards incl. CE, UL and cUL
- Integrated safety functions

Differences Between the Four MELSERVO Servo Amplifier Series

MR-J4-A (standard/Modbus-RTU type)

The MR-J4-A series is ideal for servo applications using conventional control systems. The servo amplifiers have two analog inputs and numerous digital inputs for activating internal application functions (i.e. pulse train positioning). Using the digital pulse train method eliminates the problems inherent in analog control, such as offset shifts caused by temperature fluctuations and drifting when the system is at rest.

The MR-J4-A series can be used in torque, speed or position control mode.

Additionally, the MR-J4-A-RJ has a built-in positioning function. Simple positioning tasks can be implemented directly in the servo amplifier, a higher-level position control is not required.

It is also possible to control positioning tasks via Modbus-RTU.

Highlights

- 2 analog inputs
- 1 digital pulse train input
- 7 preset speeds
- Supports three different types of pulse train signals: standard encoder signals (line driver or open collector); pulse and direction; pulse train for right and left rotation
- Positioning function additionally program or data tables
- Safety functions according to EN IEC 61800-5-2: „Safe Torque Off“ (STO) and „Safe Stop 1“ (SS1).

MR-J4-B (SSCNETIII/H network type)

The MR-J4-B series supports connection to Mitsubishi Electric motion control and positioning control systems. The drive systems are connected to these controllers via SSCNETIII/H, a high-speed motion network enabling high precision synchronization and advanced interpolation. The minimum cycle time of just 0.22 ms increases responsiveness and reduces tact cycle of machine due to fast data exchange. Setting up this plug-and-play network couldn't be easier; you just have to select the axis address and connect the preconfigured bus cable, which also makes wiring errors impossible.

Highlights

- Plug-and-play SSCNETIII/H network
- Motor brake can be controlled directly by the amplifier
- Emulated encoder outputs for connection of conventional slave drive systems
- Amplifier replacement is fast and simple because data management is performed by superior controller.
- Automatic position detection on power-up thanks to absolute position detection system (multi-turn absolute positioning is realised by optional back-up battery)
- Safety functions according to EN IEC 61800-5-2: „Safe Torque Off“ (STO) and „Safe Stop 1“ (SS1), Safe Brake Control (SBC), Safely Limited Speed (SLS), Safe Speed Monitor (SSM) additionally with the functional safety unit MR-D30 and the Servoamplifiers MR-J4-B-RJ.

MR-JE-A (general purpose/Modbus-RTU type)

The servo system MR-JE-A can perform operation in different control modes, e.g. position/internal speed control. It fits a wide range of applications such as precision positioning and smooth speed control of machine tools and general industrial machines (e.g. packaging, processing or labelling machines).

External analog speed command or torque command are implemented to use this servo system for applications in which speed or torque has to be smoothly controlled.

Up to 1 Mpps high-speed pulse train is used to control the speed and direction of the motor and execute precision positioning also taking advantage of the high encoder revolution of 131072 pulses/rev.

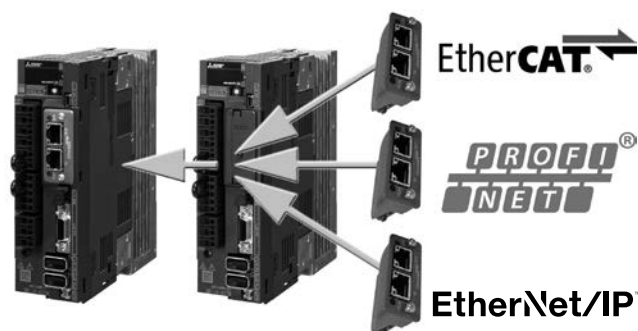
Highlights

- The compact dimensions enable flexible installation and economical design
- With an output range of 100 W–3 kW the system is suitable for any kind of application
- The system allows high accuracy positioning thanks to the integrated high resolution encoder (131072 pls/rev)
- It is a well-priced product for cost-effective and economical servo solutions
- Auto-tuning and diagnostic tools are available for easy and time-saving installation

MR-J4-TM (open network solution)

The MR-J4-TM combines industry leading performance, features and reliability of the MR-J4 series servo system with different open network interfaces like EtherCAT, EtherNet/IP™ and PROFINET. Even if the control system is specified by endcustomer, system manufactures can use Mitsubishi Electric servo technology and benefit of the highly compact, powerful technology.

This technology enables a machine to be adapted for use with various Ethernet systems quickly and easily, and consequently makes it suitable for a worldwide use with different types of control systems and network technology.

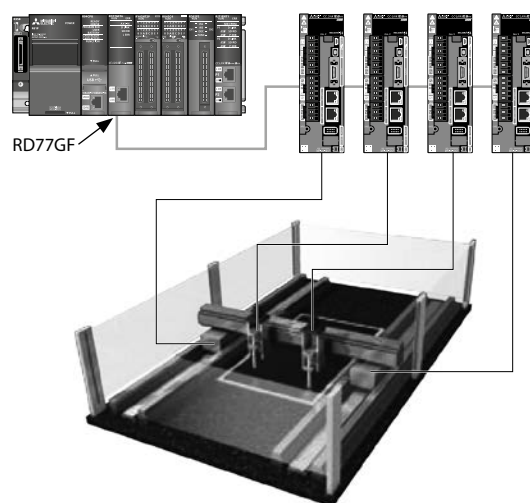


MR-J4-GF (single network solution for motion, I/O and safety function)

MR-J4-GF(-RJ) is compatible with CC-Link IE Field Network as standard. CC-Link IE Field Network is a single network which combines the versatility of Ethernet and highly accurate synchronous operation for Motion control. With the single network, various field devices, such as servo amplifiers, I/O modules, and high-speed counter modules, are connected with no restriction.

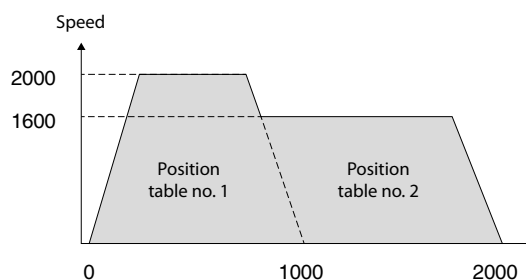
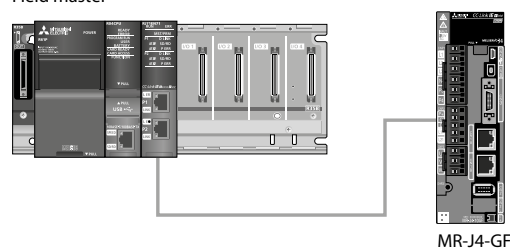
Beside point-to-point positioning, speed and torque control, advanced motion functions are available in combination with the Simple Motion Module, like axes synchronisation, CAM and print mark control.

The integrated safety function of the MR-J4-GF can be activated by the CC-Link IE Field network without additional wiring at the servo amplifier.



Combined with the CC-Link IE embedded CPU or a master/local module, the servo amplifier can perform positioning operations just as easy as I/O operations, suitable for belt conveyers, rotary tables, ball screws, etc. Up to 120 servo axes can be controlled in the I/O mode.

PLC CPU module with integrated CC-Link IE Field master



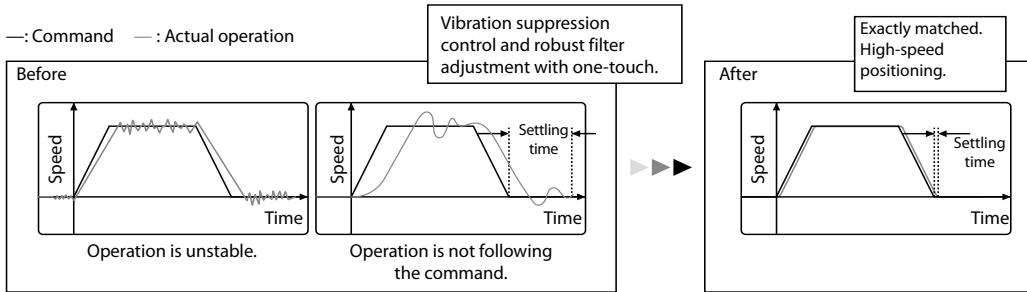
Advanced Servo Gain Adjustment Function

Advanced one-touch tuning function

Servo gains including machine resonance suppression filter, advanced vibration suppression control II, and robust filter are adjusted just by turning on

the one-touch tuning function. Machine performance is utilized to the fullest using the advanced vibration suppression control function.

Result is a vibration-free, high-precision and fast positioning process.

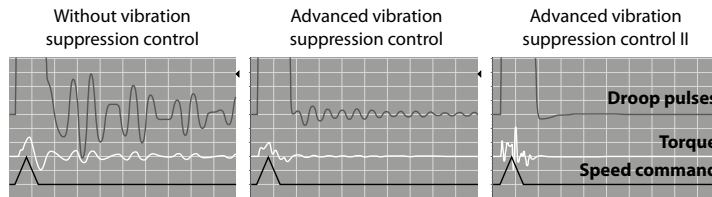
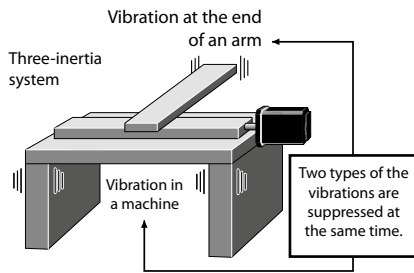


Advanced vibration suppression control II

Due to vibration suppression algorithm which supports three-inertia system, two types of low frequency vibrations are suppressed at

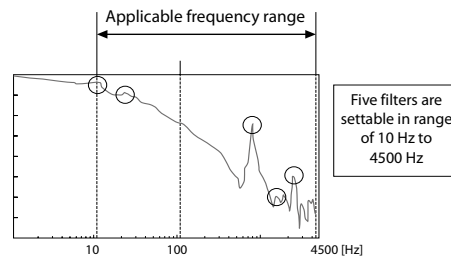
the same time. Adjustment is performed on MR Configurator2. This function is effective in suppressing vibration at the end of an arm and

in reducing residual vibration in a machine, enabling a shorter settling time.



Machine resonance suppression filter

With advanced filter structure, applicable frequency range is expanded to between 10 Hz and 4500 Hz. Additionally, the number of simultaneously applicable filters is increased to five, improving vibration suppression performance of machines.

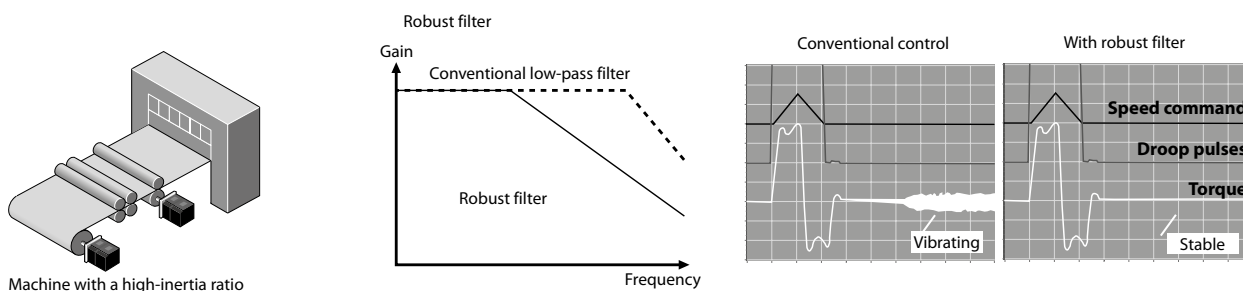


Robust filter

Achieving both high responsivity and stability was difficult with the conventional control in high-inertia systems with belts and roller such as printing and packaging machines.

Now, this function enables the high responsivity and the stability at the same time without adjustment. The robust filter more gradually reduces the torque with wide frequency range

and achieves more stability as compared to the prior model.

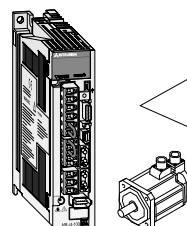


Servo Amplifier with Built-in Positioning Function

A simple positioning system can be configured without a controller (positioning module) since the positioning function (point table and program methods, and indexer positioning operation) is built into the MR-J4-A-RJ servo amplifier. Built-in positioning function. With the direct connection of an Graphic Operation Panel (GOT), the positioning operations can easily be adjusted. Of course all diagnostic functions of the GOT are available.

Built-in positioning function:

- Point table method
- Program method
- Indexer positioning operation



Point table method

| Point Table No. | Position data | Servo motor speed | Acceleration time constant | Deceleration time constant | Dead time | Auxiliary function |
|-----------------|---------------|-------------------|----------------------------|----------------------------|-----------|--------------------|
| 1 | 1000 | 2000 | 200 | 200 | 0 | 1 |
| 2 | 2000 | 1600 | 100 | 100 | 0 | 0 |
| ... | ... | ... | ... | ... | ... | ... |

Setting position data (target position), servo motor speed, and acceleration and deceleration time in the point table is as easy as setting parameters.

Program method
Positioning operation is performed according to the program that is created in advance. For this purpose 25 instructions are provided in the servo amplifier.

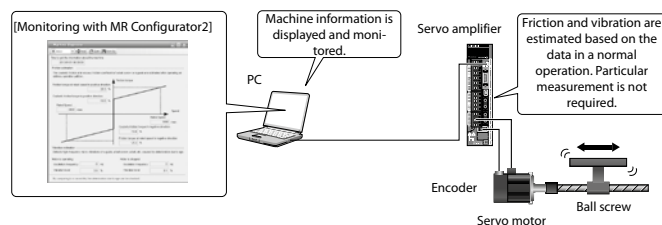
```

Program No.1
SPN (2000)
STC (20)
MOV (1000)
TMI (100)
FOR (3)
MOVH (100)
TMI (100)
NEXT
STOP
    
```

Indexer
Positioning to a set number of equally divided stations is possible.

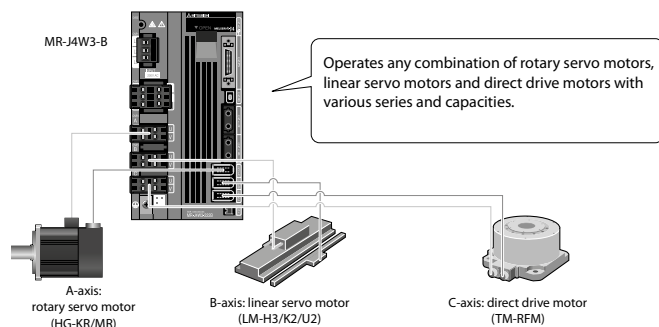
Machine Diagnosis Function

This function detects changes of machine parts (ball screw, guide, bearing, belt, etc.) by analyzing machine friction, load moment of inertia, unbalanced torque, and changes in vibration component from the data inside the servo amplifier, supporting timely maintenance of the driving parts.



2-axis/3-axis Types for Energy-conservative, Miniaturized, and Low-cost Machine

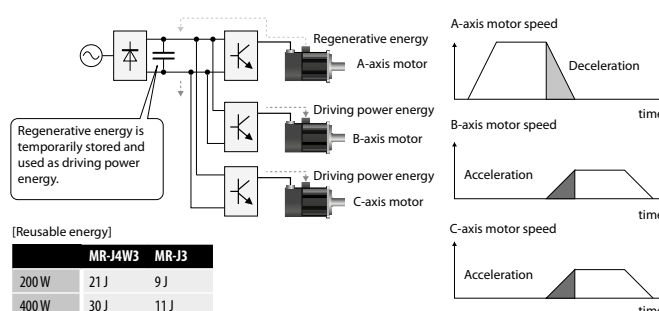
2-axis and 3-axis servo amplifiers are available for operating two and three servo motors, respectively. These servo amplifiers enable energy-conservative, compact machine at lower cost. Different types of servo motors including rotary servo motors, linear servo motors, and direct drive motors are freely combined as long as the servo motors are compatible with the servo amplifier.



Supporting Energy-conservative Machine Using Regenerative Energy

In the multi-axis servo amplifier, the regenerative energy of an axis is used as driving power energy for the other axes, contributing to energy-conservation of machine. Reusable regenerative energy stored in the capacitor is increased for MR-J4W2-B/MR-J4W3-B as compared to the prior model. Regenerative option is no longer required.

In the multi-axis servo amplifier, the amount of temporarily stored regenerative energy can be increased by using a capacitor bank. (Available in the future) Contact your local sales office for more details.



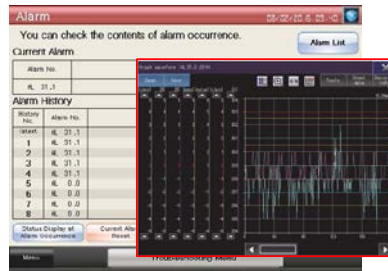
GOT Drive – Advanced drive control connectivity provides additional value to your system

The GOT2000 provides advanced functionality and improves connectivity with Mitsubishi Electric servo systems. It provides some functions of MR Configurator2. The new GOT Drive enhanced functionality is designed to eliminate

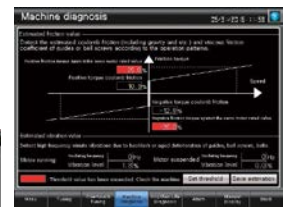
need for additional hardware, software and suits customers' applications to speed up system startup, improve maintenance and troubleshooting.

The following functions are supported by GOT using predefined screens

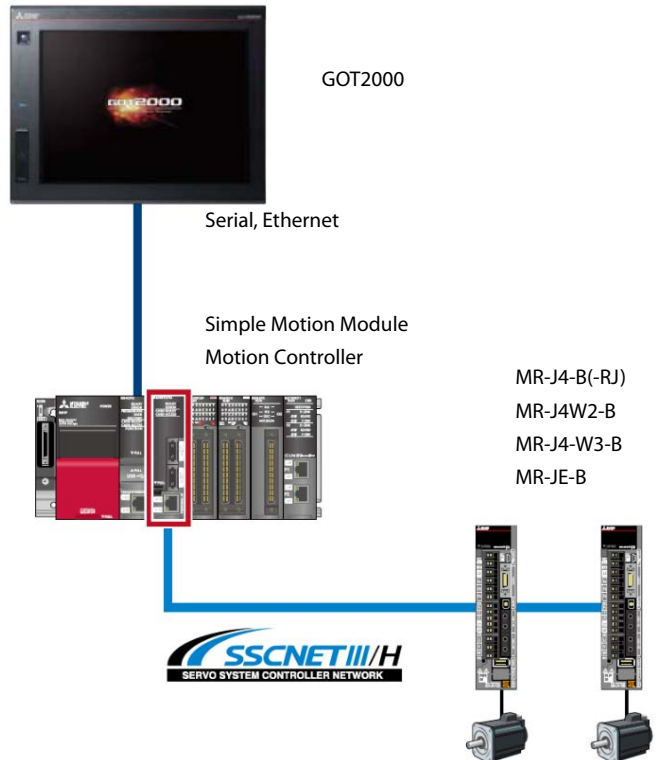
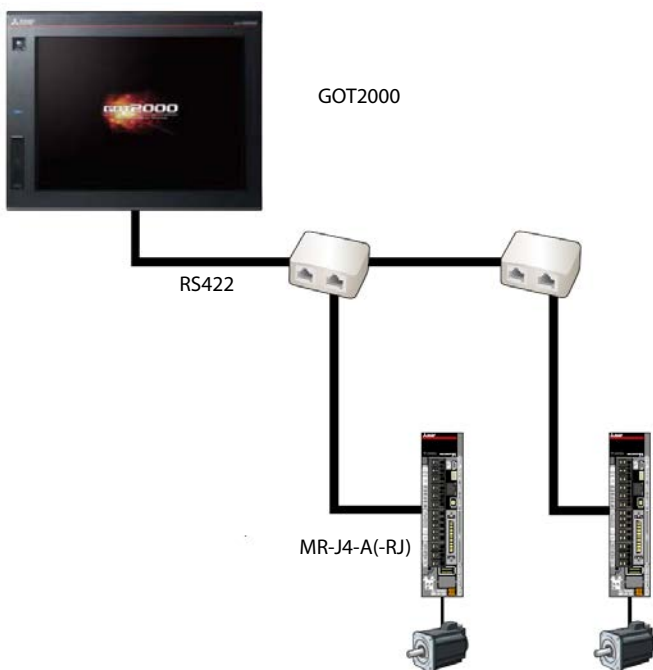
- Check servo amplifier alarm information on the GOT
- Retrieve servo amplifier data using GOT and analyze it on your computer
- Predict machine deterioration and improve system preventive maintenance without a need for personal computer
- Supports preventative maintenance functions of servo amplifiers
- Display power consumption and total power consumption on the GOT
- Check alarm documentation stored on the GOT
- Easily backup parameters and programs
- Support startup, adjustment of servo systems
- Display and set the values in the point table of a servo amplifier (MR-J4-A-RJ)



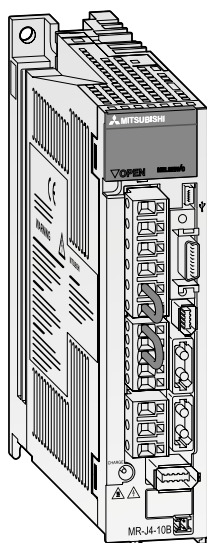
Display the graph waveform data that was collected at the occurrence of a servo alarm in a window screen.



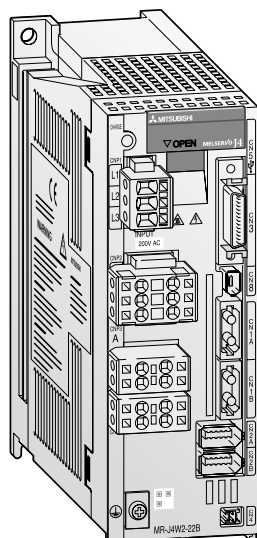
System Configuration



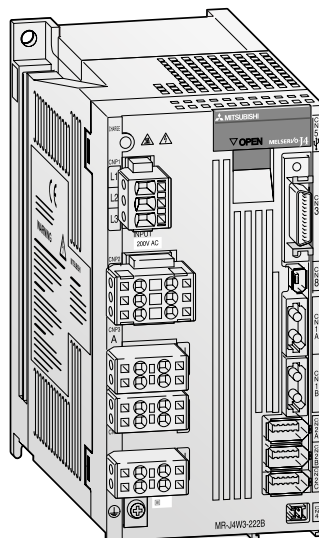
Servo Amplifiers Model Designation



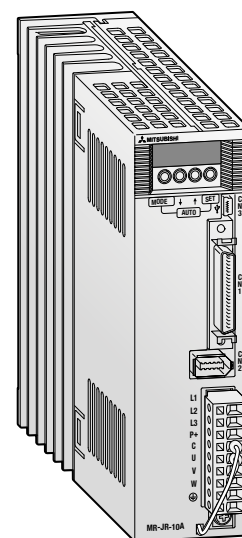
MR-J4-A/B/GF/TM



MR-J4W2-B



MR-J4W3-B



MR-JE-A/B

Servo amplifiers 200 V

MR-J4-□A/B/GF/TM -RJ

| Series | Code | Compatible servomotors | | | | | Code | Type | Code | Type | Code | Type | |
|--------|------|------------------------|--------|---------|--|---------|------|--|------|---------------------------|----------------------------|---|---------------------------|
| | | HG-MR□ | HG-KR□ | HG-SR□ | HG-JR□ | HG-RR□ | | | | | | | — |
| MR-J4 | 10 | 053/13 | 053/13 | — | — | — | A | Standard general-purpose Modbus-RTU compatible | — | 200–230 V AC power supply | — | Standard | |
| | 20 | 23 | 23 | — | — | — | B | SSCNETIII/H compatible | — | — | A-RJ ^② | Integrated positioning Extended safety functions via functional safety unit MR-D30 | |
| | 40 | 43 | 43 | — | — | — | GF | CC-Link IE Field compatible | — | — | B-RJ GF-RJ ^② | Extended safety functions via functional safety unit MR-D30 | |
| | 60 | — | — | 52 | 53 | — | TM | Open network interface | — | — | TM-ECT | Open network EtherCAT | |
| | 70 | 73 | 73 | — | 73 | — | — | — | — | — | TM-PNT | Open network PROFINET | |
| | 100 | — | — | 102 | 53 ^① /103 | — | — | — | — | — | — | TM-EIP | Open network EtherNet/IP™ |
| | 200 | — | — | 152/202 | 73 ^① /103 ^① / 153/203 | 103/153 | — | — | — | — | — | — | — |
| | 350 | — | — | 352 | 153 ^① /203 ^① / /353 | 203 | — | — | — | — | — | — | — |
| | 500 | — | — | 502 | 353 ^① /503 | 353/503 | — | — | — | — | — | — | — |
| | 700 | — | — | 702 | 503 ^① /703 | — | — | — | — | — | — | — | — |
| | 11K | — | — | — | 903/11K1M | — | — | — | — | — | — | — | — |
| | 15K | — | — | — | 15K1M | — | — | — | — | — | — | — | — |
| | 22K | — | — | — | 22K1M | — | — | — | — | — | — | — | — |

① This combination increases the maximum torque from 300% to 400% of the rated torque.
② Additional input for external encoder

Servo amplifiers 400 V

MR-J4-□A/B/GF/TM4-RJ

| Series | Code | Compatible servomotors | | Code | Type | Code | Type | Code | Type |
|--------|------|------------------------|--|------|--|------|---------------------------|----------------------------|---|
| | | HG-SR□ | HG-JR□ | | | | | | |
| MR-J4 | 60 | 524 | 534 | A | Standard general-purpose Modbus-RTU compatible | 4 | 380–480 V AC power supply | — | Standard |
| | 100 | 1024 | 534 ^① /734 ^① /1034 | B | SSCNETIII/H compatible | — | — | A-RJ ^② | Integrated positioning Extended safety functions via functional safety unit MR-D30 |
| | 200 | 1524/2024 | 734 ^① /1034 ^① /1534/2034 | GF | CC-Link IE Field compatible | — | — | B-RJ GF-RJ ^② | Extended safety functions via functional safety unit MR-D30 |
| | 350 | 3524 | 1534 ^① /2034 ^① /3534 | TM | Open network interface | — | — | TM-ECT | Open network EtherCAT |
| | 500 | 5024 | 3534 ^① /5034 | — | — | — | — | TM-PNT | Open network PROFINET |
| | 700 | 7024 | 5034 ^① /7034 | — | — | — | — | TM-EIP | Open network EtherNet/IP™ |
| | 11K | — | 9034/11K1M4 | — | — | — | — | — | — |
| | 15K | — | 15K1M4 | — | — | — | — | — | — |
| | 22K | — | 22K1M4 | — | — | — | — | — | — |

① This combination increases the maximum torque from 300% to 400% of the rated torque.
② Additional input for external encoder

All amplifiers conform to the following standards: CE, UL, cUL

MR-J4W2-□B

| | | | | | | | | | | | |
|---------------|-------------|--------------------|-------------------------------|---------------|---------------|---------------|---------------|-------------|------------------------|-------------|---------------------------|
| Series | Code | No. of axes | Compatible servomotors | | | | Code | Type | Code | Type | |
| MR-J4 | W2 | 2 axes | Code | HG-MR□ | HG-KR□ | HG-SR□ | HG-JR□ | B | SSCNETIII/H compatible | — | 200–230 V AC power supply |
| | | | 22 | 053/13/23 | 053/13/23 | — | — | | | | |
| | | | 44 | 053/13/23/43 | 053/13/23/43 | — | — | | | | |
| | | | 77 | 43/73 | 43/73 | 52 | 53/73 | | | | |
| | | | 1010 | 43/73 | 43/73 | 52/102 | 53/73/103 | | | | |

MR-J4W3-□B

| | | | | | | | | | | | |
|---------------|-------------|--------------------|-------------------------------|---------------|---------------|---------------|---------------|-------------|------------------------|-------------|---------------------------|
| Series | Code | No. of axes | Compatible servomotors | | | | Code | Type | Code | Type | |
| MR-J4 | W3 | 3 axes | Code | HG-MR□ | HG-KR□ | HG-SR□ | HG-JR□ | B | SSCNETIII/H compatible | — | 200–230 V AC power supply |
| | | | 222 | 053/13/23 | 053/13/23 | — | — | | | | |
| | | | 444 | 053/13/23/43 | 053/13/23/43 | — | — | | | | |

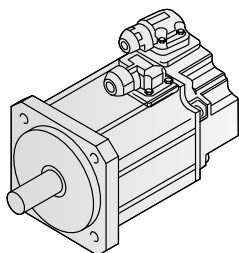
MR-JE-□A/B

| | | | | |
|---------------|-------------------------------|---------------|-------------|--|
| Series | Compatible servomotors | | Code | Type |
| MR-JE | HG-KN□ | HG-SN□ | | A |
| | 13 | — | | Standard general-purpose Modbus-RTU compatible |
| | 20 | — | | B |
| | 23 | — | | SSCNETIII/H compatible |
| | 40 | — | | |
| | 43 | — | | |
| | 70 | 52 | | |
| | 73 | 52 | | |
| | — | 102 | | |
| | — | 152/202 | | |
| | — | 302 | | |
| | 200 | — | | |
| | — | 152/202 | | |
| | 300 | — | | |
| | — | 302 | | |

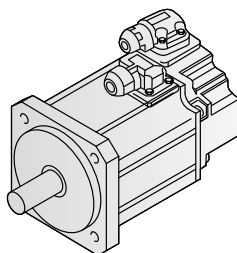
All amplifiers conform to the following standards: CE, UL, cUL

Servo Motors Model Designation

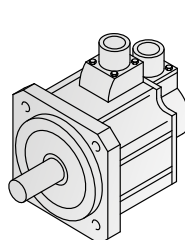
HG-MR series



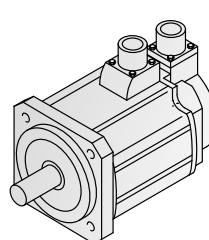
Serie HG-KR/HG-KN



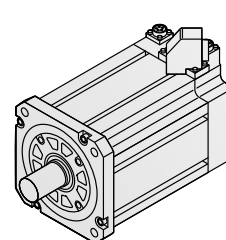
Serie HG-SR/HG-SN



HG-RR series



HG-JR series



Servo motors 200 V

HG-KR □ □ □ □

| Symbol | Motor series | Code | Rated output [W] | Code | Rated speed [rpm] | Code | Electromagnetic brake | Code | Type |
|--------|------------------------------------|------|------------------|------|-------------------|------|-----------------------|------|--|
| HG-KN | Low inertia, small capacity | 05 | 50 | 2 | 2000 | — | — | — | Standard motor |
| | | 1 | 100 | | | | | | |
| HG-SN | Medium inertia, medium capacity | 2 | 200 | 3 | 3000 | B | ● | WOC | Servo motors with functional safety encoder (only HG-KR/HG-JR) |
| | | 4 | 400 | | | | | | |
| HG-MR | Ultra-low inertia, small capacity | 5 | 500 | | | | | | |
| | | 7 | 750 | | | | | | |
| HG-KR | Low inertia, small capacity | 10 | 1000 | | | | | | |
| | | 15 | 1500 | | | | | | |
| HG-RR | Ultra-low inertia, medium capacity | 20 | 2000 | | | | | | |
| | | 35 | 3500 | | | | | | |
| HG-JR | Low inertia, medium capacity | 50 | 5000 | | | | | | |
| | | 70 | 7000 | | | | | | |
| HG-SR | Medium inertia, medium capacity | | | | | | | | |

All motors conform to the following standards:
CE, UL, cUL

Example: HG-MR 053 B = Ultra-low inertia type with small capacity; 50 W; 3000 rpm; 200 V; with electromagnetic brake

Servo motors 400 V

HG-SR □ □ 4 □ □

| Symbol | Motor series | Serie | Rated output [W] | Code | Rated speed [rpm] | Code | Typ | Code | Electromagnetic brake | Code | Type |
|--------|---------------------------------|-------|------------------|------|-------------------|------|-------|------|-----------------------|------|--|
| HG-JR | Low inertia, medium capacity | 5 | 500 | 1M | 1500 | 4 | 400 V | — | — | — | Standard motor |
| | | 10 | 1000 | | | | | | | | |
| HG-SR | Medium inertia, medium capacity | 15 | 1500 | 2 | 2000 | B | ● | WOC | | | Servo motors with functional safety encoder (only HG-KR/HG-JR) |
| | | 20 | 2000 | | | | | | | | |
| | | 35 | 3500 | | | | | | | | |
| | | 50 | 5000 | | | | | | | | |
| | | 70 | 7000 | | | | | | | | |
| | | 11k | 11000 | | | | | | | | |
| | | 15k | 15000 | | | | | | | | |
| | | 22k | 22000 | | | | | | | | |

Example: HG-SR 702 4B = Medium inertia type with medium capacity; 7000 W; 2000 rpm; 400 V; with electromagnetic brake

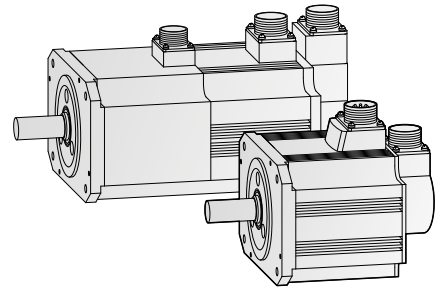
General note: The above tables show the motor model name break-down. Not all combinations are possible. Please refer to the motor specifications table on page 14

Servo Motor Features and Typical Applications

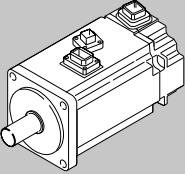
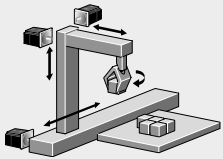
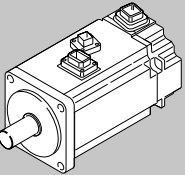
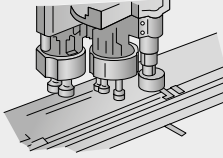
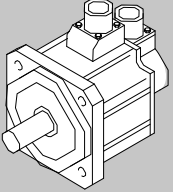
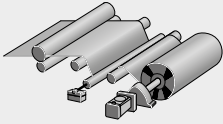
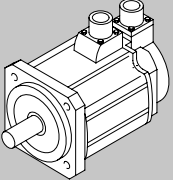
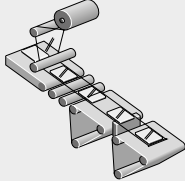
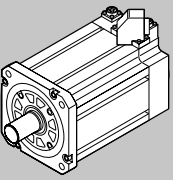
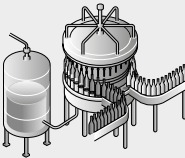
Absolute high-resolution encoder as standard equipment

Inclusion of an absolute position detection system eliminates the need for a homing sequence, approximate DOG and other sensors, helping to reduce time and enhance reliability. With these motors high performance and safety at low speed is ensured.

With Mitsubishi Electric original absolute mode, an absolute system can be configured using conventional I/O even with pulse-train control.

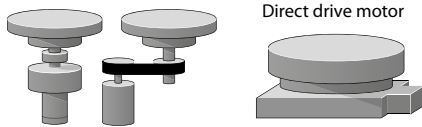
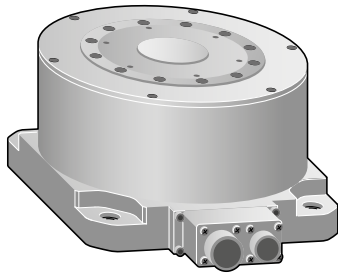


Overview

| Model designation | Features | Application example |
|--|--|---|
| K  | Low inertia Larger motor inertia moment makes this unit well suited for machines with fluctuating load inertia moment or machines with low rigidity such as conveyors. | <ul style="list-style-type: none"> ● Conveyors ● Food preparation machinery ● Printers ● Small loaders and unloaders ● Small robots and component assembly devices ● Small X-Y tables ● Small press feeders  <p>Handling systems</p> |
| M  | Ultra low inertia Small motor inertia moment makes this unit well suited for high-dynamic positioning operations with extra small cycle times. | <ul style="list-style-type: none"> ● Inserters, mounters, bonders ● Printed board hole openers ● In-circuit testers ● Label printers ● Knitting and embroidery machinery ● Ultra-small robots and robot tips  <p>Inserters, mounters, bonders</p> |
| S  | Medium inertia Stable control is performed from low to high speeds, enabling this unit to handle a wide range of applications (e.g. direct connection to ball screw components). | <ul style="list-style-type: none"> ● Conveyor machinery ● Specialised machinery ● Robots ● Loaders and unloaders ● Winders and tension devices ● Turrets ● X-Y tables ● Test devices  <p>Winders and tension devices</p> |
| R  | Low inertia A compact sized low-inertia moment model with medium capacity. Well suited for high-frequency operation. | <ul style="list-style-type: none"> ● Roll feeders ● Loaders and unloaders ● High-frequency conveyor machinery  |
| J  | Low Inertia (400 V) A 400 V Servo Motor for the MELSERVO-J4 Series for a power range up to 22 kW with low inertia and high speed. It has a compact size, is equipped with high resolution encoder and is compatible to global standards. | <ul style="list-style-type: none"> ● Food and Packaging ● Printing machine ● Pick up robot for Injection molding machine ● Palletizing machine ● General machine which require High speed and High frequency  <p>Wrapping machinery</p> |

Note: Other types of motors are available on request.

Achieving High-performance Machine



Conventional motor + transmission mechanism (gear, belt, etc.)

For higher machine performance

- Suitable for low-speed and high-torque operations.
- High-accuracy positioning is achieved because the motor is directly connected to the driving part.

For easier use

- Since transmission mechanism is no longer required, no backlash and no abrasion occurs, enabling smooth operation with less audible noise, clean system, and easy maintenance.
- Less components are required for the system.

For flexible machine configurations

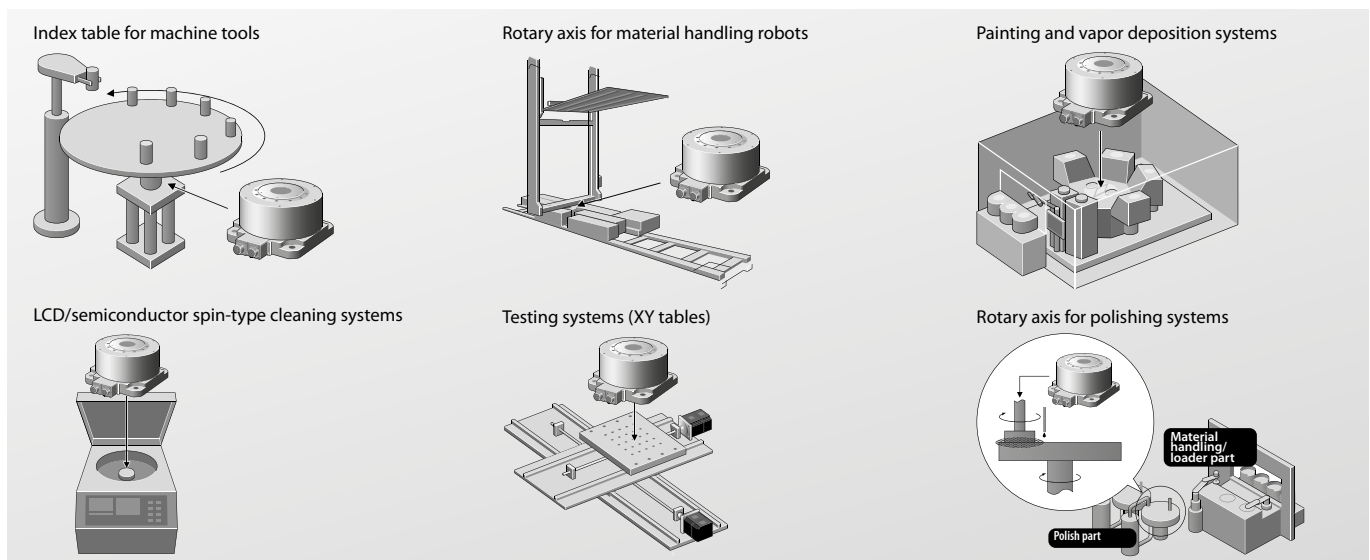
- Simple, compact, and rigid machine is achieved.
- Machine stability is enhanced due to the low-profile design and a low center of gravity.
- The motor has an inner rotor with hollow shaft that allows cables and pipes to pass through.

Product lines

| Motor series 200 V | Motor outer diameter [mm] | Rated speed [r/min] | Maximum rotation speed [r/min] | Rated torque [Nm] 1 | Peak running range [Nm] | Moment of inertia J [$\times 10^{-4}$ kg m ²] | Rated output capacity [kW] | Servo motor model | Servo motor type | | Amplifier pairing MR-J4A/B | | | | | | | | | | | | | | | | | | | | |
|-----------------------|---------------------------|---------------------|--------------------------------|---------------------|-------------------------|--|----------------------------|-------------------|------------------|----------------------|----------------------------|----|----|----|----|-----|-----|-----|-----|----------|----------|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | Voltage | Protective structure | 10 | 20 | 40 | 60 | 70 | 100 | 200 | 350 | 500 | MR-J4W2B | MR-J4W3B | | | | | | | | | | |
| TM TM-RFM | 130 | 200 | 500 | 2 | 6 | 10.9 | 0.042 | TM-RFM002C20 | 200 V AC | IP42 | | | | | | | | | | | | | | | | | | | | | |
| | | | | 4 | 12 | 16.6 | 0.084 | TM-RFM004C20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 6 | 18 | 22.4 | 0.126 | TM-RFM006C20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 6 | 18 | 74.0 | 0.126 | TM-RFM006E20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 12 | 36 | 111 | 0.251 | TM-RFM012E20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 18 | 54 | 149 | 0.377 | TM-RFM018E20 | | | | | | | | | | | | | | | | | | | | | | | |
| | 180 | 200 | 500 | 12 | 36 | 74.0 | 0.126 | TM-RFM012E20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 18 | 54 | 149 | 0.377 | TM-RFM018E20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 12 | 36 | 238 | 0.251 | TM-RFM012G20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 72 | 216 | 875 | 1.508 | TM-RFM072G20 | | | | | | | | | | | | | | | | | | | | | | | |
| | 230 | 200 | 500 | 48 | 144 | 615 | 1.005 | TM-RFM048G20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 72 | 216 | 875 | 1.508 | TM-RFM072G20 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 40 | 120 | 1694 | 0.419 | TM-RFM040J10 | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | 120 | 360 | 3519 | 1.257 | TM-RFM120J10 | | | | | | | | | | | | | | | | | | | | | | | |
| 330 | 100 | 200 | 120 | 360 | 3519 | 1.257 | TM-RFM120J10 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 240 | 720 | 6303 | 2.513 | TM-RFM240J10 | | | | | | | | | | | | | | | | | | | | | | | | |

① When unbalanced torque is generated, such as in a vertical lift machine, be sure to use the absolute position detection system. It is also recommended that the unbalanced torque be kept under 70 % of the servo motor rated torque. Please contact your Mitsubishi Electric sales representative if necessary.

Application examples



Servo Motor Specifications and Matching Amplifiers

The possible combinations of servo amplifiers and servo motors are listed in the table below.

Details of the braked version motors is given on page 28.

The detailed specifications of all servo motors are listed on the following pages.

Motors for MR-J4 (200 V) series servo amplifiers

| Motor series 200 V | Rated speed [r/min] | Maximum rotation speed [r/min] | Rated torque [Nm] | Peak running range [Nm] | Moment of inertia J [x10 ⁻⁴ kg m ²] | Rated output capacity [kW] | Servo motor model | Servo motor type | | Amplifier pairing MR-J4 | | | | | | | | | | | | | | | | | | | | |
|--------------------|---------------------|--------------------------------|--------------------------|--------------------------|--|----------------------------|-------------------|------------------|----------------------|-------------------------|----|----|----|----|-----|----------------|----------------|-----------------|----------------|-----|-----|-----|----------|--------|--|--------|--------|--------|--------|--------|
| | | | | | | | | Voltage | Protective structure | 10 | 20 | 40 | 60 | 70 | 100 | 200 | 350 | 500 | 700 | 11K | 15K | 22K | Art. no. | | | | | | | |
| HG-MR M | 3000 | 6000 | 0.16 | 0.48 | 0.0162 | 0.05 | HG-MR053 | 200 V AC | IP65 | ● | | | | | | | | | | | | | | 248661 | | | | | | |
| | | | 0.32 | 0.95 | 0.0300 | 0.10 | HG-MR13 | | | ● | | | | | | | | | | | | | | | | 248662 | | | | |
| | | | 0.64 | 1.9 | 0.0865 | 0.20 | HG-MR23 | | | | ● | | | | | | | | | | | | | | | | 248663 | | | |
| | | | 1.3 | 3.8 | 0.142 | 0.40 | HG-MR43 | | | | | ● | | | | | | | | | | | | | | | | 248664 | | |
| | | | 2.4 | 7.2 | 0.586 | 0.75 | HG-MR73 | | | | | | ● | | | | | | | | | | | | | | | | 248665 | |
| HG-KR K | 3000 | 6000 | 0.16 | 0.56 | 0.0450 | 0.05 | HG-KR053 | 200 V AC | IP65 | ● | | | | | | | | | | | | | | | | 248651 | | | | |
| | | | 0.32 | 1.1 | 0.0777 | 0.10 | HG-KR13 | | | ● | | | | | | | | | | | | | | | | | 248652 | | | |
| | | | 0.64 | 2.2 | 0.221 | 0.20 | HG-KR23 | | | | ● | | | | | | | | | | | | | | | | | 248653 | | |
| | | | 1.3 | 4.5 | 0.371 | 0.40 | HG-KR43 | | | | | ● | | | | | | | | | | | | | | | | 248654 | | |
| | | | 2.4 | 8.4 | 1.26 | 0.75 | HG-KR73 | | | | | | ● | | | | | | | | | | | | | | | | 248655 | |
| HG-SR S | 2000 | 3000 | 2.4 | 7.2 | 7.26 | 0.50 | HG-SR52 | 200 V AC | IP67 | | | | ● | | | | | | | | | | | | | | 248671 | | | |
| | | | 4.8 | 14.3 | 11.6 | 1.00 | HG-SR102 | | | | | | | ● | | | | | | | | | | | | | 248672 | | | |
| | | | 7.2 | 21.5 | 16.0 | 1.50 | HG-SR152 | | | | | | | | ● | | | | | | | | | | | | | 248673 | | |
| | | | 9.5 | 28.6 | 46.8 | 2.00 | HG-SR202 | | | | | | | | | ● | | | | | | | | | | | | | 248674 | |
| | | | 16.7 | 50.1 | 78.6 | 3.50 | HG-SR352 | | | | | | | | | | ● | | | | | | | | | | | | 248675 | |
| | | | 23.9 | 71.6 | 99.7 | 5.00 | HG-SR502 | | | | | | | | | | | ● | | | | | | | | | | | | 248676 |
| | | | 33.4 | 100 | 151 | 7.00 | HG-SR702 | | | | | | | | | | | | ● | | | | | | | | | | | 248677 |
| HG-JR J | 3000 | 6000 | 1.6 | 4.8 <6.4> ^① | 1.52 | 0.5 | HG-JR53 | 200 V AC | IP67 ^④ | | | | ● | | | ● ^② | | | | | | | | | | | | 261539 | | |
| | | | 2.4 | 7.2 <9.6> ^① | 2.09 | 0.75 | HG-JR73 | | | | | | | ● | | | ● ^② | | | | | | | | | | | | 261540 | |
| | | | 3.2 | 9.6 <12.7> ^① | 2.65 | 1.0 | HG-JR103 | | | | | | | | ● | | ● ^② | | | | | | | | | | | | 261541 | |
| | | | 4.8 | 14.3 <19.1> ^① | 3.79 | 1.5 | HG-JR153 | | | | | | | | | ● | ● ^② | | | | | | | | | | | | | 261542 |
| | | | 6.4 | 19.1 <25.5> ^① | 4.92 | 2.0 | HG-JR203 | | | | | | | | | | ● | ● ^② | | | | | | | | | | | | 261543 |
| | 1500 | 3000 | 10.5 <11.1> ^③ | 32.0 <44.6> ^① | 13.2 | 3.3 <3.5> ^③ | HG-JR353 | | | | | | | | | | ● | ● ^{②③} | | | | | | | | | | | 261544 | |
| | | | 15.9 | 47.7 <63.7> ^① | 19.0 | 5.0 | HG-JR503 | | | | | | | | | | | ● | ● ^② | | | | | | | | | | 261545 | |
| | | | 22.3 | 66.8 | 43.3 | 7.0 | HG-JR703 | | | | | | | | | | | | ● | | | | | | | | | | 261546 | |
| | | | 28.6 | 85.8 | 55.8 | 9.0 | HG-JR903 | | | | | | | | | | | | | | ● | | | | | | | | 261547 | |
| | | | 70.0 | 210 | 220 | 11 | HG-JR11K1M | | | | | | | | | | | | | | | ● | | | | | | | 261557 | |
| 2500 | 3000 | 95.5 | 286 | 315 | 15 | HG-JR15K1M | | | | | | | | | | | | | ● | | | | | | | 261558 | | | | |
| | | 140 | 420 | 489 | 22 | HG-JR22K1M | | | | | | | | | | | | | | ● | | | | | | 261559 | | | | |
| HG-RR R | 3000 | 4500 | 3.2 | 8.0 | 1.50 | 1.0 | HG-RR103 | 200 V AC | IP65 | | | | | | | ● | | | | | | | | | | | 262896 | | | |
| | | | 4.8 | 11.9 | 1.90 | 1.5 | HG-RR153 | | | | | | | | | ● | | | | | | | | | | | | 262897 | | |
| | | | 6.4 | 15.9 | 2.30 | 2.0 | HG-RR203 | | | | | | | | | | ● | | | | | | | | | | | 262898 | | |
| | | | 11.1 | 27.9 | 8.30 | 3.5 | HG-RR353 | | | | | | | | | | | ● | | | | | | | | | | 262899 | | |
| | | | 15.9 | 39.8 | 12.0 | 5.0 | HG-RR503 | | | | | | | | | | | | ● | | | | | | | | | | 262900 | |

- ① The value in angle brackets is applicable when the maximum torque is increased. The maximum torque will be increased by changing the servo amplifier to be combined (see ②).
- ② This combination of the HG-JR servo motor and the servo amplifier increases the maximum torque from 300 % to 400 % of the rated torque.
- ③ The value in angle brackets is applicable when the servo motor is used with MR-J4-500B or MR-J4-500A.
- ④ 22 kW of HG-JR series is rated IP44

Motors for MR-J4 (400 V) series servo amplifiers

| Motor series 400 V | Rated speed [r/min] | Maximum rotation speed [r/min] | Rated torque [Nm] | Peak running range [Nm] | Moment of inertia J [$\times 10^{-4}$ kg m ²] | Rated output capacity [kW] | Servo motor model | Servo motor type | | Amplifier pairing MR-J4 | | | | | | | | | | | | |
|--------------------|---------------------|--------------------------------|--------------------------|--------------------------|--|----------------------------|-------------------|------------------|----------------------|-------------------------|----------------|----------------|----------------|-----------------|----------------|-----|-----|-----|----------|--------|--------|--------|
| | | | | | | | | Voltage | Protective structure | 60 | 100 | 200 | 350 | 500 | 700 | 11K | 15K | 22K | Art. no. | | | |
| HG-SR S | 2000 | 3000 | 2.4 | 7.2 | 7.26 | 0.5 | HG-SR524 | 400 V AC | IP67 | ● | | | | | | | | | 261431 | | | |
| | | | 4.8 | 14.3 | 11.6 | 1.0 | HG-SR1024 | | | | ● | | | | | | | | 261432 | | | |
| | | | 7.2 | 21.5 | 16.0 | 1.5 | HG-SR1524 | | | | | ● | | | | | | | | 261433 | | |
| | | | 9.5 | 28.6 | 46.8 | 2.0 | HG-SR2024 | | | | | | ● | | | | | | | | 261434 | |
| | | | 16.7 | 50.1 | 78.6 | 3.5 | HG-SR3524 | | | | | | | ● | | | | | | | 261435 | |
| | | | 23.9 | 71.6 | 99.7 | 5.0 | HG-SR5024 | | | | | | | | ● | | | | | | | 261436 |
| | | | 33.4 | 100 | 151 | 7.0 | HG-SR7024 | | | | | | | | | ● | | | | | | 261437 |
| HG-JR J | 3000 | 6000 | 1.6 | 4.8 <6.4> ^① | 1.52 | 0.5 | HG-JR534 | 400 V AC | IP67 ^④ | ● | ● ^② | | | | | | | | 261445 | | | |
| | | | 2.4 | 7.2 <9.6> ^① | 2.09 | 0.75 | HG-JR734 | | | | ● | ● ^② | | | | | | | | 261446 | | |
| | | | 3.2 | 9.6 <12.7> ^① | 2.65 | 1.0 | HG-JR1034 | | | | ● | ● ^② | | | | | | | | 261447 | | |
| | | | 4.8 | 14.3 <19.1> ^① | 3.79 | 1.5 | HG-JR1534 | | | | | ● | ● ^② | | | | | | | | 261448 | |
| | | | 6.4 | 19.1 <25.5> ^① | 4.92 | 2.0 | HG-JR2034 | | | | | ● | ● ^② | | | | | | | | 261449 | |
| | | | 10.5 <11.1> ^③ | 32.0 <44.6> ^① | 13.2 | 3.3 <3.5> ^③ | HG-JR3534 | | | | | | ● | ● ^{②③} | | | | | | | 261450 | |
| | | | 15.9 | 47.7 <63.7> ^① | 19.0 | 5.0 | HG-JR5034 | | | | | | | ● | ● ^② | | | | | | 261451 | |
| | | 5000 | 22.3 | 66.8 | 43.3 | 7.0 | HG-JR7034 | | | | | | | | ● | | | | | | 261452 | |
| | | | 28.6 | 85.8 | 55.8 | 9.0 | HG-JR9034 | | | | | | | | | ● | | | | | 261453 | |
| | | | 70.0 | 210 | 220 | 11 | HG-JR11K1M4 | | | | | | | | | | ● | | | | 261384 | |
| | | 1500 | 3000 | 95.5 | 286 | 315 | 15 | | | HG-JR15K1M4 | | | | | | | | ● | | | 261535 | |
| | | | | 2500 | 140 | 420 | 489 | | | 22 | HG-JR22K1M4 | | | | | | | | | ● | 261536 | |

- ① The value in angle brackets is applicable when the maximum torque is increased. The maximum torque will be increased by changing the servo amplifier to be combined (see ②).
- ② This combination of the HG-JR servo motor and the servo amplifier increases the maximum torque from 300% to 400% of the rated torque.
- ③ The value in angle brackets is applicable when the servo motor is used with MR-J4-500B or MR-J4-500A.
- ④ 22 kW of HG-JR series is rated IP44

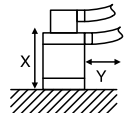
Motors for MR-JE-A/B series servo amplifiers

| Motor series 200 V | Rated speed [r/min] | Maximum rotation speed [r/min] | Rated torque [Nm] | Peak running range [Nm] | Moment of inertia J [$\times 10^{-4}$ kg m ²] | Rated output capacity [kW] | Servo motor model | Servo motor type | | Amplifier pairing MR-JE | | | | | | Art. no. | | | |
|--------------------|---------------------|--------------------------------|-------------------|-------------------------|--|----------------------------|-------------------|------------------|----------------------|-------------------------|----|----|----|-----|-----|----------|-----|--------|--------|
| | | | | | | | | Voltage | Protective structure | 10 | 20 | 40 | 70 | 100 | 200 | | 300 | | |
| HG-KN K | 3000 | 4500 | 0.32 | 0.95 | 0.088 | 0.1 | HG-KN13 | 200 V AC | IP65 | ● | | | | | | | | 282631 | |
| | | | 0.64 | 1.9 | 0.24 | 0.2 | HG-KN23K | | | | ● | | | | | | | 282633 | |
| | | | 1.3 | 3.8 | 0.42 | 0.4 | HG-KN43K | | | | | ● | | | | | | 282635 | |
| | | | 2.4 | 7.2 | 1.43 | 0.75 | HG-KN73JK | | | | | | ● | | | | | | 268237 |
| | | | 2.39 | 7.16 | 6.1 | 0.5 | HG-SN52JK | | | | | | | ● | | | | | 282639 |
| HG-SN S | 2000 | 3000 | 4.77 | 14.3 | 11.9 | 1.0 | HG-SN102JK | 200 V AC | IP67 | | | | | ● | | | | 282641 | |
| | | | 7.16 | 21.5 | 17.8 | 1.5 | HG-SN152JK | | | | | | | | ● | | | 282643 | |
| | | | 9.55 | 28.6 | 38.3 | 2.0 | HG-SN202JK | | | | | | | | | ● | | 282645 | |
| | | | 14.3 | 42.9 | 58.5 | 3.0 | HG-SN302JK | | | | | | | | | | ● | 282647 | |

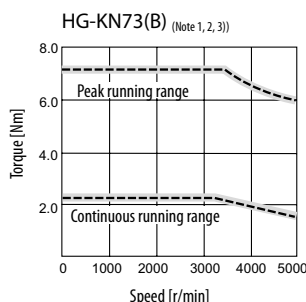
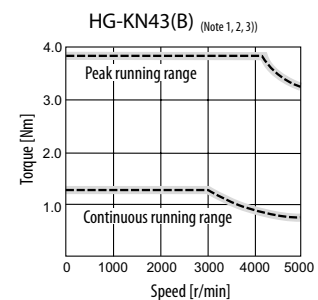
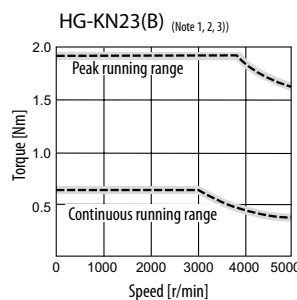
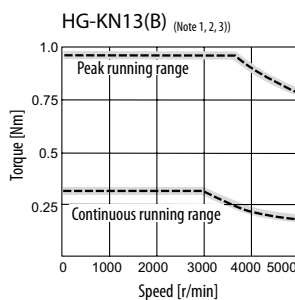
HG-KN(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | HG-KN13(B) ⑥ | HG-KN23(B)JK ⑥ | HG-KN43(B)JK ⑥ | HG-KN73(B)JK ⑥ | |
|--|--|--|----------------|----------------|--------|
| Servo amplifier model | MR-JE-10A/B | MR-JE-20A/B | MR-JE-40A/B | MR-JE-70A/B | |
| Power facility capacity ① | [kVA] 0.3 | 0.5 | 0.9 | 1.3 | |
| Continuous characteristics | rated output [kW] | 0.1 | 0.2 | 0.4 | |
| | rated torque [Nm] | 0.32 | 0.64 | 1.3 | |
| Maximum torque | [Nm] 0.95 | 1.9 | 3.8 | 7.2 | |
| Rated rotation speed | [rpm] 3000 | 3000 | 3000 | 3000 | |
| Maximum rotation speed | [rpm] 5000 | 5000 | 5000 | 5000 | |
| Permissible instantaneous rotation speed | [rpm] 5750 | 5750 | 5750 | 5750 | |
| Power rate at continuous rated torque | [kW/s] 12.9 | 18.0 | 43.2 | 44.5 | |
| Rated current | [A] 0.8 | 1.3 | 2.6 | 4.8 | |
| Maximum current | [A] 2.4 | 3.9 | 7.8 | 14 | |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] | standard | 0.0783 | 0.225 | 0.375 | |
| | with electromagnetic brake | 0.0843 | 0.247 | 0.397 | 1.39 |
| Regeneration braking frequency ②③ | [1/min] ④ | ④ | 276 | 159 | |
| Recommended load/motor inertia ratio | Less than 15 times the servo motor's inertia moment ⑤ | | | | |
| Speed/position detector | Incremental encoder (resolution servo motor rotation: 131072 p/rev.) | | | | |
| Structure | Self-cooling (protection rating: IP65) ⑦ | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: –15–70 °C (no freezing) | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | |
| | elevation/vibration ⑧ | 1000 m or less above sea level: 49 m/s ² , Y: 49 m/s ² | | | |
| Weight [kg] | standard motor ⑥ | 0.6 | 0.98 | 1.5 | 3.1 |
| Order information | (without brake) | Art. no. 282631 | 282633 | 282635 | 282637 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- ③ The regenerative braking frequency of the 600 W or smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
- ④ There are no limits on regeneration frequency as long as the effective torque is within the rated torque range. However, the load/motor of inertia moment ratio must be more than 15 times.
- ⑤ Contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.
- ⑦ The shaft-through portion and connector for cable terminal are excluded.
- ⑧ The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when the motor stops, so maintain vibration of approximately one-half of the allowable value.



HG-KN Series Servo Motor Torque Characteristics

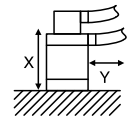


- Notes:
 1. ——— For 3-phase 200 V AC.
 2. - - - - For 1-phase 230 V AC.
 3. Torque drops when the power supply voltage is below the specified value

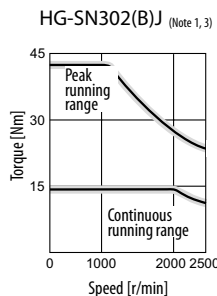
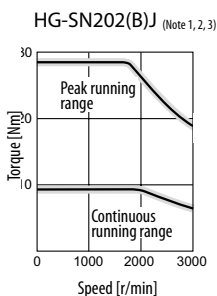
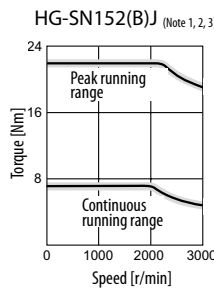
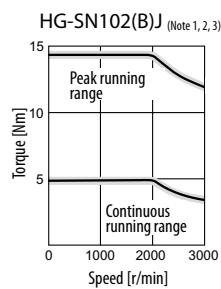
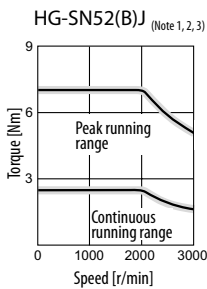
■ HG-SN(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | HG-SN52(B)JK ^⑥ | HG-SN102(B)JK ^⑥ | HG-SN152(B)JK ^⑥ | HG-SN202(B)JK ^⑥ | HG-SN302(B)JK ^⑥ |
|---|--|--|----------------------------|--|----------------------------|
| Servo amplifier model | MR-JE-70A/B | MR-JE-100A/B | MR-JE-200A/B | MR-JE-200A/B | MR-JE-300A/B |
| Power facility capacity ^① | [kVA] 1.0 | 1.7 | 2.5 | 3.5 | 4.8 |
| Continuous rated output | [kW] 0.5 | 1.0 | 1.5 | 2.0 | 3.0 |
| Characteristics rated torque | [Nm] 2.39 | 4.77 | 7.16 | 9.55 | 14.3 |
| Maximum torque | [Nm] 7.16 | 14.3 | 21.5 | 28.6 | 42.9 |
| Rated rotation speed | [rpm] 2000 | 2000 | 2000 | 2000 | 2000 |
| Maximum rotation speed | [rpm] 3000 | 3000 | 3000 | 3000 | 2500 |
| Permissible instantaneous rotation speed | [rpm] 3450 | 3450 | 3450 | 3450 | 2875 |
| Power rate at continuous rated torque | [kW/s] 7.85 | 19.7 | 32.1 | 19.5 | 26.1 |
| Rated current | [A] 2.9 | 5.6 | 9.4 | 9.6 | 11 |
| Maximum current | [A] 9.0 | 17 | 29 | 31 | 33 |
| Moment of inertia standard | 7.26 | 11.6 | 16.0 | 46.8 | 78.6 |
| J [$\times 10^{-4}$ kg m ²] with electromagnetic brake | 9.48 | 13.8 | 18.2 | 56.5 | 88.2 |
| Regeneration braking frequency ^{② ③} | [1/min] 62 | 38 | 139 | 47 | 28 |
| Recommended load/motor inertia ratio | Less than 15 times the servo motor's inertia moment ^④ | | | | |
| Speed/position detector | Incremental encoder (resolution servo motor rotation: 131072 p/rev.) | | | | |
| Structure | Self-cooling (protection rating: IP67) ^⑤ | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: -15–70 °C (no freezing) | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | |
| | elevation/vibration ^⑦ | 1000 m or less above sea level: X: 24.5 m/s ² , Y: 24.5 m/s ² | | 1000 m or less above sea level: X: 24.5 m/s ² , Y: 49 m/s ² | |
| Weight [kg] standard motor ^⑥ | 4.8 | 6.5 | 8.3 | 12 | 15 |
| Order information | (without brake) Art. no. 282639 | 282641 | 282643 | 282645 | 282647 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- ③ The regenerative braking frequency of the 600 W or smaller servo amplifier may fluctuate due to the affect of the power voltage since the energy charged by the electrolytic capacitor in the servo amplifier is large.
- ④ Contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table.
- ⑤ The shaft-through portion is excluded.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.
- ⑦ The vibration direction is shown in the right-side diagram. The numeric value indicates the maximum value of the component (commonly the bracket in the opposite direction of the motor shaft). Fretting of the bearing occurs easily when the motor stops, so maintain vibration at approximately one-half of the allowable value.



HG-SN Series Servo Motor Torque Characteristics

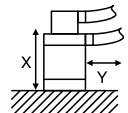


- Notes:
- 1. —: For 3-phase 200 V AC.
 - 2. - - -: For 1-phase 230 V AC.
 - 3. Torque drops when the power supply voltage is below the specified value.

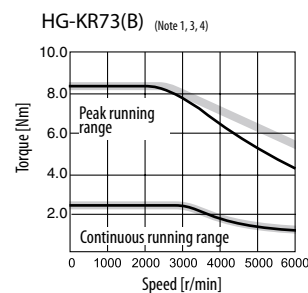
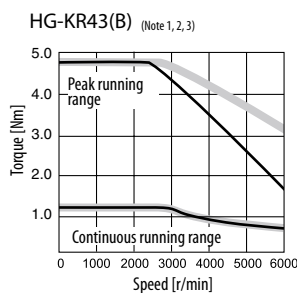
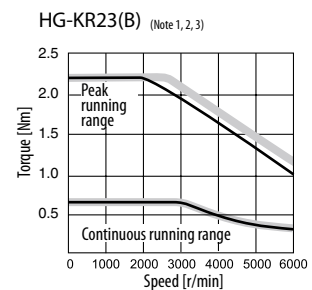
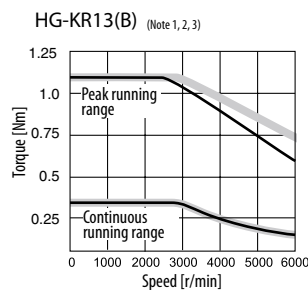
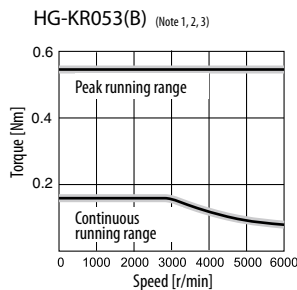
HG-KR(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | HG-KR053(B) ⑥ | HG-KR13(B) ⑥ | HG-KR23(B) ⑥ | HG-KR43(B) ⑥ | HG-KR73(B) ⑥ | |
|--|----------------------------|--|--------------|---|---|---|
| Servo amplifier model | MR-J4-□A/B/GF/TM | 10 | 10 | 20 | 40 | 70 |
| Power facility capacity ① | [kVA] | 0.3 | 0.3 | 0.5 | 0.9 | 1.3 |
| Continuous characteristics | rated output [kW] | 0.05 | 0.1 | 0.2 | 0.4 | 0.75 |
| | rated torque [Nm] | 0.16 | 0.32 | 0.64 | 1.3 | 2.4 |
| Maximum torque | [Nm] | 0.56 | 1.1 | 2.2 | 4.5 | 8.4 |
| Rated rotation speed | [rpm] | 3000 | 3000 | 3000 | 3000 | 3000 |
| Maximum rotation speed | [rpm] | 6000 | 6000 | 6000 | 6000 | 6000 |
| Permissible instantaneous rotation speed | [rpm] | 6900 | 6900 | 6900 | 6900 | 6900 |
| Power rate at continuous rated torque | [kW/s] | 5.63 | 13.0 | 18.3 | 43.7 | 45.2 |
| Rated current | [A] | 0.9 | 0.8 | 1.3 | 2.6 | 4.8 |
| Maximum current | [A] | 3.2 | 2.5 | 4.6 | 9.1 | 17.0 |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] ② | standard | 0.0450 | 0.0777 | 0.221 | 0.371 | 1.26 |
| | with electromagnetic brake | 0.0472 | 0.0837 | 0.243 | 0.393 | 1.37 |
| Regeneration braking frequency | [1/min] | 2 (a) | 2 (b) | 453 | 268 | 393 |
| Recommended load/motor inertia ratio ③ | | Less than 17 times the servo motor's inertia moment | | Less than 26 times the servo motor's inertia moment | Less than 25 times the servo motor's inertia moment | Less than 17 times the servo motor's inertia moment |
| Speed/position detector | | 22-bit encoder (resolution per encoder/servo motor rotation: 4194304 p/rev.) | | | | |
| Structure | | Self-cooling (protection rating: IP65) ④ | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: -15–70 °C (no freezing) | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | |
| | elevation/vibration ⑤ | 1000 m or less above sea level; X: 49 m/s ² , Y: 49 m/s ² | | | | |
| Weight [kg] | standard motor ⑥ | 0.34 | 0.54 | 0.91 | 1.4 | 2.8 |
| Order information | Art. no. | (without brake) 248651 | 248652 | 248653 | 248654 | 248655 |
| | WOC | 289372 | 289373 | 289374 | 289385 | 289386 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software. (a)/(b) When a 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 a motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is (a) 26-fold (b) 15-fold or less and the effective torque is within the rated torque range.
- ③ Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table
- ④ The shaft-through portion is excluded.
- ⑤ The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiload side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.



HG-KR Series Servo Motor Torque Characteristics

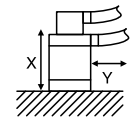


- Notes:
- 1. —: For 3-phase 200 V AC or 1-phase 230 V AC.
 - 2. —: For 1-phase 200 V AC.
 - 3. This line is drawn only where differs from the other two lines.
 - 4. Torque drops when the power supply voltage is below the specified value

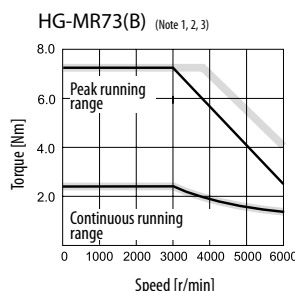
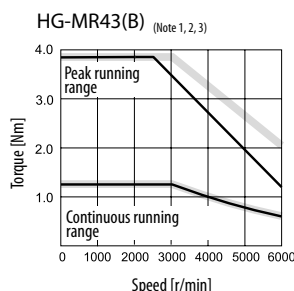
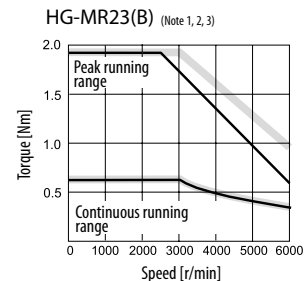
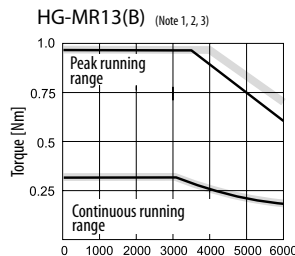
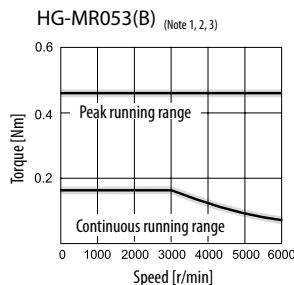
■ HG-MR(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | | HG-MR053(B) ⑥ | HG-MR13(B) ⑥ | HG-MR23(B) ⑥ | HG-MR43(B) ⑥ | HG-MR73(B) ⑥ |
|--|----------------------------|--|--------------|--|--------------|--------------|
| Servo amplifier model | MR-J4-□□A/B/GF/TM | 10 | 10 | 20 | 40 | 70 |
| Power facility capacity ① | [kVA] | 0.3 | 0.3 | 0.5 | 0.9 | 1.3 |
| Continuous characteristics | rated output [kW] | 0.05 | 0.1 | 0.2 | 0.4 | 0.75 |
| | rated torque [Nm] | 0.16 | 0.32 | 0.64 | 1.3 | 2.4 |
| Maximum torque | [Nm] | 0.48 | 0.95 | 1.9 | 3.8 | 7.2 |
| Rated rotation speed | [rpm] | 3000 | 3000 | 3000 | 3000 | 3000 |
| Maximum rotation speed | [rpm] | 6000 | 6000 | 6000 | 6000 | 6000 |
| Permissible instantaneous rotation speed | [rpm] | 6900 | 6900 | 6900 | 6900 | 6900 |
| Power rate at continuous rated torque | [kW/s] | 15.6 | 33.8 | 46.9 | 114.2 | 97.3 |
| Rated current | [A] | 1.0 | 0.9 | 1.5 | 2.6 | 5.8 |
| Maximum current | [A] | 3.1 | 2.5 | 5.3 | 9.0 | 20 |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] ② | standard | 0.0162 | 0.0300 | 0.0865 | 0.142 | 0.586 |
| | with electromagnetic brake | 0.0224 | 0.0362 | 0.109 | 0.164 | 0.694 |
| Regeneration braking frequency [1/min] | | ③ (a) | ③ (b) | 1570 | 920 | 420 |
| Recommended load/motor inertia ratio | | Less than 35 times the servo motors inertia moment ③ | | Less than 32 times the servo motors inertia moment ③ | | |
| Speed/position detector | | 22-bit encoder (resolution per encoder/servo motor rotation: 4194304 p/rev.) | | | | |
| Structure | | Self-cooling (protection rating: IP65) ④ | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: -15–70 °C (no freezing) | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | |
| | elevation/vibration ⑤ | 1000 m or less above sea level; X: 49 m/s ² , Y: 49 m/s ² | | | | |
| Weight [kg] | standard motor ⑥ | 0.34 | 0.54 | 0.91 | 1.4 | 2.8 |
| Order information | (without brake) Art. no. | 248661 | 248662 | 248663 | 248664 | 248665 |

- The power facility capacity varies depending on the power supply's impedance.
- The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
(a)/(b) When a 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 a motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load inertia moment is (a) 26-fold (b) 15-fold or less and the effective torque is within the rated torque range.
- Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table
- The shaft-through portion is excluded.
- The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiloading side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- For servo motors with electromagnetic brake please refer to page 28.



HG-MR Series Servo Motor Torque Characteristics

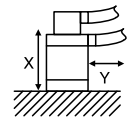


- Notes:
- : For 3-phase 200 V AC or 1-phase 230 V AC.
 - : For 1-phase 200 V AC.
 - This line is drawn only where it differs from the other two lines.
Torque drops when the power supply voltage is below the specified value

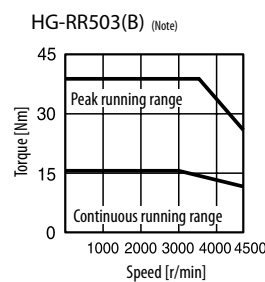
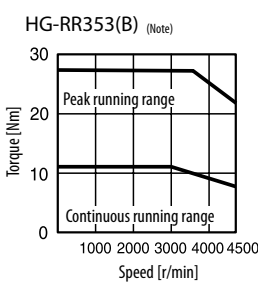
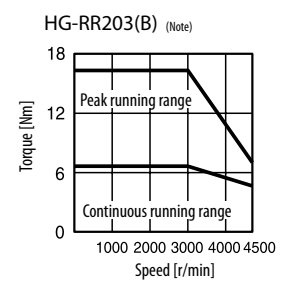
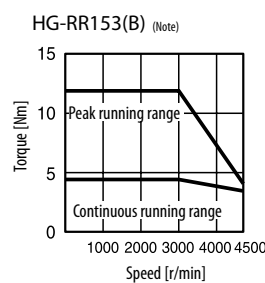
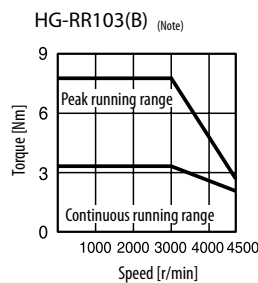
HG-RR(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | | HG-RR103(B) ⑥ | HG-RR153(B) ⑥ | HG-RR203(B) ⑥ | HG-RR353(B) ⑥ | HG-RR503(B) ⑥ |
|--|-------------------------|--|---------------|---------------|---------------|---------------|
| Servo amplifier model | MR-J4-□A/B/GF/TM | 200 | 200 | 350 | 500 | 500 |
| Power facility capacity ① | [kVA] | 1.7 | 2.5 | 3.5 | 5.5 | 7.5 |
| Continuous characteristics | rated output [kW] | 1.0 | 1.5 | 2.0 | 3.5 | 5.0 |
| | rated torque [Nm] | 3.2 | 4.8 | 6.4 | 11.1 | 15.9 |
| Maximum torque | [Nm] | 8.0 | 11.9 | 15.9 | 27.9 | 39.8 |
| Rated rotation speed | [rpm] | 3000 | 3000 | 3000 | 3000 | 3000 |
| Maximum rotation speed | [rpm] | 4500 | 4500 | 4500 | 4500 | 4500 |
| Permissible instantaneous rotation speed | [rpm] | 5175 | 5175 | 5175 | 5175 | 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 |
| Regeneration braking frequency ② | [1/min] | 1090 | 860 | 710 | 174 | 125 |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] ② | | 1.5 | 1.9 | 2.3 | 8.3 | 12 |
| Recommended load/motor inertia ratio | | Less than 5 times the servo motors inertia moment ③ | | | | |
| Speed/position detector | | Resolution per encoder/servo motor rotation: 4194304 p/rev (22-bit) | | | | |
| Structure | | Self-cooling (protection rating: IP65) ④ | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: -15–70 °C (no freezing) | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | |
| | elevation/vibration ⑤ ⑥ | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² | | | | |
| Weight [kg] | standard motor ⑥ | 3.9 | 5.0 | 6.2 | 12 | 17 |
| Order information | (without brake) Art.no. | 262896 | 262897 | 262898 | 262899 | 262900 |

- The power facility capacity varies depending on the power supply's impedance.
- The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table.
- The shaft-through portion is excluded.
- The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiloading side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- For servo motors with electromagnetic brake please refer to page 28.



HG-RR Series Servo Motor Torque Characteristics

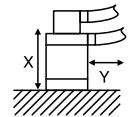


Note: — : For 3-phase 200 V AC.

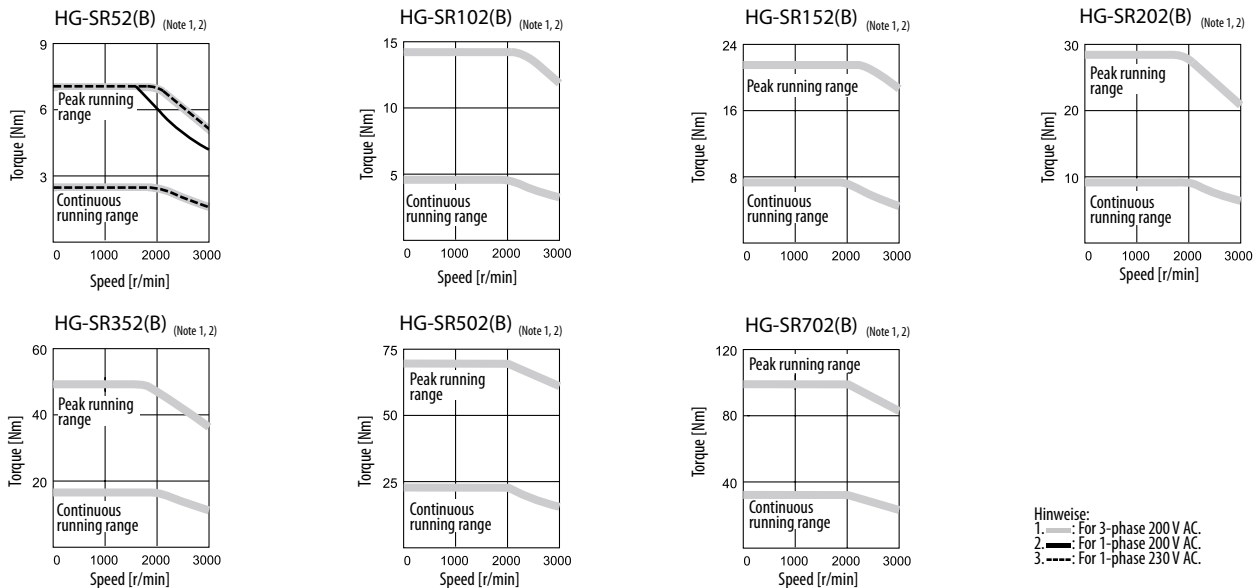
■ HG-SR(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | HG-SR52(B) ① | HG-SR102(B) ① | HG-SR152(B) ① | HG-SR202(B) ① | HG-SR352(B) ① | HG-SR502(B) ① | HG-SR702(B) ① | |
|--|----------------------------|--|--|---|---------------|---|---------------|--------|
| Servo amplifier model | MR-J4-□A/B/GF/TM | 60 | 100 | 200 | 200 | 350 | 500 | 700 |
| Power facility capacity ① | [kVA] | 1.0 | 1.7 | 2.5 | 3.5 | 5.5 | 7.5 | 10 |
| Continuous characteristics | rated output [kW] | 0.5 | 1.0 | 1.5 | 2.0 | 3.5 | 5.0 | 7.0 |
| | rated torque [Nm] | 2.4 | 4.8 | 7.2 | 9.5 | 16.7 | 23.9 | 33.4 |
| Maximum torque | [Nm] | 7.2 | 14.3 | 21.5 | 28.6 | 50.1 | 71.6 | 100 |
| Rated rotation speed | [rpm] | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| Maximum rotation speed | [rpm] | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| Permissible instantaneous rotation speed | [rpm] | 3450 | 3450 | 3450 | 3450 | 3450 | 3450 | 3450 |
| Power rate at continuous rated torque | [kW/s] | 7.85 | 10.7 | 32.1 | 19.5 | 35.5 | 57.2 | 74.0 |
| Rated current | [A] | 2.9 | 5.6 | 9.4 | 9.6 | 14 | 22 | 26 |
| Maximum current | [A] | 9.0 | 17 | 29 | 31 | 45 | 70 | 83 |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] ② | standard | 7.26 | 11.6 | 16 | 46.8 | 78.6 | 99.7 | 151 |
| | with electromagnetic brake | 9.48 | 13.8 | 18.2 | 56.5 | 88.2 | 109 | 161 |
| Regeneration braking frequency | [1/min] | 31 | 38 | 139 | 47 | 28 | 29 | 25 |
| Recommended load/ motor inertia ratio | | Less than 15 times the servo motors inertia moment ③ | Less than 17 times the servo motors inertia moment ③ | Less than 15 times the servo motors inertia moment ③ | | | | |
| Speed/position detector | | 22-bit encoder (resolution per encoder/servo motor rotation: 4194304 p/rev.) | | | | | | |
| Structure | | Self-cooling (protection rating: IP67) ④ | | | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: –15–70 °C (no freezing) | | | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | | | |
| | elevation/vibration ⑤ | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 49 m/s ² | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 29.4 m/s ² | | |
| Weight [kg] | standard motor ⑥ | 4.8 | 6.2 | 7.3 | 11 | 16 | 20 | 27 |
| Order information | Art. no. (without brake) | 248671 | 248672 | 248673 | 248674 | 248675 | 248676 | 248677 |
| | WOC ⑦ | 289376 | 289377 | 289378 | 289379 | 289380 | 289381 | 289382 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- ③ Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table
- ④ The shaft-through portion is excluded.
- ⑤ The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiloading side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.
- ⑦ The item has longer delivery time. Please contact your Mitsubishi Electric representative.



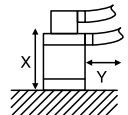
HG-SR Series Servo Motor Torque Characteristics



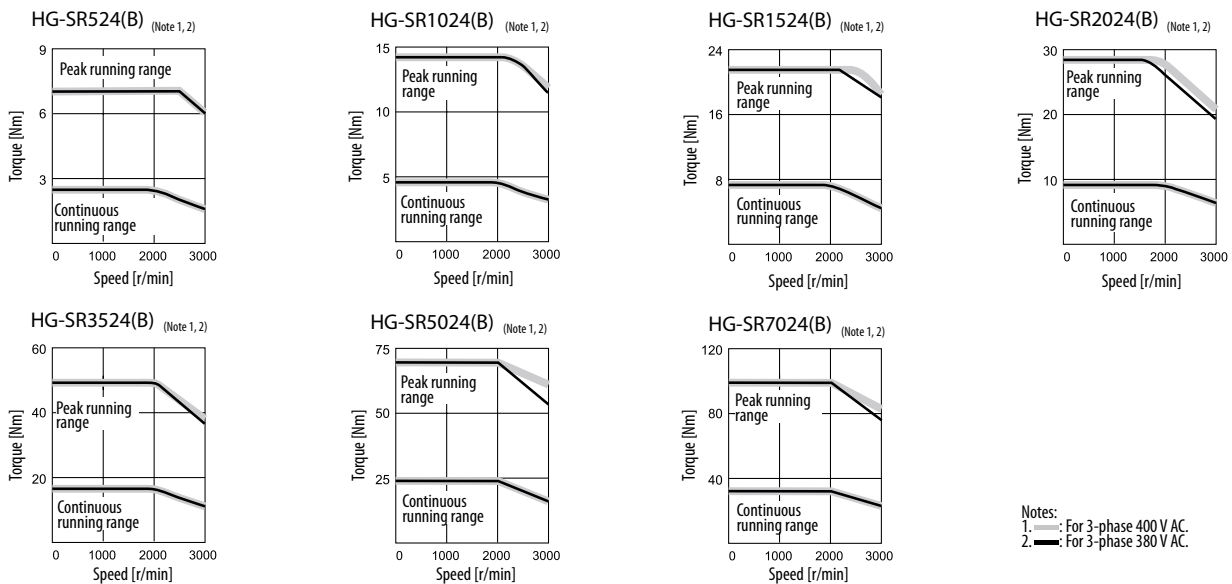
HG-SR(B) Series Servo Motor Specifications (400 V Type)

| Servo motor model | HG-SR524(B) ⑥ | HG-SR1024(B) ⑥ | HG-SR1524(B) ⑥ | HG-SR2024(B) ⑥ | HG-SR3524(B) ⑥ | HG-SR5024(B) ⑥ | HG-SR7024(B) ⑥ | |
|--|----------------------------|--|----------------|---|----------------|---|----------------|--------|
| Servo amplifier model | MR-J4-□A4/B4/GF4/TM4 | 60 | 100 | 200 | 200 | 350 | 500 | 700 |
| Power facility capacity ① | [kVA] | 1.0 | 1.7 | 2.5 | 3.5 | 5.5 | 7.5 | 10 |
| Continuous characteristics | rated output [kW] | 0.5 | 1.0 | 1.5 | 2.0 | 3.5 | 5.0 | 7.0 |
| | rated torque [Nm] | 2.4 | 4.8 | 7.2 | 9.5 | 16.7 | 23.9 | 33.4 |
| Maximum torque | [Nm] | 7.2 | 14.3 | 21.5 | 28.6 | 50.1 | 71.6 | 100 |
| Rated rotation speed | [rpm] | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| Maximum rotation speed | [rpm] | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| Permissible instantaneous rotation speed | [rpm] | 3450 | 3450 | 3450 | 3450 | 3450 | 3450 | 3450 |
| Power rate at continuous rated torque | [kW/s] | 7.85 | 19.7 | 32.1 | 19.5 | 35.5 | 57.2 | 74.0 |
| Rated current | [A] | 1.5 | 2.8 | 4.7 | 4.9 | 7.0 | 11 | 13 |
| Maximum current | [A] | 4.5 | 8.9 | 17 | 17 | 27 | 42 | 59 |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] ② | standard | 7.26 | 11.6 | 16.0 | 46.8 | 78.6 | 99.7 | 151 |
| | with electromagnetic brake | 9.48 | 13.8 | 18.2 | 56.5 | 88.2 | 109 | 161 |
| Regeneration braking frequency | [1/min] | 46 | 29 | 139 | 47 | 34 | 29 | 25 |
| Recommended load/ motor inertia ratio | | Less than 15 times the servo motors inertia moment ③ | | Less than 17 times the servo motors inertia moment ③ | | Less than 15 times the servo motors inertia moment ③ | | |
| Speed/position detector | | 22-bit encoder (resolution per encoder/servo motor rotation: 4194304 p/rev. | | | | | | |
| Structure | | Self-cooling (protection rating: IP67) ④ | | | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); Storage: -15–70 °C (no freezing) | | | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); Storage: 90 % RH max. (no condensation) | | | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | | | |
| | elevation/vibration ⑤ | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 49 m/s ² | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 29.4 m/s ² | | |
| Weight [kg] | standard motor ⑥ | 4.8 | 6.2 | 7.3 | 11 | 16 | 20 | 27 |
| Order information | Art. no. | (without brake) 261431 | 261432 | 261433 | 261434 | 261435 | 261436 | 261437 |
| | WOC ⑦ | 289383 | 289384 | 289405 | 289406 | 289407 | 289408 | 289409 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- ③ Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table
- ④ The shaft-through portion is excluded.
- ⑤ The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiload side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.
- ⑦ The item has longer delivery time. Please contact your Mitsubishi Electric representative.



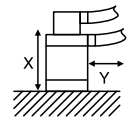
HG-SR Series Servo Motor Torque Characteristics



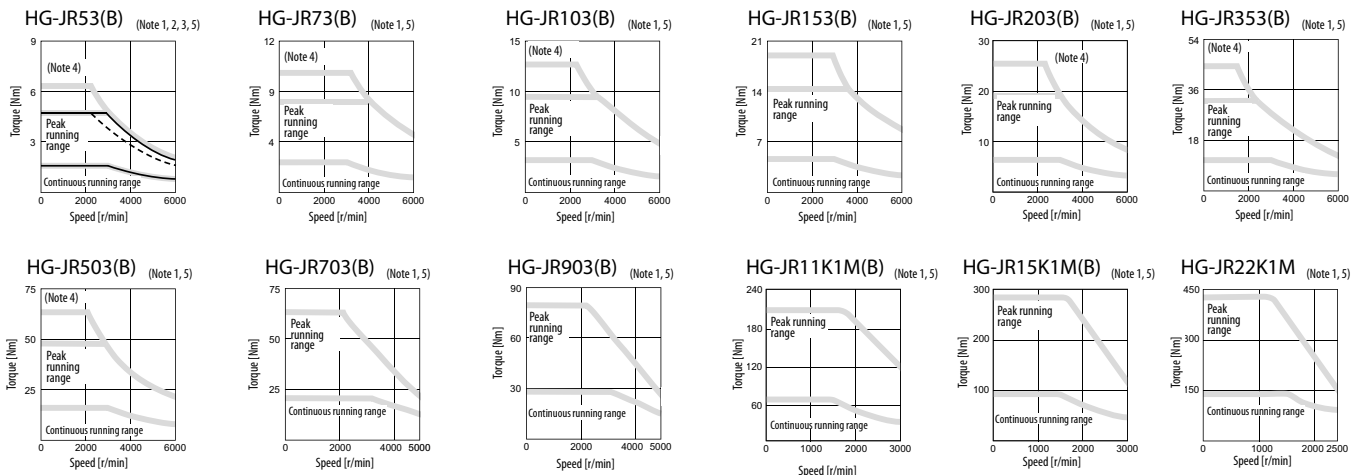
■ HG-JR(B) Series Servo Motor Specifications (200 V Type)

| Servo motor model | HG-JR 53(B) ⑧ | HG-JR 73(B) ⑧ | HG-JR 103(B) ⑧ | HG-JR 153(B) ⑧ | HG-JR 203(B) ⑧ | HG-JR 353(B) ⑧ | HG-JR 503(B) ⑧ | HG-JR 703(B) ⑧ | HG-JR 903(B) ⑧ | HG-JR 11K1M(B) ⑧ | HG-JR 15K1M(B) ⑧ | HG-JR 22K1M ⑧ | | |
|--|---|--|----------------|----------------|----------------|----------------|----------------|---|----------------|---|------------------|---|----------|----------|
| Servo amplifier model ① | MR-J4□A/B/GF/TM | | | | | | | | | | | | | |
| Power facility capacity ① | [kVA] | | | | | | | | | | | | | |
| Continuous characteristics ② | rated output | [kW] | | | | | | | | | | | | |
| | rated torque | [Nm] | | | | | | | | | | | | |
| Maximum torque ⑦ | [Nm] | | | | | | | | | | | | | |
| Rated rotation speed | [U/min] | | | | | | | | | | | | | |
| Maximum rotation speed | [U/min] | | | | | | | | | | | | | |
| Permissible instantaneous rotation speed | [U/min] | | | | | | | | | | | | | |
| Power rate at continuous rated torque | [kW/s] | | | | | | | | | | | | | |
| Rated current ② | [A] | | | | | | | | | | | | | |
| Maximum current | [A] | | | | | | | | | | | | | |
| Moment of inertia J [×10 ⁻⁴ kg m ²] | standard | | | | | | | | | | | | | |
| | with electromagnetic brake | | | | | | | | | | | | | |
| Regeneration braking frequency ② ⑦ | [1/min] | | | | | | | | | | | | | |
| Recommended load/motor inertia ratio | Less than 10 times the servo motor's inertia moment ③ | | | | | | | | | | | | | |
| Speed/position detector | 22-bit encoder (resolution per encoder/servo motor rotation: 4194304 p/rev.) | | | | | | | | | | | | | |
| Structure | Self-cooling (protection rating: IP67) ④ | | | | | | | | | | | Fan-cooling (protection rating: IP44) ④ | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: -15–70 °C (no freezing) | | | | | | | | | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | | | | | | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | | | | | | | | | |
| elevation/vibration ⑥ | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² | | | | | | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 29.4 m/s ² | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² | | | | |
| Weight [kg] standard motor ⑧ | 3.0 | 3.7 | 4.5 | 5.9 | 7.5 | 13 | 18 | 29 | 36 | 62 | 86 | 120 | | |
| Order information | Art. no. | (without brake) | 261539 | 261540 | 261541 | 261542 | 261543 | 261544 | 261545 | 261546 8 | 261547 8 | 261557 ⑧ | 261558 ⑧ | 261559 ⑧ |
| | | WOC ⑧ | 289424 | 289425 | 289426 | 289427 | 289428 | 289429 | 289430 | 289431 | 289432 | 289460 | 289461 | 289462 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- ③ Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table.
- ④ The shaft-through portion is excluded.
- ⑤ The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiloop side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.
- ⑦ The maximum torque of the HG-JR534(B)–HG-JR5034(B) motors can be increased from 300 % to 400 % by increasing the amplifier capacity by one rank.
- ⑧ The item has longer delivery time. Please contact your Mitsubishi Electric representative.



HG-JR Series Servo Motor Torque Characteristics



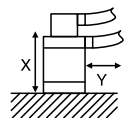
1 —: For 3-phase 200 V AC.
 2 —: For 1-phase 200 V AC.
 3 - - -: For 1-phase 230 V AC.

4. This value is applicable when the torque is maximally increased. Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (200 V Class) for Increasing the Maximum Torque to 400 % of the Rated Torque."
 5. Torque drops when the power supply voltage is below the specified value.

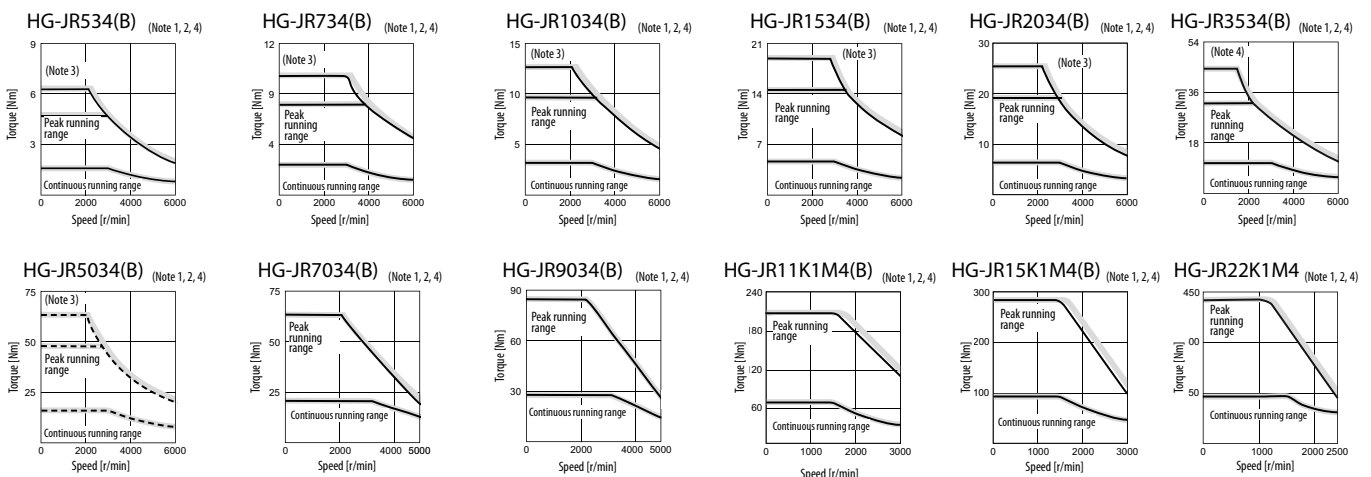
HG-JR(B) Series Servo Motor Specifications (400 V Type)

| Servo motor model | | HG-JR 534(B) ⑥ | HG-JR 734(B) ⑥ | HG-JR 1034(B) ⑥ | HG-JR 1534(B) ⑥ | HG-JR 2034(B) ⑥ | HG-JR 3534(B) ⑥ | HG-JR 5034(B) ⑥ | HG-JR 7034(B) ⑥ | HG-JR 9034(B) ⑥ | HG-JR 11K1M4(B) ⑥ | HG-JR 15K1M4(B) ⑥ | HG-JR 22K1M4 ⑥ |
|--|----------------------------|--|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|-------------------|---|
| Servo amplifier model | MR-J4□A4/B4/GF4/TM4 | 60/100 | 70/200 | 100/200 | 200/350 | 200/350 | 350/500 | 500/700 | 700 | 11K | 11K | 15K | 22K |
| Power facility capacity ① | [kVA] | 1.0 | 1.3 | 1.7 | 2.5 | 3.5 | 5.5 | 7.5 | 10 | 13 | 16 | 22 | 33 |
| Continuous characteristics ⑦ | rated output [kW] | 0.5 | 0.75 | 1.0 | 1.5 | 2.0 | 3.3 | 5.0 | 7.0 | 9.0 | 11 | 15 | 22 |
| | rated torque [Nm] | 1.6 | 2.4 | 3.2 | 4.8 | 6.4 | 10.5 | 15.9 | 22.3 | 28.6 | 70 | 95.5 | 140 |
| Maximum torque ⑦ | [Nm] | 4.8 | 7.2 | 9.6 | 14.3 | 19.1 | 32.0 | 47.7 | 66.8 | 85.8 | 210 | 286 | 420 |
| Rated rotation speed | [U/min] | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 1500 | 1500 | 1500 |
| Maximum rotation speed | [U/min] | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 6000 | 5000 | 5000 | 3000 | 3000 | 2500 |
| Permissible instantaneous rotation speed | [U/min] | 6900 | 6900 | 6900 | 6900 | 6900 | 6900 | 6900 | 5750 | 5750 | 3450 | 3450 | 2875 |
| Power rate at continuous rated torque | [kW/s] | 16.7 | 27.3 | 38.2 | 60.2 | 82.4 | 83.5 | 133 | 115 | 147 | 223 | 290 | 401 |
| Rated current ⑦ | [A] | 1.5 | 2.8 | 2.8 | 5.4 | 5.4 | 8.3 | 14 | 17 | 21 | 31 | 38 | 50 |
| Maximum current | [A] | 4.5 | 8.4 | 8.4 | 17 | 17 | 26 | 41 | 52 | 67 | 100 | 123 | 170 |
| Moment of inertia J [$\times 10^{-4}$ kg m ²] | standard | 1.52 | 2.09 | 2.65 | 3.79 | 4.92 | 13.2 | 19.0 | 43.3 | 55.8 | 220 | 315 | 489 |
| | with electromagnetic brake | 2.02 | 2.59 | 3.15 | 4.29 | 5.42 | 15.4 | 21.2 | 52.9 | 65.4 | 240 | 336 | — |
| Regeneration braking frequency ②⑧ | [1/min] | 99 | 72 | 53 | 265 | 203 | 75 | 68 | 56 | 205 | 143 | 162 | 104 |
| Recommended load/motor inertia ratio | | Less than 10 times the servo motor's inertia moment ③ | | | | | | | | | | | |
| Speed/position detector | | 22-bit encoder (resolution per encoder/servo motor rotation: 4194304 p/rev.) | | | | | | | | | | | |
| Structure | | Self-cooling (protection rating: IP67) ④ | | | | | | | | | | | Fan-cooling (protection rating: IP44) ④ |
| | | | | | | | | | | | | | |
| Environment | ambient temperature | Operation: 0–40 °C (no freezing); storage: -15–70 °C (no freezing) | | | | | | | | | | | |
| | ambient humidity | Operation: 80 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | | | | | | | | |
| | atmosphere | Indoors (no direct sunlight); no corrosive gas, no inflammable gas, no oil mist, no dust | | | | | | | | | | | |
| | elevation/vibration ⑤ | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² | | | | | | | | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 29.4 m/s ² | | 1000 m or less above sea level; X: 24.5 m/s ² , Y: 24.5 m/s ² |
| Weight [kg] | standard motor ⑥ | 3.0 | 3.7 | 4.5 | 5.9 | 7.5 | 13 | 18 | 29 | 36 | 62 | 86 | 120 |
| Order information | Art. no. (without brake) | 261445 | 261446 | 261447 | 261448 | 261449 | 261450 | 261451 | 261452 ⑨ | 261453 ⑨ | 261384 ⑨ | 261535 ⑨ | 261536 ⑨ |
| | WOC ⑥ | 289433 | 289434 | 289435 | 289436 | 289437 | 289438 | 289440 | 289441 | 289441 | 289463 | 289464 | 289465 |

- ① The power facility capacity varies depending on the power supply's impedance.
- ② The regenerative braking frequency shown is the permissible frequency for decelerating a stand-alone motor from rated rpm to a stop. When under load, however, the value becomes the table value divided by (m+1) where m is the load inertia moment divided by the motor inertia moment. When the rated rpm is exceeded, the regenerative brake frequency is inversely proportional to the square of (operating speed/rated speed). When the operating speed varies frequently or when regeneration is constant (as with vertical feeds), find the regeneration heat generated (W) while operating. The heat should not exceed the tolerable regenerative power (W). Refer to the section "OPTIONS AND PERIPHERAL EQUIPMENT" in this catalog for details on the tolerable regenerative power (W). Optimal regenerative resistor varies for each system. Select the most suitable regenerative resistor by using the capacity selection software.
- ③ Please contact Mitsubishi Electric if the load/motor of inertia moment ratio exceeds the value in the table.
- ④ The shaft-through portion is excluded.
- ⑤ The vibration direction is shown in the right side diagram. The numeric value indicates the maximum value of the component (commonly the bracket on the antiload side). Fretting of the bearing occurs easily when the motor stops, so please maintain vibration to approximately one-half the allowable value.
- ⑥ For servo motors with electromagnetic brake please refer to page 28.
- ⑦ The maximum torque of the HG-JR534(B)–HG-JR5034(B) motors can be increased from 300 % to 400 % by increasing the amplifier capacity by one rank.
- ⑧ The item has longer delivery time. Please contact your Mitsubishi Electric representative.

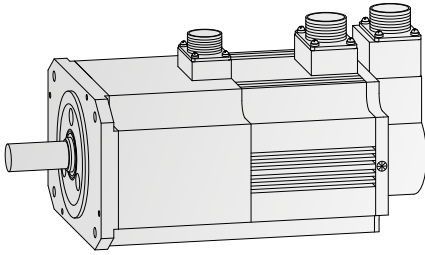


HG-JR Series Servo Motor Torque Characteristics



- Notes:
- 1. —: For 3-phase 400 V AC.
 - 2. —: For 3-phase 380 V AC.
 - 3. This value is applicable when the torque is maximally increased. Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (200 V Class) for Increasing the Maximum Torque to 400 % of the Rated Torque."
 - 4. Torque drops when the power supply voltage is below the specified value.

■ Servo Motor with Electromagnetic Brake



For applications requiring the motor shaft to be held in position (e.g. vertical lift applications), all offered motors are available with an electro-

magnetic brake. The wide variety of servo motors allows the user to choose a motor, which suits best according to the task.

| Motor model (200 V) | HG-KN | | | | HG-SN | | | | | |
|--|----------------------------|--------|--------|--------|----------------------------|--------|--------|--------|--------|--------|
| | 13B | 23KB | 43KB | 73BJK | 52BJK | 102BJK | 152BJK | 202BJK | 302BJK | |
| Type | Spring-loaded safety brake | | | | Spring-loaded safety brake | | | | | |
| Rated voltage | 24 V DC | | | | 24 V DC | | | | | |
| Static friction torque [Nm] | 0.32 | 1.3 | 1.3 | 2.4 | 8.5 | 8.5 | 8.5 | 44 | 44 | |
| Rated current at 20 °C [A] | 0.26 | 0.33 | 0.33 | 0.42 | 0.8 | 0.8 | 0.8 | 1.4 | 1.4 | |
| Coil resistance at 20 °C [Ω] | 91 | 73 | 73 | 57 | 29 | 29 | 29 | 16.8 | 16.8 | |
| Power consumption at 20 °C [W] | 6.3 | 7.9 | 7.9 | 10 | 20 | 20 | 20 | 34 | 34 | |
| Moment of inertia J ^② [10 ⁻⁴ kg m ²] | 0.0843 | 0.247 | 0.397 | 1.39 | 9.48 | 13.8 | 18.2 | 56.5 | 88.2 | |
| Permissible braking volume [J]/time | 5.6 | 22 | 22 | 64 | 400 | 400 | 400 | 4500 | 4500 | |
| Permissible braking volume [J]/hour | 56 | 220 | 220 | 640 | 4000 | 4000 | 4000 | 45000 | 45000 | |
| Brake life [times] ^③ | 20000 | | | | 20000 | | | | | |
| Brake volume per brake action [J] | 5.6 | 22 | 22 | 64 | 200 | 200 | 200 | 1000 | 1000 | |
| Weight ^① [kg] | 0.8 | 1.4 | 1.9 | 4.0 | 6.7 | 8.2 | 9.3 | 17.0 | 22.0 | |
| Order information | Art. no. | 282632 | 282634 | 282636 | 282638 | 282640 | 282642 | 282644 | 282646 | 282648 |

① Total mass of motor with electromagnetic brake ② Total moment of inertia of motor with electromagnetic brake ③ Brake gap cannot be adjusted.

| Motor model (200 V) | HG-KR | | | | | HG-MR | | | | | HG-RR | | | | | |
|--|----------------------------|--------|--------|--------|--------|----------------------------|--------|--------|--------|--------|----------------------------|--------|--------|--------|--------|--------|
| | 053B | 13B | 23B | 43B | 73B | 103B | 153B | 203B | 353B | 503B | 52B | 102B | 152B | 202B | 352B | |
| Type | Spring-loaded safety brake | | | | | Spring-loaded safety brake | | | | | Spring-loaded safety brake | | | | | |
| Rated voltage | 24 V DC | | | | | 24 V DC | | | | | 24 V DC | | | | | |
| Static friction torque [Nm] | 0.32 | 0.32 | 1.3 | 1.3 | 2.4 | 0.32 | 0.32 | 1.3 | 1.3 | 2.4 | 7.0 | 7.0 | 7.0 | 17 | 17 | |
| Rated current at 20 °C [A] | 0.26 | 0.26 | 0.33 | 0.33 | 0.42 | 0.8 | 0.8 | 0.8 | 0.96 | 0.96 | 0.8 | 0.8 | 0.8 | 1.4 | 1.4 | |
| Coil resistance at 20 °C [Ω] | 91 | 91 | 73 | 73 | 57 | 30 | 30 | 30 | 25 | 25 | 19 | 19 | 19 | 23 | 23 | |
| Power consumption at 20 °C [W] | 6.3 | 6.3 | 7.9 | 7.9 | 10 | 6.3 | 6.3 | 7.9 | 7.9 | 10 | 19 | 19 | 19 | 23 | 23 | |
| Moment of inertia J ^② [10 ⁻⁴ kg m ²] | 0.0452 | 0.837 | 0.243 | 0.393 | 1.37 | 0.0224 | 0.0362 | 0.109 | 0.164 | 0.694 | 1.58 | 2.25 | 2.65 | 11.8 | 15.5 | |
| Permissible braking volume [J]/time | 5.6 | 5.6 | 22 | 22 | 64 | 5.6 | 5.6 | 22 | 22 | 64 | 400 | 400 | 400 | 400 | 400 | |
| Permissible braking volume [J]/hour | 56 | 56 | 220 | 220 | 640 | 56 | 56 | 220 | 220 | 640 | 4000 | 4000 | 4000 | 4000 | 4000 | |
| Brake life [times] ^③ | 20000 | | | | | 20000 | | | | | 20000 | | | | | |
| Brake volume per brake action [J] | 5.6 | 5.6 | 22 | 22 | 64 | 5.6 | 5.6 | 22 | 22 | 64 | 200 | 200 | 200 | 200 | 200 | |
| Weight ^① [kg] | 0.54 | 0.74 | 1.3 | 1.8 | 3.8 | 0.54 | 0.74 | 1.3 | 1.8 | 3.8 | 6 | 7 | 8.3 | 15 | 21 | |
| Order information | Art. no. | 248656 | 248657 | 248658 | 248659 | 248660 | 248666 | 248667 | 248668 | 248669 | 248670 | 262901 | 262902 | 262903 | 262904 | 262905 |
| | Art. no. WOC ^④ | 289387 | 289388 | 289389 | 289390 | 289391 | | | | | | | | | | |

① Total mass of motor with electromagnetic brake ② Total moment of inertia of motor with electromagnetic brake ③ Brake gap cannot be adjusted.
 ④ The item has longer delivery time. Please contact your Mitsubishi Electric representative.

| Motor model (400 V) | HG-SR (200) | | | | | | | HG-SR (400) | | | | | | | |
|---|----------------------------|--------|--------|--------|--------|--------|--------|----------------------------|--------|--------|--------|--------|--------|--------|--------|
| | 52B | 102B | 152B | 202B | 352B | 502B | 702B | 524B | 1024B | 1524B | 2024B | 3524B | 5024B | 7024B | |
| Type | Spring-loaded safety brake | | | | | | | Spring-loaded safety brake | | | | | | | |
| Rated voltage | 24 V DC | | | | | | | 24 V DC | | | | | | | |
| Static friction torque [Nm] | 8.5 | 8.5 | 8.5 | 44 | 44 | 44 | 44 | 8.5 | 8.5 | 8.5 | 44 | 44 | 44 | 44 | |
| Rated current at 20 °C [A] | 0.8 | 0.8 | 0.8 | 1.4 | 1.4 | 1.4 | 1.4 | 0.8 | 0.8 | 0.8 | 1.4 | 1.4 | 1.4 | 1.4 | |
| Coil resistance at 20 °C [Ω] | 29 | 29 | 29 | 16.8 | 16.8 | 16.8 | 16.8 | 29 | 29 | 29 | 16.8 | 16.8 | 16.8 | 16.8 | |
| Power consumption at 20 °C [W] | 20 | 20 | 20 | 34 | 34 | 34 | 34 | 20 | 20 | 20 | 34 | 34 | 34 | 34 | |
| Moment of inertia J ^② [$\times 10^{-4}$ kg m ²] | 9.48 | 13.8 | 18.2 | 56.5 | 88.2 | 109 | 161 | 9.48 | 13.8 | 18.2 | 56.5 | 88.2 | 109 | 161 | |
| Permissible braking volume [J]/time [J]/hour | 400 | 400 | 400 | 4500 | 4500 | 4500 | 4500 | 400 | 400 | 400 | 4500 | 4500 | 4500 | 4500 | |
| Brake life [times] ^③ | 20000 | | | | | | | 20000 | | | | | | | |
| Brake volume per brake action [J] | 200 | 200 | 200 | 1000 | 1000 | 1000 | 1000 | 200 | 200 | 200 | 1000 | 1000 | 1000 | 1000 | |
| Weight ^① [kg] | 6.7 | 8.2 | 9.3 | 17 | 22 | 26 | 33 | 6.7 | 8.2 | 9.3 | 17 | 22 | 26 | 33 | |
| Order information | Art. no. | 248678 | 248679 | 248680 | 248681 | 248682 | 248683 | 248684 | 261438 | 261439 | 261440 | 261441 | 261442 | 261443 | 261444 |
| | Art. no. WOC ^④ | 289410 | 289411 | 289412 | 289413 | 289414 | 289415 | 289416 | 289417 | 289418 | 289419 | 289420 | 289421 | 289422 | 289423 |

① Total mass of motor with electromagnetic brake ② Total moment of inertia of motor with electromagnetic brake ③ Brake gap cannot be adjusted.
 ④ The item has longer delivery time. Please contact your Mitsubishi Electric representative.

| Motor model (400 V) | HG-JR (200) | | | | | | | | | | | |
|---|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------------------|---------------------|
| | 53B | 73B | 103B | 153B | 203B | 353B | 503B | 703B | 903B | 11K1MB | 15K1MB | |
| Type | Spring-loaded safety brake | | | | | | | | | | | |
| Rated voltage | 24 V DC | | | | | | | | | | | |
| Static friction torque [Nm] | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 16 | 16 | 44 | 44 | 126 | 126 | |
| Rated current at 20 °C [A] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 1.4 | 1.4 | 1.3 | 1.3 | |
| Coil resistance at 20 °C [Ω] | 49 | 49 | 49 | 49 | 49 | 25 | 25 | 16.8 | 16.8 | 18 | 18 | |
| Leistungsaufnahme bei 20 °C [W] | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 23 | 23 | 34 | 34 | 32 | 32 | |
| Moment of inertia J ^② [$\times 10^{-4}$ kg m ²] | 2.02 | 2.59 | 3.15 | 4.29 | 5.42 | 15.4 | 21.2 | 52.9 | 65.4 | 240 | 336 | |
| Permissible braking volume [J]/time [J]/hour | 64 | 64 | 64 | 64 | 64 | 400 | 400 | 4500 | 4500 | 5000 | 5000 | |
| Brake life [times] ^③ | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 20000 | 20000 | 20000 | 20000 | |
| Brake volume per brake action [J] | 64 | 64 | 64 | 64 | 64 | 400 | 400 | 1000 | 1000 | 400 | 400 | |
| Weight ^① [kg] | 4.4 | 5.1 | 5.9 | 7.3 | 8.9 | 15 | 20 | 35 | 42 | 74 | 97 | |
| Order information | Art. no. | 261548 | 261549 | 261550 | 261551 | 261552 | 261553 | 261554 | 261555 | 261556 | 261560 ^④ | 261561 ^④ |
| | Art. no. WOC ^④ | 289442 | 289443 | 289444 | 289445 | 289446 | 289447 | 289448 | 289449 | 289450 | 289466 | 289467 |

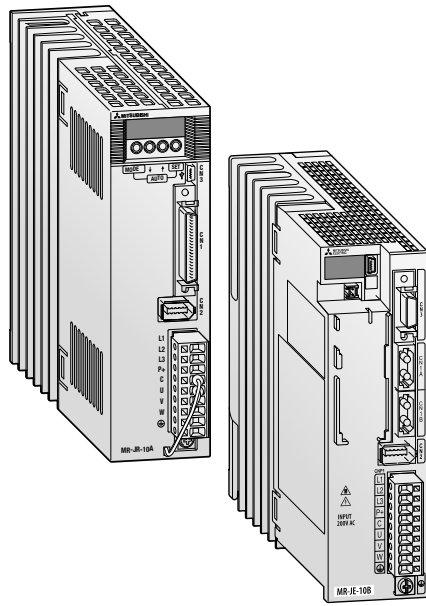
① Total mass of motor with electromagnetic brake ② Total moment of inertia of motor with electromagnetic brake ③ Brake gap cannot be adjusted.
 ④ The item has longer delivery time. Please contact your Mitsubishi Electric representative.

| Motor model (400 V) | HG-JR (400) | | | | | | | | | | | |
|---|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------------------|---------------------|
| | 534B | 734B | 1034B | 1534B | 2034B | 3534B | 5034B | 7034B | 9034B | 11K1M4B | 15K1M4B | |
| Type | Spring-loaded safety brake | | | | | | | | | | | |
| Rated voltage | 24 V DC | | | | | | | | | | | |
| Static friction torque [Nm] | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 16 | 16 | 44 | 44 | 126 | 126 | |
| Rated current at 20 °C [A] | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.0 | 1.4 | 1.4 | 1.3 | 1.3 | |
| Coil resistance at 20 °C [Ω] | 49 | 49 | 49 | 49 | 49 | 25 | 25 | 16.8 | 16.8 | 18 | 18 | |
| Power consumption at 20 °C [W] | 11.7 | 11.7 | 11.7 | 11.7 | 11.7 | 23 | 23 | 34 | 34 | 32 | 32 | |
| Moment of inertia J ^② [$\times 10^{-4}$ kg m ²] | 2.02 | 2.59 | 3.15 | 4.29 | 5.42 | 15.4 | 21.2 | 52.9 | 65.4 | 240 | 336 | |
| Permissible braking volume [J]/time [J]/hour | 64 | 64 | 64 | 64 | 64 | 400 | 400 | 4500 | 4500 | 5000 | 5000 | |
| Brake life [times] ^③ | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 20000 | 20000 | 20000 | 20000 | |
| Brake volume per brake action [J] | 64 | 64 | 64 | 64 | 64 | 400 | 400 | 1000 | 1000 | 400 | 400 | |
| Weight ^① [kg] | 4.4 | 5.1 | 5.9 | 7.3 | 8.9 | 15 | 20 | 35 | 42 | 74 | 97 | |
| Order information | Art. no. | 261454 | 261455 | 261456 | 261457 | 261458 | 261459 | 261460 | 261382 | 261383 | 261537 ^④ | 261538 ^④ |
| | Art. no. WOC ^④ | 289451 | 289452 | 289453 | 289454 | 289455 | 289456 | 289457 | 289458 | 289459 | 289468 | 289469 |

① Total mass of motor with electromagnetic brake ② Total moment of inertia of motor with electromagnetic brake ③ Brake gap cannot be adjusted.
 ④ The item has longer delivery time. Please contact your Mitsubishi Electric representative.

MR-JE-A/B Servo Amplifier Specifications

3
Servo Amplifier



The MR-JE was designed to reach high performance and to get an easy-to-use servo system for all kind of machines. Proven reliability with a 2.0 kHz highfrequency response, an energy-saving design and the easy setup with Advanced One-Touch Tuning can be offered by MR-JE. The servo motors are equipped with 131072 pulses/rev (17-bit) incremental encoder

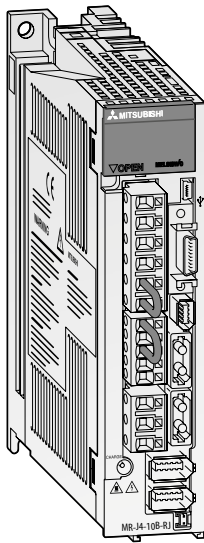
for achieving high-accuracy positioning and smooth rotation for applications from 100 W to 3 kW. In combination with the MR Configurator2 software package the servo system is easy to start-up, to adjust and to analyze.

| Servo amplifier MR-JE-□A | 10A | 20A | 40A | 70A | 100A | 200A | 300A |
|--------------------------|--|------------|------------|------------|---|--------------------------|--------------------------------|
| Power supply | 3-phase or 1-phase 200–240 V AC, 50/60 Hz | | | | 3-phase or 1-phase 200–240 V AC, 50/60 Hz | | 3-phase 200–240 V AC, 50/60 Hz |
| Control system | Sinusoidal PWM control/current control system | | | | | | |
| Dynamic brake | Built-in | | | | | | |
| Protective functions | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection | | | | | | |
| Structure/protection | Self-cooling, open (IP20) | | | | | Fan-cooling, open (IP20) | |
| Environment | ambient temperature Operation: 0–55 °C (no freezing); storage: -20–65 °C (no freezing) | | | | | | |
| | ambient humidity Operation: 90 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | | | |
| | others Elevation: 1000 m or less above sea level; oscillation: 5.9 m/s ² (0.6 G) max. | | | | | | |
| Position control mode | max. input pulse frequency 4 Mpps (differential receiver), 200 kpps (open collector) | | | | | | |
| | positioning feedback pulse 131072 pulses per servo motor rotation | | | | | | |
| | torque limit Set by parameters or external analog input (0–+ 10 V DC/maximum torque) | | | | | | |
| Speed control mode | control range Analog speed command 1:2000, internal speed command 1:5000 | | | | | | |
| | fluctuation rate ±0.01 % max. (load fluctuation 0–100 %) | | | | | | |
| | torque limit Set by parameters or external analog input (0–+10 V DC/maximum torque) | | | | | | |
| Torque control mode | command input 0–±8 V DC/maximum torque | | | | | | |
| | speed limit Set by parameters or external analog input (0–±10 V DC, rated speed) | | | | | | |
| Weight | kg | 0.8 | 0.8 | 0.8 | 1.5 | 1.5 | 2.1 |
| Dimensions (WxHxD) | mm | 50x168x135 | 50x168x135 | 50x168x135 | 70x168x185 | 70x168x185 | 90x168x195 |
| Order information | Art.-no. | 268792 | 268793 | 268794 | 268795 | 268796 | 268797 |

| Servo amplifier MR-JE-□B | 10B | 20B | 40B | 70B | 100B | 200B | 300B |
|---|--|------------|------------|------------|---|--------------------------|----------------------------------|
| Power supply | 3-phase or 1-phase 200–240 V AC, 50/60 Hz | | | | 3-phasisg oder 1-phasisg 200–240 V AC, 50/60 Hz (*) | | 3-phasisg 200–240 V AC, 50/60 Hz |
| Control system | Sinusoidal PWM control/current control system | | | | | | |
| Dynamic brake | Built-in | | | | | | |
| Protective functions | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection | | | | | | |
| Structure/protection | Self-cooling, open (IP20) | | | | | Fan-cooling, open (IP20) | |
| Environment | ambient temperature Operation: 0–55 °C (no freezing); storage: -20–65 °C (no freezing) | | | | | | |
| | ambient humidity Operation: 90 % RH max. (no condensation); storage: 90 % RH max. (no condensation) | | | | | | |
| | others Elevation: 1000 m or less above sea level; oscillation: 5.9 m/s ² (0.6 G) max. | | | | | | |
| Position-, speed- and torque control mode | Possible using SSCNETIII/H control | | | | | | |
| Kommunikationsgeschwindigkeit | 150 Mpps | | | | | | |
| Weight | kg | 0.8 | 0.8 | 0.8 | 1.5 | 1.5 | 2.1 |
| Dimensions (WxHxD) | mm | 50x168x135 | 50x168x135 | 50x168x135 | 70x168x185 | 70x168x185 | 90x168x195 |
| Order information | Art.-no. | 281964 | 281975 | 281976 | 281977 | 281978 | 281979 |

* When 1 phase 200–240 V AC power supply is used, use them with 75 % or less effective load ratio.

MR-J4-A/B Servo Amplifier Specifications (200 V Type)



The MELSERVO MR-J4 series is designed for ease of use and setup, safety, energy-efficiency and user friendly handling. With additional functions like “One-touch Tuning” and “Advanced Vibration Suppression Control” the servo performance achieves industry-leading level. The range covers 100 W units through to 22 kW.

- Processing of encoder signals with 22 bit resolution (4194304 pulses/rev.)
- Speed frequency response is increased to 2.5 kHz
- Operating of rotary, linear and direct drive motors as standard
- Compatible with integrated safety functions STO (Safe Torque Off) corresponding EN 61800-5-2 as standard.

- In combination with the MR-D30 functional safety unit, the MR-J4-B-RJ amplifier series can be expanded by the additional EN 61800-5-2 safety functions SS1, SBC, SSM and SLS.

The MR-J4-B servo amplifier receives a command signal from a control system via high speed motion network SSCNETIII/H with a communication speed of 150 Mbps and a cycle time of 0.22 ms. This optical network is very reliable in operation because it is not affected by EMC.

For control, the MR-J4-A servo amplifier has a pulse train input and two analog inputs for current or voltage. Possible modes are torque, speed or position control. In addition the MR-J4-A-RJ has an integrated positioning function. Simple positioning tasks can be realized directly from the servo amplifier.

| Servo amplifier MR-J4-A/B | | 10A-RJ | 20A-RJ | 40A-RJ | 60A-RJ | 70A-RJ | 100A-RJ | 200A-RJ | 350A-RJ | 500A-RJ | 700A-RJ | 11KA-RJ | 15KA-RJ | 22KA-RJ | |
|---------------------------|---|--|------------|------------|------------|------------|--------------------------|---|------------|--------------------------------|-------------|-----------------|-------------|-------------|--|
| | | 10B-RJ | 20B-RJ | 40B-RJ | 60B-RJ | 70B-RJ | 100B-RJ | 200B-RJ | 350B-RJ | 500B-RJ | 700B-RJ | 11KB-RJ | 15KB-RJ | 22KB-RJ | |
| Power supply | voltage /frequency ① | 1-phase or 3-phase 200–240 V AC, 50/60 Hz | | | | | | 1-phase or 3-phase 200–240 V AC, 50/60 Hz | | 3-phase 200–240 V AC, 50/60 Hz | | | | | |
| | permissible voltage fluctuation | 1-phase or 3-phase 170–264 V AC | | | | | | 3-phase 170–264 V AC | | | | | | | |
| | permissible frequency fluctuation | ±5 % max. | | | | | | | | | | | | | |
| Control system | Sinusoidal PWM control/current control system | | | | | | | | | | | | | | |
| Dynamic brake | Built-in | | | | | | | | | | | External option | | | |
| Speed frequency response | 2500 Hz | | | | | | | | | | | | | | |
| Protective functions | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection. | | | | | | | | | | | | | | |
| Safety function | STO (IEC/EN 61800-5-2); (The functions SS1, SS2, SOS, SBC, SLS and SSM are available in combination with the optional functional safety unit MR-D30.) | | | | | | | | | | | | | | |
| Structure | Self-cooling, open (IP20) | | | | | | Fan cooling, open (IP20) | | | | | | | | |
| Environment | ambient temperature | Operation: 0–55 °C (no freezing), storage: –20–65 °C (no freezing) | | | | | | | | | | | | | |
| | ambient humidity | Operation: 90 % RH max. (no condensation), storage: 90 % RH max. (no condensation) | | | | | | | | | | | | | |
| | atmosphere | Inside control panel; no corrosive gas, no flammable gas, no oil mist, no dust | | | | | | | | | | | | | |
| | elevation | 1000 m or less above sea level | | | | | | | | | | | | | |
| | oscillation | 5.9 m/s ² (0.6 G) max. | | | | | | | | | | | | | |
| Weight | kg | 0.8 | 0.8 | 1.0 | 1.0 | 1.4 | 1.4 | 2.1 | 2.3 | 4.0 | 6.2 | 13.4 | 13.4 | 18.2 | |
| Dimensions (WxHxD) | mm | 40x168x135 | 40x168x135 | 40x168x170 | 40x168x170 | 60x168x185 | 60x168x185 | 90x168x195 | 90x168x195 | 105x250x200 | 172x300x200 | 220x400x260 | 220x400x260 | 260x400x260 | |

Order information

| | | | | | | | | | | | | | | |
|--------|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A type | Art. no. | 269247 | 269248 | 269249 | 269250 | 269251 | 269252 | 269253 | 269254 | 269265 | 269266 | 269267 | 269268 | 269269 |
| B type | Art. no. | 269279 | 269280 | 269281 | 269282 | 269283 | 269284 | 269285 | 269286 | 269287 | 269288 | 269289 | 269290 | 269291 |

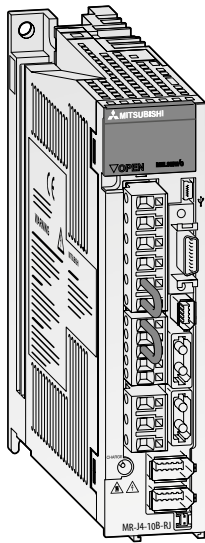
① Rated output capacity and rated rotation speed of the servo motor used in combination with the servo amplifier are as indicated when using the power voltage and frequency listed. Output and speed cannot be guaranteed when the power supply voltage is less than specified.

② When 1 phase 200–240 V AC power supply is used, use them with 75 % or less effective load ratio.

| Servo amplifier MR-J4-A | | 10A-RJ | 20A-RJ | 40A-RJ | 60A-RJ | 70A-RJ | 100A-RJ | 200A-RJ | 350A-RJ | 500A-RJ | 700A-RJ | 11KA-RJ | 15KA-RJ | 22KA-RJ | |
|-------------------------------|-------------------------------|--|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Position control mode | maximum input pulse frequency | 4 Mpps (when using differential receiver), 200 kpps (when using open collector) | | | | | | | | | | | | | |
| | positioning feedback pulse | Resolution per encoder/servo motor rotation: 4194304 pulses/revolution (22 Bit) | | | | | | | | | | | | | |
| | command pulse multiple | Electronic gear A/B multiple; A: 1–16777216, B: 1–16777216, 1/10 <A/B <4000 | | | | | | | | | | | | | |
| Speed control mode | torque limit input | Set by parameters or external analog input (0–±10 V DC/maximum torque) | | | | | | | | | | | | | |
| | speed control range | Analog speed command 1:2000, internal speed command 1:5000 | | | | | | | | | | | | | |
| | analog speed command input | 0–±10 V DC/rated speed (The speed at 10 V can be changed by parameter) | | | | | | | | | | | | | |
| Torque control specifications | speed fluctuation rate | ±0.01 % max. (load fluctuation 0–100 %); 0 % (power fluctuation ±10 %) ±0.2 % max. (ambient temperature 25 °C ±10 °C), when using external analog speed command | | | | | | | | | | | | | |
| | torque limit | Set by parameters or external analog input (0–±10 V DC/maximum torque) | | | | | | | | | | | | | |
| | torque command input | 0–±8 V DC/maximum torque (input impedance 10–12 kΩ) | | | | | | | | | | | | | |
| Integrated positioning | speed limit | Set by parameters or external analog input (0–±10 V DC, rated speed) | | | | | | | | | | | | | |
| | position tables | 255 table entries for target position, set speed value, acceleration/deceleration time, braking | | | | | | | | | | | | | |
| | programming style | 256 programs, 640 program steps, 25 commands | | | | | | | | | | | | | |
| | indexing function | 255 stations, rotational direction tightly adjustable or automatically shortest path | | | | | | | | | | | | | |

| Servo amplifier MR-J4-B (SSCNETIII/H) | | 10B-RJ | 20B-RJ | 40B-RJ | 60B-RJ | 70B-RJ | 100B-RJ | 200B-RJ | 350B-RJ | 500B-RJ | 700B-RJ | 11KB-RJ | 15KB-RJ | 22KB-RJ | |
|---------------------------------------|--|------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Position and speed control | | Possible using SSCNETIII/H control | | | | | | | | | | | | | |
| Communication speed | | 150 Mbps | | | | | | | | | | | | | |

MR-J4-A/B Servo Amplifier Specifications (400 V Type)



The MELSERVO MR-J4 servo amplifiers for 400 V power supply offer the same industry leading performance as the 200 V types. The range of rated output is from 600 W to 22 kW.

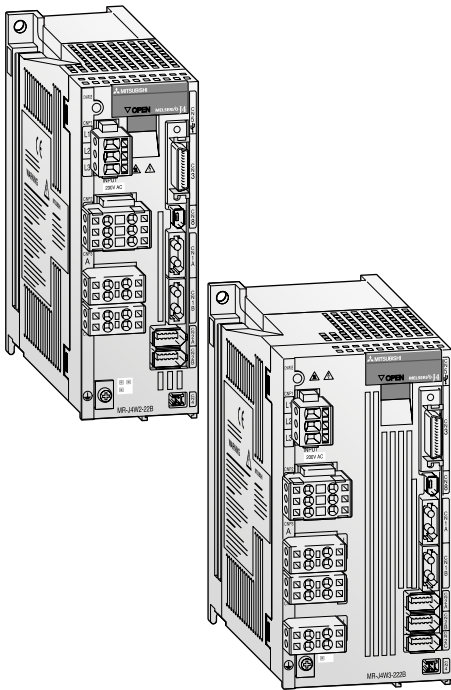
| Servo amplifier MR-J4-A4/B4 | | 60A4-RJ 60B4-RJ | 100A4-RJ 100B4-RJ | 200A4-RJ 200B4-RJ | 350A4-RJ 350B4-RJ | 500A4-RJ 500B4-RJ | 700A4-RJ 700B4-RJ | 11KA4-RJ 11KB4-RJ | 15KA4-RJ 15KB4-RJ | 22KA4-RJ 22KB4-RJ |
|-----------------------------|-----------------------------------|---|----------------------|----------------------|----------------------|--------------------------|----------------------|----------------------|----------------------|----------------------|
| Power supply | voltage /frequency ① | 3-phase 380–480 V AC, 50/60 Hz | | | | | | | | |
| | permissible voltage fluctuation | 3-phase 323–528 V AC, 50/60 Hz | | | | | | | | |
| | permissible frequency fluctuation | ±5 % max. | | | | | | | | |
| Control system | | Sinusoidal PWM control/current control system | | | | | | | | |
| Dynamic brake | | Built-in | | | | | | | | |
| Speed frequency response | | 2500 Hz | | | | | | | | |
| Protective functions | | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection. | | | | | | | | |
| Safety function | | STO (IEC/EN 61800-5-2); (The functions SS1, SS2, SOS, SBC, SLS and SSM are available in combination with the optional functional safety unit MR-D30.) | | | | | | | | |
| Structure | | Self-cooling, open (IP20) | | | | Fan cooling, open (IP20) | | | | |
| Environment | ambient temperature | Operation: 0–55 °C (no freezing), storage: –20–65 °C (no freezing) | | | | | | | | |
| | ambient humidity | Operation: 90 % RH max. (no condensation), storage: 90 % RH max. (no condensation) | | | | | | | | |
| | atmosphere | Inside control panel; no corrosive gas, no flammable gas, no oil mist, no dust | | | | | | | | |
| | elevation | 1000 m or less above sea level | | | | | | | | |
| | oscillation | 5.9 m/s ² (0.6 G) max. | | | | | | | | |
| Weight | kg | 1.7 | 1.7 | 2.1 | 3.6 | 4.3 | 6.5 | 13.4 | 13.4 | 18.2 |
| Dimensions (WxHxD) | mm | 60x168x195 | 60x168x195 | 90x168x195 | 105x250x200 | 130x250x200 | 172x350x200 | 220x400x260 | 220x400x260 | 260x400x260 |
| Order information | | | | | | | | | | |
| A type | Art. no. | 269270 | 269271 | 269272 | 269273 | 269274 | 269275 | 269276 | 269277 | 269278 |
| B type | Art. no. | 269292 | 269293 | 269294 | 269295 | 269296 | 269297 | 269298 | 269299 | 269300 |

① Rated output capacity and rated rotation speed of the servo motor used in combination with the servo amplifier are as indicated when using the power voltage and frequency listed. Output and speed cannot be guaranteed when the power supply voltage is less than specified.

| Servo amplifier MR-J4-A4 | | 60A4-RJ | 100A4-RJ | 200A4-RJ | 350A4-RJ | 500A4-RJ | 700A4-RJ | 11KA4-RJ | 15KA4-RJ | 22KA4-RJ |
|-------------------------------|-------------------------------|---|----------|----------|----------|----------|----------|----------|----------|----------|
| Position control mode | maximum input pulse frequency | 4 Mpps (when using differential receiver), 200 kpps (when using open collector) | | | | | | | | |
| | positioning feedback pulse | Resolution per encoder/servo motor rotation: 4194304 pulses/revolution (22 Bit) | | | | | | | | |
| | command pulse multiple | A/B multiple; A: 1–16777215, B: 1–16777215, 1/10 < A/B < 4000 | | | | | | | | |
| Speed control mode | torque limit input | Set by parameters or external analog input (0–± 10 V DC/maximum torque) | | | | | | | | |
| | speed control range | Analog speed command 1:2000, internal speed command 1:5000 | | | | | | | | |
| | analog speed command input | 0–± 10 V DC/rated speed (The speed at 10 V can be changed by parameter.) | | | | | | | | |
| Torque control specifications | speed fluctuation rate | ±0.01 % max. (load fluctuation 0–100 %); 0 % (power fluctuation ±10 %) | | | | | | | | |
| | torque limit | ±0.2 % max. (ambient temperature 25 °C ±10 °C), when using external analog speed command | | | | | | | | |
| | torque limit | Set by parameters or external analog input (0–± 10 V DC/maximum torque) | | | | | | | | |
| Integrated positioning | torque command input | 0–±8 V DC/maximum torque (input impedance 10–12 kΩ) | | | | | | | | |
| | speed limit | Set by parameters or external analog input (0–± 10 V DC, rated speed) | | | | | | | | |
| Integrated positioning | position tables | 255 table entries for target position, set speed value, acceleration/deceleration time, braking | | | | | | | | |
| | programming style | 256 programs, 640 program steps, 25 commands | | | | | | | | |
| | indexing function | 255 stations, rotational direction tightly adjustable or automatically shortest path | | | | | | | | |

| Servo amplifier MR-J4-B4 (SSCNETIII/H) | | 60B4-RJ | 100B4-RJ | 200B4-RJ | 350B4-RJ | 500B4-RJ | 700B4-RJ | 11KB4-RJ | 15KB4-RJ | 22KB4-RJ |
|--|--|------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Position and speed control | | Possible using SSCNETIII/H control | | | | | | | | |
| Communication speed | | 150 Mbps | | | | | | | | |

MR-J4W2-B/MR-J4W3-B Servo Amplifier Specifications



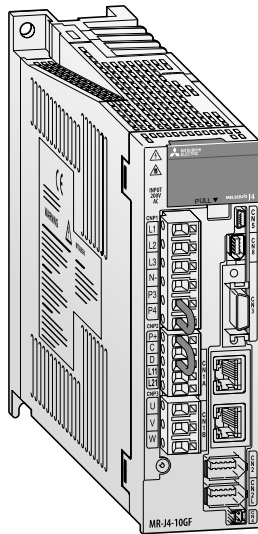
Additional to the standard version of the MR-J4 amplifiers (SSCNETIII/H Motion Network) for one servo motor Mitsubishi Electric now offers also servo amplifiers for two or three servo motors. The amplifiers for two (MR-J4W2-B) and three axes (MR-J4W3-B) are space and wiring saving and more efficient than two or three single amplifiers. Therefore the engineer saves not only space inside the cabinet and costs due to less wires, but also valuable energy what reduces the pollution of CO₂ at the same time. The range of output power for the amplifier for

two axes is from 0.2 to 1 kW, for three axes from 0.2 to 0.4 kW per axis. All other specification items are identical with the standard version of the MR-J4-B for one axis.

| Servo amplifier MR-J4W-B | | W2-22B | W2-44B | W2-77B | W2-1010B | W3-222B | W3-444B | |
|--------------------------|-----------------------------------|---|------------|--------------------------|--------------------------------|---|------------|--------|
| Power supply | voltage /frequency ^① | 1-phase or 3-phase 200–240 V AC, 50/60 Hz | | | 3-phase 200–240 V AC, 50/60 Hz | 1-phase or 3-phase 200–240 V AC, 50/60 Hz | | |
| | permissible voltage fluctuation | 1-phase or 3-phase 170–264 V AC | | | 3-phase 170–264 V AC | 1-phase or 3-phase 170–264 V AC | | |
| | permissible frequency fluctuation | ±5 % max. | | | | | | |
| Control system | | Sinusoidal PWM control/current control system | | | | | | |
| Dynamic brake | | Built-in | | | | | | |
| Speed frequency response | | 2500 Hz | | | | | | |
| Protective functions | | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection. | | | | | | |
| Safety function | | STO (IEC/EN 61800-5-2) | | | | | | |
| Structure | | Self-cooling, open (IP20) | | Fan cooling, open (IP20) | | | | |
| Environment | ambient temperature | Operation: 0–55 °C (no freezing), storage: -20–65 °C (no freezing) | | | | | | |
| | atmosphere | Inside control panel; no corrosive gas, no flammable gas, no oil mist, no dust | | | | | | |
| | elevation | 1000 m or less above sea level | | | | | | |
| | oscillation | 5.9 m/s ² (0.6 G) max. | | | | | | |
| Weight | kg | 1.5 | 1.5 | 2.0 | 2.0 | 1.9 | 1.9 | |
| Dimensions (WxHxD) | mm | 60x168x195 | 60x168x195 | 85x168x195 | 85x168x195 | 85x168x195 | 85x168x195 | |
| Order information | | Art. no. | 248645 | 248646 | 248647 | 248648 | 248649 | 248650 |

^① Rated output capacity and rated rotation speed of the servo motor used in combination with the servo amplifier are as indicated when using the power voltage and frequency listed. Output and speed cannot be guaranteed when the power supply voltage is less than specified.

MR-J4-GF Servo Amplifier Specifications



Compatible with CC-Link IE Field Network

CC-Link IE Field Network compatible servo amplifier MR-J4-GF executes positioning of one or multiple axes, synchronous control, and speed-torque control by being connected to the various master modules compatible with CC-Link IE Field Network, including the Simple Motion module, and CC-Link IE embedded CPU module, etc.

Two types of modes are available according to your needs:

- Motion mode for a wide range of motion control such as positioning of multiple axes, synchronous control, etc.
- I/O mode for positioning of one axis

In combination with the Simple Motion Module RD77GF, that can be used in the CC-Link IE Field network, the system offers extraordinary speed and performance, excellent flexibility, reduced wiring and simple programming.

- Gigabit CC-Link IE Field network
- Outstanding motion performance
- Two types of communication for maximum flexibility
- Advanced synchronous control
- Single-Software solution
- One-Touch Auto-Tuning™
- Advanced Vibration suppression II™
- High resolution 22 bit encoder
- Industry leading speed frequency response of 2.5 kHz

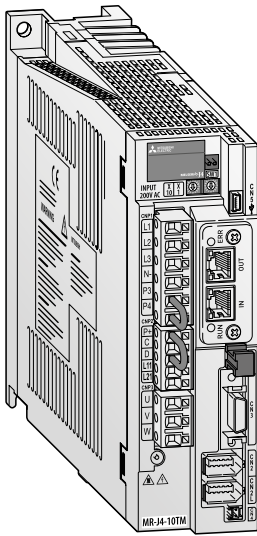
| Servo amplifier MR-J4-□(-RJ) (200 V-Type) | | 10GF | 20GF | 40GF | 60GF | 70GF | 100GF | 200GF | 350GF | 500GF | 700GF | 11KGF | 15KGF | 22KGF | |
|---|---------------------------------|---|---------------------------------|------------|------------|------------|---|-----------------------------------|--------------------------------|----------------------------|-------------|-----------------|-------------|-------------|--------|
| Power supply | voltage /frequency ① | 1-phase or 3-phase 200–240 V AC, 50/60 Hz | | | | | 1-phase or 3-phase 200–240 V AC, 50/60 Hz ③ | | 3-phase 200–240 V AC, 50/60 Hz | | | | | | |
| | DC input ② | 283–340 V DC | | | | | | | | | | | | | |
| | permissible voltage fluctuation | AC input | 1-phase or 3-phase 170–264 V AC | | | | | 1-phase or 3-phase 170–264 V AC ③ | | 3-phase 170–264 V AC | | | | | |
| | | DC input ② | 241–374 V DC | | | | | | | | | | | | |
| speed frequency response | | ±5 % max. | | | | | | | | | | | | | |
| Dynamic brake | | Built-in | | | | | | | | | | External option | | | |
| Structure | | Self-cooling, open (IP20) | | | | | Fan cooling, open (IP20) | | | Fan cooling, open (IP20) ⑤ | | | | | |
| Weight | | 1.0 | 1.0 | 1.0 | 1.0 | 1.4 | 1.4 | 2.1 | 2.3 | 4.0 | 6.2 | 13.4 | 13.4 | 18.2 | |
| Dimensions (WxHxD) | | 50x168x155 | 50x168x155 | 50x168x155 | 50x168x155 | 60x168x185 | 60x168x185 | 90x168x195 | 90x168x195 | 105x250x200 | 172x300x200 | 220x400x260 | 220x400x260 | 260x400x260 | |
| Order information | | Art. no. | 295435 | 295436 | 295437 | 295438 | 295439 | 295440 | 295441 | 295442 | 295443 | 295444 | 306875 | 306876 | 306877 |

| Servo amplifier MR-J4-□(-RJ) (400 V-Type) | | 60GF4 | 100GF4 | 200GF4 | 350GF4 | 500GF4 | 700GF4 | 11KGF4 | 15KGF4 | 22KGF4 | |
|---|---------------------------------|--------------------------------|------------|------------|--------------------------|-------------|----------------------------|-------------|-----------------|-------------|--------|
| Power supply | voltage /frequency ① | 3-phase 380–480 V AC, 50/60 Hz | | | | | | | | | |
| | permissible voltage fluctuation | 3-phase 323–528 V AC | | | | | | | | | |
| | speed frequency response | ±5 % max. | | | | | | | | | |
| Dynamic brake | | Built-in | | | | | | | External option | | |
| Structure | | Self-cooling, open (IP20) | | | Fan cooling, open (IP20) | | Fan cooling, open (IP20) ⑤ | | | | |
| Weight | | 1.7 | 1.7 | 2.1 | 3.6 | 4.3 | 6.5 | 13.4 | 13.4 | 18.2 | |
| Dimensions (WxHxD) | | 60x168x195 | 60x168x195 | 90x168x195 | 105x250x200 | 130x250x200 | 172x300x200 | 220x400x260 | 220x400x260 | 260x400x260 | |
| Order information | | Art. no. | 295445 | 295446 | 295447 | 295448 | 295449 | 295450 | 306878 | 306879 | 306880 |

| Common specifications | | |
|--|---|--|
| Control system | Sinusoidal PWM control/current control system | |
| Speed frequency response | 2500 Hz | |
| CC-Link IE Field communication cycle ④ | 0,5 ms, 1,0 ms, 2,0 ms, 4,0 ms | |
| Protective functions | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servomotor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection. | |
| Safety function | STO (IEC/EN 61800-5-2); (The functions SS1, SS2, SOS, SBC, SLS and SSM are available in combination with the optional functional safety unit MR-D30.) | |
| Environment | ambient temperature | Operation: 0–55 °C (no freezing), storage: –20–65 °C (no freezing) |
| | ambient humidity | Operation: 90 % RH max. (no condensation), storage: 90 % RH max. (no condensation) |
| | atmosphere | Inside control panel; no corrosive gas, no flammable gas, no oil mist, no dust |
| | elevation | 2000 m or less above sea level |
| | oscillation | 5.9 m/s ² (0.6 G) max. |

① Rated output capacity and rated rotation speed of the servo motor used in combination with the servo amplifier are as indicated when using the power voltage and frequency listed. Output and speed cannot be guaranteed when the power supply voltage is less than specified.
 ② The DC power supply input is available only with MR-J4-□GF-RJ servo amplifiers.
 ③ When 1-phase 200–240 V AC power supply is used, use them with 75 % or less effective load ratio.
 ④ The communication cycle depends on the controller specifications and the number of axes connected.
 ⑤ Except for the terminal block.

MR-J4-TM-ECT/MR-J4-TM-PNT/MR-J4-TM-EIP Servo Amplifier Specifications



With the MR-J4-TM servo amplifier the industry leading performance, features and reliability of the MR-J4 series servo system is combined with Ethernet based open network interface.

- Industry-leading performance with 2.5 kHz speed frequency response for shortest settling time
- Dedicated Servo amplifier control loops by Mitsubishi Electric developed components like One-Touch-Tuning, Vibration suppression control, Adaptive Real-Time Autotuning.

- High resolution 4,194,304 pulse/rev absolute encoders for high-accuracy positioning and smooth rotation
- Compact design for saving space in the cabinet

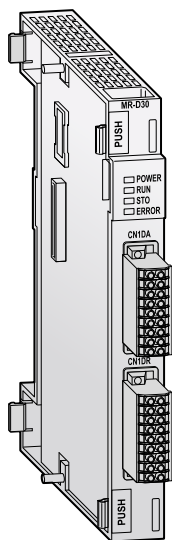
| Servo amplifier MR-J4-TM (200 V Type) | | 10TM | 20TM | 40TM | 60TM | 70TM | 100TM | 200TM | 350TM | 500TM | 700TM |
|---------------------------------------|--------------------|---|------------|------------|------------|------------|--|------------|--------------------------------|-------------|-------------|
| Power supply | voltage /frequency | 1-phase or 3-phase 200–240 V AC, 50/60 Hz | | | | | 1-phase or 3-phase 200–240 V AC, 50/60 Hz ^① | | 3-phase 200–240 V AC, 50/60 Hz | | |
| Weight | kg | 1.0 | 1.0 | 1.0 | 1.0 | 1.4 | 1.4 | 2.1 | 2.3 | 4.0 | 6.2 |
| Dimensions (WxHxD) | mm | 50x168x161 | 50x168x161 | 50x168x161 | 50x168x161 | 60x168x191 | 60x168x191 | 90x168x201 | 90x168x201 | 105x250x206 | 172x300x206 |
| Order information | MR-J4-□TM-ECT | 290156 | 290157 | 290158 | 290159 | 290160 | 290161 | 290162 | 290163 | 290164 | 290205 |
| | MR-J4-□TM-PNT | 298566 | 298567 | 298568 | 298569 | 298570 | 298571 | 298572 | 298573 | 298574 | 298695 |
| | MR-J4-□TM-EIP | 298708 | 298709 | 298710 | 298711 | 298712 | 298713 | 298714 | 298715 | 298716 | 298717 |

| Servo amplifier MR-J4-TM4 (400 V Type) | | 60TM4 | 100TM4 | 200TM4 | 350TM4 | 500TM4 | 700TM4 | 11KTM4 | 15KTM4 | 22KTM4 |
|--|---------------------------------|-----------------------------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Power supply | voltage /frequency ^① | 3-phase 380–480 V AC, 50 Hz/60 Hz | | | | | | | | |
| Weight | kg | 1.7 | 1.7 | 2.1 | 3.6 | 4.3 | 6.5 | 13.4 | 13.4 | 18.2 |
| Dimensions (WxHxD) | mm | 60x168x201 | 60x168x201 | 90x168x201 | 105x250x206 | 130x250x206 | 172x300x206 | 220x400x266 | 220x400x266 | 260x400x266 |
| Order information | MR-J4-□TM4-ECT | 290206 | 290207 | 290208 | 290209 | 290210 | 290211 | 294050 | 294051 | 294052 |
| | MR-J4-□TM4-PNT | 298696 | 298697 | 298698 | 298699 | 298700 | 298701 | 298705 | 298706 | 298707 |
| | MR-J4-□TM4-EIP | 298718 | 298719 | 298720 | 298721 | 298722 | 298723 | 298727 | 298728 | 298729 |

① When 1-phase 200–240 V AC power supply is used, use them with 75 % or less effective load ratio.

| Common specifications | MR-J4-TM-ECT | MR-J4-TM-PNT | MR-J4-TM-EIP |
|------------------------|--|--|--|
| Safety function | STO (IEC/EN 61800-5-2) | | |
| Ethernet Interfaces | 2 ports RJ45 100 BASE-TX | | |
| Communication protocol | IEC61158 Type12 CAN application protocol over EtherCAT (CoE), IEC61800-7 CiA402 Drive Profile | PROFINET IO, Real Time (RT) communication, PROFIdrive v4.1 | THE CIP NETWORKS LIBRARY Volume 2, EtherNet/IP Adaptation of CIP |
| Cycle time | 250 μs, 500 μs, 1 ms, 2 ms | 1 ms, 2 ms, 4 ms, 8 ms, 16 ms, 32 ms, 64 ms, 128 ms, 256 ms, 512 ms | 1 – 100 ms |
| Control functions | Cyclic synchronous position mode (csp), Cyclic synchronous velocity mode (csv), Cyclic synchronous torque mode (cst), Profile position mode (pp), Profile velocity mode (pv), Profile torque mode (tq), Homing mode (hm) | Profile position mode (pp), Profile velocity mode (pv), Profile torque mode (tq), Homing mode (hm) | Profile position mode (pp), Profile velocity mode (pv), Profile torque mode (tq), Homing mode (hm) |
| Latch function | Hardware and Software latch method, 2 channels (1 ch. 55 μs + 1 ch. 2 μs) | | |

MR-D30 Functional Safety Unit



In combination with the optional MR-D30 functional safety unit, additional safety functions according to EN IEC 61800-5-2 can be realized. By combining the MR-D30 functional safety unit with a MR-J4 servo amplifier, safety functions "Safe Stop 1" (SS1), "Safe Brake Control" (SBC), "Safely Limited Speed" (SLS) and "Safe Speed Monitor" (SSM) according to EN IEC 61800-5-2 are available.

If additionally a servo motor with functional safety encoder is used, "Safe Stop 2" (SS2) and "Safe Operating Stop" (SOS) can be used.

The activation is possible by wiring the signals directly to the MR-D30 or in combination with the Motion Controller via a safe SSCNETIII/H communication. Additionally the wiring will be reduced by activating via network.

| Common specifications | | MR-D30 |
|--|---------------------------------|--|
| Control power supply | voltage /frequency | 24 V DC |
| | permissible voltage fluctuation | 24 V DC $\pm 10\%$ |
| | power supply capacity | 800 mA |
| Supported amplifiers | | MR-J4-□A-RJ/B-RJ/GF-RJ/TM |
| Shut-off input (Safety devices) | | 6 redundant input points, source or sink logic |
| Shut-off release input (restart devices) | | 3 redundant output points, source logic |
| Response time | | 15 ms or less for Safe Torque Off (STO) |
| Environment | ambient temperature | Operation: 0–55 °C (no freezing), storage: -20–65 °C (no freezing) |
| | ambient humidity | Operation: 90 % RH or less (no condensation), storage: 90 % RH or less (no condensation) |
| | atmosphere | Inside control panel; no corrosive gas, no flammable gas, no oil mist, no dust |
| | elevation | 1000 m or less above sea level |
| | oscillation | 5.9 m/s ² or less at 10 to 57 Hz (directions of X, Y and Z axes) |
| Weight | kg | 0.15 |
| Dimensions (WxHxD) | mm | 22.5x192x86 |
| Order information | | Art. no. 275670 |

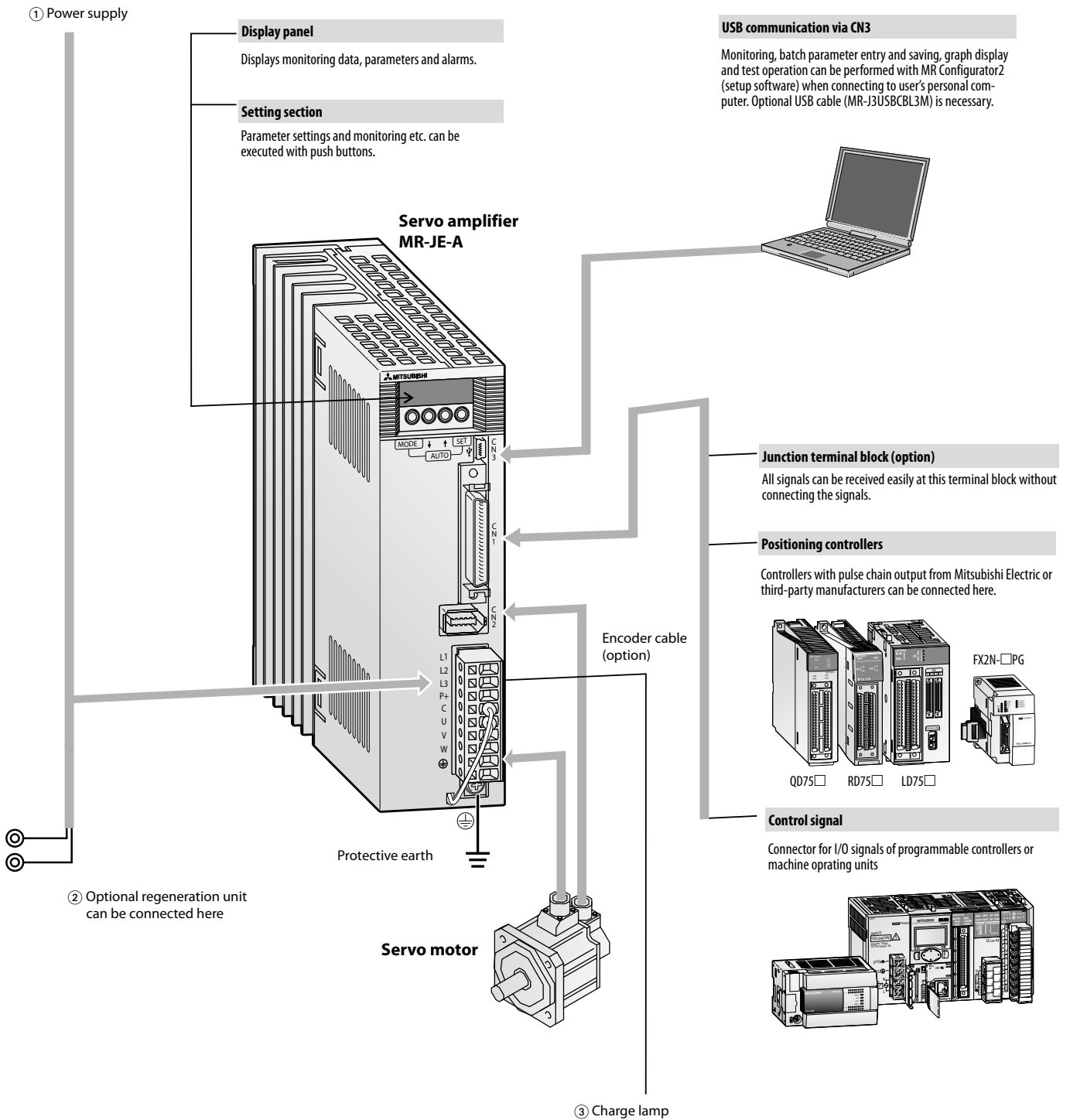
| Safety specifications | | MR-D30 | |
|--|------------------------------------|---|--|
| Safety standards | | EN ISO 13849-1 category 3 PL d and category 4 PL e IEC 61508 SIL 2 and SIL 3 EN 62061 SIL CL 2 and SIL CL 3 EN 61800-5-2 SIL 2 and SIL 3 | |
| Response time | | 15 ms or less for Safe Torque Off (STO) | |
| Safety functions | Servo motor with functional safety | direct wiring to functional safety unit | Category 4 PL e, SIL 3 Safe Torque (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS), Safely Limited Speed (SLS), Safe Brake Control (SBC), Safe Speed Monitor (SSM) |
| | | reduced wiring through SSCNETIII/H | Category 3 PL d, SIL 2 Safe Torque (STO), Safe Stop 1 (SS1), Safe Stop 2 (SS2), Safe Operating Stop (SOS), Safely Limited Speed (SLS), Safe Brake Control (SBC), Safe Speed Monitor (SSM) |
| | Servo motor | direct wiring to functional safety unit | Category 4 PL e, SIL 3 (Safe Torque (STO), Safe Stop 1 (SS1), Safe Brake Control (SBC)) Category 3 PL d, SIL 2 (Safely Limited Speed (SLS), Safe Speed Monitor (SSM)) |
| | | reduced wiring through SSCNETIII/H or CC-Link IE Field | Category 3 PL d, SIL 2 Safe Torque (STO), Safe Stop 1 (SS1) Safely Limited Speed (SLS), Safe Brake Control (SBC), Safe Speed Monitor (SSM) |
| MTTFd Expectation of the average time for a dangerous failure to occur | | ≥ 100 years | |
| DC Diagnostic Coverage (DC) is the effectiveness of fault monitoring of a system or subsystem | | $\geq 90\%$ | |
| PFH Average probability of dangerous failure taking place during one (1) hour | | 6.57×10^{-9} /h | |

MR-JE-A Servo Amplifier Connections with Peripheral Equipment

Peripheral equipment is connected to the MR-JE-A as shown below. To ensure fast, efficient configuration and reliable operation always use

only the connecting cables, expansion options and other accessories supplied or recommended by Mitsubishi Electric.

A complete overview with detailed specifications of all cables and accessories can be found in the next chapter.



- ① **Power supply**
3~, 200–240 V AC
1~, 200–240 V AC for servo drives ≤2 kW

- ② **Regeneration unit (option)**
This unit can be installed in situations involving frequent regeneration and large load inertia moments. For more details refer to the MR-JE-A Instruction manual.

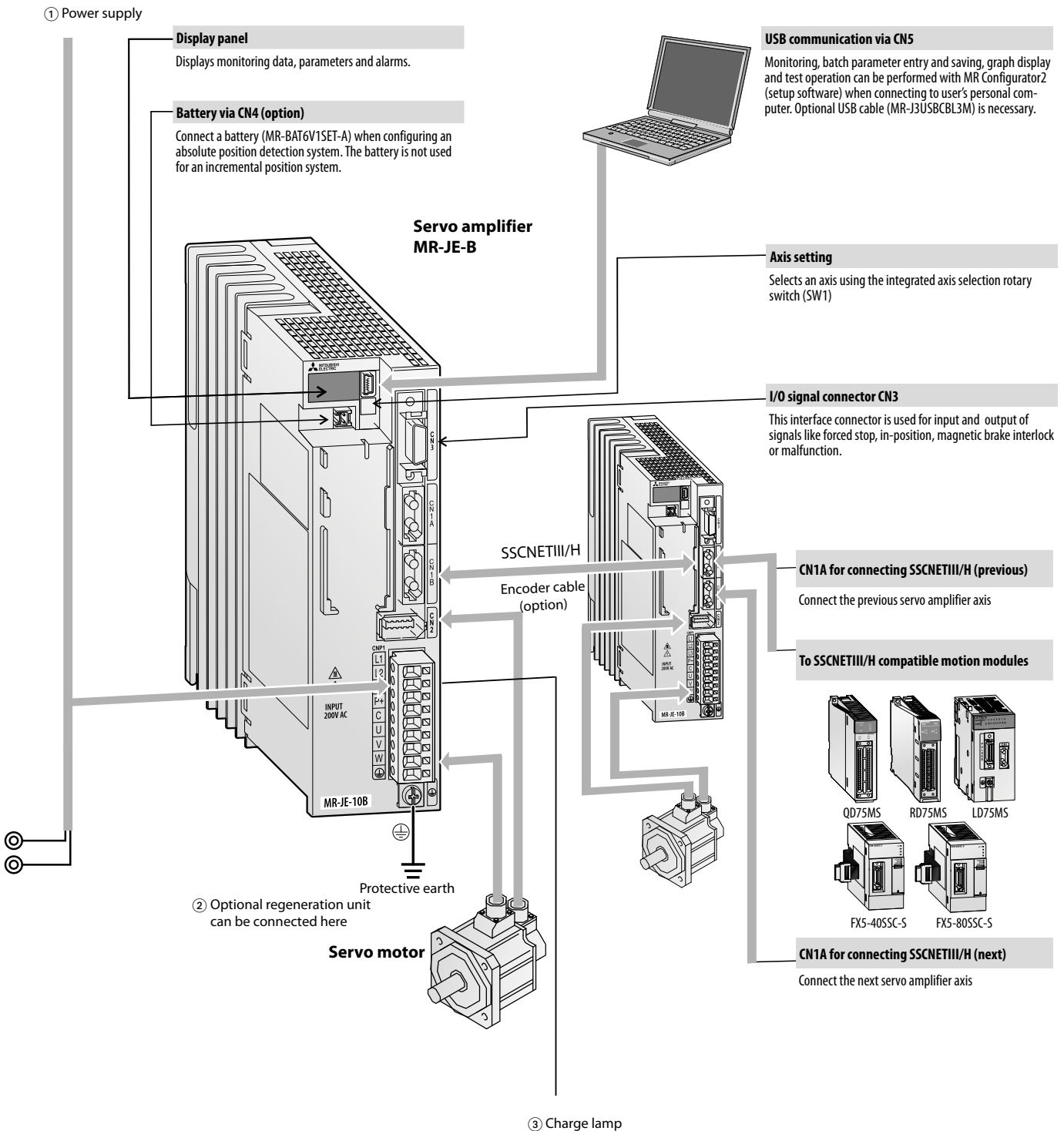
- ③ **Charge lamp**
Lights up when the main power supply is on. **Power lines should not be plugged or unplugged when this lamp is on.**

MR-JE-B Servo Amplifier Connections with Peripheral Equipment

Peripheral equipment is connected to the MR-JE-B as shown below. To ensure fast, efficient configuration and reliable operation always use

only the connecting cables, expansion options and other accessories supplied or recommended by Mitsubishi Electric.

A complete overview with detailed specifications of all cables and accessories can be found in the next chapter.



① **Power supply**
 3~, 200–240 V AC
 1~, 200–240 V AC for servo drives ≤2 kW

② **Regeneration unit (option)**
 This unit can be installed in situations involving frequent regeneration and large load inertia moments. For more details refer to the MR-JE-B Instruction manual.

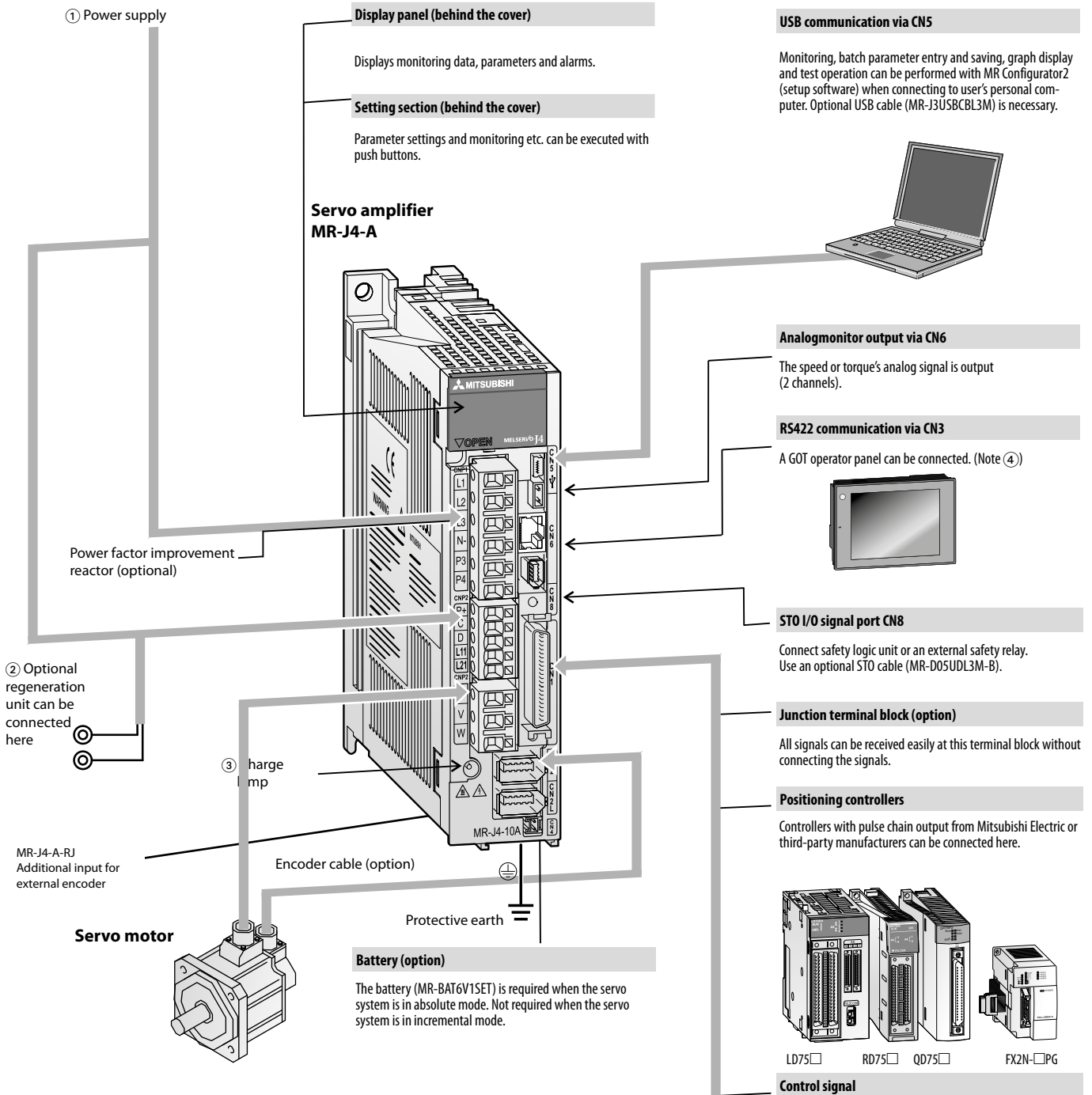
③ **Charge lamp**
 Lights up when the main power supply is on. **Power lines should not be plugged or unplugged when this lamp is on.**

MR-J4-A Servo Amplifier Connections with Peripheral Equipment

Peripheral equipment is connected to the MR-J4-A as shown below. To ensure fast, efficient configuration and reliable operation

always use only the connecting cables, expansion options and other accessories supplied or recommended by Mitsubishi Electric.

A complete overview with detailed specifications of all cables and accessories can be found in the next chapter.



① Power supply

3~, 200–240 V AC
 1~, 200–240 V AC for servo drives ≤ 2 kW
 3~, 380–400 V AC for servo drives ≥ 600 W (A4)

② Regeneration unit (option)

This unit can be installed in situations involving frequent regeneration and large load inertia moments. For more details refer to the MR-J4-A users manual.

③ Charge lamp

Lights up when the main power supply is on.
Power lines should not be plugged or unplugged when this lamp is on.

④ RS422 Communication

A personal computer can be connected using a RS-422/RS-232C converter and a conversion cable.

USB communication via CN5

Monitoring, batch parameter entry and saving, graph display and test operation can be performed with MR Configurator2 (setup software) when connecting to user's personal computer. Optional USB cable (MR-J3USBCBL3M) is necessary.

Analog monitor output via CN6

The speed or torque's analog signal is output (2 channels).

RS422 communication via CN3

A GOT operator panel can be connected. (Note ④)

STO I/O signal port CN8

Connect safety logic unit or an external safety relay. Use an optional STO cable (MR-D05UDL3M-B).

Junction terminal block (option)

All signals can be received easily at this terminal block without connecting the signals.

Positioning controllers

Controllers with pulse chain output from Mitsubishi Electric or third-party manufacturers can be connected here.

Control signal

Connector for I/O signals of programmable controllers or machine operating units

MR-J4-B Servo Amplifier Connections with Peripheral Equipment

Peripheral equipment is connected to the MR-J4-B as shown below. Connectors, cables, options, and other necessary equipment are available so that users can set up MR-J4-B easily and begin using it right away.

Through its SSCNETIII/H-compatible simple connections (optical fibre bus, 150 Mbps), the MR-J4-B series reduce wiring time and chances of wiring errors.

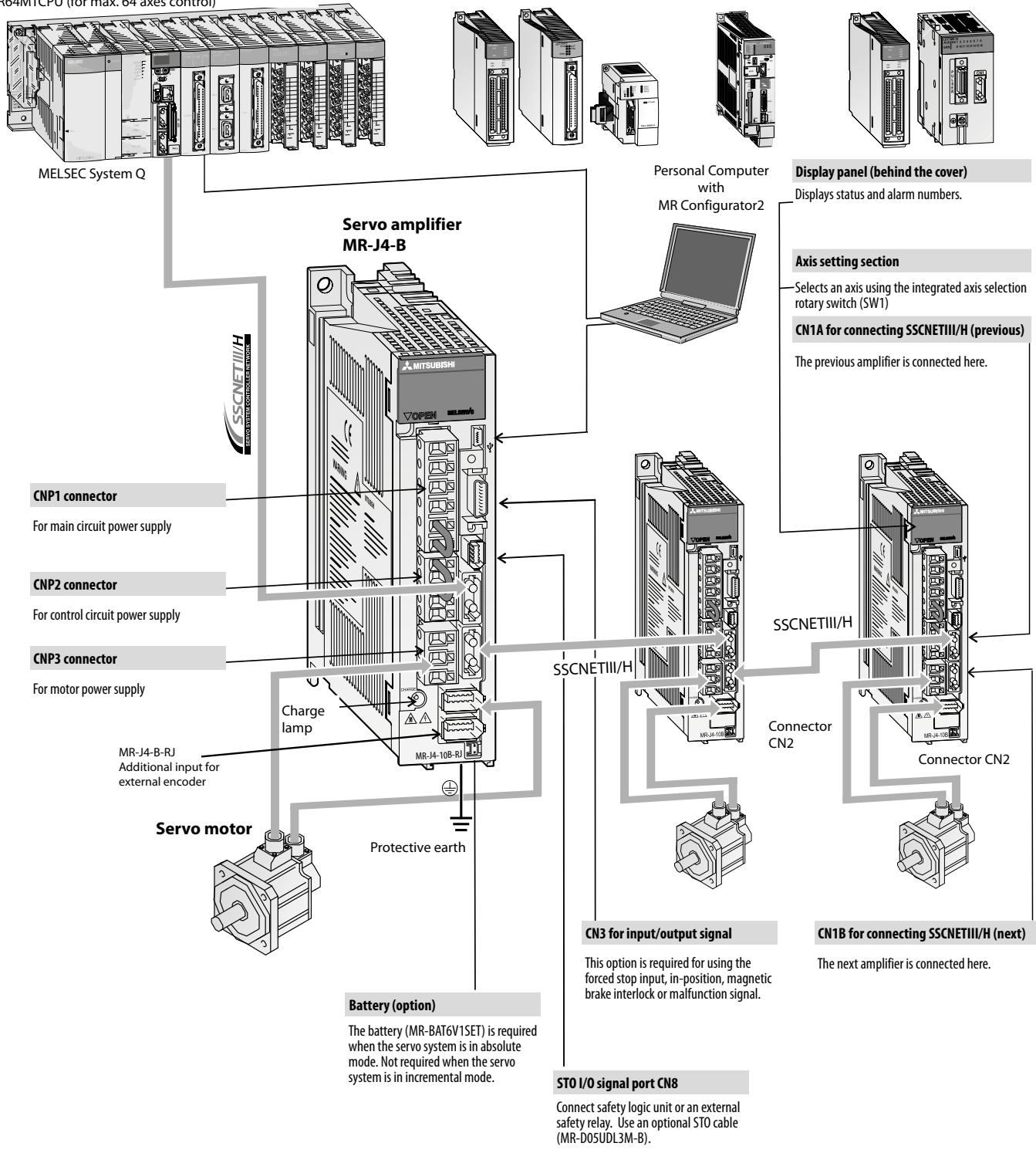
A complete overview with detailed specifications of all cables and accessories can be found in the next chapter.

Motion Controller MELSEC System Q:
 Q172DSCPU (for max. 16 axes control)
 Q173DSCPU (for max. 32 axes control)
Motion Controller MELSEC iQ-R System:
 R16MTCPU (for max. 16 axes control)
 R32MTCPU (for max. 32 axes control)
 R64MTCPU (for max. 64 axes control)

Motion-/ Positioning modules
 MELSEC FX: FX3U-20SSC-H

Stand Alone Motion-Controller
 MR-MQ100, Q170MSCPU

Simple Motion Module
 MELSEC System Q: QD77MS
 MELSEC iQ-R System: RD77MS
 MELSEC L series: LD77MS
 MELSEC FX: FX5-40SSC-S/
 FX5-80SSC-S



MR-J4-GF Servo Amplifier Connections with Peripheral Equipment

Peripheral equipment is connected to the MR-J4-GF as shown below. Connectors, cables, options, and other necessary equipment are available so that users can set up MR-J4-B easily and begin using it right away

A complete overview with detailed specifications of all cables and accessories can be found in the next chapter.

Motion Controller

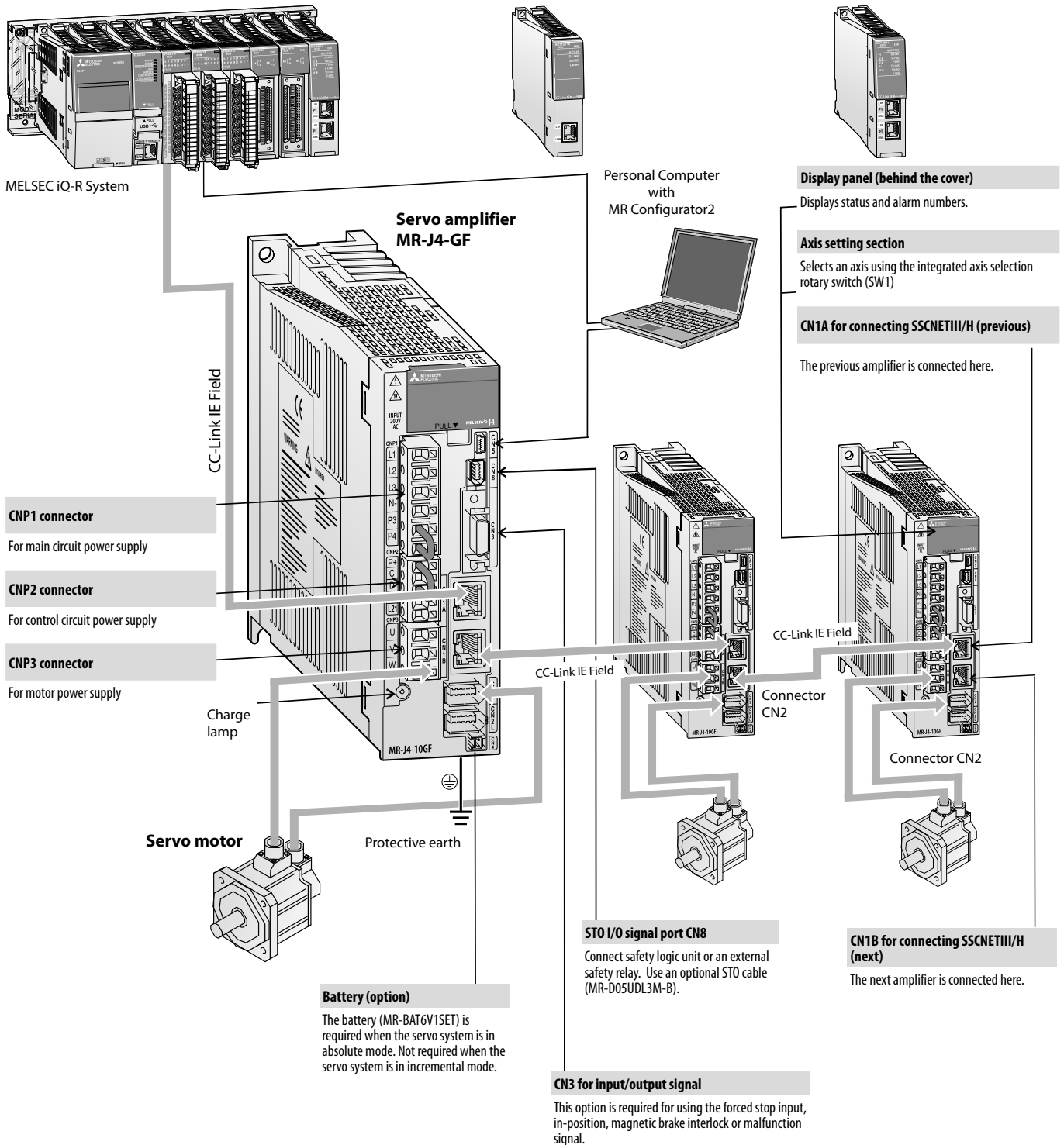
MELSEC System Q
 MELSEC iQ-R System: R□CPU,
 R□ENCPU (CC-Link IE embedded CPU module)

Simple Motion Module

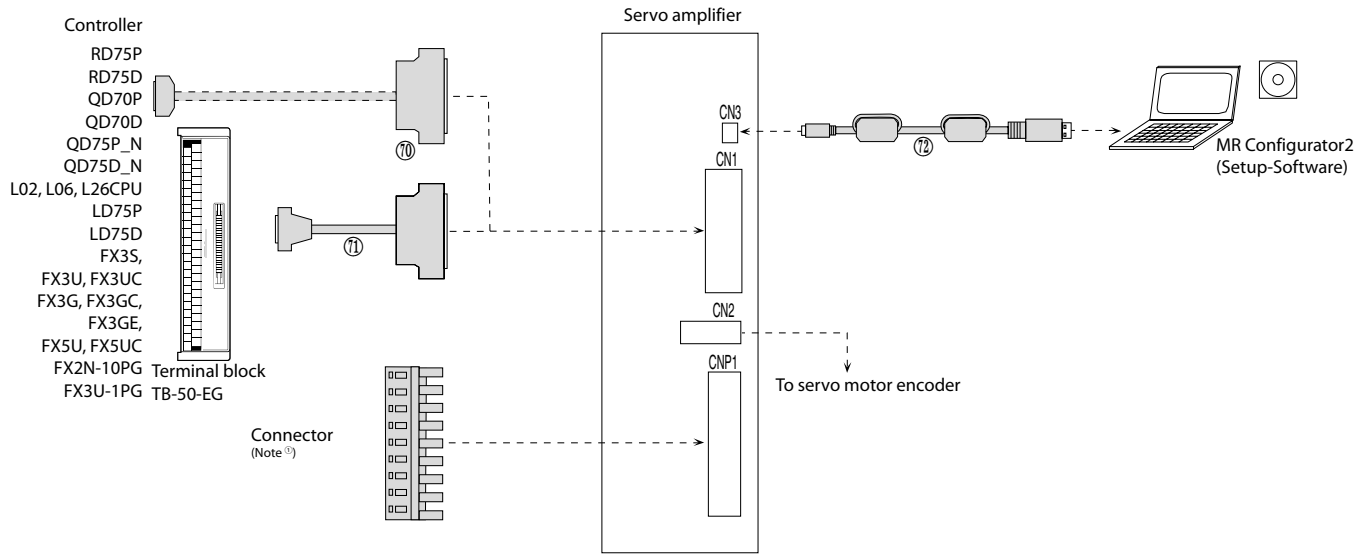
MELSEC System Q: QD77GF4, QD77GF8, QD77GF16
 MELSEC iQ-R System: RD77GF4, RD77GF8, RD77GF16/
 RD77GF32

Local Master Module

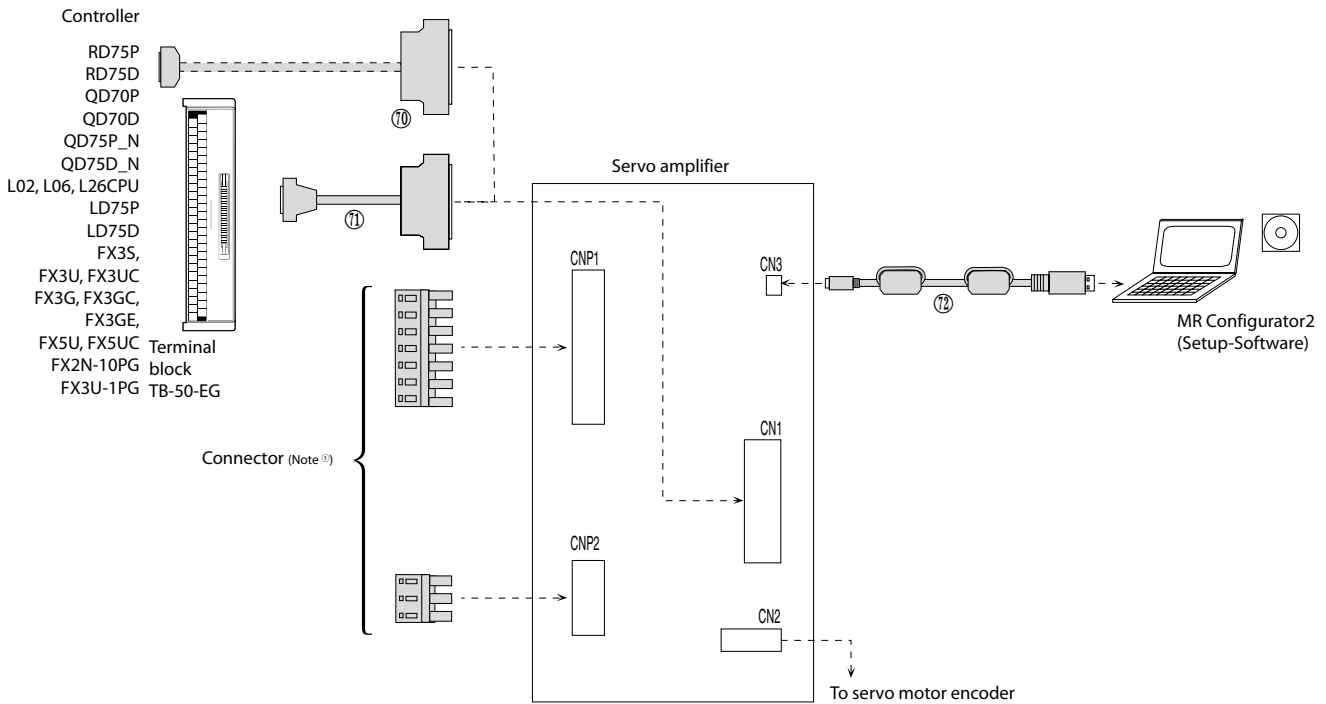
MELSEC System Q: QJ71GF11-T2
 MELSEC iQ-R System: RJ71EN71, RJ71GF11-T2



■ Cables and Connectors for MR-JE-A Servo Amplifiers up to 1 kW

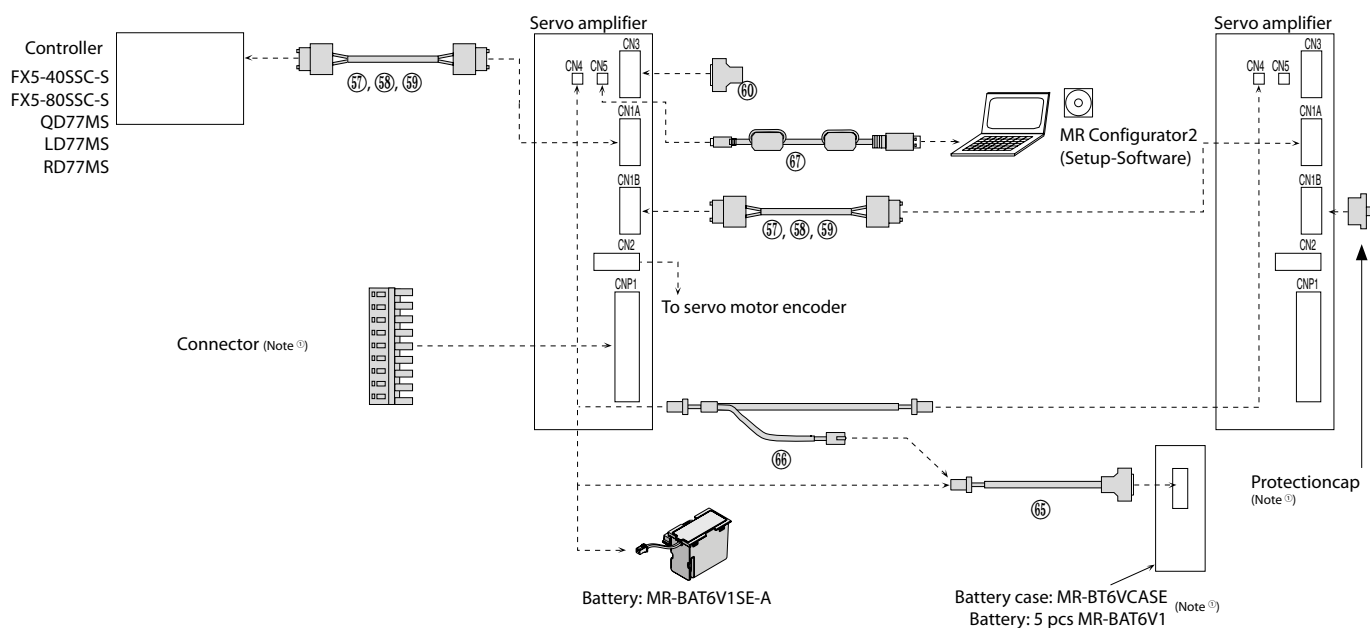


■ Cables and Connectors for MR-JE-A Servo Amplifiers 2 kW and 3 kW

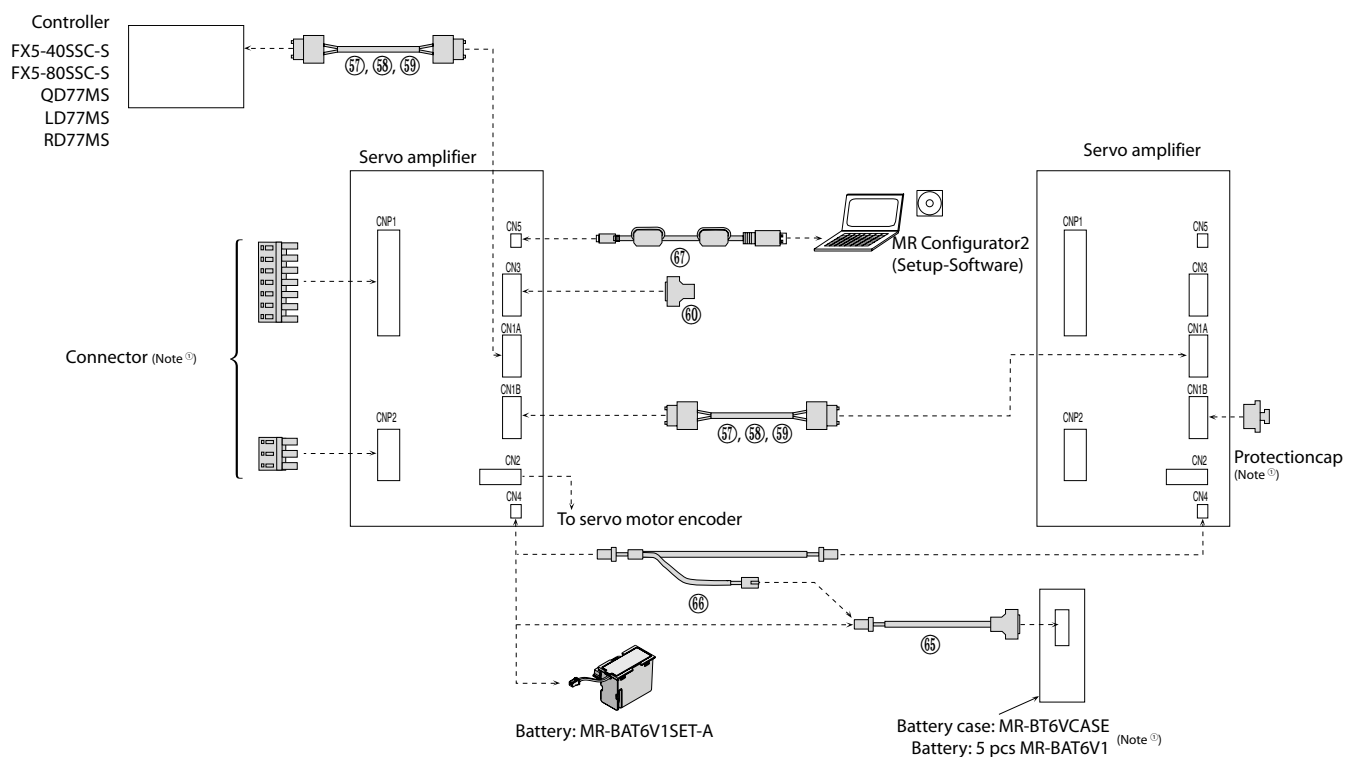


Notes:
① Part of the delivery contents

Cables and Connectors for MR-JE-B Servo Amplifiers up to 1 kW



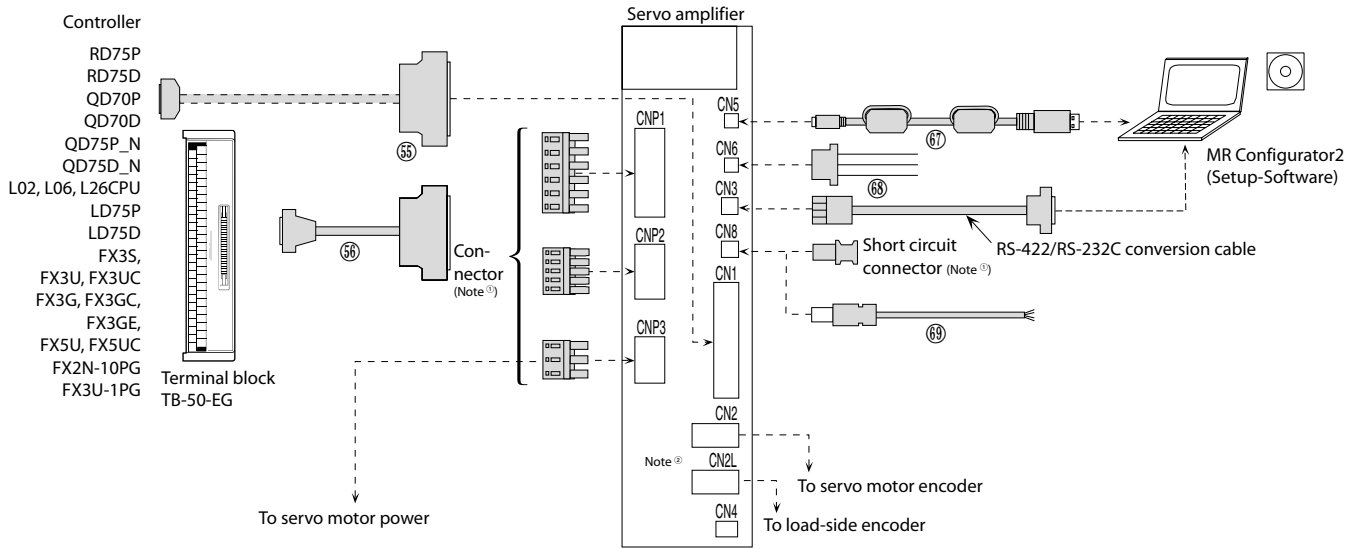
Cables and Connectors for MR-JE-B Servo Amplifiers 2 kW and 3 kW



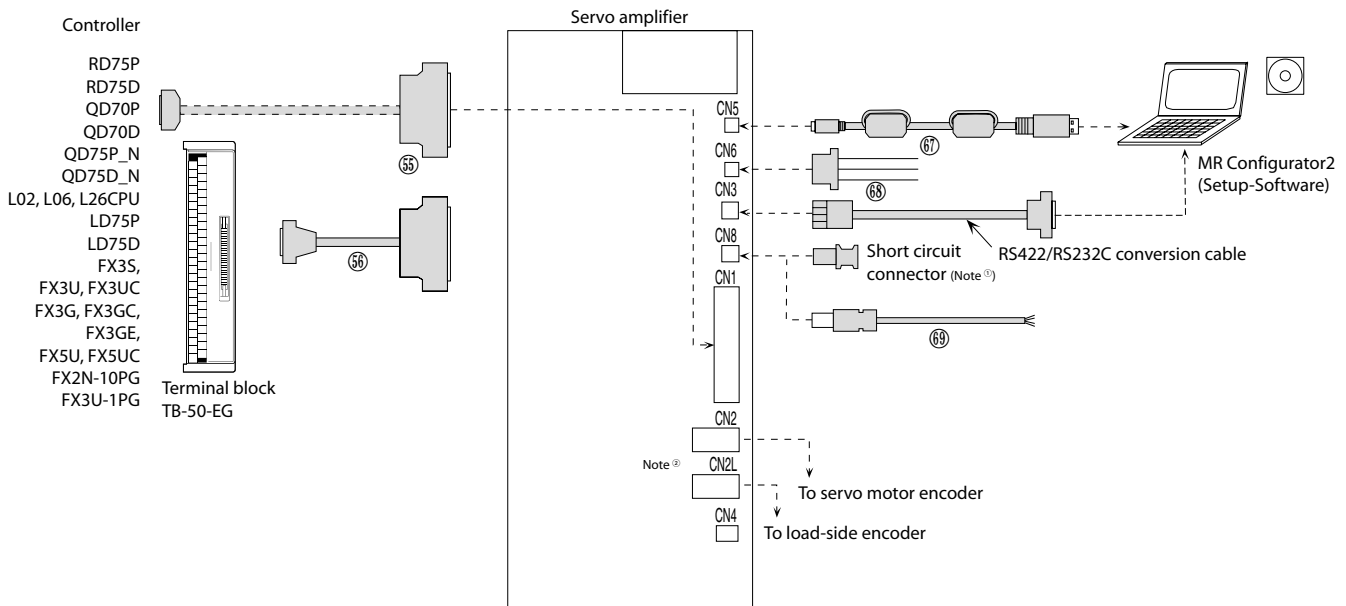
Notes:

① Part of the delivery contents

■ Cables and Connectors for MR-J4-A Servo Amplifiers up to 3.5 kW



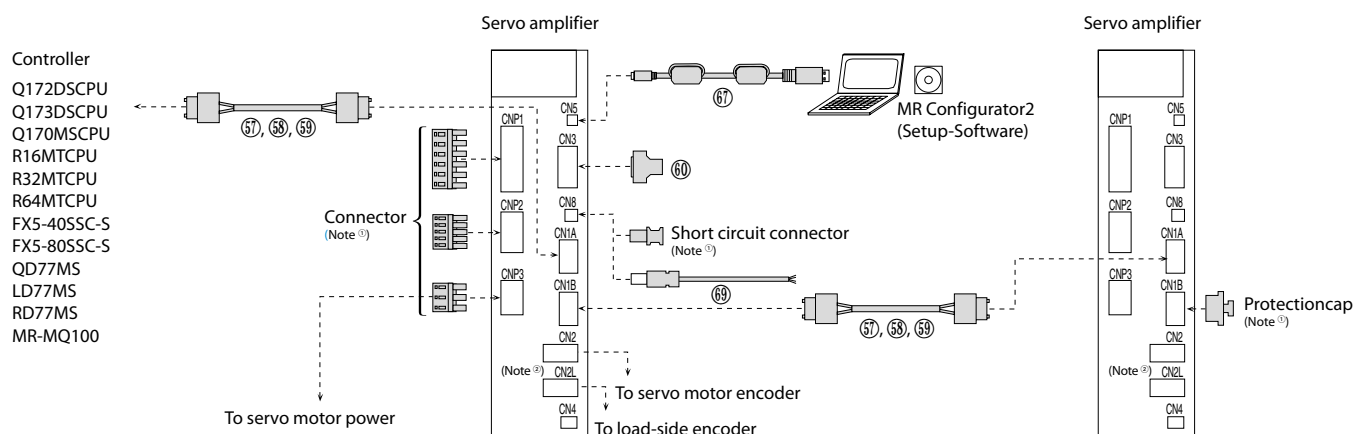
■ Cables and Connectors for MR-J4-A Servo Amplifiers 5 kW or more



Notes:

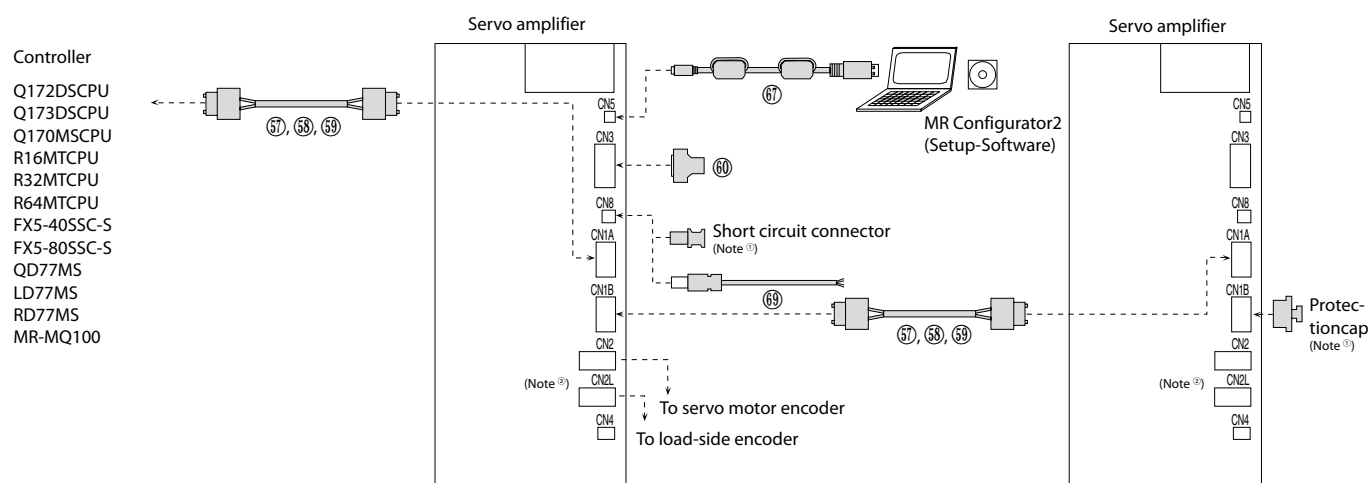
- ① Part of the delivery contents
- ② CN2L connector is available for MR-J4-B-RJ servo amplifier.

■ Cables and Connectors for MR-J4-B Servo Amplifiers up to 3.5 kW



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■ Cables and Connectors for MR-J4-B Servo Amplifiers 5 kW or more

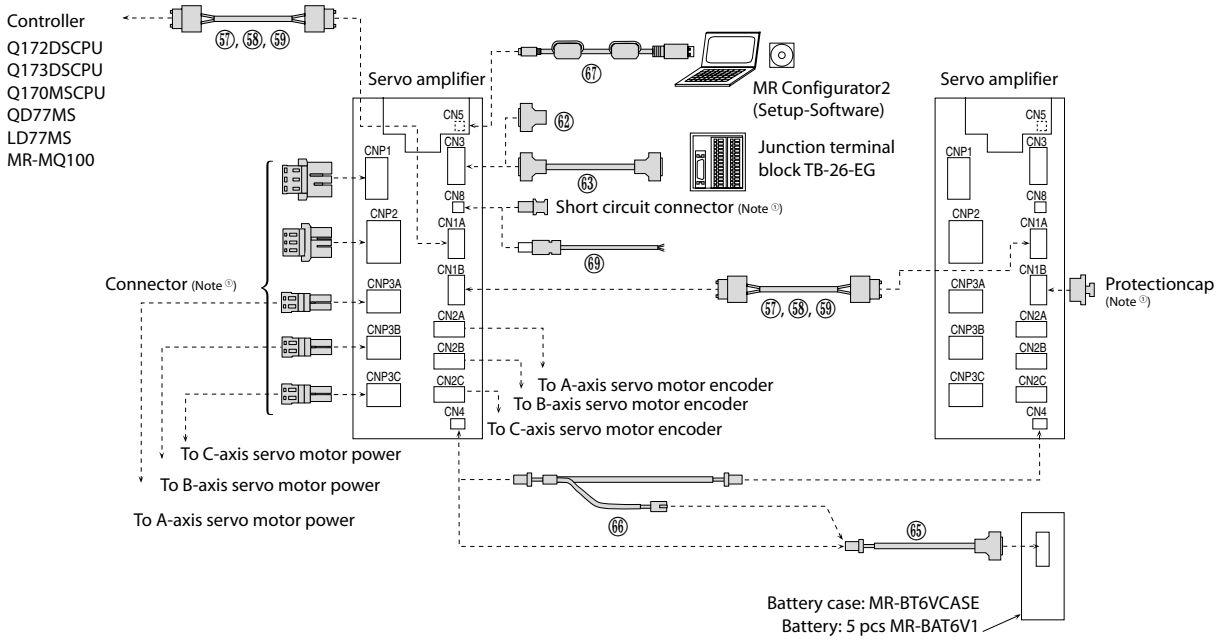


Options and Peripheral Equipment

Notes:

- ① Part of the delivery contents
- ② CN2L connector is available for MR-J4-B-RJ servo amplifier.

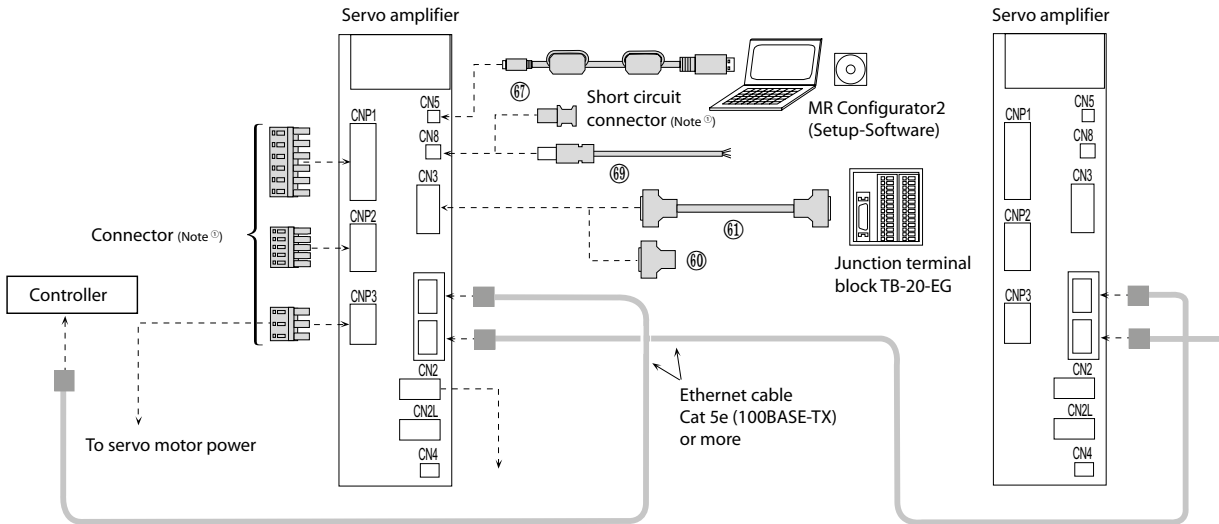
■ Cables and Connectors for MR-J4W2-B and MR-J4W3-B Servo Amplifiers



4

Options and Peripheral Equipment

■ Cables and Connectors for MR-J4-TM



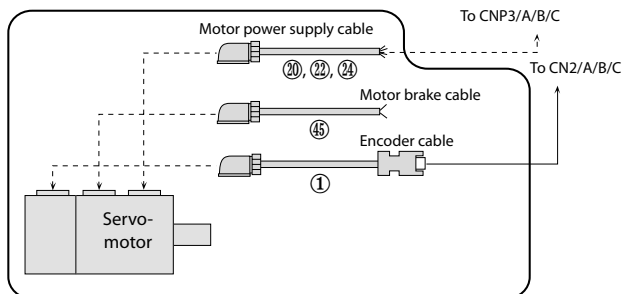
Notes:

- ① Part of the delivery contents
- ② CN2L connector is available for MR-J4-B-RJ servo amplifier.

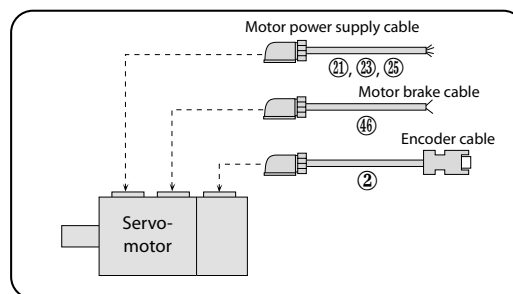
Cables and Connectors for Servo Motors

For HG-KR/HG-MR servo motor series: encoder cable length ≤ 10 m

Cables leading in the direction of the motor shaft

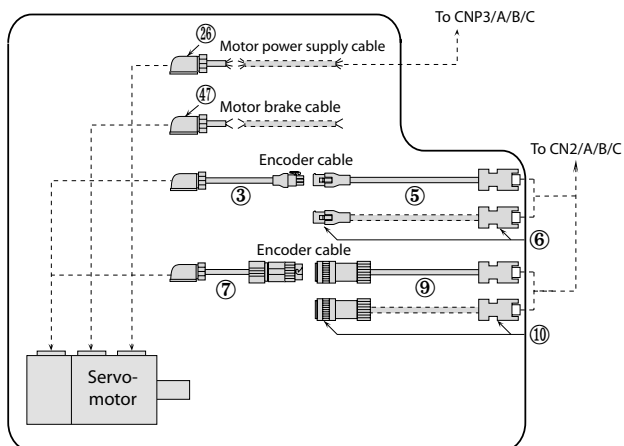


Cables leading in the opposite direction of the motor shaft

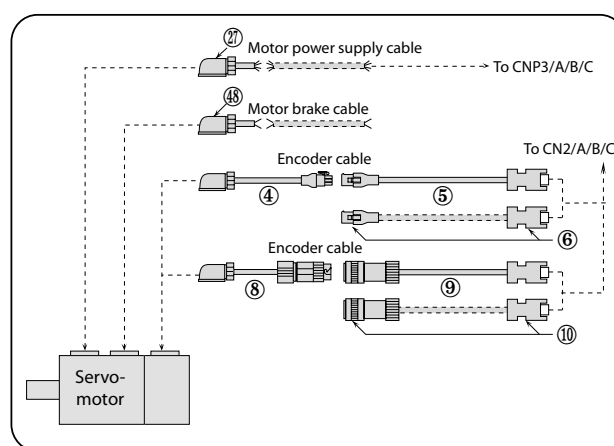


For HG-KR/HG-MR servo motor series: encoder cable length > 10 m

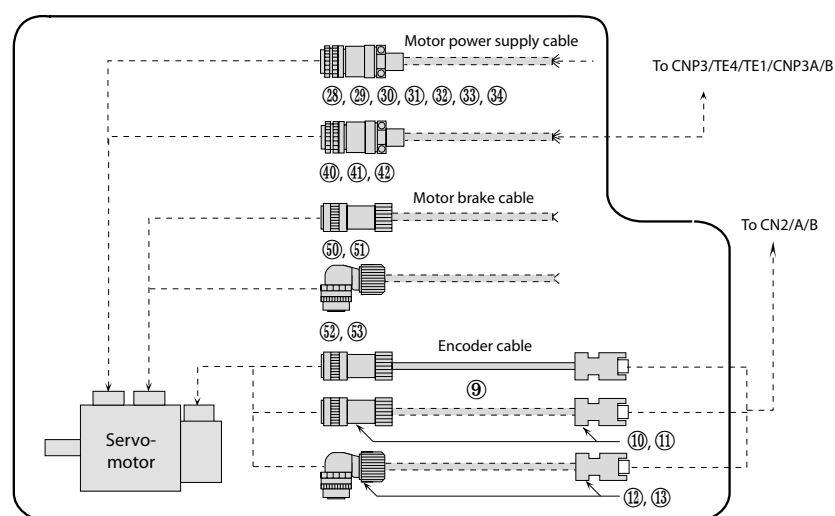
Cables leading in the direction of the motor shaft



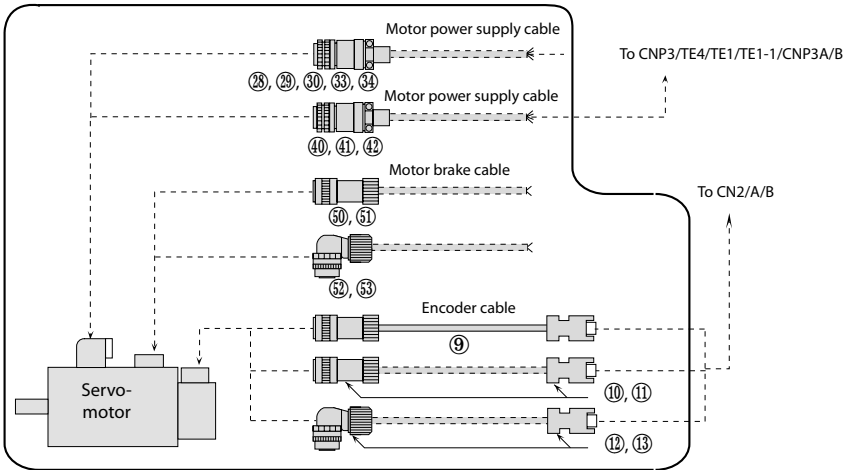
Cables leading in the opposite direction of the motor shaft



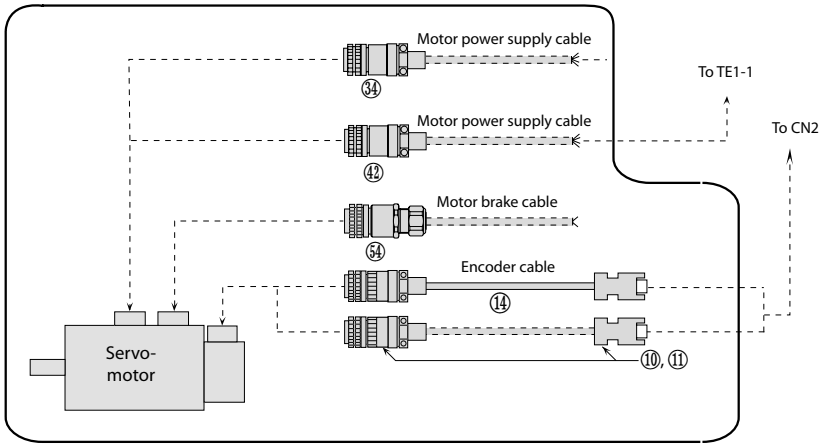
For HG-SR servo motor series



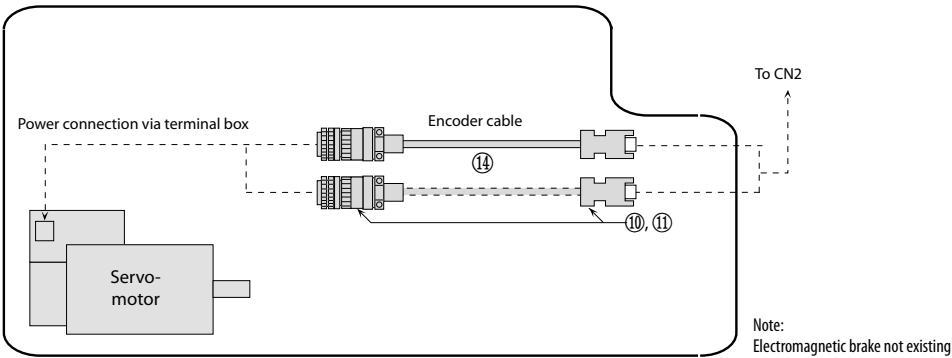
For HG-JR servo motor series ≤9 kW



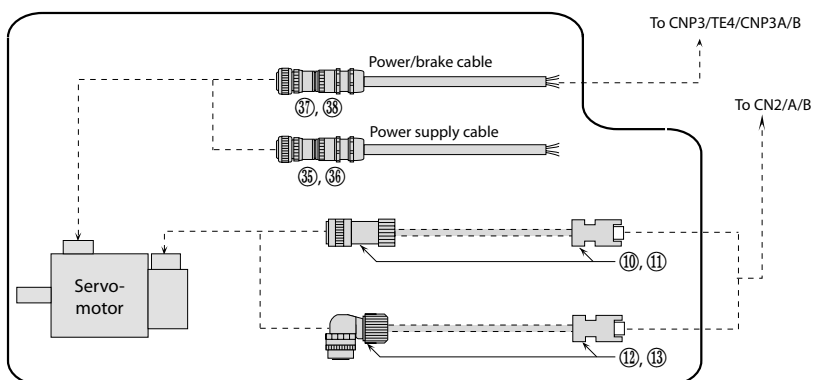
For HG-JR servo motor series 11 kW and 15 kW



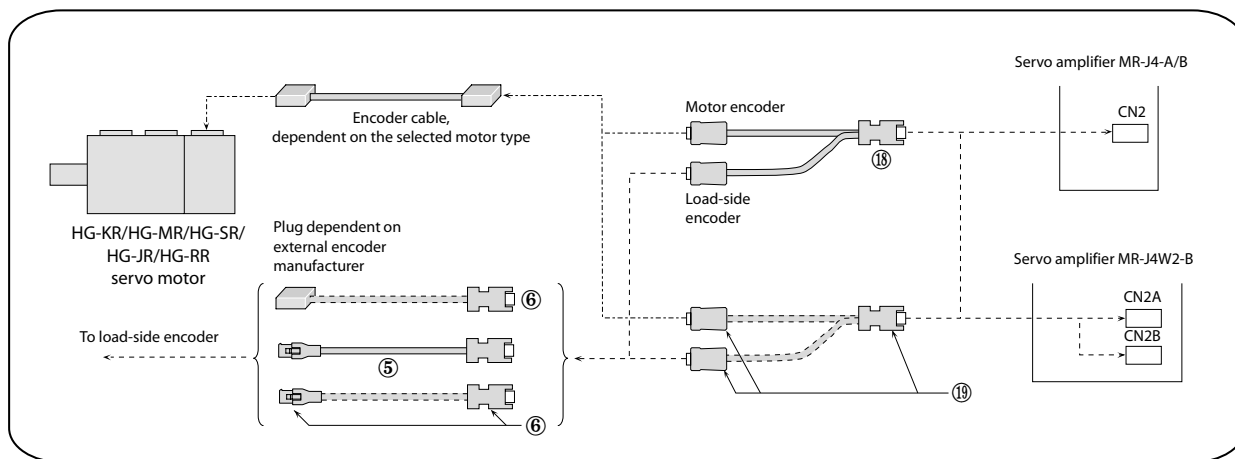
For HG-JR servo motor series 22 kW



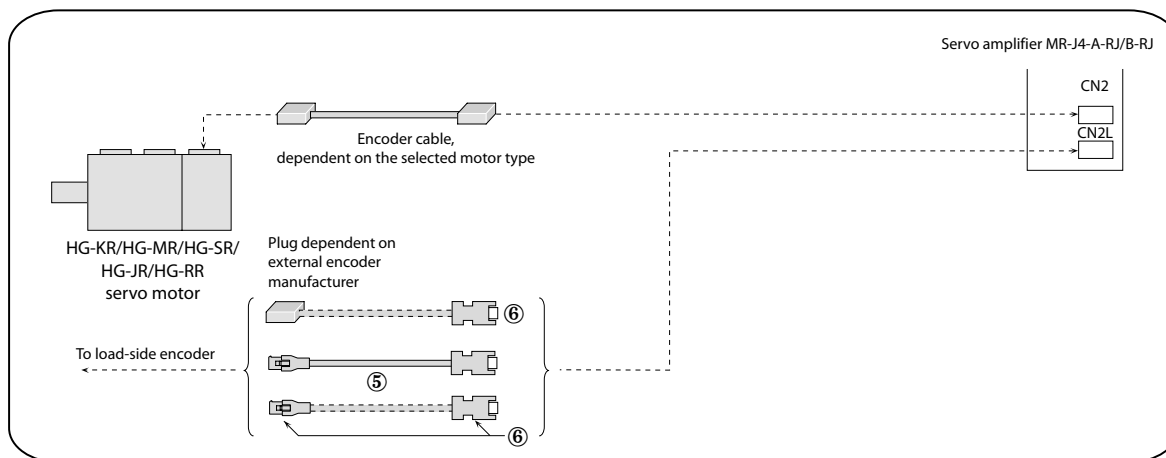
For HG-RR servo motor series



For fully closed loop control (MR-J4-B/A or MR-J4W2-B, and rotary servo motor)

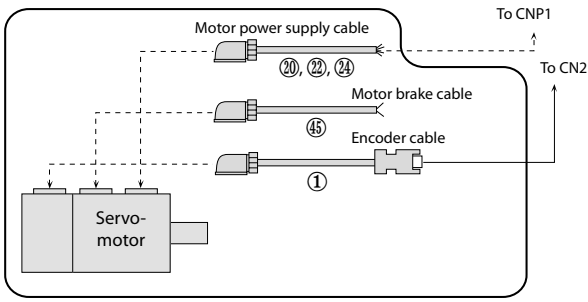


For fully closed loop control (MR-J4-B-RJ/A-RJ and rotary servo motor)

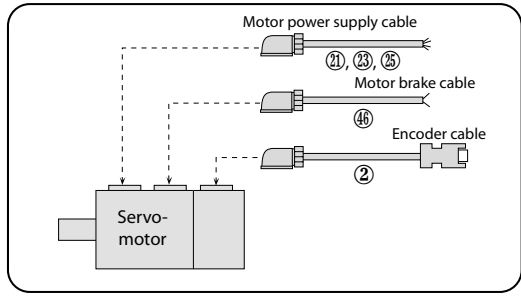


For HG-KN servo motor series: encoder cable length ≤10 m

Cables leading in the direction of the motor shaft



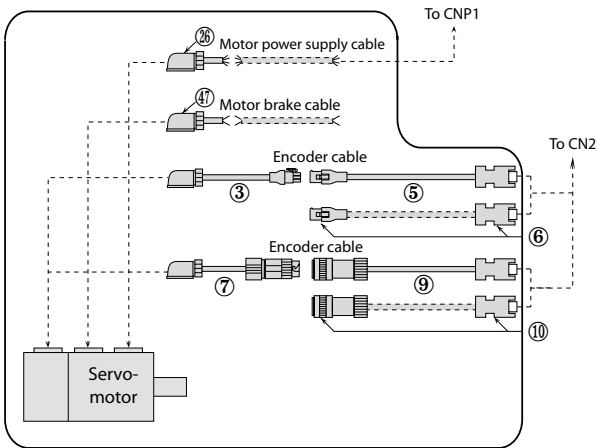
Cables leading in the opposite direction of the motor shaft



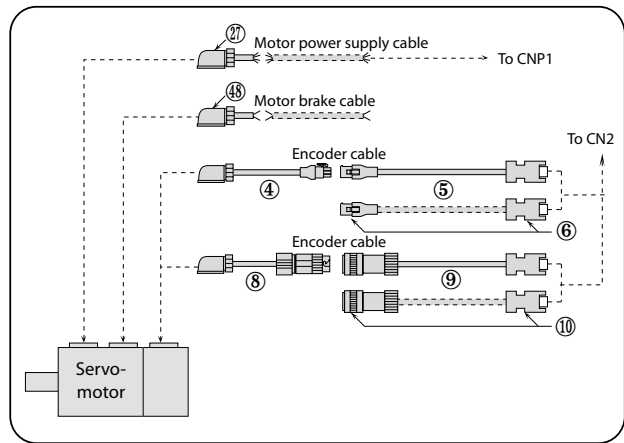
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For HG-KN servo motor series: encoder cable length >10 m

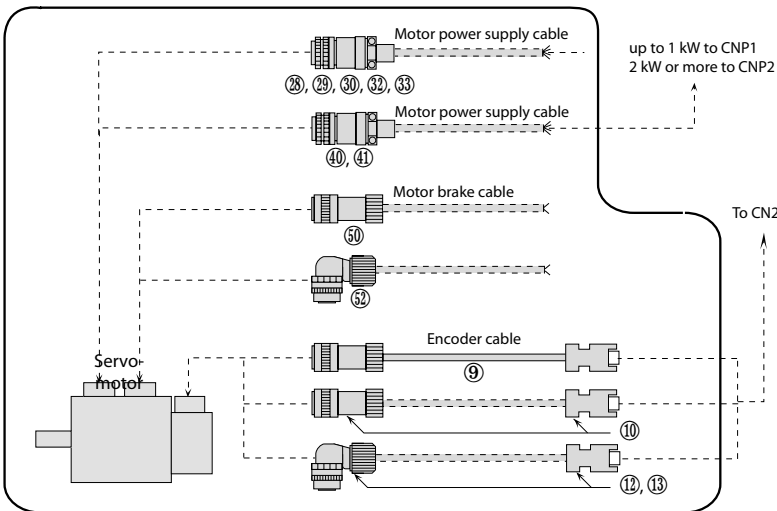
Cables leading in the direction of the motor shaft



Cables leading in the opposite direction of the motor shaft







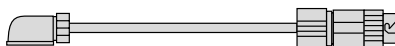
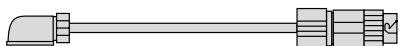

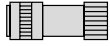



For HG-SN servo motor series



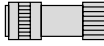
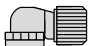

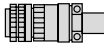


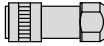



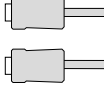



Note:
The online servo selection tool on our website helps you to select the right components for your system requirements. The corresponding article numbers of the selected configuration will be listed.

Cables and Connectors for Servo Amplifier (general)

| Item | Description | Model | Protection | Length | Art. no. | | |
|--|---|---|---|---|---|---|--|
| Select one for connecting the encoder to CN2 | ① Encoder cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft | Encoder connector (Tyco Electronics AMP) 1674320-1 | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) oder 54599-1019 (connector set, Molex) | MR-J3ENCBL□M-A1-H □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 160312 5 m 161547 10 m 161548 | |
| | | | | MR-J3ENCBL□M-A1-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 161549 5 m 161550 10 m 161551 | |
| | ② Encoder cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft |  | | | MR-J3ENCBL□M-A2-H □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 160230 5 m 161552 10 m 161553 |
| | | | | | MR-J3ENCBL□M-A2-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 161554 5 m 161555 10 m 161556 |
| | ③ Motor-side encoder cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft | Encoder connector (Tyco Electronics AMP) 1674320-1 | Junction connector (Tyco Electronics AMP) 1473226-1 (with ring) (contact) 1-172169-9 (housing) 316454-1 (cable clamp) |  | MR-J3JCBLO3M-A1-L Cable length: 0.3 m ① | IP20 | 0.3 m 161557 |
| | | | | | MR-J3JCBLO3M-A2-L Cable length: 0.3 m ① | IP20 | 0.3 m 154367 |
| | ④ Motor-side encoder cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft | Encoder connector (Tyco Electronics AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL) | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex) |  | MR-EKCBL□M-H □=Cable length: 20, 30, 40, 50 m ① | IP20 | 20 m 161559 30 m 161560 40 m 269075 50 m 229788 |
| | | | | | MR-EKCBL□M-L □=Cable length: 20, 30 m ① | IP20 | 20 m 161561 30 m 161562 |
| | ⑤ Amplifier-side encoder cable for HG-KR/HG-MR/HF-KN | Junction connector (Tyco Electronics AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL) | 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. | | |
| | | | | | Use these in combination of ③ or ④. | | |
| ⑥ Junction connector, Amplifier-side encoder ② for HG-KR/HG-MR/HG-KN | Junction connector (Tyco Electronics AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL) | Amplifier connector 54599-1019 (connector set, Molex), or 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) |  |  | MR-ECNM | IP20 — 161572 | |
| | | | | | | | <Applicable cable example> Wire size: 0.3 mm ² (AWG22) Completed cable outer diameter: Ø 8.2 mm Crimping tool (91529-1) is required. |
| ⑦ Encoder cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft | Encoder connector (TE Connectivity Ltd. Company) 2174053-1 | Junction connector (DDK) CM10-CR10P-M (straight plug) |  | MR-J3JSCBLO3M-A1-L Cable length: 0.3 m ① | IP65 | 0.3 m 239651 | |
| | | | | MR-J3JSCBLO3M-A2-L Cable length: 0.3 m ① | IP65 | 0.3 m 239652 | |
| ⑧ Encoder cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft | Encoder connector (DDK) <Für Kabel bis 10 m Länge> CM10-SP10S-M (straight plug) CM10-#225C(C1)-100 (socket contact) | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) oder 54599-1019 (connector set, Molex) |  | MR-J3ENSCLB□M-H □=Cable length: 2, 5, 10, 20, 30, 40, 50 m ① | IP67 | 2 m 160226 5 m 161563 10 m 161564 20 m 161565 30 m 161566 40 m 269076 50 m 244812 | |
| | | | | MR-J3ENSCLB□M-L □=Cable length: 2, 5, 10, 20, 30 m ① | IP67 | 2 m 161567 5 m 161568 10 m 161569 20 m 161570 30 m 161571 | |
| ⑨ Encoder cable for HG-KR/HG-MR/HG-SR/HG-JR/HG-RR/HG-KN/HG-SN | Encoder connector (DDK) CM10-SP10S-M (straight plug) CM10-#225C(S1)-100 (socket contact) | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) oder 54599-1019 (connector set, Molex) |  | MR-J3SCNS | | | |
| | | | | <Applicable cable example> Wire size: 0.5 mm ² (AWG20) or smaller Completed cable outer diameter: Ø 6.0 – 9.0 mm | | | |
| ⑩ Encoder connector set for HG-KR/HG-MR/HG-SR/HG-JR/HG-RR/HG-KN/HG-SN | Encoder connector (DDK) CM10-SP10S-M (straight plug) CM10-#225C(S1)-100 (socket contact) | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) oder 54599-1019 (connector set, Molex) |  |  | MR-J3SCNS | | |
| | | | | | <Applicable cable example> Wire size: 0.5 mm ² (AWG20) or smaller Completed cable outer diameter: Ø 6.0 – 9.0 mm | | |

Note:
 ① -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
 ② Concerning the making of the cables please refer to the user's manual of the servo amplifier MR-JE/MR-J4.

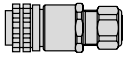
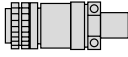
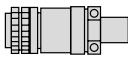
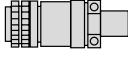
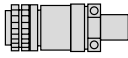
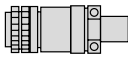
4 Options and Peripheral Equipment

| Item | Description | Model | Protection | Length | Art. no. | |
|------|--|---|---|--------|------------------------------------|--|
| ⑪ | Encoder connector set for HG-KR/HG-MR/HG-SR/HG-JR/HG-RR  <Applicable cable example> Wire size: 0.5 mm ² (AWG20) or kleiner Completed cable outer diameter: Ø 5.5 – 9.0 mm | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) oder 54599-1019 (connector set, Molex)  | MR-ENCNS2 | IP67 | — | 248686 |
| ⑫ | Encoder connector set for HG-SR/HG-JR/HG-RR/HG-SN  | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex)  | MR-J3SCNSA | IP67 | — | 227425 |
| ⑬ | <Applicable cable example> Wire size: 0.5 mm ² (AWG20) or smaller Completed cable outer diameter: Ø 5.5 – 9.0 mm | | MR-ENCNS2A | IP67 | — | 248687 |
| ⑭ | Encoder cable for HG-JR11K1M(4), 15K1M(4), 22K1M(4)  | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex)  | MR-ENECBL□M-H-MTH □=Cable length 2, 5, 10, 20, 30, 40, 50 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 268160 268161 268162 268163 268164 |
| ⑮ | Encoder connector set for HG-JR11K1M(4), 15K1M(4), 22K1M(4)  <Applicable cable example> Wire size: 0.3 mm ² (AWG22) to 1.25 mm ² (AWG16) Completed cable outer diameter: Ø 6.8 – 10 mm | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex)  | MR-ENECNS | IP67 | — | 210966 |
| ⑯ | Encoder connector set for TM-RFM  | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M) or 54599-1019 (connector set, Molex)  | MR-J3DDCNS | IP67 | — | 227979 |
| ⑰ | Encoder connector set for TM-RFM  | Encoder connector RM15WTPZK-12S(plug) JR13WCCA-8(72) (cable clamp)  | MR-J3DDSPS | IP67 | — | 227980 |
| ⑱ | Y cable for fully closed loop function  | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M)  | MR-J4FCCBL03M | — | 0.3 m | 248690 |
| ⑲ | Set for fully closed loop function  | Amplifier connector 36210-0100PL (receptacle, 3M) 36310-3200-008 (shell kit, 3M)  | MR-J3THMCN2 | — | — | 227110 |

| Item | Description | Model | Protection | Length | Art. no. | |
|---------------------------------------|---|---|--|--------------------|------------------------------------|--|
| Select one for the motor power supply | ⑳ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft, unshielded | MR-PWS1CBL□M-A1-H □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 160227 161592 161593 | |
| | ㉑ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft, unshielded | MR-PWS1CBL□M-A1-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 161594 161595 161596 | |
| | ㉒ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft, shielded | MR-PWS1CBL□M-A2-H □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 160228 161597 161598 | |
| | ㉓ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft, shielded | MR-PWS1CBL□M-A2-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 161599 161600 161601 | |
| | ㉔ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft, shielded, power chain. | MR-PWS3CBL□M-A1-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 210799 210800 210801 | |
| | ㉕ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft, shielded, power chain. | MR-PWS3CBL□M-A2-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 210802 210803 210814 | |
| | ㉖ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in direction of motor shaft | Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04SJ1-R (connector) ST-TMH-S-C1B-100-(A534G) (socket contact) | MR-PWS2CBL03M-A1-L Cable length: 0.3 m ① | IP55 | 0.3 m | 161602 |
| | ㉗ Power supply cable for HG-KR/HG-MR/HG-KN Lead out in opposite direction of motor shaft | Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04SJ1-R (connector) ST-TMH-S-C1B-100-(A534G) (socket contact) | MR-PWS2CBL03M-A2-L Cable length: 0.3 m ① | IP55 | 0.3 m | 161603 |
| | ㉘ Power supply cable for HG-SR52/HG-SN52, HG-SR524-1524/HG-JR53-73/HG-JR534-1034 | Motor power supply connector (DDK) CE05-6A□□SD-D-BSS (straight plug) CE3057-□A-□-D (cable clamp) | PCS015N-□.0-0C4 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 202275 202276 202277 202278 202279 |
| | ㉙ Power supply cable for HG-SN102/HG-SN102, HG-JR103-203/HG-JR1534-3534 | Motor power supply connector (DDK) CE05-6A□□SD-D-BSS (straight plug) CE3057-□A-□-D (cable clamp) | PCS025N-□.0-0C4 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 202280 202281 202282 202283 202294 |
| | ㉚ Power supply cable for HG-SR152/HG-SN152/HG-JR5034 | Motor power supply connector (DDK) CE05-6A□□SD-D-BSS (straight plug) CE3057-□A-□-D (cable clamp) | PCS040N-□.0-0C4 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 202295 202296 202297 202298 202299 |
| | ㉛ Power supply cable for HG-SR2024 | Motor power supply connector (DDK) CE05-6A□□SD-D-BSS (straight plug) CE3057-□A-□-D (cable clamp) | PCS025N-□.0-0C5 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 207465 207467 207468 207469 207470 |

Notes:






- ① -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
- ② The HG-RR motors with brake don't have an additional connector for brake. The contacts for brake are inside the power connector.

| Item | Description | Model | Protection | Length | Art. no. |
|--|--|--|------------|------------------------------------|--|
| Select one for the motor power supply | ③② Power supply cable for HG-SR202/HG-SR3524/HG-JR353/HG-SN202 | PCS040N-□.0-0C5 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 202300 202301 202302 202303 202304 |
| | ③③ Power supply cable for HG-SR352-502/HG-SR5024/HG-JR503/HG-SN302 | PCS060N-□.0-0C5 □=Cable length: 2, 5, 10, 20, 30 m | | IP67 | 2 m 5 m 10 m 20 m 30 m |
| | ③④ Power supply cable for HG-SR702/HG-SR7024/HG-JR703/HG-JR7034-15K1M4 | PCS100N-□.0-0C3 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | | 2 m 5 m 10 m 20 m 30 m |
| | ③⑤ Power supply cable for HG-RR103-203 | PCS040N-□.0-0C1 □=Cable length: 2, 5, 10, 20, 30 m | | IP67 | 2 m 5 m 10 m 20 m 30 m |
| | ③⑥ Power supply cable for HG-RR353-503 | PCS060N-□.0-0C2 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | | 2 m 5 m 10 m 20 m 30 m |
| | ③⑦ Power supply cable with integrated brake cable for HG-RR103B-203B ② | PCS040B-□.0-C1 □=Cable length: 2, 5, 10, 20, 30 m | | IP67 | 2 m 5 m 10 m 20 m 30 m |
| | ③⑧ Power supply cable with integrated brake cable for HG-RR353B-503B ② | PCS060B-□.0-C2 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | | 2 m 5 m 10 m 20 m 30 m |
| ③⑨ Motor power supply connector set (motor side) for TM-RFM□C20/TM-RFM□E20 |  Motor power supply connector (DDK) CE05-6A14S-2SD-D (plug) (straight) YS014-9-11 (cable clamp) (Daiwa Denryo) <Applicable cable example> Wire size: 0.3 mm ² (AWG22) to 1.25 mm ² (AWG16) Completed cable outer diameter: Ø 8.3 – 11.3 mm | MR-PWCNF (Straight type) | | IP67 | — |
| ④⑩ Motor power supply connector set (motor side) for HG-SR52-152, HG-SR524-1524, HG-JR53-203, HG-JR534-2034, 3534 and 5034 TM-RFM_G20, HG-SN52-152 |  Motor power supply connector (DDK) CE05-6A18-10SD-D-BSS (plug) (straight) CE3057-10A-1-D (cable clamp) <Applicable cable example> Wire size: 2 mm ² (AWG14) to 3.5 mm ² (AWG12) Completed cable outer diameter: Ø 10.5 – 14.1 mm | MR-PWCNS4 (Straight type) | IP67 | — | 161573 |
| ④⑪ Motor power supply connector set (motor side) for HG-SR202-502, HG-SR2024-5024, HG-JR353-503 TM-RFM040J10, TM-RFM120J10, HG-SN202-302 |  Motor power supply connector (DDK) CE05-6A22-22SD-D-BSS (plug) (straight) CE3057-12A-1-D (cable clamp) <Applicable cable example> Wire size: 5.5 mm ² (AWG10) to 8 mm ² (AWG8) Completed cable outer diameter: Ø 12.5 – 16 mm | MR-PWCNS5 (Straight type) | IP67 | — | 161574 |
| ④⑫ Motor power supply connector set (motor side) for HG-SR702, 7024, HG-JR703-15K1M HG-JR7034-15K1M4 TM-RFM240J10 |  Motor power supply connector (DDK) CE05-6A32-17SD-D-BSS (plug) (straight) CE3057-20A-1-D (cable clamp) <Applicable cable example> Wire size: 14 mm ² (AWG6) to 22 mm ² (AWG4) Completed cable outer diameter: Ø 22 – 23.8 mm | MR-PWCNS3 (Straight type) | IP67 | — | 136358 |
| ④⑬ Motor power supply connector set (motor side) for HG-RR103-203 |  Motor power supply connector (DDK) CE05-6A22-23SD-D-BSS (plug) (straight) CE3057-12A-2-D (cable clamp) <Applicable cable example> Wire size: 2 mm ² (AWG14) to 3.5 mm ² (AWG12) Completed cable outer diameter: Ø 9.5 – 13 mm | MR-PWCNS1 (Straight type) | IP67 | — | 64036 |
| ④⑭ Motor power supply connector set (motor side) for HG-RR353-503 |  Motor power supply connector (DDK) CE05-6A24-10SD-D-BSS (plug) (straight) CE3057-16A-2-D (cable clamp) <Applicable cable example> Wire size: 5.5 mm ² (AWG10) to 8 mm ² (AWG8) Completed cable outer diameter: Ø 13 – 15.5 mm | MR-PWCNS2 (Straight type) | IP67 | — | 64035 |

Notes:

- ① -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
- ② The HG-RR motors with brake don't have an additional connector for brake. The contacts for brake are inside the power connector.

■ Cables and Connectors for Servo Amplifier (with electromagnetic brake)

| Item | Description | Model | Protection | Length | Art. no. | | |
|--|---|---|--|------------------------------|------------------------------------|--|--------|
| ④5 | Brake cable for HG-KR/ HG-MR/HG-KN Lead out in direction of motor shaft | Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04S1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact) | MR-BKS1CBL□M-A1-H □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 161604 161605 161606 | |
| | Brake cable for r HG-KR/ HG-MR/HG-KN Lead out in opposite direc- tion of motor shaft |  Lead out | MR-BKS1CBL□M-A1-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 161607 161608 161609 | |
| ④6 | Brake cable for r HG-KR/ HG-MR/HG-KN Lead out in opposite direc- tion of motor shaft |  Lead out | MR-BKS1CBL□M-A2-H □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 160311 161610 161611 | |
| | Brake cable for HG-KR/ HG-MR/HG-KN Lead out in direction of motor shaft | Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04S1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact) | MR-BKS1CBL□M-A2-L □=Cable length: 2, 5, 10 m ① | IP65 | 2 m 5 m 10 m | 161612 161613 161614 | |
| ④7 | Brake cable for HG-KR/ HG-MR/HG-KN Lead out in direction of motor shaft | Motor power supply connector (Japan Aviation Electronics Industry) JN4FT04S1-R (plug) ST-TMH-S-C1B-100-(A534G) (socket contact) | MR-BKS2CBL03M-A1-L Cable length: 0.3 m ① | IP55 | 0.3 m | 161615 | |
| | Brake cable for HG-KR/ HG-MR/HG-KN Lead out in opposite direc- tion of motor shaft |  Lead out | MR-BKS2CBL03M-A2-L Cable length: 0.3 m ① | IP55 | 0.3 m | 161616 | |
| Select one for the motor electro-magnetic brak | ④9 Brake cable for HG-SN/ HG-SR/HG-JR | Motor power supply connector (DDK) (soldered type) CM10-SP2S-L (straight plug), CM10-#22SC (S2)-100 (socket contact) | BCS015S-□.0-BKS1 □=Cable length: 2, 5, 10, 20, 30 m | IP67 | 2 m 5 m 10 m 20 m 30 m | 202249 202250 202251 202252 202253 | |
| | ④8 | Brake connector for HG-SR, HG-JR53B-903B HG-JR534B-9034B, HG-SN | Motor power supply connector (DDK) (soldered type) CMV1-SP2S-L (straight plug), CMV1-#22BSC-S2-100 (socket contact) | MR-BKCNS1 (Straight type) | IP67 | — | 161575 |
| ④9 | Brake connector for HG-SR, HG-JR53B-903B HG-JR534B-9034B | <Applicable cable example> Wire size: 1.25 mm ² (AWG16) or smaller Completed cable outer diameter: Ø9.0 – 11.6 mm | Motor power supply connector (DDK) (soldered type) CMV1S-SP2S-L (straight plug), CMV1-#22BSC-S2-100 (socket contact) | MR-BKCNS2 (Straight type) | IP67 | — | 248688 |
| ④0 | Brake connector for HG-SR, HG-JR53B-903B HG-JR534B-9034B, HG-SN |  | Motor power supply connector (DDK) (soldered type) CMV1-AP2S-L (straight plug), CMV1-#22BSC-S2-100 (socket contact) | MR-BKCNS1A | IP67 | — | 227427 |
| ④1 | Brake connector for HG-SR, HG-JR53B-903B HG-JR534B-9034B | <Applicable cable example> Wire size: 1.25 mm ² (AWG16) or smaller Completed cable outer diameter: Ø9.0 – 11.6 mm | Motor power supply connector (DDK) (soldered type) CMV1S-AP2S-L (straight plug), CMV1-#22BSC-S2-100 (socket contact) | MR-BKCNS2A | IP67 | — | 248689 |
| ④2 | Brake connector for HG-JR11K1MB, 15K1MB, 11K1M4B, 15K1M4B |  | Motor power supply connector D/MS3106A10SL-4S(D190) (plug, DDK) YSO10-5 bis 8 (straight plug), Daiwa Denryo <Applicable cable example> Wire size: 0.3 mm ² (AWG22) to 1.25 mm ² (AWG16) Completed cable outer diameter: Ø5 – 8.3 mm | MR-BKCN (Straight type) | IP65 | — | 64034 |


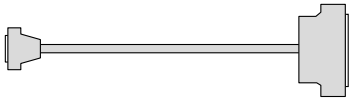


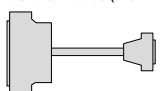


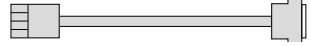

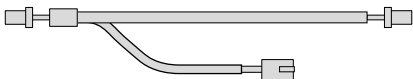
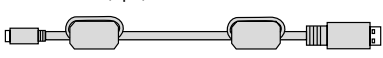
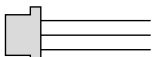

Note:
① -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.

Encoder cables, battery connection relay cable, power supply cables, brake cables, USB cable and servo amplifier power supply connector set from ① to ④2 are same for the servo amplifier series MR-JE, MR-J4-A, MR-J4-B, MR-J4W2 and MR-J4W3.




■ Cables and Connectors for MR-J4 Servo Amplifier

4

Options and Peripheral Equipment

| Item | Description | Model | Protection | Length | Art. no. | |
|-------------------|--|--|--|--|------------------------------|--------------------------------------|
| For CN1 | 55 Connector set for MR-J4-A/MR-JE-A  | Amplifier connector (3M or an equivalent product) 10150-3000PE (connector) 10350-52F0-008 (shell kit) | — | — | 160225 | |
| | 56 Cable of junction terminal block TB-50-EG and MR-J4-A/MR-JE-A  | Junction terminal block connector (3M) D7950-B500FL (connector) Amplifier connector (3M or an equivalent product) 10150-6000EL (connector) 10350-3210-000 (shell kit) ③ | MR-J2M-CN1TBL□M □= | — | 0.5 m 1 m | 146794 189864 |
| For CN1A/ CN1B | 57 SSCNETIII/H cable (standard) for MR-J4-B MR-J4W2-B MR-J4W3-B MR-JE-B Connector: PF-2D103 (Japan Aviation Electronics Industry) |  | — | 0.15 m | 161579 | |
| | 58 SSCNETIII/H cable (long flex) for MR-J4-B MR-J4W2-B MR-J4W3-B MR-JE-B Connector: PF-2D103 (Japan Aviation Electronics Industry) | | | MR-J3BUS□M □=Cable length: 0.15, 0.3, 0.5, 1, 3 m | 0.3 m 0.5 m 1 m 3 m | 161580 161581 161582 161583 |
| | 59 SSCNETIII/H cable (long flex) for MR-J4-B MR-J4W2-B MR-J4W3-B MR-JE-B | | | MR-J3BUS□M-A □=Cable length: 5, 10, 20 m | 5 m 10 m 20 m | 161584 161585 161586 |
| For CN3 | 60 Connector set for MR-J4-B MR-J4-B/MR-J4-GF/ MR-J4-TM/MR-JE-B  | — | — | — | 55912 | |
| | 61 Cable for junction terminal block TB-20-EG and MR-J4-B/MR-J4-GF/ MR-J4-TM/MR-JE-B  | Amplifier connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) ② Junction terminal block connector (3M) 3421-6020 (connector) | MR-J3TBL-CN3-□M-EG □=Cable length: 0.5, 1 m | — | 0.5 m 1 m | 212096 212095 |
| | 62 Connector set (Qty:1 pc) for MR-J4W2-B MR-J4W3-B  | Amplifier connector (3M or an equivalent product) 10126-3000PE (connector) 10326-52F0-008 (shell kit) | MR-J2CMP2 | — | — | 149764 |
| For CN4 | 63 Cable of junction terminal block TB-26-EG and MR-J4W2-B/MR-J4W3-B  | Amplifier connector (3M or an equivalent product) 10120-3000PE (connector) 10320-52F0-008 (shell kit) ② Junction terminal block connector (3M) 3421-6020 (connector) | MR-ESTBL-CN1-□M-EG □=Cable length: 0.5, 1 m | — | 0.5 m 1 m | 215135 215137 |
| | 64 RS422-Kabel für MR-J4-A  | Amplifier connector RJ45 Connector GOT D-SUB DE-9 | GT01-C30RJ45-9P-EG GT01-C50RJ45-9P-EG | — | 3 m 5 m | 304011 304010 |
| | 65 Cable of battery MR-BT6VCASE and MR-J4W2-B/MR-J4W3-B  | — | MR-BT6V1CBL□M □=Cable length: 0.3, 1 m | — | 0.3 m 1.0 m | 248694 248695 |
| For CN5 | 66 Cable for MR-J4W2-B and MR-J4W3-B  | — | MR-BT6V2CBL□M □=Cable length: 0.3, 1 m | — | 0.3 m 1.0 m | 248696 248697 |
| | 67 USB cable for MR-J4-B/ MR-J4-A/ MR-J4-GF/MR-J4-TM/ MR-J4W2-B/MR-J4W3-B/ MR-JE-A/MR-JE-B  | Amplifier connector mini B connector (5 pin) Personal computer connector A connector | MR-J3USBCBL3M Cable length: 3 m | — | 3 m | 160229 |
| For CN6 | 68 Monitor cable  | — | MR-J3CN6CBL1M Cable length: 1 m | — | 1 m | 161578 |
| For CN8 | 69 STO cable  | Safety logic unit connector (Tyco Electronics) 2013595-1 (connector set) Amplifier connector (Tyco Electronics) 2013595-1 (connector set) | MR-D05UDL3M-B | — | 3 m | 227986 |

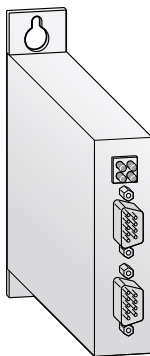
■ Cables and Connectors for MR-JE Servo Amplifier

| Item | Description | Model | Protection | Length | Art. no. |
|---------|---|--|------------|--------------|------------------|
| For CN1 | ⑩ Connector Set for MR-JE-A  Amplifier connector (3M or an equivalent product) 10150-3000PE (connector) 10350-52F0-008 (shell kit) | MR-J3CN1 | — | — | 160225 |
| | ⑪ Cable of junction terminal block TB-50-EG and MR-JE-A  Amplifier connector (3M or an equivalent product) 10150-6000EL Junction terminal block connector (3M) D7950-B500FL (connector) 10350-3210-000 (shell kit) ③ | MR-J2M-CN1TBL□M □=Cable length: 0.5, 1m | — | 0.5 m 1 m | 146794 189864 |
| For CN3 | ⑫ USB cable for MR-JE-A/B  Amplifier connector mini B connector (5 pin) Personal computer connector A connector | MR-J3USBCBL3M Cable length: 3 m | — | 3 m | 160229 |

Note:

- ① -H and -L indicate a bending life. -H indicates a long bending life, and -L indicates a standard bending life.
- ② Concerning the making of the cables please refer to the user's manual of the servo amplifier MR-J4.
- ③ Connector and shell kit are press bonding type. The solder type is 10120-3000PE (connector) and 10350-52F0-008 (shell kit).

■ Converter MR-ENCOM

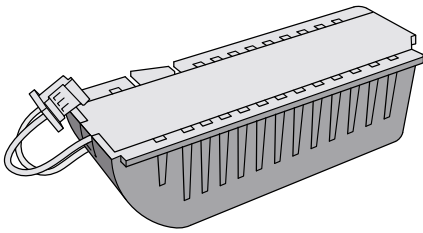


The interface module MR-ENCOM is a gateway to convert the Endat 2.2 or Hipecface DSL communication to Mitsubishi Electric serial encoder communication. By changing the external wiring the module is compatible to both Endat2.2 and Hyperface DSL.

In addition to the variety of compatible rotary/linear servo motors offered by Mitsubishi Electric, also motors from third-party manufacturers can be driven by MR-J4 servo amplifiers by using the gateway MR-ENCOM.

| Specifications | MR-ENCOM-SET |
|--------------------------------|---|
| Communication | Endat 2.1 (without analog signals and sense signal), Endat 2.2 (without safety function), Hyperface DSL (without safety function) |
| Absolute/incremental | Both |
| Rotary/linear | Both |
| Resolution | 10–40 Bits |
| Rated output voltage | 10 ± 0.3 V (at CN1 connector) |
| Max. continuous output current | 200 mA |
| Protection class | IP30 |
| Dimensions (WxHxD) | mm 23x114x101 |
| Order information | Art. no. 275133 |
| Connection cables | Length 0.3 m; part of the set. |
| Servoamplifier | MR-J4-A-RJ and MR-J4-B-RJ (compatible with MR-ENCOM). Please contact your Mitsubishi Electric sales representative if necessary. |

■ Buffer Battery



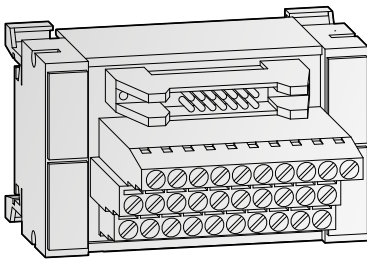
The servomotor's absolute value can be maintained by mounting the MR-BAT6V1SET(-A) battery on the servo amplifier. The battery is not required when the servo system is used in incremental mode.

| Battery | MR-BAT6V1SET | MR-BAT6V1SET-A |
|-------------------|---|---|
| Application | Buffering absolute positioning data for MR-J4-A/B | Buffering absolute positioning data for MR-JE-B/MR-J4-GF/MR-J4-TM |
| Order information | Art. no. 248691 | 281981 |

4

Options and Peripheral Equipment

■ Terminal Blocks

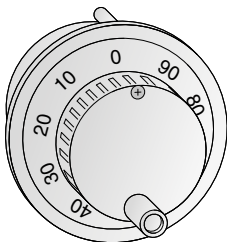


These terminal blocks TB-20-EG, TB-26-EG and TB-50-EG are adapter modules that simplify the wiring of the inputs and outputs of the servo

amplifiers. In addition preconfigured system cabling is available for all of these terminal blocks.

| Specifications | TB-20-EG | TB-26-EG | TB-50-EG |
|---------------------|--|---|---|
| Terminal block type | Input/output block | Input/output block | Input/output block |
| Channels | 8/16 | 26 | 50 |
| Design | 20 pin terminal module | 26 pin terminal module | 50 pin terminal module |
| Connection type | Screw terminals | Screw terminals | Screw terminals |
| Application | Servoamplifier MR-JE-B/ MR-J4-B/MR-J4-GF/MR-J4-TM | Servoamplifier MR-J4W2-B/ MR-J4W3-B Motion controller Q170MSCPU | Servoamplifier MR-J4-A/ MR-JE-A Motion controller MR-MQ100 |
| Dimensions (WxHxD) | mm 75x45x52 | 73x81x58 | 102x81x80 |
| Order information | Art. no. 212032 | 215134 | 212033 |
| Connection cables | MR-J3TBL-CN3-05M-EG; length 0.5 m; Art. no.: 212096, MR-J3TBL-CN3-1M-EG; length 1 m; Art. no.: 212095 | MR-ESTBL-CN1-05M-EG; length 0.5 m; Art. no.: 215135 MR-ESTBL-CN1-1M-EG; length 1 m; Art. no.: 215137 | MR-J2M-CN1TBL05M; length 0.5 m; Art. no.: 146794 MR-J2M-CN1TBL1M; length 1 m; Art. no.: 189864 |

■ Manual Pulse Generator

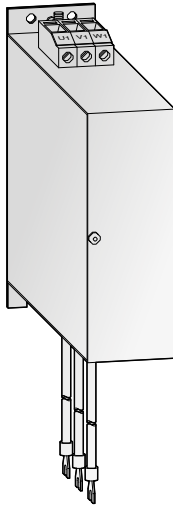


MR-HDP01

By this serial handwheel an external incremental setting value can be generated.

| Specifications | MR-HDP01 |
|---------------------|--|
| Resolution | 25 pls/rev (100 pls/rev at magnification of 4) |
| Output voltage | Input voltage > 1 V |
| Consumption current | Max. 60 mA |
| Weight | kg 0.4 |
| Order information | Art. no. 128728 |

EMC Filters



For complying with the EMC directives of the European Community regarding the electromagnetic compatibility, the servo amplifiers have to be equipped with an EMC filter across the input circuit. Additionally it has to be installed and wired according to the EMC directives.

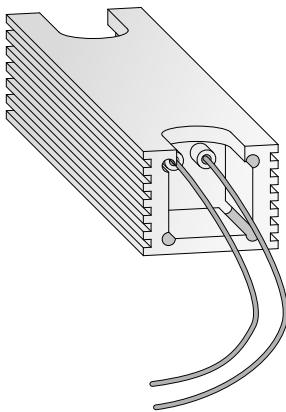
The filter units are designed to reduce mains conducted RFI emissions to meet the European standard EN 61800-3.

More details are enclosed in the installation sheet of the MR-J4 filters.

| Filter ① | Servo amplifier | Power loss [W] | Rated current [A] | Leakage current ② [mA] | Weight [kg] | Art. no. |
|-----------------------|---|----------------|-------------------|------------------------|-------------|----------|
| MF-2F230-006.230MFa | MR-J4-10A/B–MR-J4-60A/B | 10 | 6 | <26 | 0.45 | 189332 |
| MF-2F230-006.230Mfb | MR-J4-70A/B/GF/TM | 10 | 6 | <26 | 0.45 | 189331 |
| MF-2F230-006.230Mfc | MR-J4-10GF/TM–MR-J4-60GF/TM | 10 | 6 | <26 | 0.75 | 291739 |
| MF-2F230-006.232MF | MR-J4W2-22B–MR-J4W2-44B | 2 | 6 | <39 | 1.2 | 258685 |
| MF-2F230-015.232MF | MR-J4W2-77B and MR-J4W3-222B–MR-J4W3-444B | 4 | 15 | <39 | 1.2 | 258261 |
| MF-3F480-010.233MF | MR-J4-100A/B/GF/TM and MR-J4-60A4/B4/GF4/TM4–MR-J4-100A4/B4/GF4/TM4 | 9 | 10 | <7 | 1.0 | 208775 |
| MF-3F480-015.230MF3 | MR-J4-200A/B/GF/TM, MR-J4-200A4/B4/GF4/TM4, MR-JE-200A/B and MR-JE-300A/B | 12 | 15 | <4 ② | 1.5 | 200463 |
| MF-3F480-015.234MF | MR-J4-350A4/B4/GF4/TM4 | 4 | 15 | <11,7 | 1,5 | 270474 |
| MF-3F480-025.230MF3 ③ | MR-J4-350A/B/GF/TM and MR-J4-500A4/B4/GF4/TM4 –MR-J4-700A4/B4/GF4/TM4 | 20 | 25 | <4 | 3,0 | 203854 |
| MF-3F480-050.230MF3 ③ | MR-J4-500A/B/GF/TM and MR-J4-700A/B/GF/TM | 40 | 50 | <4 | 4.0 | 203855 |
| MF-3F480-015.232MF | MR-J4W2-1010B and MR-J4W3-222B–MR-J4W3-444B | 4 | 15 | <15 | 1.3 | 258262 |
| FMR-ES-3A-RS1-FP | MR-JE-10A/B–MR-JE-40A/B | 1 | 3 | <3.5 | 0.32 | 219207 |
| FMR-ES-6A-RS1-FP | MR-JE-70A/B and MR-JE-100A/B 1-pahse | 4.4 | 6 | <3.5 | 0.37 | 219208 |

- ① All filters can provide conformity with the limits for environment 1, restricted distribution up to 50 m or environment 1, unrestricted distribution up to 20 m.
- ② At normal operation: voltage difference between 2 phases < 3 %/at fault occurrence (value in brackets) : 2 dead phases (worst case)
- ③ No foot print filter

Brake Resistors



If the regenerative power exceeds the power of the built-in resistor, the following listed optional brake resistors can be used.

| Resistor | Servo amplifier | Power capacity [W] | Resistance [Ω] | Weight [kg] | Dimensions (WxHxD) [mm] | Art. no. |
|--------------------|--|--------------------|----------------|-------------|-------------------------|----------|
| MR-PWR-R 150-40 | MR-J4-10A/B/GF/TM–MR-J4-100A/B/GF/TM, and MR-JE-10A/B–MR-JE-100A/B | 150 | 40 | 0.16 | 36x27x90 | 137279 |
| MR-PWR-R 400-40 | MR-J4-70A/B/GF/TM–MR-J4-100A/B/GF/TM and MR-JE-70A/B–MR-JE-100A/B | 400 | 40 | 0.42 | 36x27x200 | 137278 |
| MR-PWR-R 600-13 | MR-J4-200A/B/GF/TM and MR-JE-200A/B–MR-JE-300A/B | 600 | 13 | 0.73 | 36x27x320 | 137277 |
| MR-PWR-R 600-6.7 | MR-J4-500A/B/GF/TM–MR-J4-700A/B/GF/TM | 600 | 6.7 | 0.73 | 36x27x320 | 137275 |
| MR-PWR-R T 400-120 | MR-J4-60A4/B4/GF4/TM4–MR-J4-100A4/B4/GF4/TM4 | 400 | 120 | 0.4 | 36x27x200 | 154746 |
| MR-PWR-R T 600-26 | MR-J4-500A4/B4/GF4/TM4–MR-J4-700A4/B4/GF4/TM4, MR-J4W2-22B–MR-J4W2-44B and MR-J4W3-222B–MR-J4W3-444B | 600 | 26 | 0.64 | 36x27x320 | 154752 |
| MR-PWR-R T 400-9 | MR-J4W2-77B–MR-J4W2-1010B and MR-J4-350A/B/GF/TM | 400 | 9 | 0.64 | 36x27x320 | 269425 |
| MR-PWR-R T 600-47 | MR-J4-200A4/B4/GF4/TM4–MR-J4-350A4/B4/GF4/TM4 | 600 | 47 | 0.64 | 36x27x320 | 154751 |

Note: The MR-J4-11KA4/B4/GF4/TM4–MR-J4-22KA4/B4/GF4/TM4 have the external brake resistors included.

■ Setup Software (MR Configurator2)

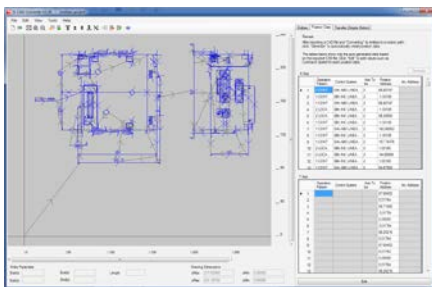
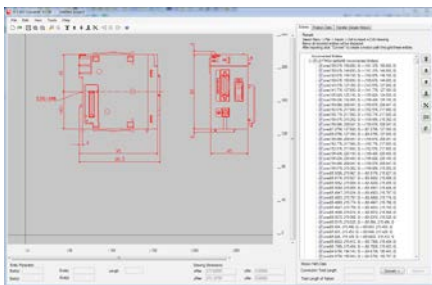


The comfortable setup software for Windows based personal computers allows perfect tuning of the servo amplifiers and the connected servo motors.

The software makes it easy to read and write parameters, monitor, diagnose and test the servo system via a personal computer.

| Functions | MR Configurator2 |
|--------------------------|--|
| Monitor | Batch display, input/output I/F display, high speed monitor, graph display |
| Parameters | Parameter setting, device setting, tuning, display of change list, display of detailed information, converter, parameter copy |
| Diagnostics | Rotation failure reason display, system information display, tuning data display, absolute data display, axis name setting, amplifier diagnostic |
| Alarms | Alarms Alarm display, alarm history, display of data that generated alarm |
| Test operations | JOG operation, positioning operation, operation without motor, forced digital output, program operation using simple language |
| Advanced function | Advanced function Machine analyser, gain search, machine simulation |
| Others | Others Automatic operation, help display, project and data administration |
| Order information | Art. no. 251540 |

■ G-CAD Converter Software



The G-CAD converter software enables the import of 2D CAD files and G code programs and converts these into programs processable with Simple Motion/Motion Controllers.

The process profile can be edited and optimized before transfer.

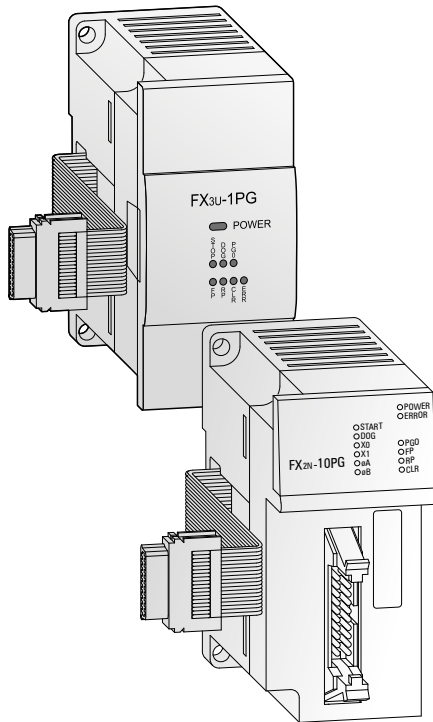
With the help of the G-CAD converter software the user can arrange different process profiles quick and easily, without touching the PLC program.

| Functions | G-CAD Converter |
|---------------------|--|
| Data import | DXF file and G code program as text file |
| Data transfer | Direct positioning data transmission to Simple Motion modules |
| Data export | Positioning data export to a CSV file |
| Others | Automatic shortcut of single elements, shifting an rotation possible, move sequence changing |
| Supported languages | English, German, Italian, Polish, Turkish |
| Supported devices | FX3U-20SSC-H, LD77MS, QD75MH, QD77MS |

MELSEC FX Positioning Units

The high-speed counter and single axis positioning modules described below can be used in combination with the FX series PLCs.

This provides a cost effective solution for small servo/motion applications.



High speed counter and pulse train modules

These high speed modules provide additional counting and pulse train output features to the FX3U/FX3UC PLC. The high speed counters allow 1- or 2-phase pulses with counting speeds up to a maximum of 50 kHz for the FX2N-1HC and 200 kHz for the FX3U modules.

The FX3U-2HSY-ADP pulse train output module can provide pulse streams up to 200 kHz for use in basic positioning applications.

The MR-JE-A and MR-J4-A series amplifiers can be directly driven by these units.

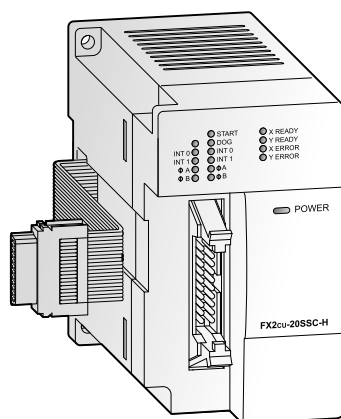
Single-axis positioning module

The positioning modules FX3U-1PG and FX2N-10PG are extremely efficient single-axis positioning modules for controlling servo drives like MR-JE-A and MR-J4-A, (by external controller) with a pulse train. It is very suitable for achieving accurate positioning in combination with the MELSEC FX series.

The configuration and allocation of the position data are carried out directly via the PLC program.

A very wide range of manual and automatic functions are available to the user.

| Specifications | FX3U-1PG | FX2N-10PG |
|---------------------------------|-------------------|---|
| Accessible axes | 1 | 1 |
| Output frequency pulse/s | 10–100 000 | 1–1 000 000 |
| Signal level for digital inputs | 24 V DC/40 mA | 5 V DC/100 mA; 24 V DC/70 mA |
| Power supply | 5 V DC 24 V DC | 55 mA (from base unit) 120 mA (from base unit) |
| Related I/O points | 8 | 8 |
| Dimensions (WxHxD) | mm 43x90x87 | 43x90x87 |
| Order information | Art. no. 259298 | 140113 |



SSCNETIII module FX3U-20SSC-H

The SSCNET module FX3U-20SSC-H can be used in combination with a FX3U programmable controller to achieve a cost effective solution for high precision, high speed positioning. The plug-and-play fiber optic SSCNETIII cabling reduces setup time and increases control distance for positioning operations in a wide range of applications.

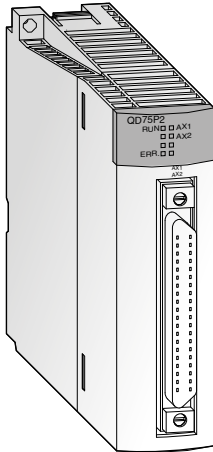
Servo parameters and positioning information for the FX3U-20SSC-H are easily set up with an FX3U base unit and a personal computer. For parameter setting, monitoring and testing the easy programming software FX Configurator-FP is available.

For further specifications please refer to the MELSEC FX technical catalogue.

| Specifications | FX3U-20SSC-H |
|---------------------------------|--|
| Accessible axes | 2 (independent or interpolation) via SSCNETIII |
| Output frequency | 1 Hz to 50 MHz |
| Communications speed | 50 Mbps |
| Starting time | ms 1.6 (+1.7 SSCNETIII cycle time) |
| Max. to PLC connectable modules | Up to 8 can be connected to the FX3U PLC |
| Power supply | 5 V DC 24 V DC |
| Related I/O points | 8 |
| Dimensions (WxHxD) | mm 55x90x87 |
| Order information | Art. no. 231512 |

Note: The FX3U-20SSC-H can only be used in combination with a FX3U series base unit.

MELSEC System Q Positioning Units



The MELSEC System Q offers two different positioning module series for control of up to four axes:

- Open-collector output type (QD75P series)
- Differential output type (QD75D series)

The open-collector and differential output controllers can be used with standard type servo amplifiers (MR-JE-A/MR-J4-A).

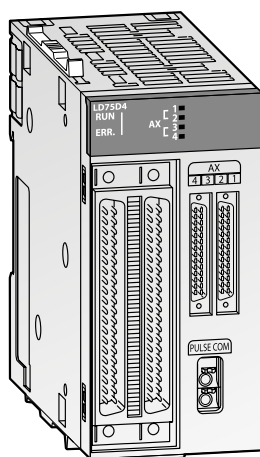
All QD75 series positioning modules can provide functionality such as interpolation and speed-position operation etc.

The open-collector output type modules provide positioning with open loop control. The modules generate the travel command via the pulse chain. The speed is proportional to the pulse frequency and the distance travelled is proportional to the pulse length.

The differential output type modules are suitable for bridging long distances between the module and the drive system due to the fact that the output allows large motor cable lengths.

| Specifications | QD75D1N | QD75D2N | QD75D4N | QD75P1N | QD75P2N | QD75P4N |
|--------------------------------------|--|--|--|------------------------------|--|--|
| Number of control axes | 1 | 2 | 4 | 1 | 2 | 4 |
| Interpolation | — | 2 axes linear and circular interpolation | 2, 3, or 4 axes linear and 2 axes circular interpolation | — | 2 axes linear and circular interpolation | 2, 3, or 4 axes linear and 2 axes circular interpolation |
| Positioning data items | 600 | | | | | |
| Output type | Differential driver | Differential driver | Differential driver | Open collector | Open collector | Open collector |
| Output signal | Pulse chain | Pulse chain | Pulse chain | Pulse chain | Pulse chain | Pulse chain |
| Positioning | PTP control: absolute data and/or incremental; speed/position switching control: incremental; locus/speed control: incremental; path control: absolute data and/or incremental | | | | | |
| | Absolute data: | | Incremental method: | | Speed/position switching control: | |
| | -2 147 483 648 | -2 147 483 647 pulse | -2 147 483 648 | -2 147 483 647 pulse | 0 - 2 147 483 647 | pulse |
| | -214 748 364.8 | -214 748 364.7 μ m | -214 748 364.8 | -214 748 364.7 μ m | 0 - 21 474 836.47 | μ m |
| -21 474.83648 | -21 474.83647 inch | -21 474.83648 | -21 474.83647 inch | 0 - 21 474.83647 | inch | |
| 0 | -35.99999 degree | -21 474.83648 | -21 474.83647 degree | 0 - 21 474.83647 | degree | |
| speed | 1 - 4 000 000 pulse/s | 0.01 - 20 000 000.00 mm/min | 0.001 - 200 000.000 degree/min | 0.001 - 200 000.000 inch/min | | |
| acceleration/deceleration processing | Automatic trapezoidal or S-pattern acceleration and deceleration or automatic S-pattern acceleration and deceleration | | | | | |
| acceleration and deceleration time | 1-8388608 ms (4 patterns, each can be set) | | | | | |
| rapid stop deceleration time | 1-8388608 ms | | | | | |
| I/O points | 32 | 32 | 32 | 32 | 32 | 32 |
| Dimensions (WxHxD) | mm | 27.4x98x90 | 27.4x98x90 | 27.4x98x90 | 27.4x98x90 | 27.4x98x90 |
| Order information | Art. no. | 248389 | 248390 | 248391 | 248392 | 248393 |
| Accessories | 40-pin connector and ready to use connection cables and system terminals; Programming software: GX Configurator QP, art. no.: 132219 | | | | | |

MELSEC L Series Positioning Units



Control of high resolution drives

The MELSEC L series offers two different positioning modules for control of up to four axes.

- Differential output type (LD75D□)
- Open-collector output type (LD75P□)

These positioning modules can be used with standard type servo amplifiers (Mitsubishi Electric MR-JE-A, MR-J4-A).

All MELSEC L series positioning modules can provide functionality such as interpolation, speed positioning operation etc.

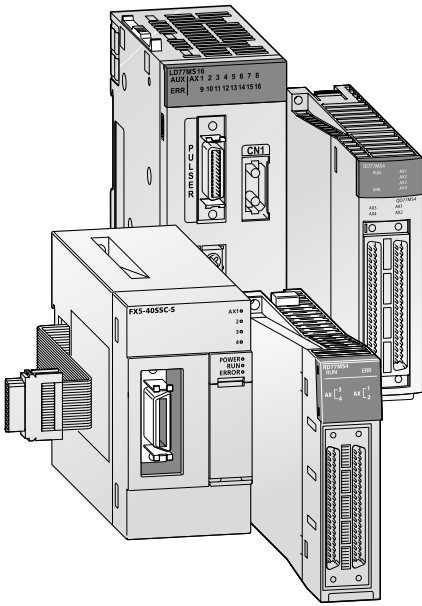
The open-collector output type module provides positioning with open loop control. The module generates the travel command via the pulse chain. The speed is proportional to the pulse frequency and the distance travelled is proportional to the pulse length.

The differential output type module is suitable for bridging long distances between the module and the drive system due to the fact that the output allows large cable lengths.

- Up to 600 positioning data per axis
- Maximum output pulse of 200 k pulses/s for LD75P4 and 4 Mpulses/s for LD75D4)
- High speed control of high resolution devices such as linear servos and direct drive motors
- Reduced machine vibration by using the optional acceleration/deceleration system
- Visualization of positioning module buffer data with customizable graphs

| Specifications | LD75D1 | LD75D2 | LD75D4 | LD75P1 | LD75P2 | LD75P4 |
|---------------------------------|--|--|--|--|----------|--|
| Accessible axes | 1 | 2 | 4 | 1 | 2 | 4 |
| Output frequency | pulse/s | — | 2-axis linear interpolation, 2-axis circular interpolation | 2-/3-/4-axis linear interpolation, 2-axis circular interpolation | — | 2-axis linear interpolation, 2-axis circular interpolation |
| Positioning data items per axis | 600 | | | | | |
| Output type | Differential driver | | | Open collector | | |
| Output signal | Pulse chain | | | | | |
| Positioning | method | PTP (Point To Point) control, path control (both linear and arc can be set), speed control, speed-position switching control, position-speed switching control | | | | |
| | range | Absolute/incremental system: -214 748 364.8–214 748 364.7 μm -21 474.83648–21 474.83647 inch 0–359.99999 degree (absolute); 21 474.83648–21 474.83647 (incremental) -2 147 483 648–2 147 483 647 pulse | | | | |
| | | In speed-position switching control (INC mode)/position-speed switching control: 0–214 748 364.7 μm 0–21 474.83647 inch 0–21 474.83647 degree 0–2 147 483 647 pulse | | | | |
| | speed | 1–1 000 000 pulse/s 0.01–20 000 000.00 mm/min 0.001–200 000.000 degree/min 0.001–200 000.000 inch/min | | | | |
| | acceleration/ deceleration processing | Automatic trapezoidal or S-pattern acceleration and deceleration or automatic S-pattern acceleration and deceleration | | | | |
| | acceleration/ deceleration time | 1–83 88 608 ms (four patterns can be set for each of acceleration time and deceleration time) | | | | |
| rapid stop deceleration time | 1–8 388 608 ms | | | | | |
| Number of occupied I/O points | 32 | 32 | 32 | 32 | 32 | 32 |
| Internal current consumption | mA | 510 | 620 | 760 | 440 | 480 |
| Dimensions (WxHxD) | mm | 45x90x95 | 45x90x95 | 45x90x95 | 45x90x95 | 45x90x95 |
| Order information | Art. no. | 251448 | 251449 | 238095 | 251446 | 251447 |
| | | | | | | 238096 |

MELSEC Simple Motion module



The MELSEC L-, MELSEC iQ-R-, MELSEC iQ-F-series and the MELSEC System Q, lineup includes Simple Motion modules in addition to the regular positioning modules. Various control functions previously only possible with Motion Controllers, such as speed control, torque control, synchronous control and cam control, are now available with the Simple Motion modules. These functions can be realized with simple parameter adjustments and via the PLC program.

Mark sensors allow use in packaging industry, filling plants, etc., without additional optional modules. A function for automatic calculation of cam data for applications with rotating cutters is implemented – only by setting the length of the product and the synchronisation path. With positioning functions, like linear interpolation (up to 4 axes), circular interpolation (2 axes) and path control it is easy to realize different applications, like X-Y tables, sealing, etc.

Proved and tested programs for the QD77MS and the LD77MS are compatible with the QD75MH.

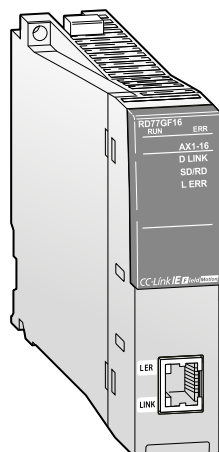
- Compatible with QD75MH
- Up to 600 positions per axis
- External encoder input for axis synchronisation
- Electronic cam control
- High-speed digital inputs for mark sensors to capture encoder position, motor position etc.
- Parameterization, programming, diagnostics and test operation by GX Works2/GX Works3
- Certified PLCopen function blocks
- Communication between the Simple Motion module and servo amplifiers via the high-speed network SSCNETIII/H



| Specifications | LD77MS2 | LD77MS4 | LD77MS16 | QD77MS2 | QD77MS4 | QD77MS16 | FX5-40SSC-S | FX5-80SSC-S | |
|------------------------------|---|--|--|--|------------|--|---------------------------------|----------------------------------|--------|
| Number of controllable axes | 2 | 4 | 16 | 2 | 4 | 16 | 4 | 8 | |
| Interpolation functions | 2 axes linear and circular interpolation | | Linear interpolation for up to 4 axes, circular interpolation for 2 axes | 2 axes linear and circular interpolation | | Linear interpolation for up to 4 axes, circular interpolation for 2 axes | | | |
| Output type | SSCNETIII/H | | SSCNETIII/H | SSCNETIII/H | | SSCNETIII/H | | | |
| Output signal | Bus | | Bus | Bus | | BUS | | | |
| Servo amplifier | MR-JE-B/MR-J4-B | | | | | | | | |
| Operation cycle | 0.88 ms | 0.88 ms | 0.88 ms/1.7 ms | 0.88 ms | 0.88 ms | 0.88 ms/1.7 ms | 1.77 ms | 0.88 ms/1.7 ms | |
| Positioning | method | PTP (Point To Point) control, path control (linear and arc), speed control, speed-position switching control, position-speed switching control, torque control | | | | | | | |
| | acceleration/deceleration control | Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration | | | | | | | |
| | compensation | Backlash compensation, electronic gear, near pass function | | | | | | | |
| | OPR control | 5 different methods | | | | | | | |
| Number of positioning points | 600 per axis (can be set with GX Works2/GX Works3 or PLC program) | | | | | | | | |
| External input signals | encoder | 1 encoder, A/B phase | | | | | | | |
| | high speed inputs | 4 digital inputs [D11–D14] | | | | | | | |
| Cam function | storage area cam data | 256 kbytes | | | | | | | |
| | number of cams | Max. 256 (depends on resolution) | | | | | Max. 64 (depends on resolution) | Max. 128 (depends on resolution) | |
| | resolution per cycle | 256, 512, 1024, 2048, 4096, 8192, 16384, 32768 | | | | | | | |
| | stroke resolution | 2–16284 | | | | | | | |
| I/O points | 32 | 32 | 32 | 32 | 32 | 32 | 8 | 8 | |
| Dimensions (WxHxD) | mm | 90x45x95 | 90x45x95 | 90x45x95 | 27.4x98x90 | 27.4x98x90 | 27.4x98x90 | 90x50x83 | |
| Order information | Art. no. | 268199 | 268200 | 268201 | 248702 | 248703 | 248704 | 281405 | 304187 |

| Specifications | RD77MS2 | RD77MS4 | RD77MS8 | RD77MS16 | |
|------------------------------|---|--|--|----------|--------|
| Number of controllable axes | 2 | 4 | 8 | 16 | |
| Interpolation functions | 2 axes linear and circular interpolation | | Linear interpolation for up to 4 axes, circular interpolation for 2 axes | | |
| Output type | SSCNETIII/H | | SSCNETIII/H | | |
| Output signal | Bus | | Bus | | |
| Servo amplifier | MR-JE-B/MR-J4(W2/W3)-B over SSCNETIII/H | | | | |
| Positioning | method | PTP (Point To Point) control, path control (linear and arc), speed control, speed-position switching control, position-speed switching control, speed-torque switching control, advanced synchronous control | | | |
| | acceleration/deceleration control | Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration | | | |
| | compensation | Backlash compensation, electronic gear, near pass function | | | |
| Number of positioning points | 600 per axis (can be set with GX Works3 or PLC program) | | | | |
| External input signals | 1 encoder, A/B phase, 4 digital inputs [D11–D14] | | | | |
| Cam function | 256 kbytes, max. 256 (depends on resolution) | | | | |
| Order information | Art. no. | 280229 | 280230 | 280231 | 280232 |

MELSEC Simple Motion module



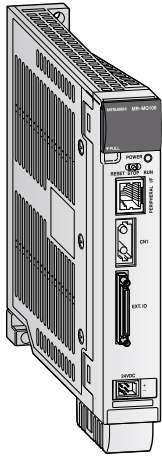
The RD77GF Simple Motion Module for the iQ-R Series controller is capable of everything from simple point table operation to advanced Synchronous control, for complex applications in an easy to program solution. Combined with the CC-Link® IE Field compatible MR-J4-GF-RJ servo system, its superior speed and performance make it a great product to tackle a wide range of applications. This solution also provides excellent flexibility, reduced wiring, improved noise-immunity, and easy programming.

| Specifications | RD77GF4 | RD77GF8 | RD77GF16 | RD77GF32 |
|-----------------------------|--|--|---|---|
| Number of controllable axes | 4 | 8 | 16 | 32 |
| Interpolation functions | 2-/3-/4-axis linear interpolation, 2-axis circular interpolation, 3-axis helical interpolation | | | |
| Output type | CC-Link IE Field | CC-Link IE Field | CC-Link IE Field | CC-Link IE Field |
| Output signal | Ethernet | Ethernet | Ethernet | Ethernet |
| Servo amplifier | MR-J4-GF | | | |
| Operation cycle | 0.5 ms/1.0 ms/2.0 ms/4.0 ms | 0.5 ms/1.0 ms/2.0 ms/4.0 ms | 0.5 ms/1.0 ms/2.0 ms/4.0 ms | 0.5 ms/1.0 ms/2.0 ms/4.0 ms |
| Positioning | method | PTP (Point To Point) control (incremental/absolute), Positionsermittlung (incremental/absolute), speed-position switching control (incremental/absolute), position-speed switching control (incremental) | | |
| | range | Absolute/incremental system: -214 748 364.8–214 748 364.7 μm -21 474.83648–21 474.83647 inch 0–359.99999 degree (absolute); 21 474.83648–21 474.83647 (incremental) -2 147 483 648–2 147 483 647 pulse In speed-position switching control (INC mode)/position-speed switching control: 0–214 748 364.7 μm 0–21 474.83647 inch 0–21 474.83647 degree 0–2 147 483 647 pulse In speed-position switching control (ABS mode) ①: 0–359.99999 Grad | | |
| | speed ② | 1–1 000 000 000 pulse/s 0.01–20 000 000.00 mm/min 0.001–200 000.000 degree/min 0.001–200 000.000 inch/min | | |
| | acceleration/deceleration control | Trapezoidal acceleration/deceleration, S-curve acceleration/deceleration | | |
| | acceleration/deceleration time | 1–83 88 608 ms (four patterns can be set for each of acceleration time and deceleration time) | | |
| | rapid stop deceleration time | 1–8 388 608 ms | | |
| | Manual Pulse Generator | Input signal | Link device | |
| | Input magnification 1 impulse | Max. 100,000 times | | |
| Positioning data | 600 per axis (can be set with buffer memory) | | | |
| I/O points | 32 (I/O allocation: Intelligent, 32 points) | 32 (I/O allocation: Intelligent, 32 points) | 32 (I/O allocation: Intelligent, 32 points) | 64 (I/O allocation: Intelligent, 64 points) |
| Dimensions (WxHxD) | mm 27.8x106x110 | 27.8x106x110 | 27.8x106x110 | 27.8x106x110 |
| Order information | Art. no 295077 | 295078 | 295079 | 304200 |

① The speed-position switching control (ABS mode) can be used only when the control unit is "degree".

② When "Speed control 10 times multiplier setting for degree axis function" is valid, the setting range is 0.01 to 20000000.00 (degree/min).

■ Single Axis Motion Controller MR-MQ100



The MR-MQ100 allows a single axis to be completely controlled and synchronised to a separate encoder or virtual axis with no additional controller hardware like a PLC. Applications such as rotary cutters, flying saws and labelling can be realized cost-effectively. A complete range of essential functions are available, including encoder and virtual axis synchronization, registration, point to point positioning and user defined cam profiles. In addition, the hardware complements these powerful software features with built-in I/O and SSCNETIII motion networking capability as well as an Ethernet port.

The MR-MQ100 uses Mitsubishi's simple but rugged optical fiber motion network SSCNETIII. A single fiber connection is all that's needed to provide full communication and control over all functions of the MR-J4/MR-J3-BSafety servo amplifier regardless of capacity.

A standard Ethernet connection is also provided to link the MR-MQ100 to the MT Works2 software and to the control system.

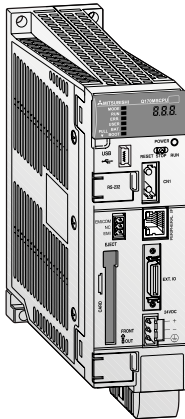
- Stand-alone Motion Control System only with servo amplifier without additional hardware
- Optical high-speed SSCNETIII network
- Ethernet interface 100/10 Mbps
- High speed inputs for mark sensors
- External encoder input for axis synchronisation
- MC protocol Ethernet communication
- Extension I/O unit MR-J3-D01 can be connected to the MR-J3-BSafety amplifier series to increase the number of in- and outputs
- Integrated serial interface (RS422) for communication with HMI

| Items | MR-MQ100 | |
|-------------------------------|---|---|
| Power supply | 24 V DC ±10 % (required current capacity: 400 mA) | |
| Digital inputs (mark sensors) | 4 inputs (24 V DC) | |
| Digital outputs | 2 outputs (24 V DC) | |
| Synchronous encoder | signal type | A/B phase pulse train input |
| | voltage input/open-collector type (5 V DC) | Up to 800 kpps (after magnification by 4), up to 10 m |
| | differential input type | Up to 4 Mpps (after magnification by 4), up to 30 m |
| Peripheral interface | 100 Mbps/10 Mbps Ethernet (for programming and additional options) | |
| Positioning | method | (PTP (Point to Point) control, Speed control/Speed-position control, Fixed-pitch feed, Constant speed control, Position follow-up control, Speed control with fixed position stop, Speed switching control, High-speed oscillation control, Synchronous control (SV22)) |
| | acceleration/deceleration control | Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration |
| | compensation | Backlash compensation, Electronic gear, Phase compensation |
| Servo program capacity | 16 k steps | |
| Number of positioning points | 3200 | |
| Number of control axis | 1 axis | |
| Operation cycle | 0.44 ms | |
| Servo amplifier | MR-J3-BSafety/MR-J4-B (over SSCNETIII) | |
| Programming language | Motion SFC, dedicated instruction, mechanical support language (SV22) | |
| Memory back up (included) | Q6BAT | |
| Cam function | number of cams | Up to 256 cam profiles may be stored internally. |
| | resolution per cycle | 256, 512, 1024, 2048 |
| | stroke resolution | 32767 |
| | control mode | Two-way cam, feed cam |
| Weight [kg] | 0.7 | |
| Dimensions (WxHxD) | mm 30x168x135 ^① | |
| Order information | Art. no. 217705 | |

① H without battery (Height with battery = 178 mm)

| Accessories | Q170MCPUI-EXTIO-05M-EG | Q170MCPUI-EXTIO-1M-EG | Q170MCPUI-EXTIO-3M |
|--------------------------|--|--|--|
| Application | Cable between Q170MCPUI I/F and TB-50-EG | Cable between Q170MCPUI I/F and TB-50-EG | Cable for Q170MCPUI I/F with open ends |
| Length | m 0.5 | 1 | 3 |
| Order information | Art. no. 229275 | 229276 | 229277 |

■ Stand-alone Motion Controller Q170MSCPU/Q170MSCPU-S1



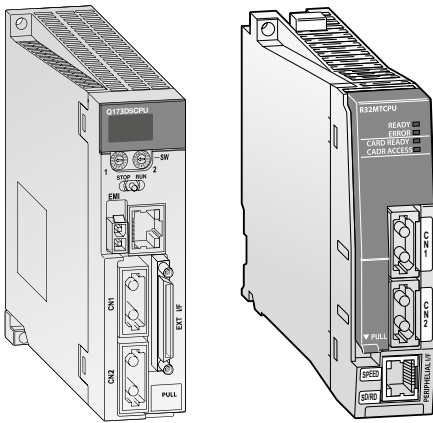
The Q170MSCPU/Q170MSCPU-S1 combines a PLC CPU, a Motion CPU and a power supply module into one compact unit. No base unit is required, although an extension base unit with standard PLC modules can be connected if required. An encoder interface is included as standard, enabling multiple axes synchronization with an external encoder.

The well-reputed mechanical support language (SV13, SV22) from the MELSEC System Q Motion Controller is incorporated.

- Small size
- Controls up to 16 axes
- Communication with servo amplifier via high-speed network SSCNETIII/H and a communication speed up to 150 Mbps.
- Programming and configuration is performed using the familiar software GX Works2 and MT Works2.
- Expandable with an extension base unit (up to 5 slots) and I/O modules, intelligent modules, and network-related modules.
- MC protocol Ethernet communication

| Specifications | | Q170MSCPU | Q170MSCPU-S1 |
|-------------------------|-----------------------------------|---|--|
| Motion-CPU | number of controllable axes | 16 | |
| | operation cycle | 0.22 ms, 0.44 ms, 0.88 ms, 1.77 ms, 3.55 ms, 7.11 ms | |
| | programming languages | Motion SFC, dedicated instruction, mechanical support language (SV22) | |
| | servo program capacity | 16 k steps | |
| | servo amplifier | MR-J4-B | |
| Interpolation functions | | Linear interpolation for up to 4 axes, circular interpolation for 2 axes, helical interpolation for 3 axes | |
| PLC CPU | number of I/O points | 4096 points | |
| | programming languages | Ladder, instruction list, SFC, structured text | |
| | program capacity | 30 k steps (120 k bytes) | 60 k steps (240 k bytes) |
| | processing speed | 20 ns (LD instruction); 40 ns (MOV instruction) | 9.5 ns (LD instruction); 19 ns (MOV instruction) |
| | total number of instructions | 858 (including real number operation instruction) | |
| Positioning | method | (PTP (Point To Point) control, speed control/speed-position control, fixed-pitch feed, constant speed control, position follow-up control, speed control with fixed position stop, speed switching control, high-speed oscillation control, synchronous control (SV22)) | |
| | acceleration/deceleration control | Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration | |
| | compensation | Backlash compensation, electronic gear, phase compensation | |
| Memory card interface | | 1 slot for memory card for MELSEC System Q | |
| Cam function | number of cams | Up to 256 cam profiles may be stored internally. | |
| | resolution per cycle | 256, 512, 1024, 2048, 4096, 8192, 16384, 32768 | |
| | stroke ratio data | -2147483648 to 2147483647 | |
| | control mode | Two-way cam, feed cam | |
| Dimensions (WxHxD) | | mm | 52x178x135 |
| Order information | | Art. no. | 266524 266535 |

MELSEC System Q and MELSEC iQ-R Motion-Controller-CPUs



The Q-Motion controller CPU controls and synchronises the connected servo amplifiers and servo motors. A motion system besides the controller CPU, also includes a PLC CPU. Only after combining a highly dynamic positioning control CPU and a PLC, an innovative motion control system is created.

While the Motion CPU controls large-scale servo movements the PLC CPU is responsible for the machine control and the communication.

- Using multiple CPUs to distribute the load improves the overall performance of the whole system
- Use of up to 3 motion CPUs within one system
- Large scale control system for up to 96 axes per MELSEC System Q, and 192 axes per MELSEC iQ-R series.
- Interpolation of 4 axes simultaneously
- Electronic cam control
- Virtual and real master axes
- Integration in the high-speed SSCNETIII/H network for communication with high-performance MR-J4-B servo amplifiers at up to 150 Mbps

4

Options and Peripheral Equipment

| Specifications | Q172DSCPU | Q173DSCPU | R16MTCPU | R32MTCPU | R64MTCPU | |
|---------------------------|---|------------------|------------------|------------------|------------------|--------|
| Type | Motion CPU | Motion CPU | Motion-CPU | Motion-CPU | Motion-CPU | |
| I/O points | 8192 | 8192 | 8192 | 8192 | 8192 | |
| No. of control axes | 16 | 32 | 16 | 32 | 64 | |
| Interpolation functions | Linear interpolation for up to 4 axes, circular interpolation for 2 axes, helical interpolation for 3 axes | | | | | |
| Positioning | method PTP (point to point), speed control/speed-position control, fixed pitch feed, constant speed control, position follow-up control, speed switching control, high-speed oscillation control, synchronous control (SV22) | | | | | |
| | acceleration/deceleration control Automatic trapezoidal acceleration/deceleration, S-curve acceleration/deceleration | | | | | |
| | compensation Backlash compensation, electronic gear | | | | | |
| Programming language | Motion SFC, dedicated instructions, software for conveyor assembly (SV13), virtual mechanical support language (SV22) | | | | | |
| Servo program capacity | 16 k steps | 16 k steps | 32 k steps | 32 k steps | 32 k steps | |
| No. of positioning points | 3200 | 3200 | 6400 | 6400 | 6400 | |
| Interfaces | Ethernet 100 Mbps/10 Mbps (for programming and additional options), SSCNETIII/H (for connection to servo amplifier with optical cable) (USB, RS232C via PLC-CPU) | | | | | |
| Servo amplifier | MR-J4-B | | | | | |
| Dimensions (WxHxD) | mm | 27.4x120.5x120.3 | 27.4x120.5x120.3 | 27.8x106.0x110.0 | 27.8x106.0x110.0 | |
| Order information | Art. no. | 248700 | 248701 | 280227 | 280228 | 295076 |

MELSEC System Q Motion System Modules

Servo external signals interface module Q172DLX

The Q172DLX input module is used in conjunction with a Q Motion CPU to capture external servo signals.

Up to 8 axes can be evaluated per module. In this way, proximity dog sensor, upper/lower limit switch, stop signal input and operating mode switching input can be easily incorporated into the system.

- 32 address points for 8 axes for each 4 inputs
- Bipolar inputs for positive and negative logic
- Galvanic isolation of the inputs by means of photocoupler
- Shortest response time of < 0.4 ms
- Modular extension possible

Serial absolute synchronous encoder interface module Q172DEX

The serial absolute synchronous encoder interface module Q172DEX is a Motion system module for receiving and evaluating up to two serial absolute-value encoders (Incremental

encoders cannot be connected). Via an external encoder it is possible to feed a setpoint source to the Motion system, which in turn is programmed as a master axis.

In addition to the interfaces for the signals of two absolute-value encoders, the Q172DEX has two digital inputs with ultra-rapid resposetimes.

- Transfer rate of 2.5 Mbit per second
- Resolution of 22 Bit with Q170ENC-WB
- Voltage-failure security of the absolute values by means of built-in buffer battery
- Shortest response times of < 0.4 ms
- Modular extension possible

Manual pulse generator interface module Q173DPX

The Manual pulse generator interface module is used in a Motion system to receive the signals of up to 3 external incremental encoders or manual impulse generators (hand wheels).

In addition to the inputs for the encoders, the Q173DPX has three digital inputs with which the encoder signal counting procedure can be started (Encoder start signal).

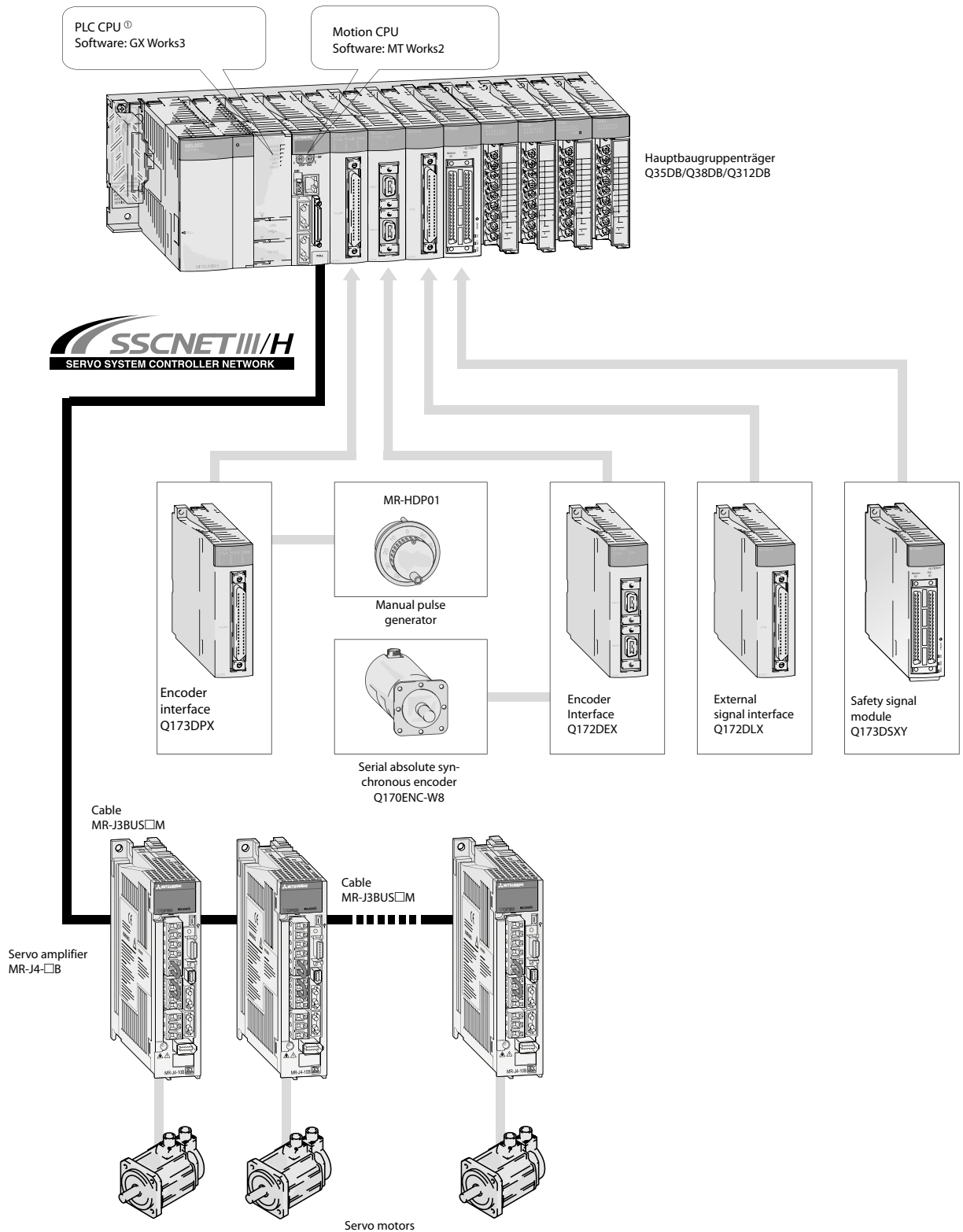
- Bipolar inputs for positive and negative logic
- Galvanic isolation of the inputs by means of photo coupler
- Shortest response times of < 0.4 ms
- Modular extension possible

Safety signal module Q173DSXY

The safety signal module is a combined I/O extension module with 20 safety input points x 2 paths and 12 safety output points x 2 paths. It passes input and output informations on to a Motion CPU or PLC CPU module.

With its safety monitor function the system fulfils the requirements of the following safety functions: STO, SS1, SS2, SOS, SLS, SBC, SSM (IEC61800-5-2:2007)

Configuration of a SSCNETIII/H System



Note:

- ① The first CPU on the main base unit must always be a PLC CPU (e.g. Q□UD(E)(H) Serie)

■ X-Y Table System Configurations

An X-Y table is a typical two axes servo application, commonly used in industry for pick and place systems such as PCB component insertion machines through to welding machines.

The following information provides two examples of possible X-Y table system configurations, using Mitsubishi Electric automation equipment.

The first is a FX3G-24MT/ESS based system and the second is a more complex interpolating QD77MS2 (SSCNETIII/H) based system.

System 1: FX3G PLC based system

| Products | Function |
|---------------|---|
| FX3G-24MT/ESS | PLC with integrated positioning control |
| MR-JE-10A | Servo amplifier |
| HG-KN13 | Motor |
| MR-JE-70A | Servo amplifier |
| HG-SN52JK | Motor |

The FX3G is a compact PLC for comprehensive machine control. It combines the functions of a PLC with positioning functions. In this configuration the FX3G-24MT/ESS is used to control the

X and Y axes. Via the transistor open collector outputs the PLC provides the Servo amplifiers of the MR-JE-A Series with pulse train signals for controlling the two axes. The setting of the system can be done with the GX Works2.

GX Works2 has a special section for the general positioning parameter setup and for the setup of each positioning command in a easy to use table. This table for each axis can contain 100 instructions with the frequency and number of pulses stored in the user data area and can be manipulated and uploaded for setting into operation of the machine.

For expanding the system, the FX3G is also connectable to the majority of existing FX3U Special Function Blocs.

- User friendly positioning
- Easy setting in GX Works2
- Cost effective
- Simple functionality

System 2: QD77MS based system

| Products | Function |
|--------------|-------------------------------|
| Q00J | PLC of MELSEC System Q |
| QD77MS2 | Simple motion modul |
| MR-J4-10B | Servo amplifier |
| HG-KR13 | Motor |
| MR-J4-60B | Servo amplifier |
| HG-SR52 | Motor |
| MR-BAT6V1SET | Battery (for servo amplifier) |

The QD77MS based system uses the powerful modular Qn PLC Series, providing greater functionality and expandability options. The QD77MS system is connected using SSCNETIII/H (Servo System Controller Network), which is Mitsubishi's dedicated motion control network. SSCNETIII/H simplifies the set-up of the system and reduces the wiring required. SSCNETIII/H systems are created by simply plugging an amplifier into the main controller (QD77MS) and then "daisy-chaining" each additional axis that is added. SSCNETIII/H connectivity requires MR-J4-B type amplifiers to be used.

Furthermore, as the Servo amplifiers are connected by a bus system, all Servo data, such as current position, torque etc. can all be monitored back at the main controller (Q00J PLC) as the data is automatically updated on the QD77MS module.

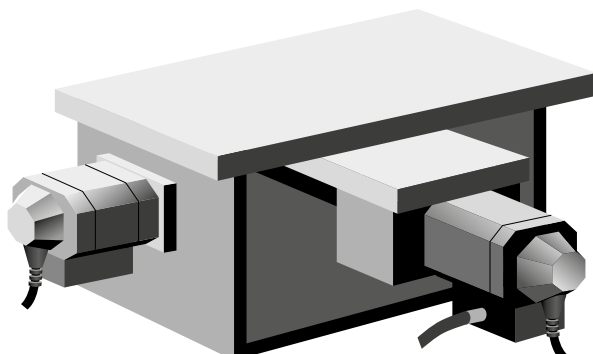
Also, all of the internal Servo parameters can be set from the PLC, again due to the bus system used.

The bus system also means that position data is sent serially, therefore reducing any possible interference due to noise.

Finally, as both axes are controlled from one high function module (QD77MS), interpolation between the two axes is possible.

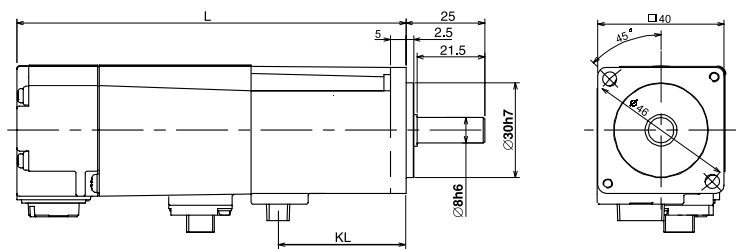
- SSCNETIII/H capability
- Easy of set-up
- High functionality
- Expandability
- Module options
- Reduced wiring

X-Y table control



■ Servo Motors

HG-KR053(B), HG-KR13(B), HG-MR053(B), HG-MR13(B)

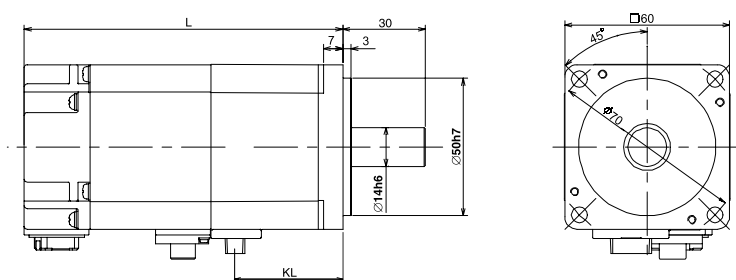


| Type | L [mm] | KL [mm] |
|----------------------------|------------|---------|
| HG-KR053(B) HG-MR053(B) | 66.4 (107) | 23.8 |
| HG-KR13(B) HG-MR13(B) | 82.4 (123) | 39.8 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-KR23(B), HG-KR43(B), HG-MR23(B), HG-MR43(B)

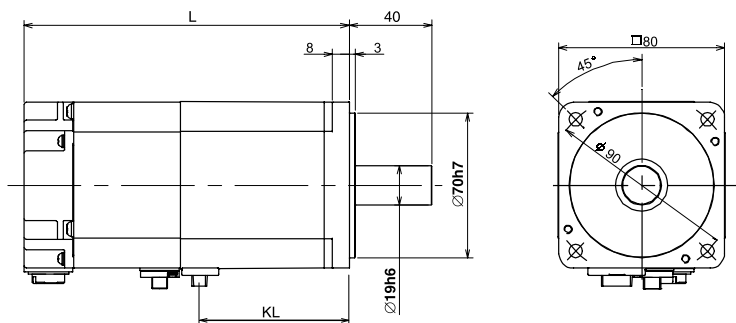


| Type | L [mm] | KL [mm] |
|--------------------------|--------------|---------|
| HG-KR23(B) HG-MR23(B) | 76.6 (113.4) | 36.4 |
| HG-KR43(B) HG-MR43(B) | 98.3 (135.1) | 58.1 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-KR73(B), HG-MR73(B)

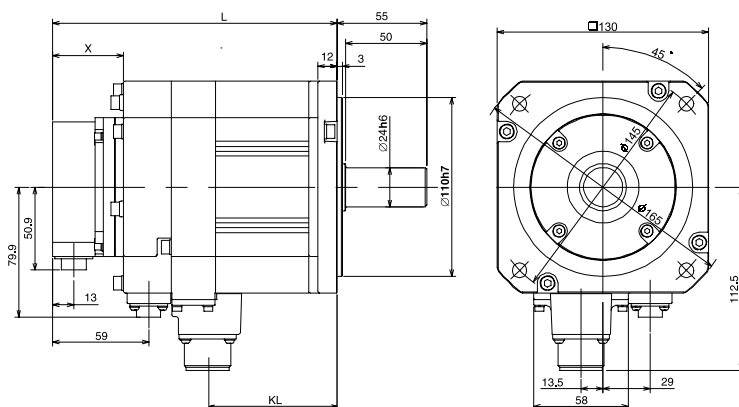


| Type | L [mm] | KL [mm] |
|--------------------------|-------------|---------|
| HG-KR73(B) HG-MR73(B) | 112 (152.3) | 69.6 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-SR52(B), HG-SR524(B), HG-SR102(B), HG-SR1024(B), HG-SR152(B), HG-SR1524(B)

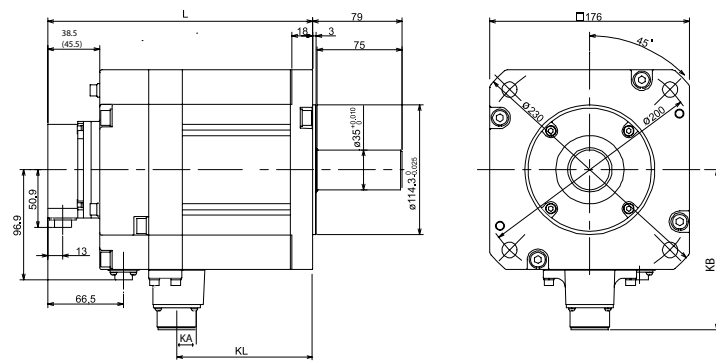


| Type | L [mm] | KL [mm] | X [mm] |
|-----------------------------|---------------|---------|-------------|
| HG-SR52(B) HG-SR524(B) | 118.5 (153.0) | 57.8 | 38.2 (43.5) |
| HG-SR102(B) HG-SR1024(B) | 132.5 (167) | 71.8 | 38.2 (43.5) |
| HG-SR152(B) HG-SR1524(B) | 146.5 (181) | 85.8 | 38.2 (43.5) |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-SR202(B), HG-SR352(B), HG-SR502(B), HG-SR702(B), HG-SR2024(B), HG-SR3524(B), HG-SR5024(B), HG-SR7024(B),

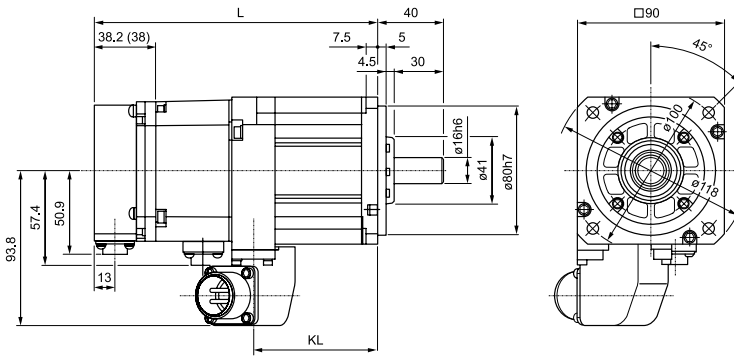


| Type | L [mm] | KL [mm] | KA [mm] | KB [mm] |
|-----------------------------|-------------|---------|---------|---------|
| HG-SR202(B) HG-SR2024(B) | 138.5 (188) | 74.8 | | |
| HG-SR352(B) HG-SR3524(B) | 162.5 (212) | 98.8 | 24.8 | 140.9 |
| HG-SR502(B) HG-SR5024(B) | 178.5 (228) | 114.8 | | |
| HG-SR702(B) HG-SR7024(B) | 218.5 (268) | 146.8 | 32 | 149.1 |

Dimensions for motors with brake in brackets ().

Unit: mm

**HG-JR53(B), HG-JR534(B), HG-JR73(B), HG-JR734(B), HG-JR103(B), HG-JR1034(B),
HG-JR153(B), HG-JR1534(B), HG-JR203(B), HG-JR2034(B)**

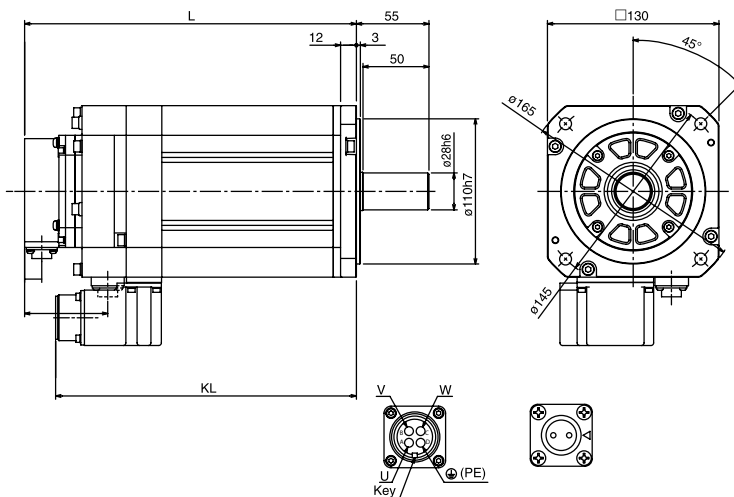


| Type | L [mm] | KL [mm] |
|-----------------------------|-------------|---------|
| HG-JR53(B) HG-JR534(B) | 127.5 (173) | 76 |
| HG-JR73(B) HG-JR734(B) | 145.5 (191) | 94 |
| HG-JR103(B) HG-JR1034(B) | 163.5 (209) | 112 |
| HG-JR153(B) HG-JR1534(B) | 199.5 (245) | 148 |
| HG-JR203(B) HG-JR2034(B) | 235.5 (281) | 184 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-JR353(B), HG-JR503(B)

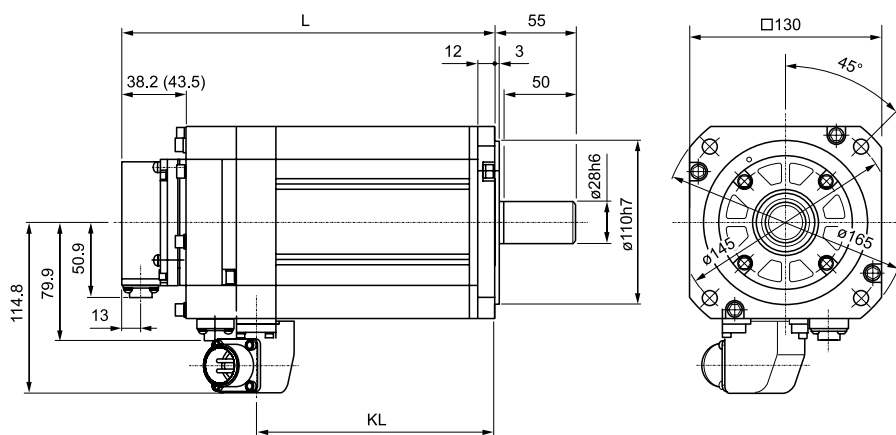


| Type | L [mm] | KL [mm] |
|--------------|-------------|---------|
| HG-JR353(B) | 213 (251.5) | 228 |
| HG-JR5034(B) | 267 (305.5) | 282 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-JR3534(B), HG-JR5034(B)

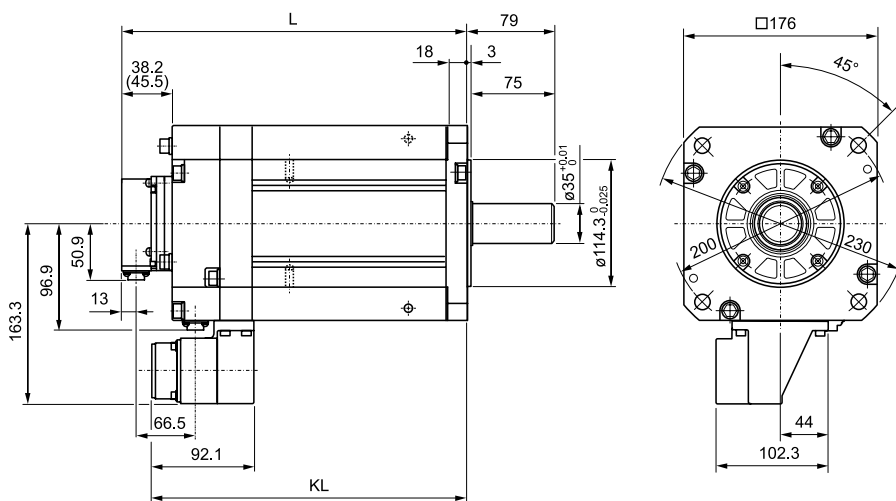


| Type | L [mm] | KL [mm] |
|--------------|-------------|---------|
| HG-JR3534(B) | 213 (251.5) | 161 |
| HG-JR5034(B) | 267 (305.5) | 215 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-JR703(B), HG-JR903(B), HG-JR7034(B), HG-JR9034(B)

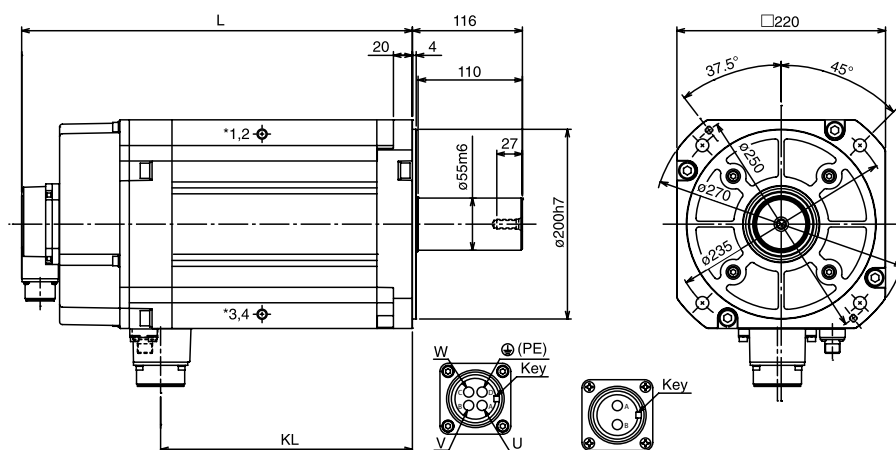


| Type | L [mm] | KL [mm] |
|--------------|-------------|---------|
| HG-JR703(B) | 263.5 (313) | 285.4 |
| HG-JR7034(B) | 263.5 (313) | 285.4 |
| HG-JR903(B) | 303.5 (353) | 325.4 |
| HG-JR9034(B) | 303.5 (353) | 325.4 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-JR11K1M(B), HG-JR15K1M(B), HG-JR11K1M4(B), HG-JR15K1M4(B)

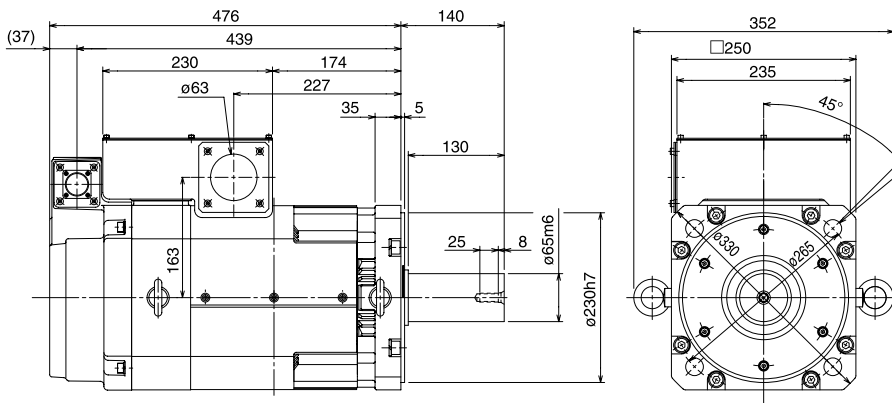


| Type | L [mm] | KL [mm] |
|----------------|-------------|---------|
| HG-JR11K1M(B) | 339.5 (412) | 265.5 |
| HG-JR11K1M4(B) | 339.5 (412) | 265.5 |
| HG-JR15K1M(B) | 439.5 (512) | 365.5 |
| HG-JR15K1M4(B) | 439.5 (512) | 365.5 |

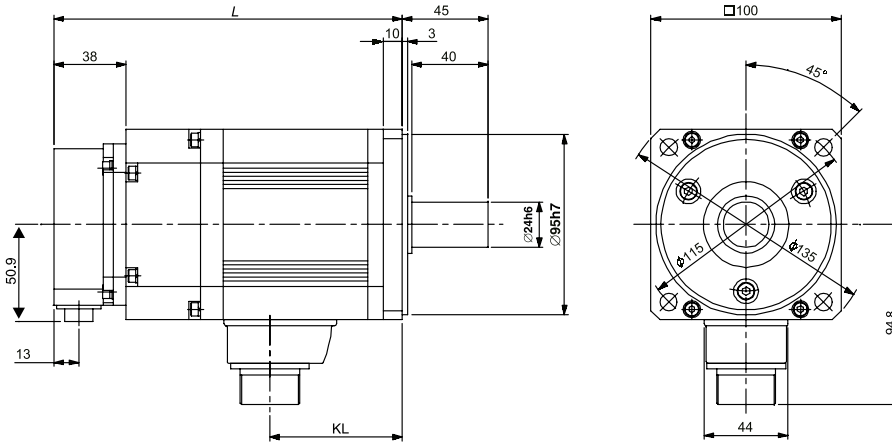
Dimensions for motors with brake in brackets ().

Unit: mm

HG-JR22K1M, HG-JR22K1M4



HG-RR103(B), HG-RR153(B), HG-RR203(B)

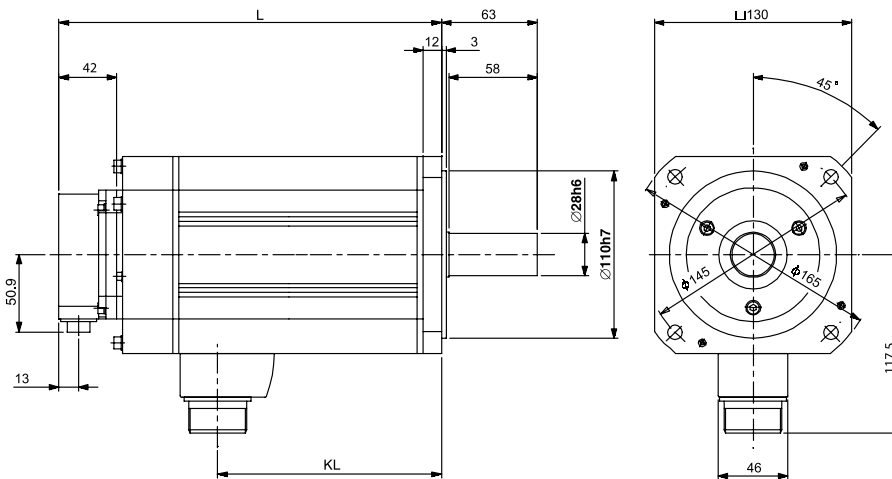


| Type | L [mm] | KL [mm] |
|-------------|-------------|---------|
| HG-RR103(B) | 145.5 (183) | 69.5 |
| HG-RR153(B) | 170.5 (208) | 94.5 |
| HG-RR203(B) | 195.5 (233) | 119.5 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-RR353(B), HG-RR503(B)

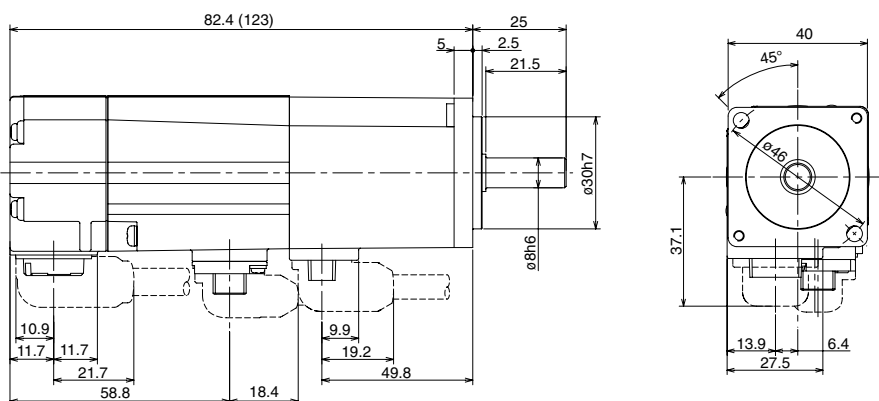


| Type | L [mm] | KL [mm] |
|-------------|-------------|---------|
| HG-RR353(B) | 215.5 (252) | 147.5 |
| HG-RR503(B) | 272.5 (309) | 204.5 |

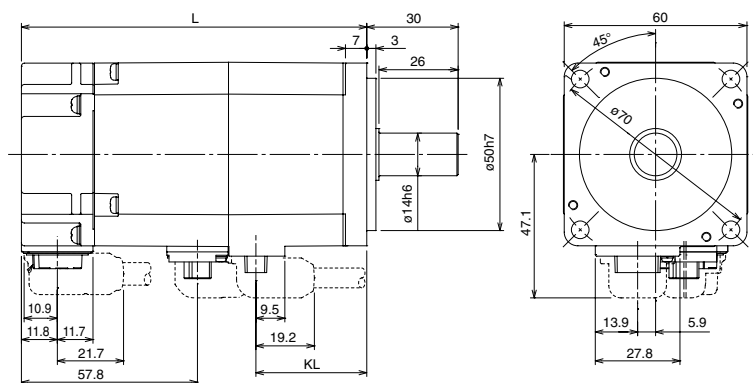
Dimensions for motors with brake in brackets ().

Unit: mm

HG-KN13(B)



HG-KN23(B), HG-KN43(B)

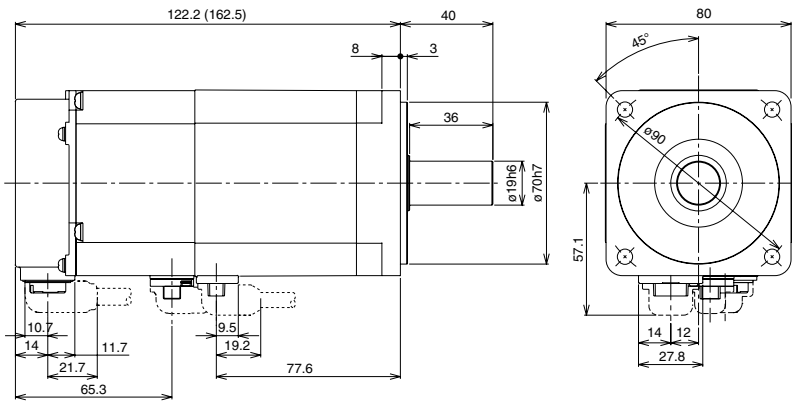


| Type | L [mm] | KL [mm] |
|------------|--------------|---------|
| HG-KN23(B) | 76.6 (113.4) | 36.4 |
| HG-KN43(B) | 98.3 (135.1) | 58.1 |

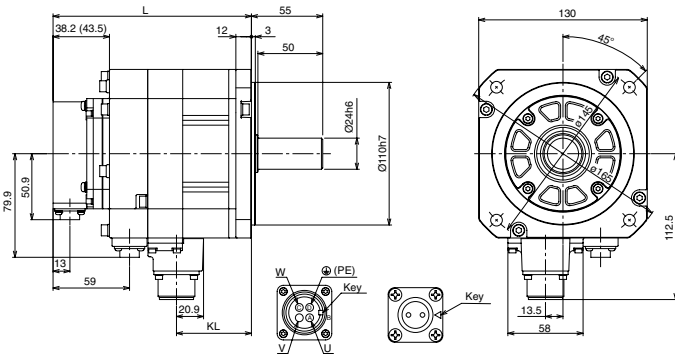
Dimensions for motors with brake in brackets ().

Unit: mm

HG-KN73(B)J



HG-SN52(B)J, HG-SN102(B)J, HG-SN152(B)J

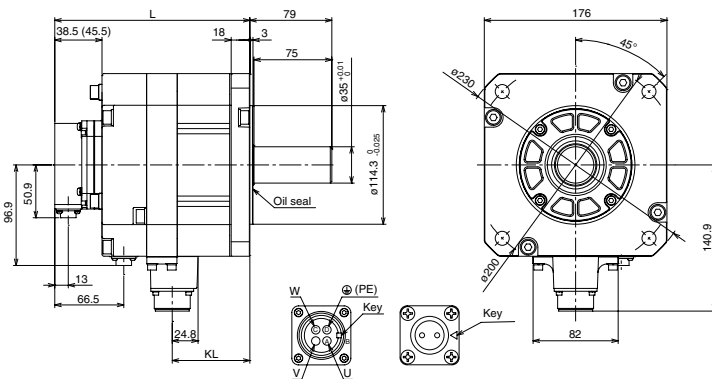


| Type | L [mm] | KL [mm] |
|--------------|-------------|---------|
| HG-SN52(B)J | 118.5 (153) | 57.8 |
| HG-SN102(B)J | 132.5 (167) | 71.8 |
| HG-SN152(B)J | 146.5 (181) | 85.8 |

Dimensions for motors with brake in brackets ().

Unit: mm

HG-SN202(B)J, HG-SN302(B)J



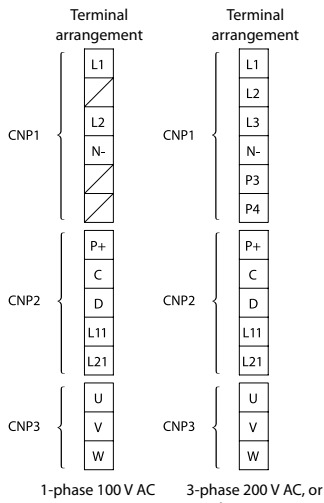
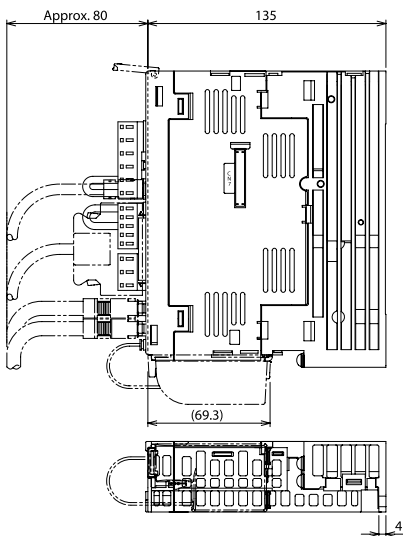
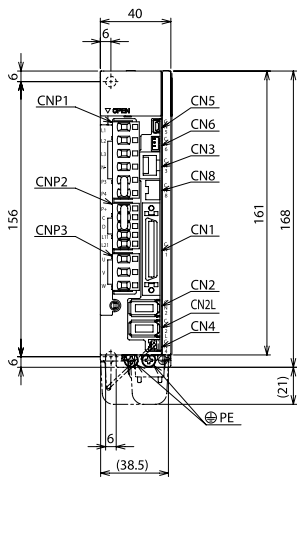
| Type | L [mm] | KL [mm] |
|--------------|-------------|---------|
| HG-SN202(B)J | 138.5 (188) | 74.8 |
| HG-SN302(B)J | 162.5 (212) | 98.8 |

Dimensions for motors with brake in brackets ().

Unit: mm

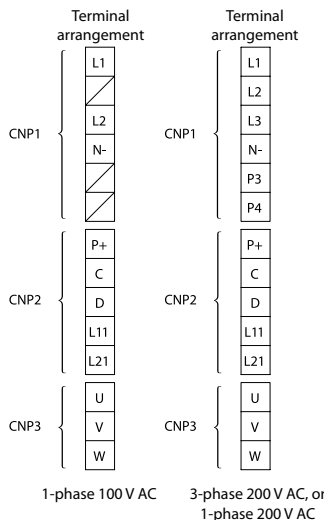
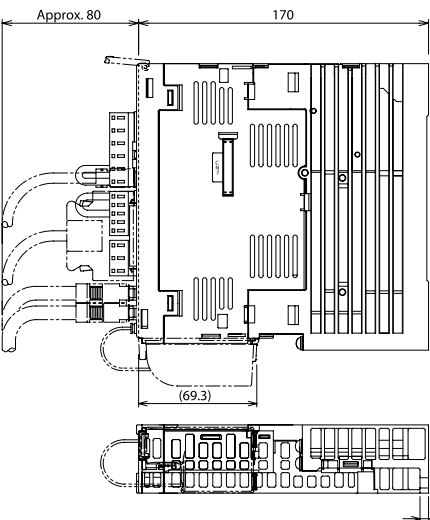
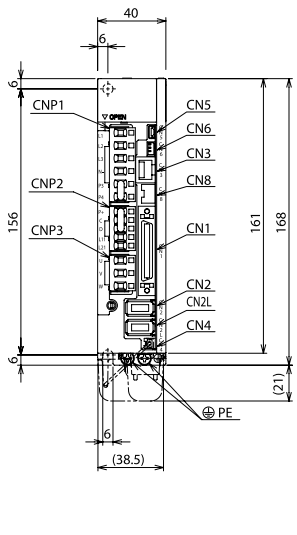
■ Servo Amplifiers MR-J4-A(4)/B(4)/MR-J4W2/3-B/MR-J4-GF(4)/MR-J4TM(4)

MR-J4-10A, MR-J4-20A



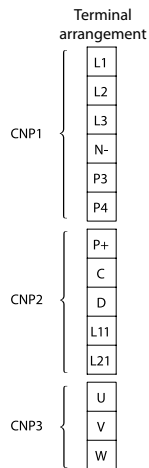
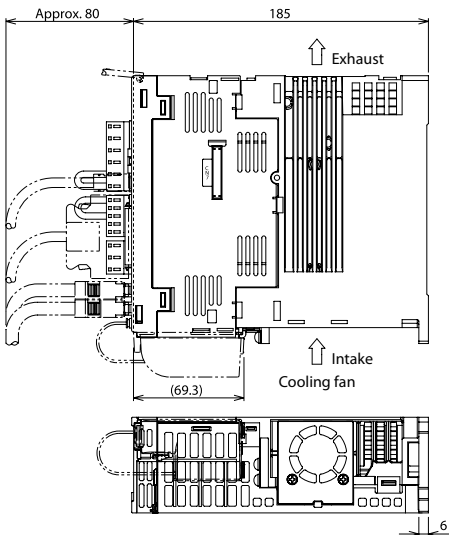
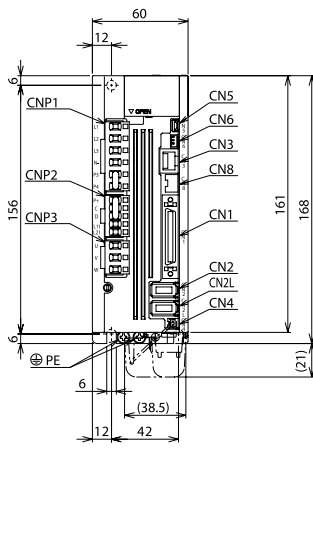
Unit: mm

MR-J4-40A, MR-J4-60A



Unit: mm

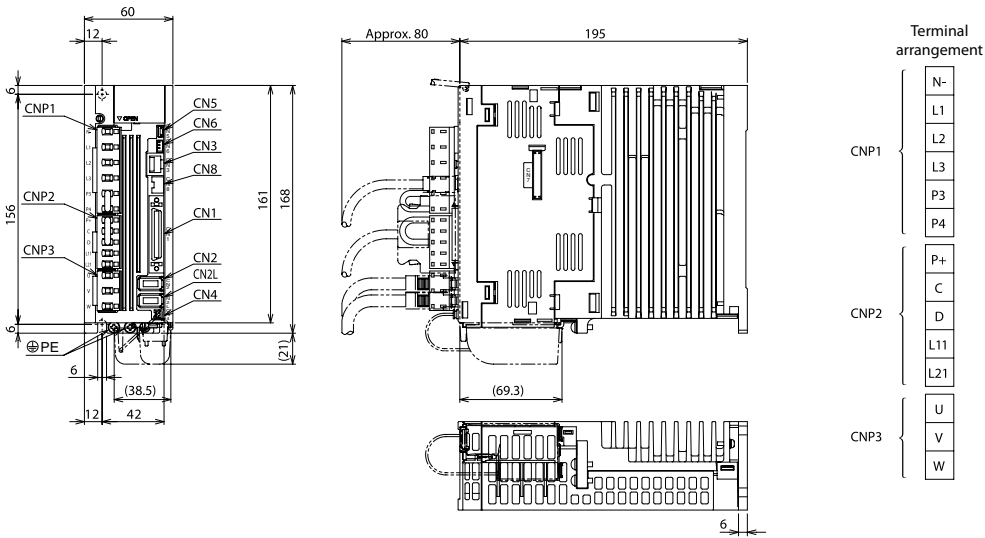
MR-J4-70A, MR-J4-100A



Unit: mm

Dimensions Servo Amplifiers

MR-J4-60A4, MR-J4-100A4

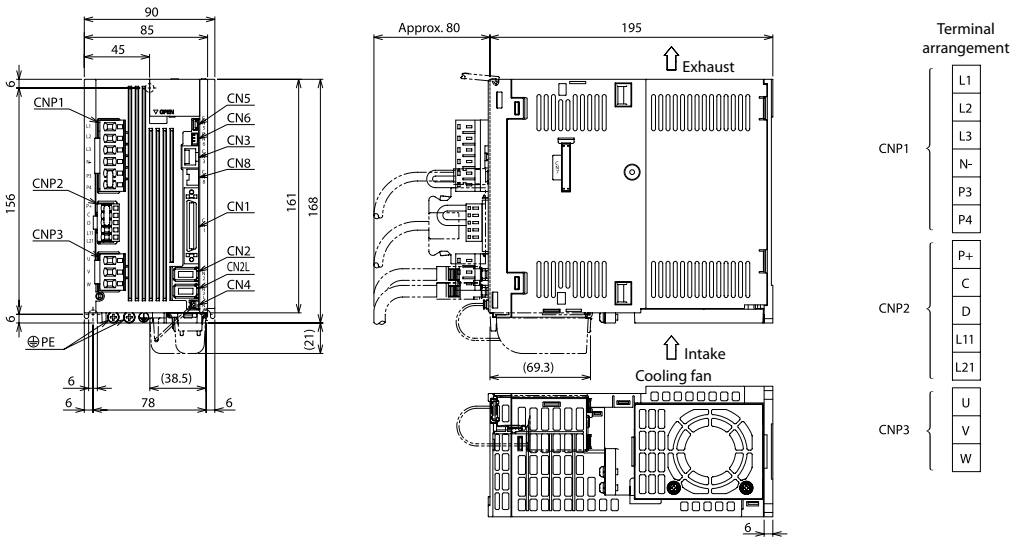


Unit: mm

MR-J4-200A

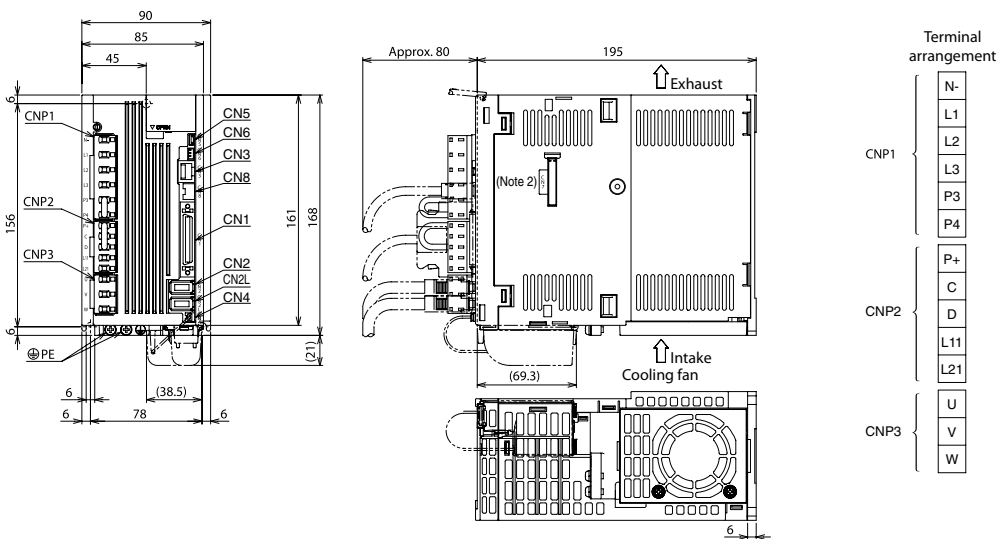
6

Dimensions



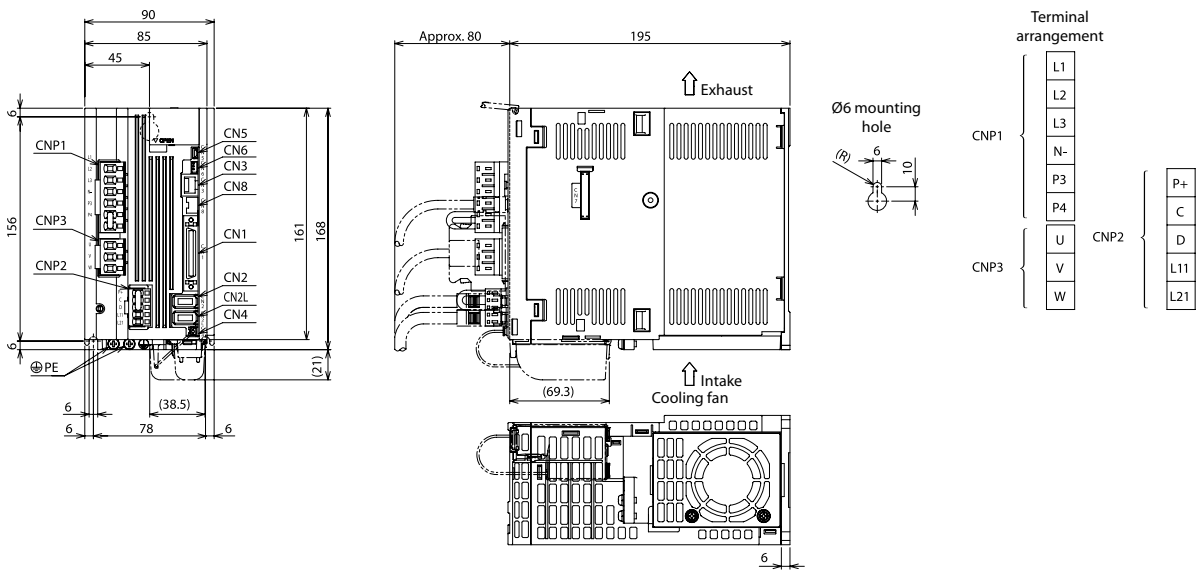
Unit: mm

MR-J4-200A4



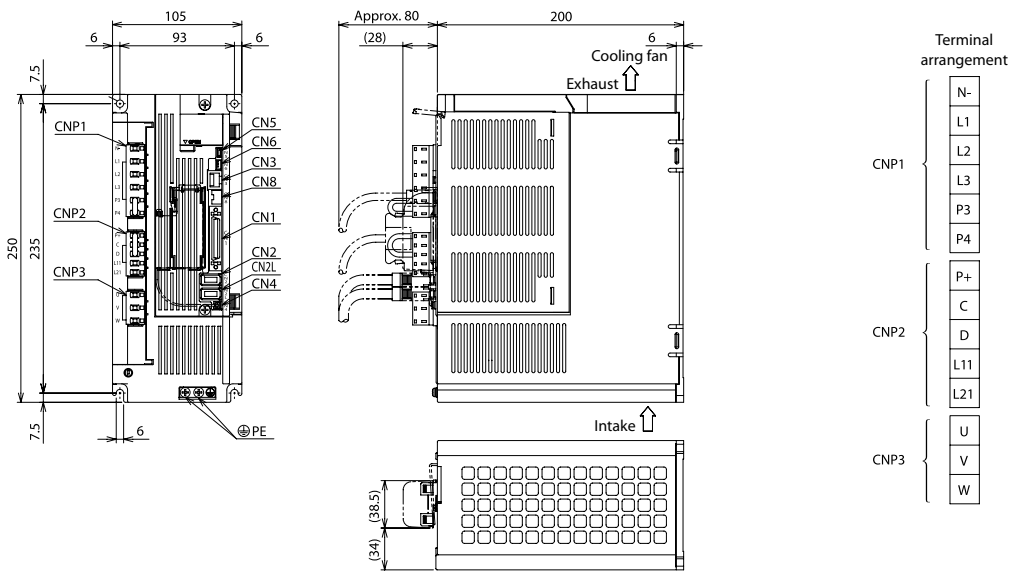
Unit: mm

MR-J4-350A



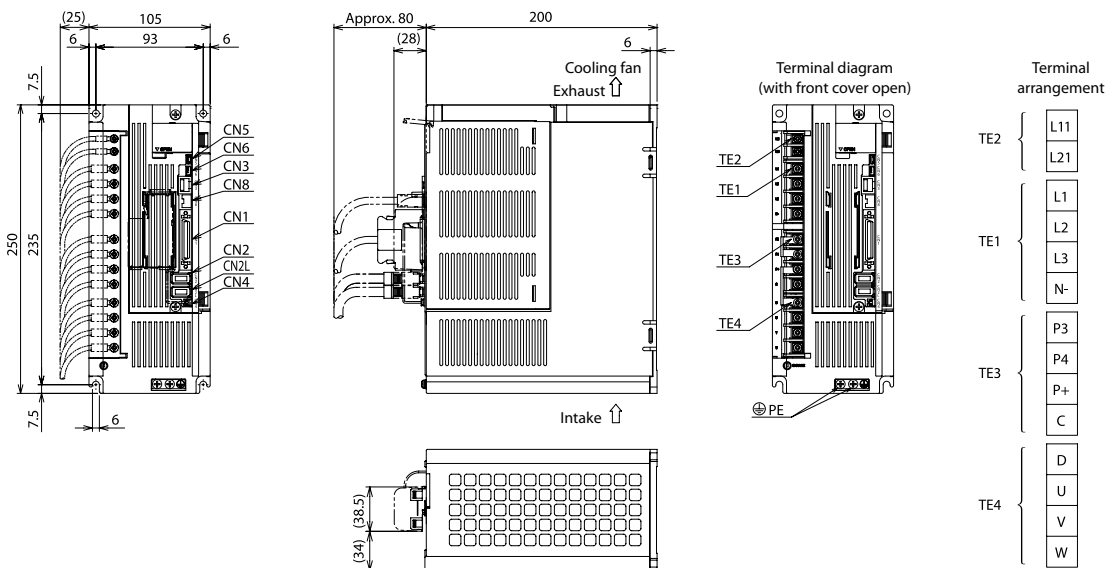
Unit: mm

MR-J4-350A4



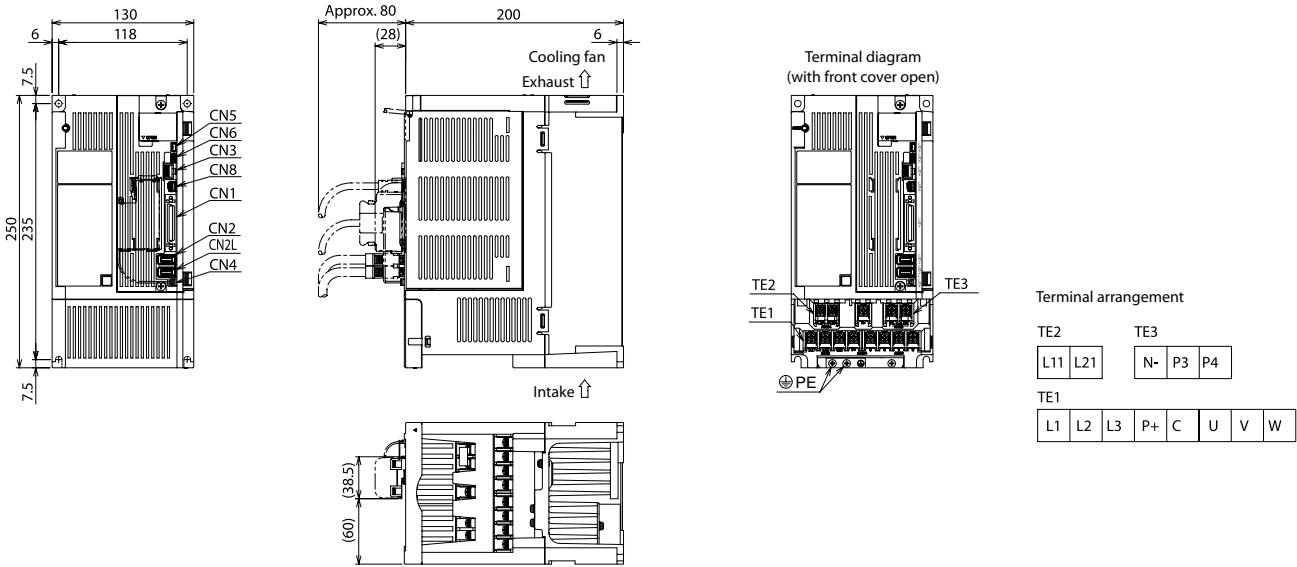
Unit: mm

MR-J4-500A



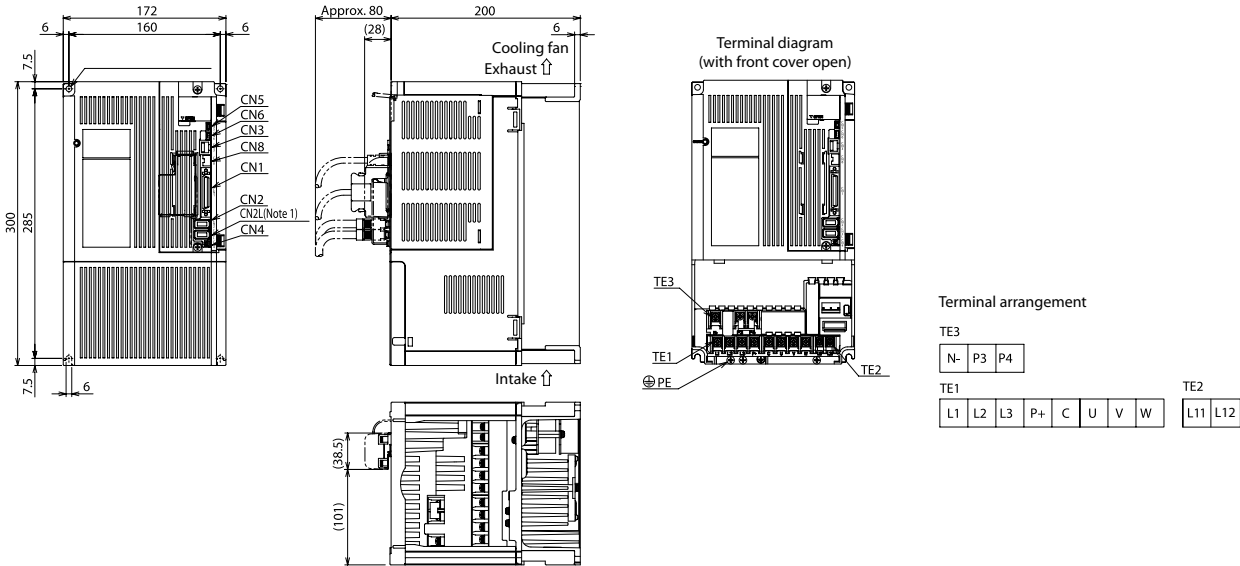
Unit: mm

MR-J4-500A4



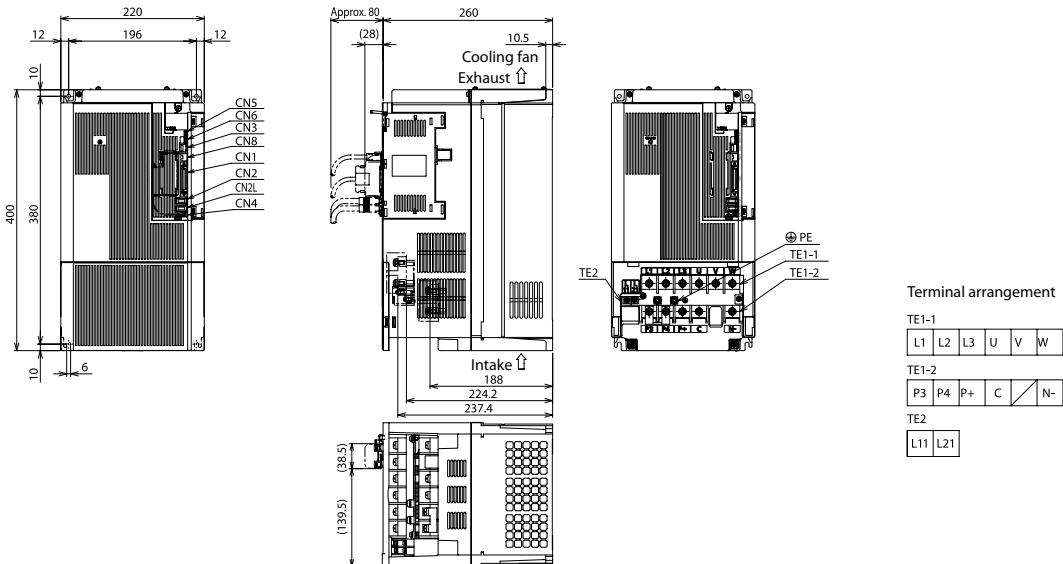
Unit: mm

MR-J4-700A, MR-J4-700A4



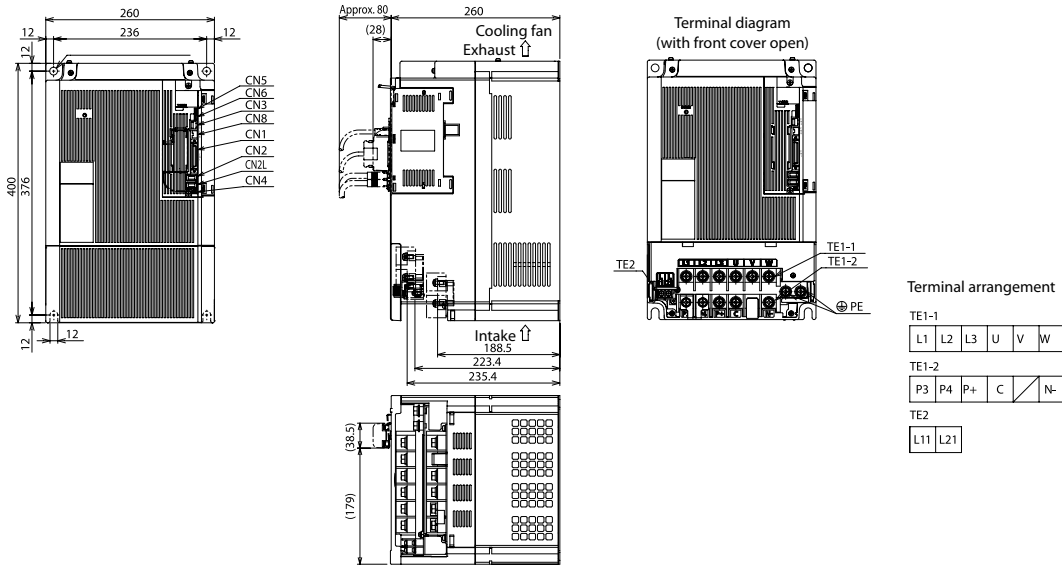
Unit: mm

MR-J4-11KA, MR-J4-11KA4, MR-J4-15KA, MR-J4-15KA4



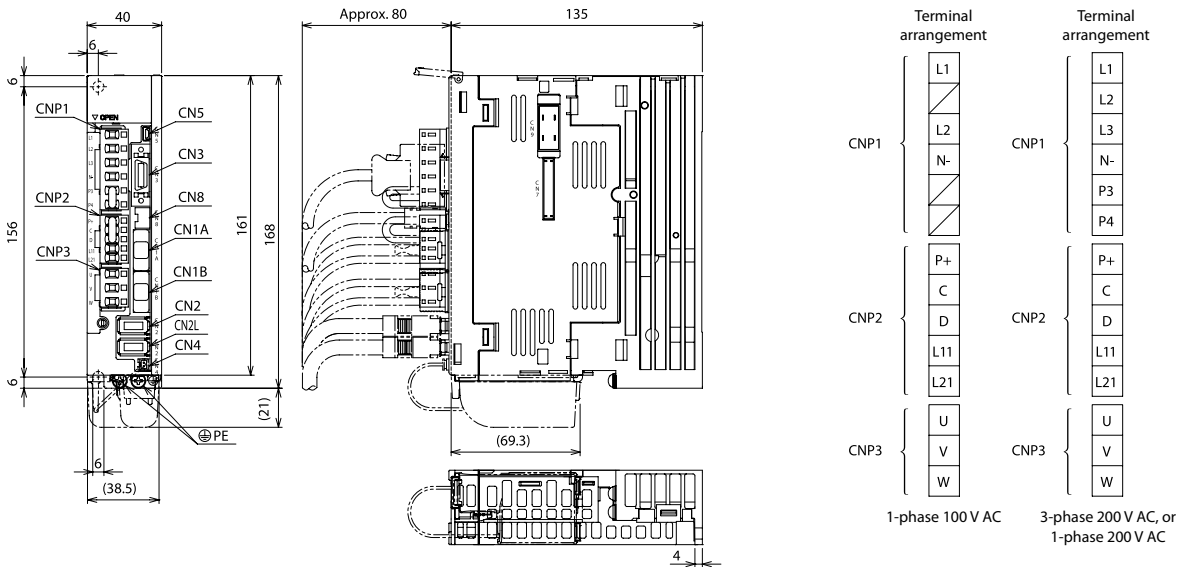
Unit: mm

MR-J4-22KA, MR-J4-22KA4



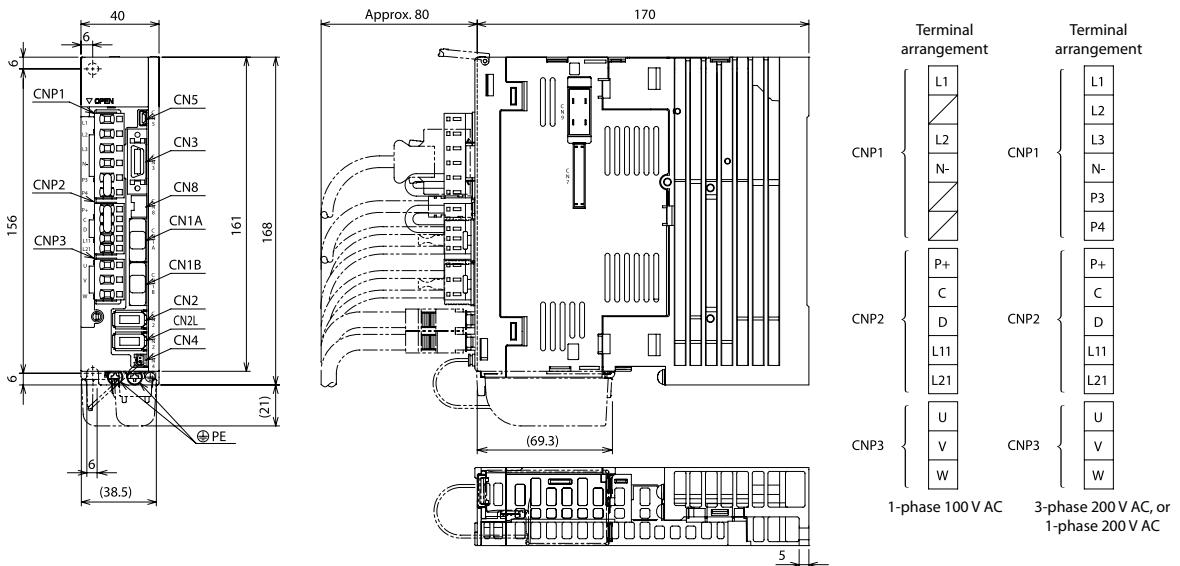
Unit: mm

MR-J4-10B, MR-J4-20B



Unit: mm

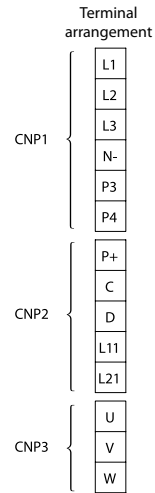
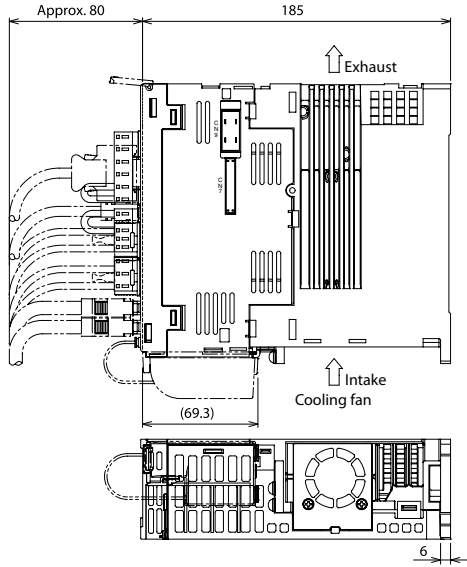
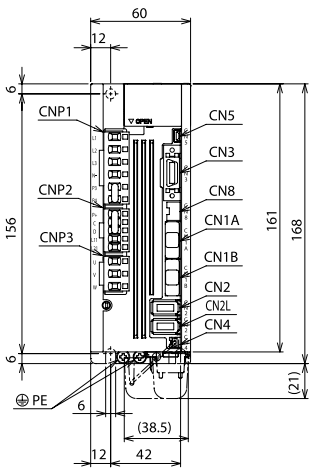
MR-J4-40B, MR-J4-60B



Unit: mm

Dimensions Servo Amplifiers

MR-J4-70B, MR-J4-100B

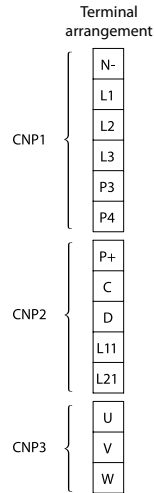
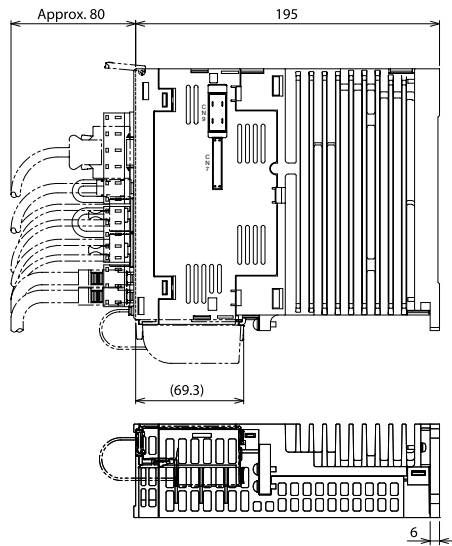
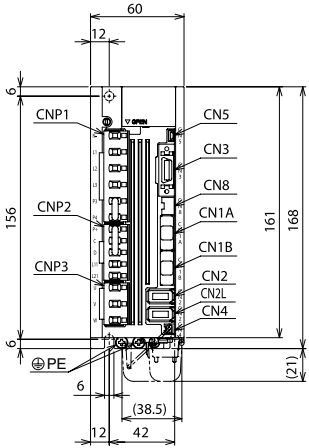


Unit: mm

MR-J4-60B4, MR-J4-100B4

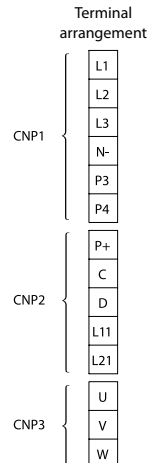
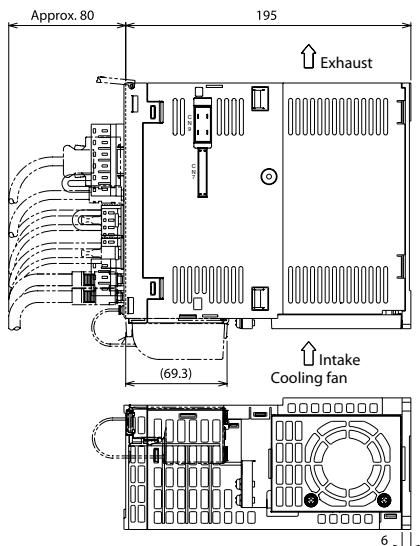
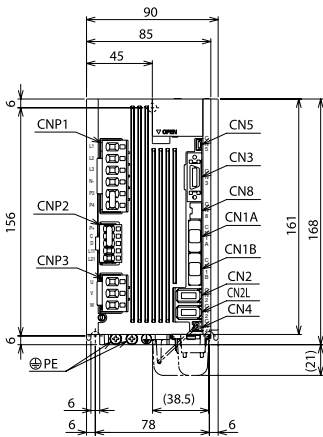
6

Dimensions



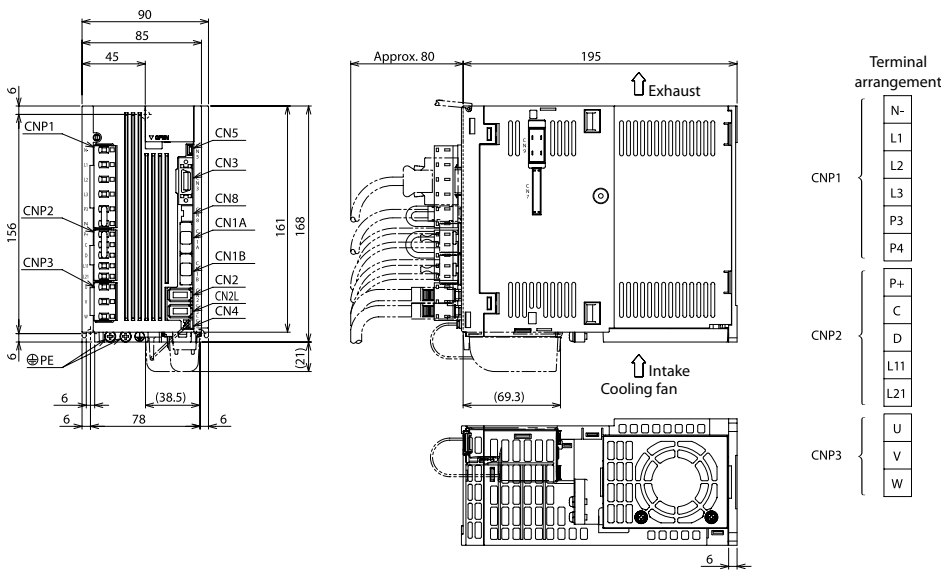
Unit: mm

MR-J4-200B



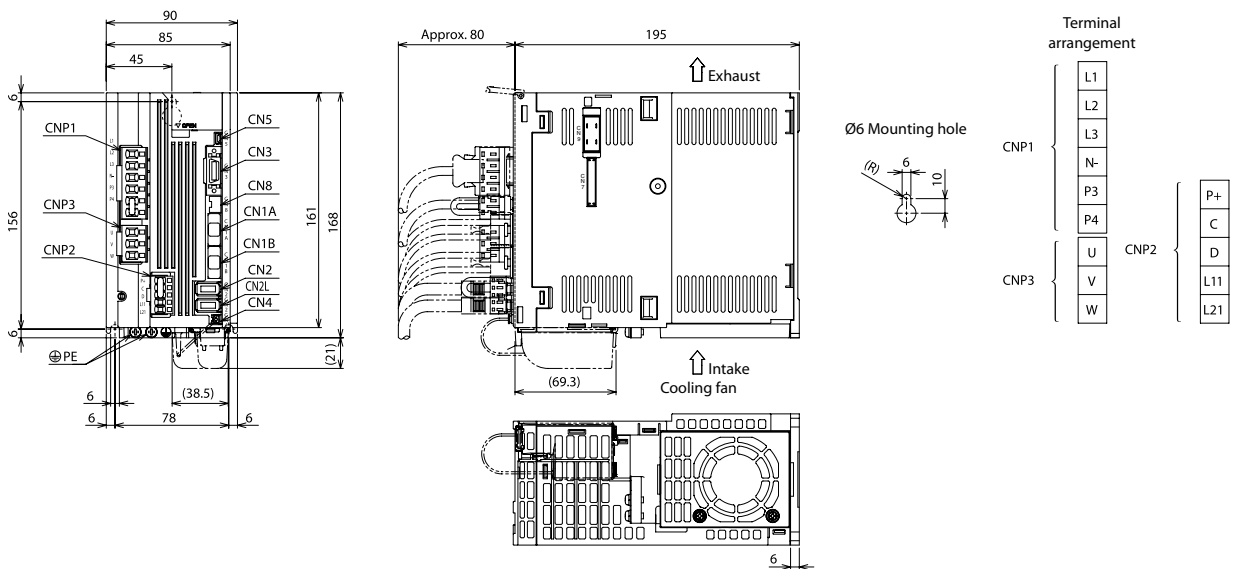
Unit: mm

MR-J4-200B4



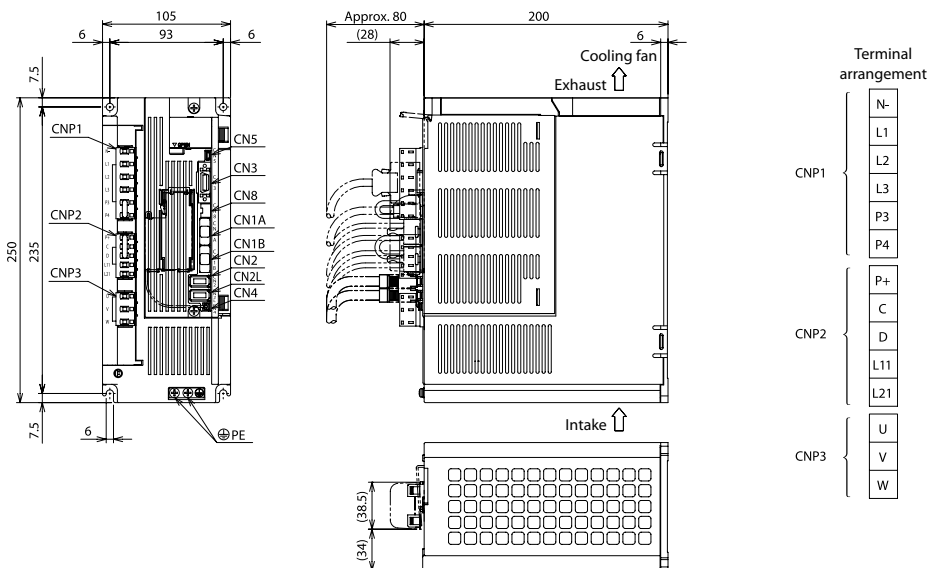
Unit: mm

MR-J4-350B



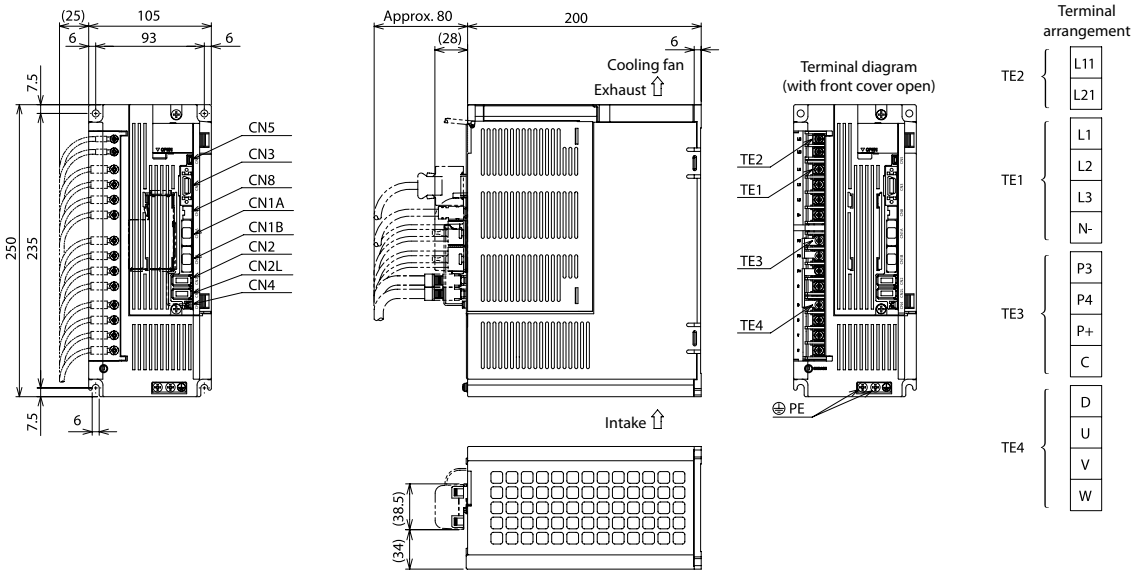
Unit: mm

MR-J4-350B4



Unit: mm

MR-J4-500B

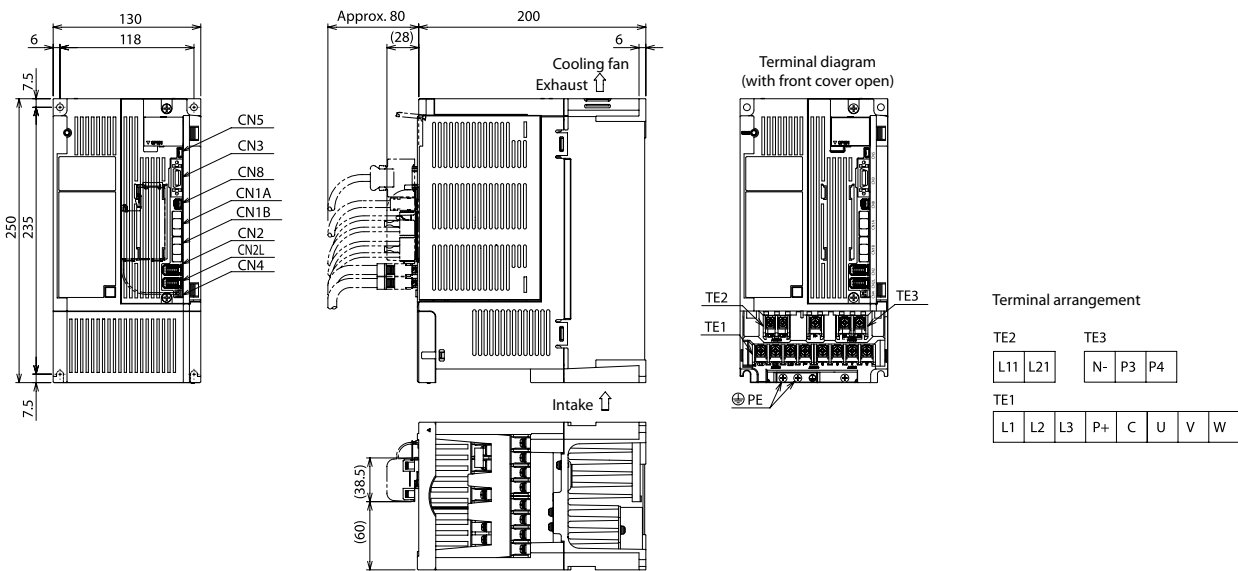


Unit: mm

MR-J4-500B4

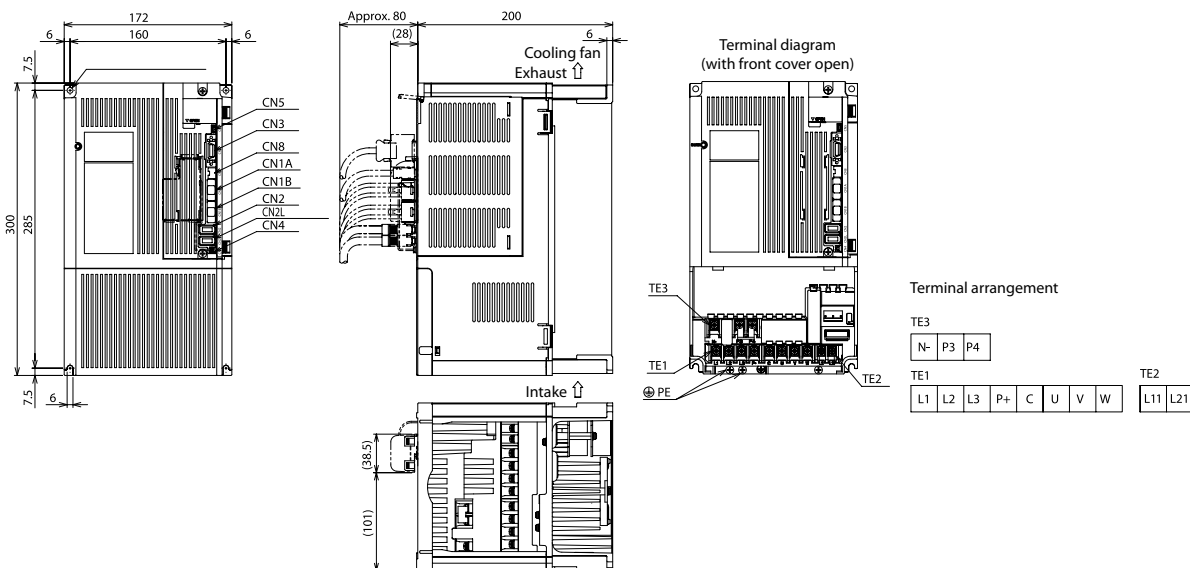
6

Dimensions



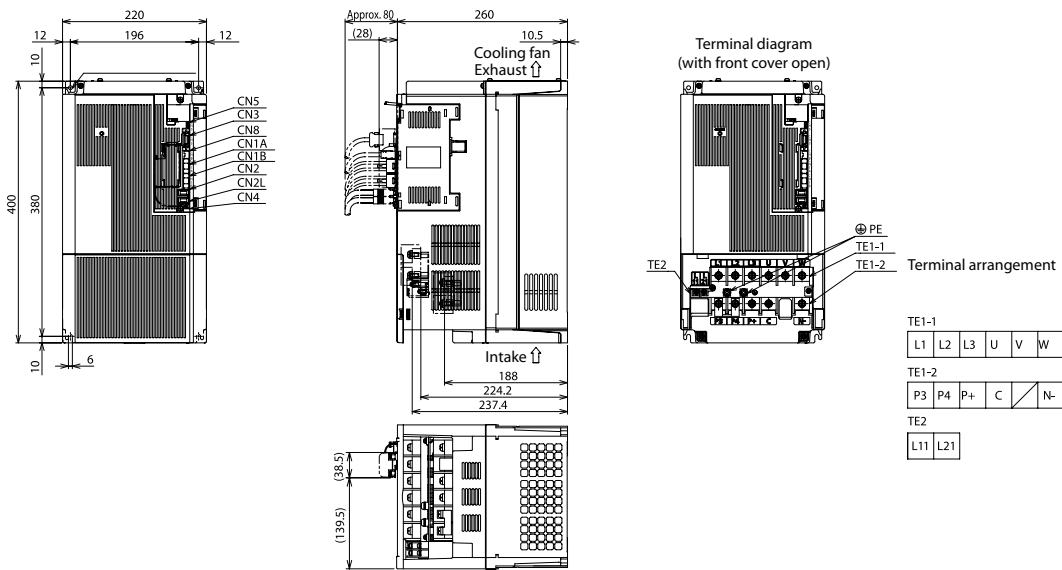
Unit: mm

MR-J4-700B, MR-J4-700B4



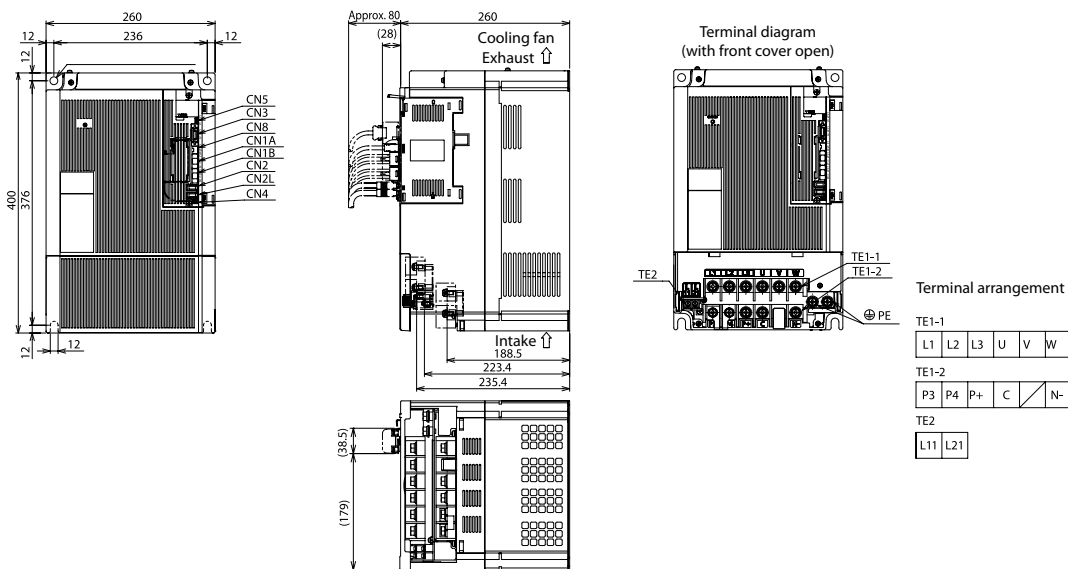
Unit: mm

MR-J4-11KB, MR-J4-11KB4, MR-J4-15KB, MR-J4-15KB4



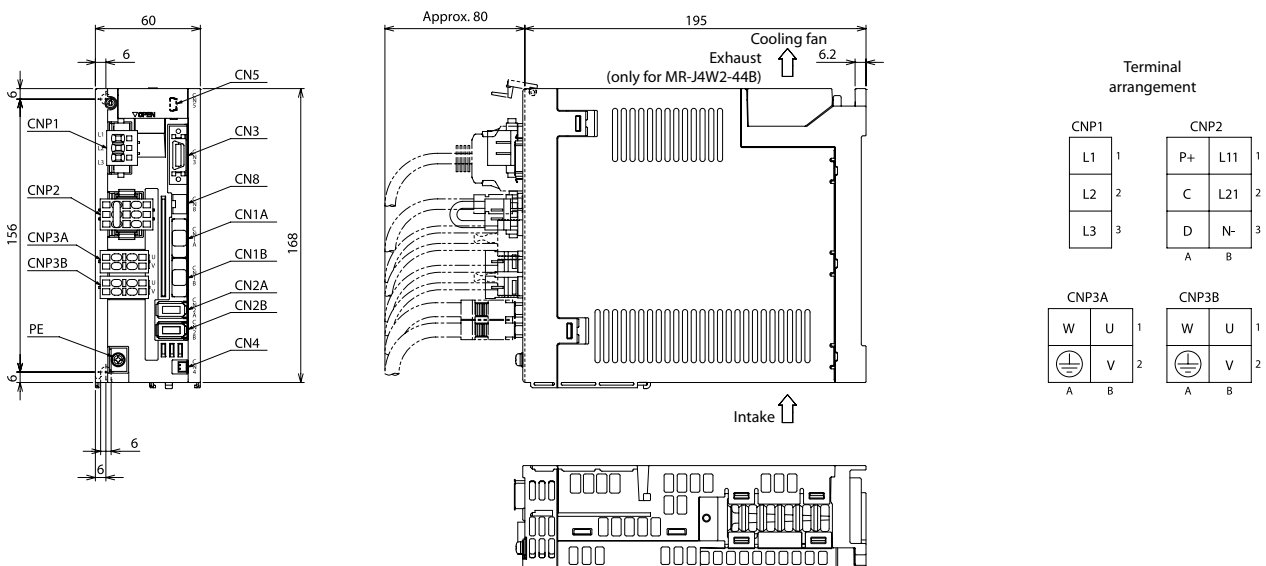
Unit: mm

MR-J4-22KB, MR-J4-22KB4



Unit: mm

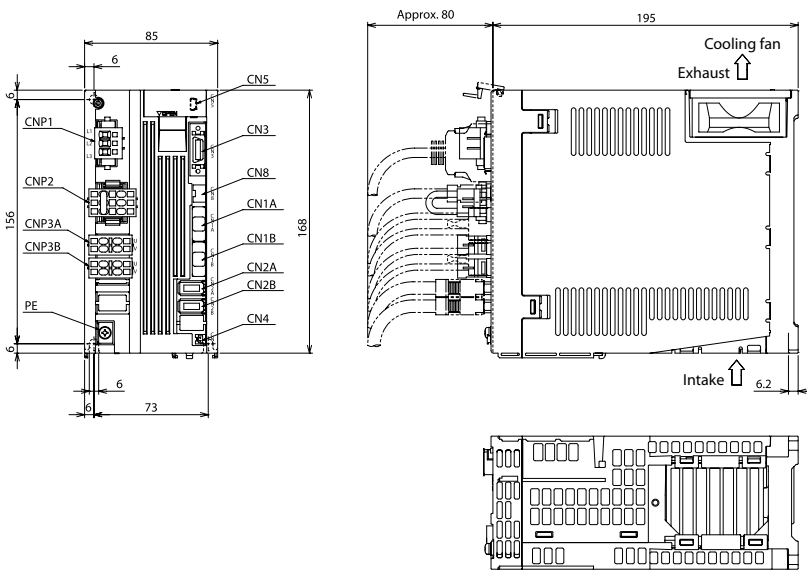
MR-J4W2-22B, MR-J4W2-44B



Unit: mm

Dimensions Servo Amplifiers

MR-J4W2-77B, MR-J4W2-1010B

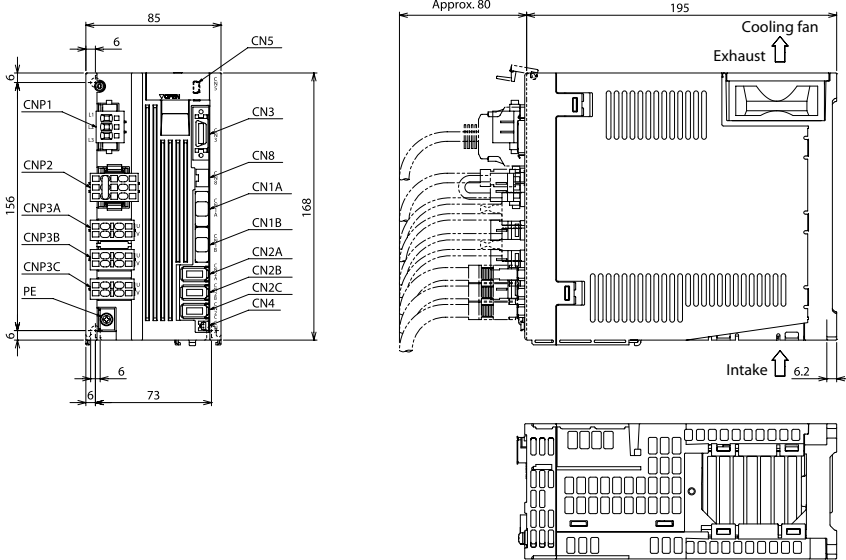


Unit: mm

MR-J4W3-222B, MR-J4W3-444B

6

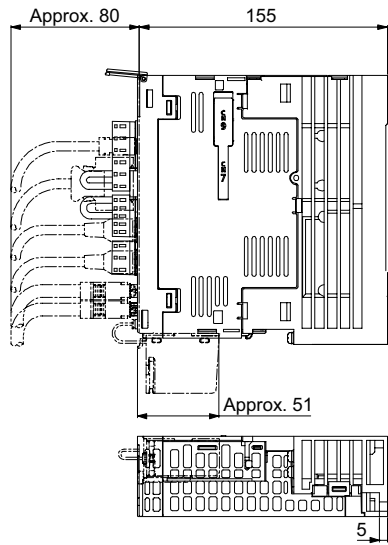
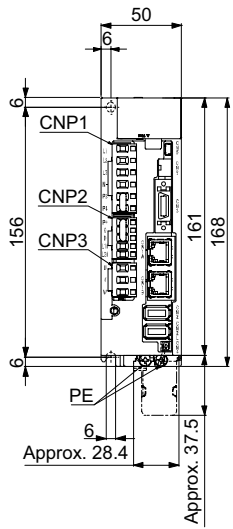
Dimensions



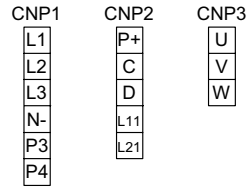
Unit: mm

MR-J4-GF 200-V-Ausführungen

MR-J4-10GF-MR-J4-60GF

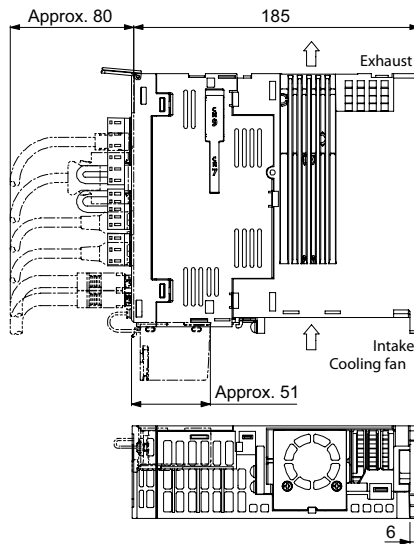
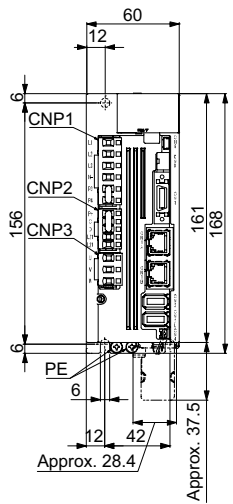


Terminal arrangement

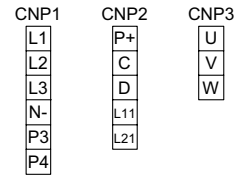


Unit: mm

MR-J4-70GF, MR-J4-100GF

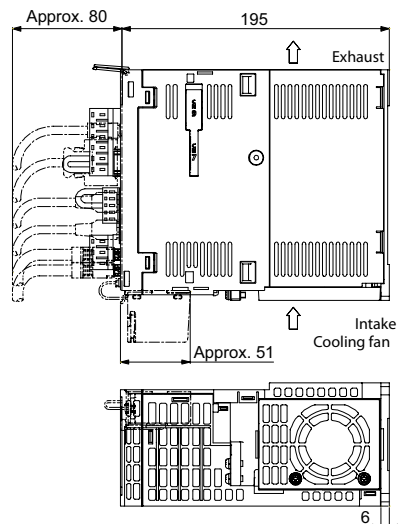
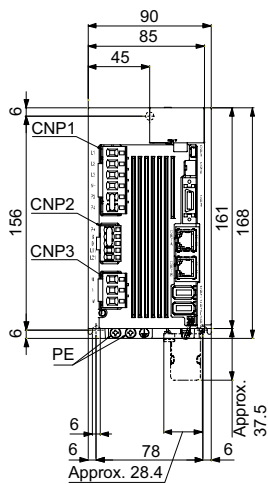


Terminal arrangement

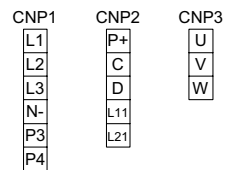


Unit: mm

MR-J4-200GF



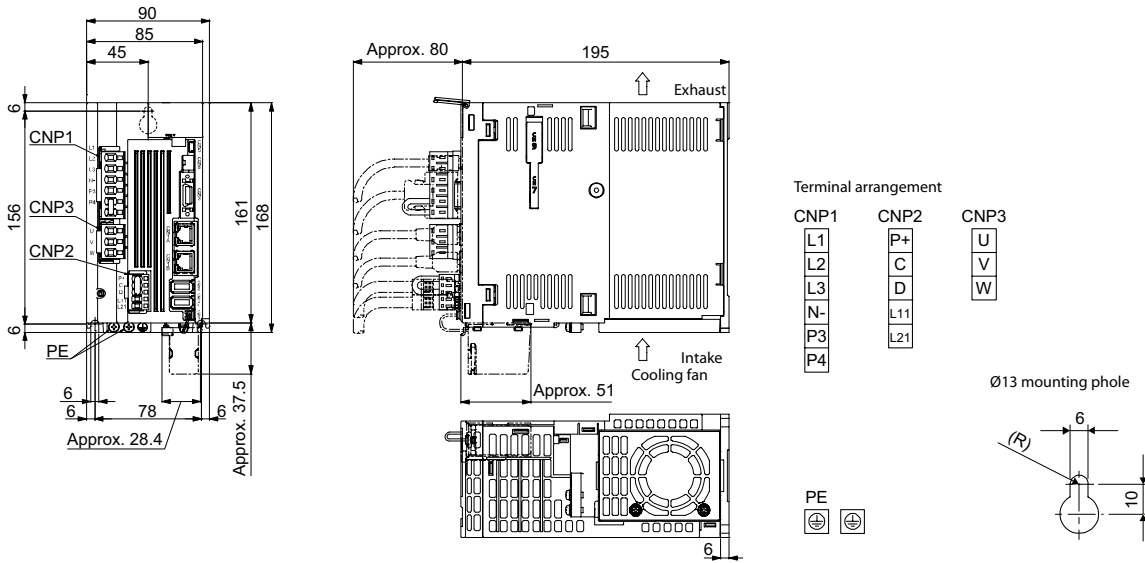
Terminal arrangement



Unit: mm

Dimensions Servo Amplifiers

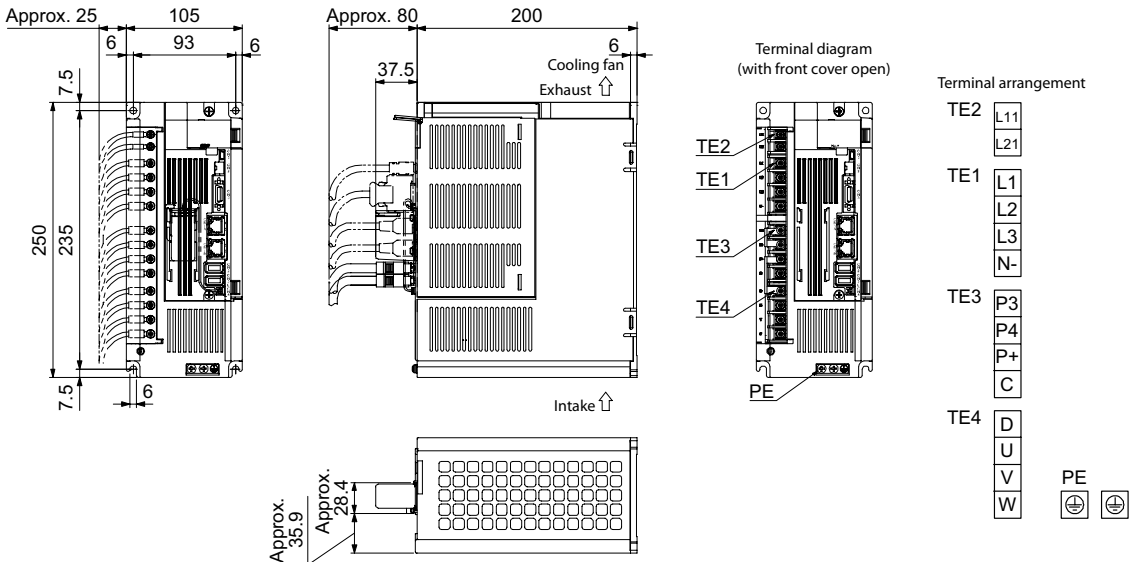
MR-J4-350GF



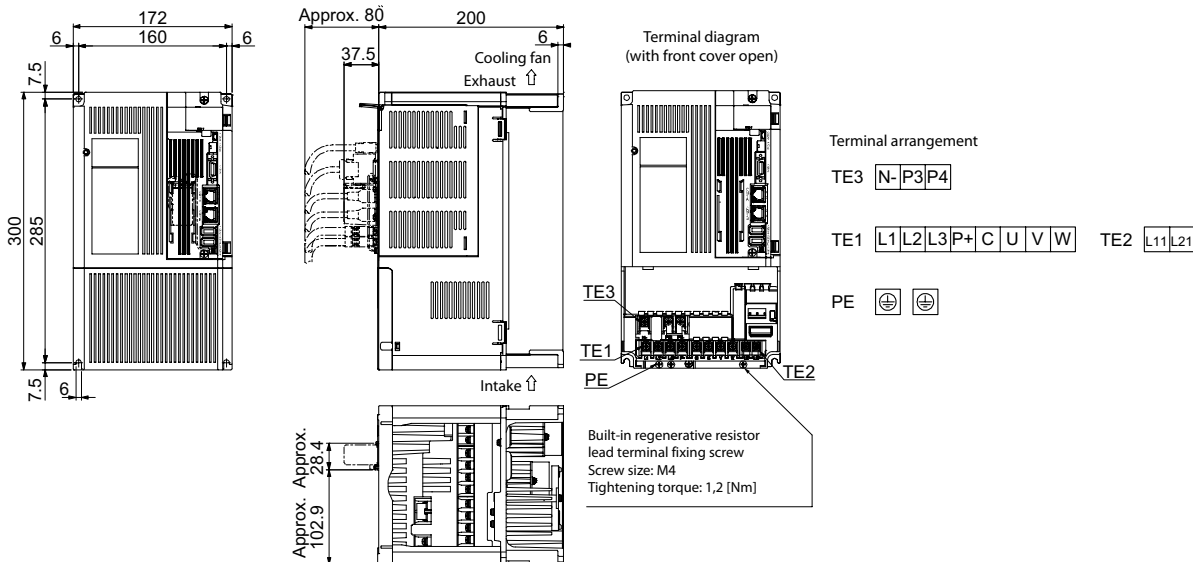
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Dimensions

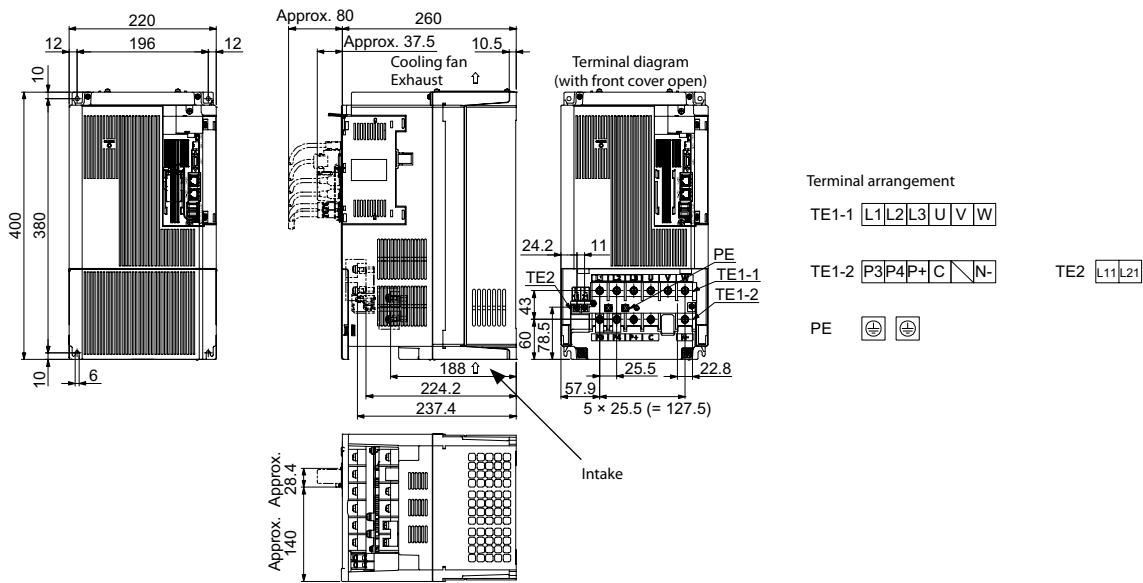
MR-J4-500GF



MR-J4-700GF

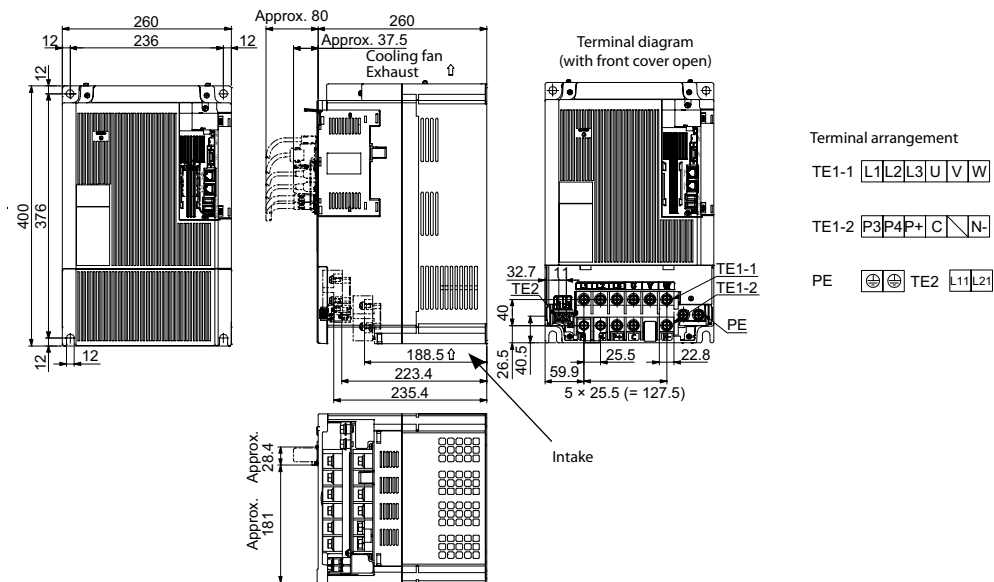


MR-J4-11KGF/MR-J4-15KGF



Unit: mm

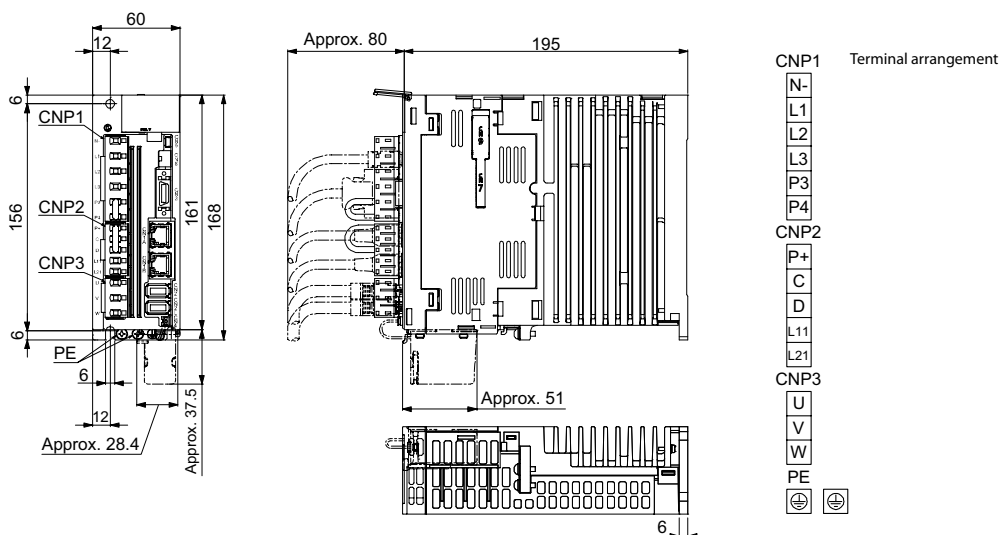
MR-J4-22KGF



Unit: mm

MR-J4-GF 400-V-Ausführungen

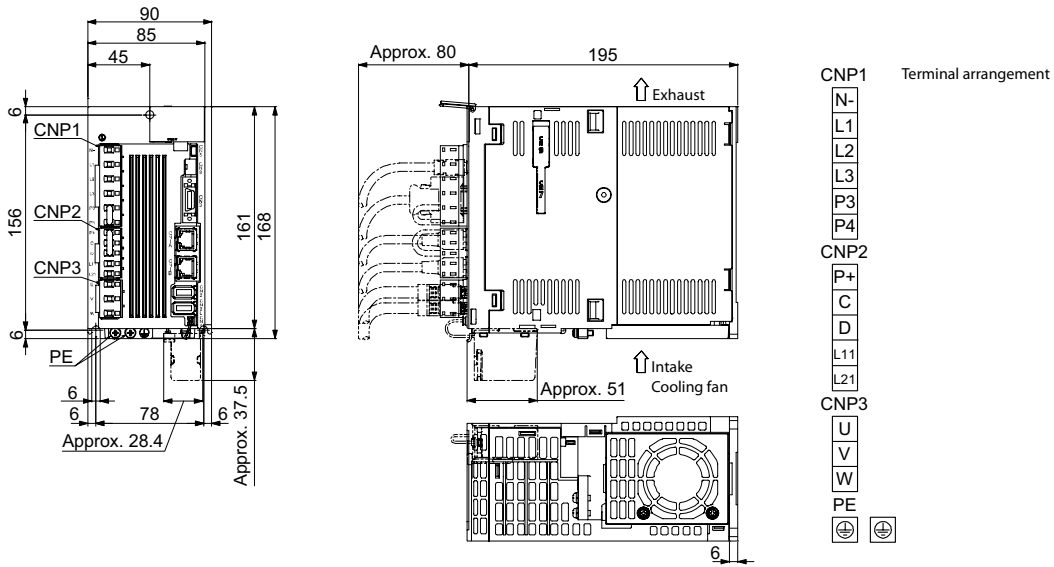
MR-J4-60GF4/MR-J4-100GF4



Unit: mm

Dimensions Servo Amplifiers

MR-J4-200GF4

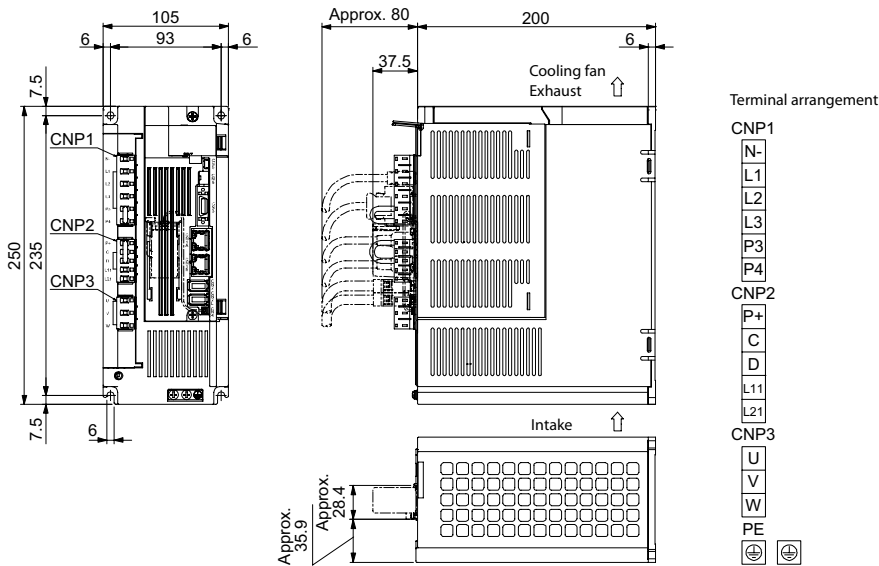


Unit: mm

MR-J4-350GF4

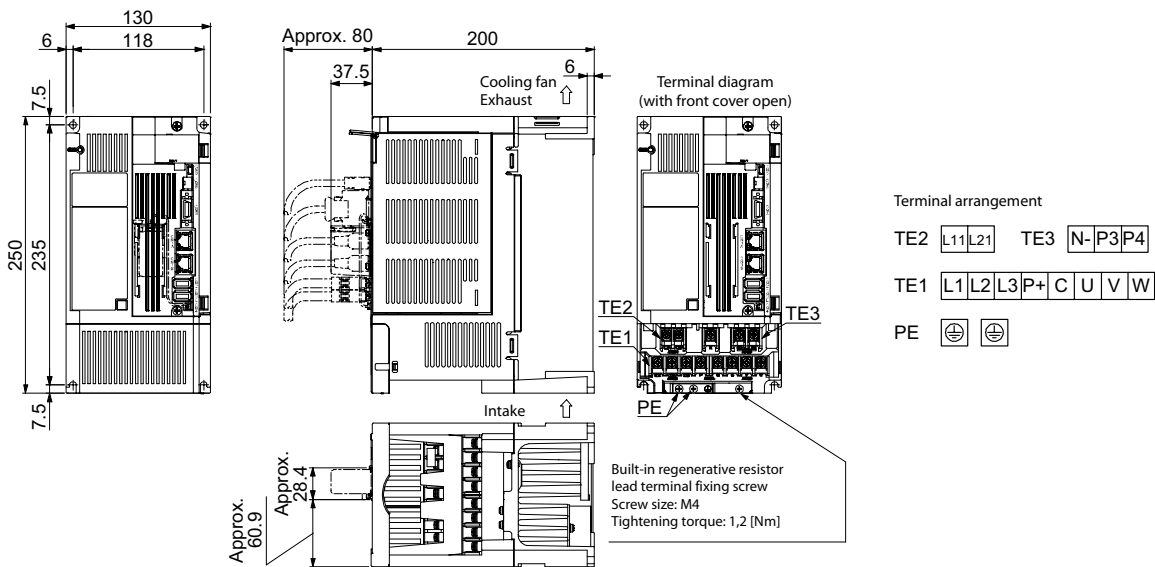
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Dimensions



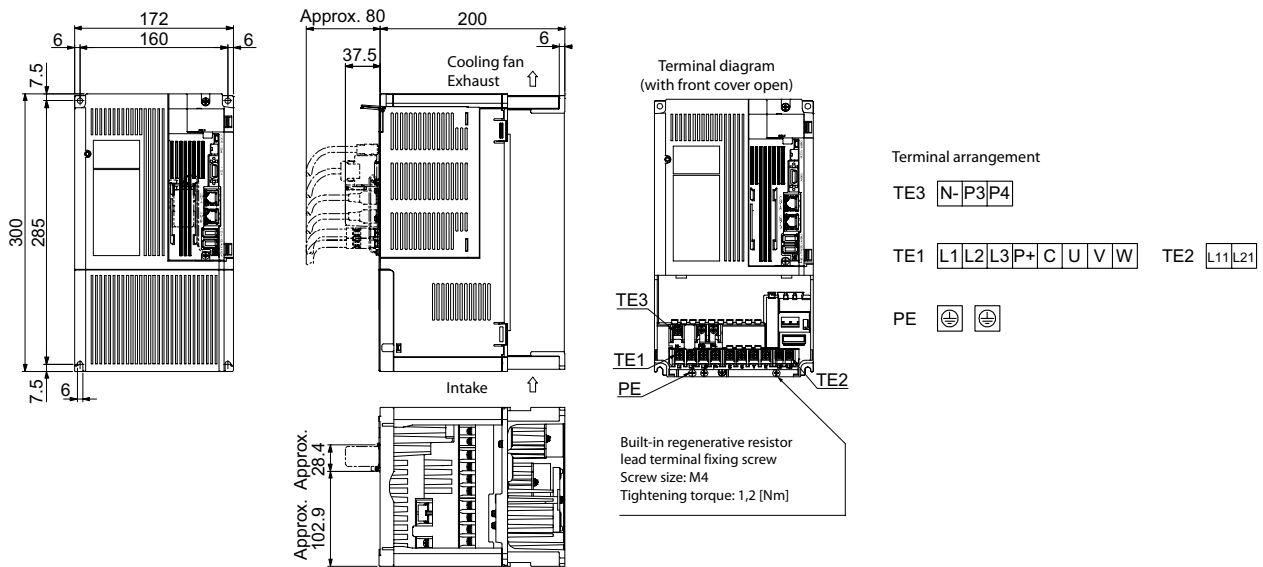
Unit: mm

MR-J4-500GF4

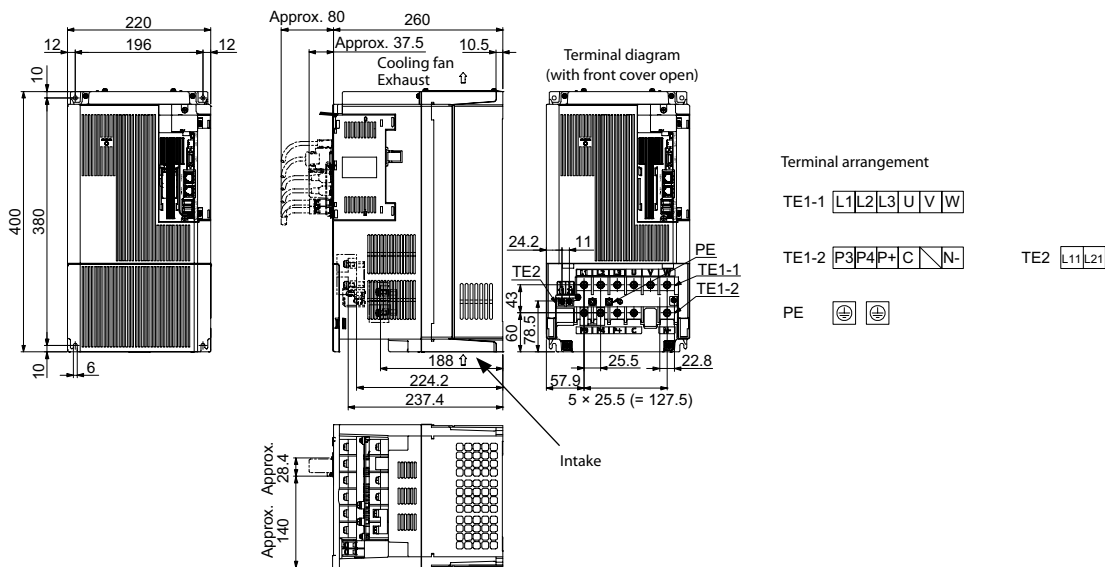


Unit: mm

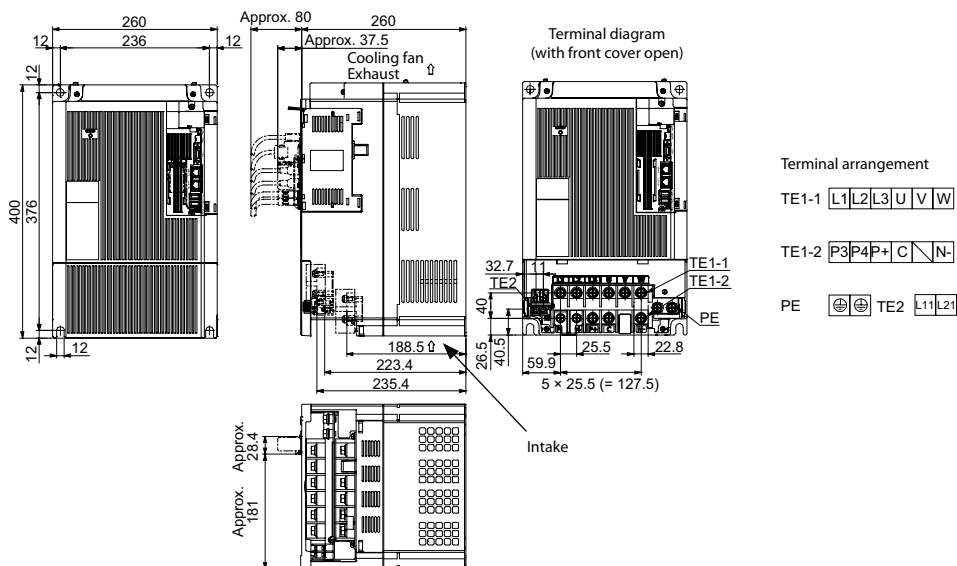
MR-J4-700GF4



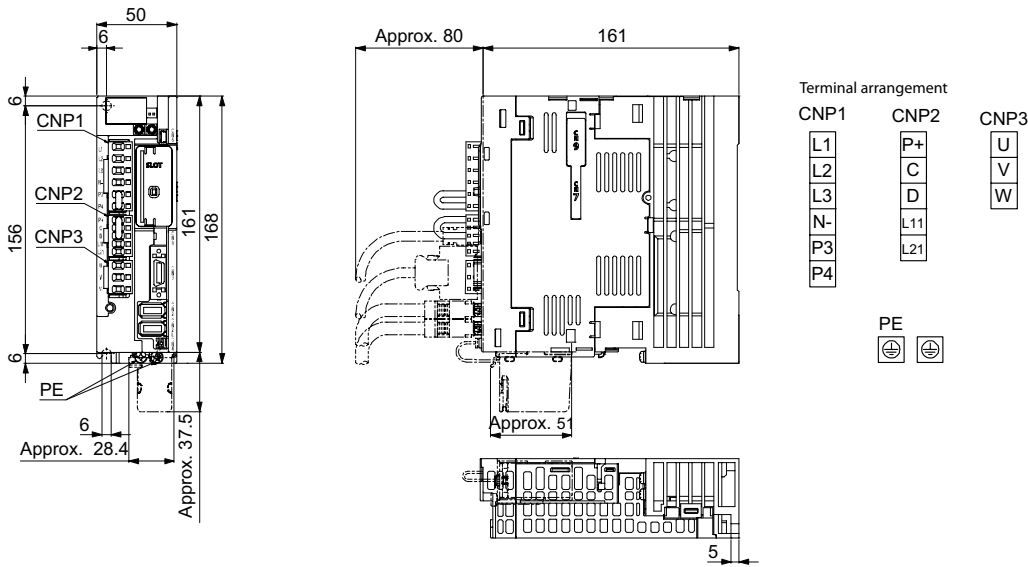
MR-J4-11KGF4/MR-J4-15KGF4



MR-J4-22KGF4



MR-J4-10TM/10TM4-MR-J4-60TM/60TM4

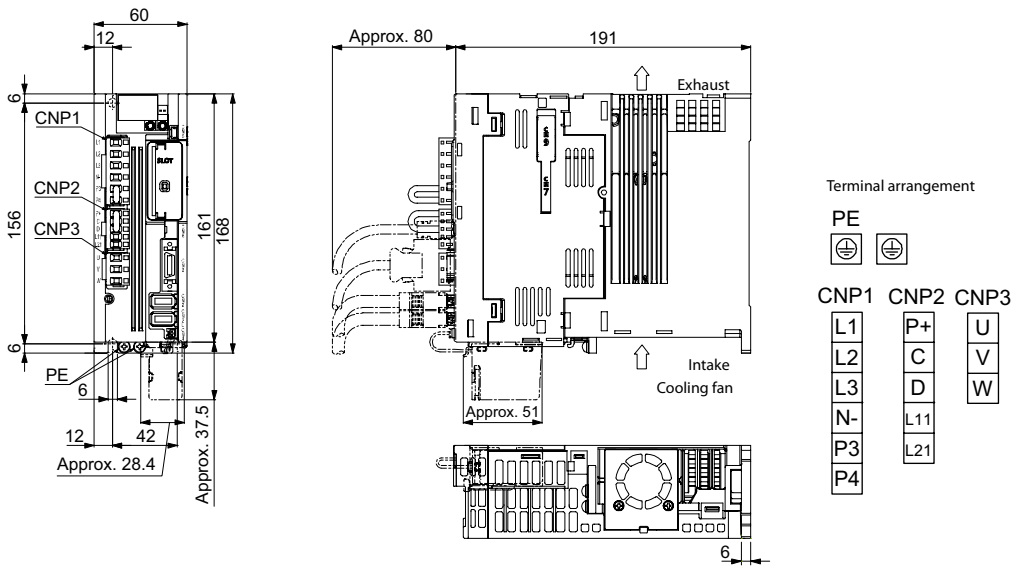


Unit: mm

MR-J4-70TM/70TM4-MR-J4-100TM/100TM4

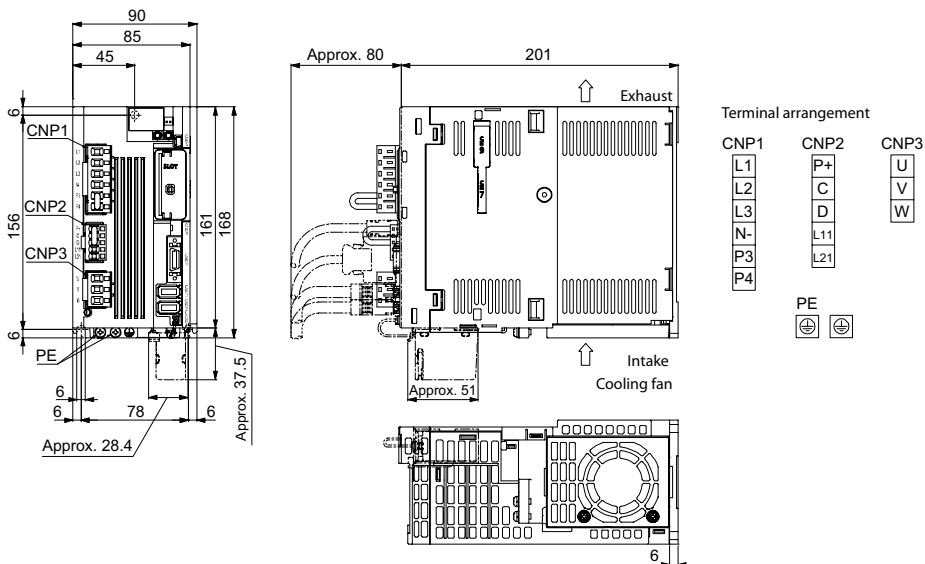
6

Dimensions



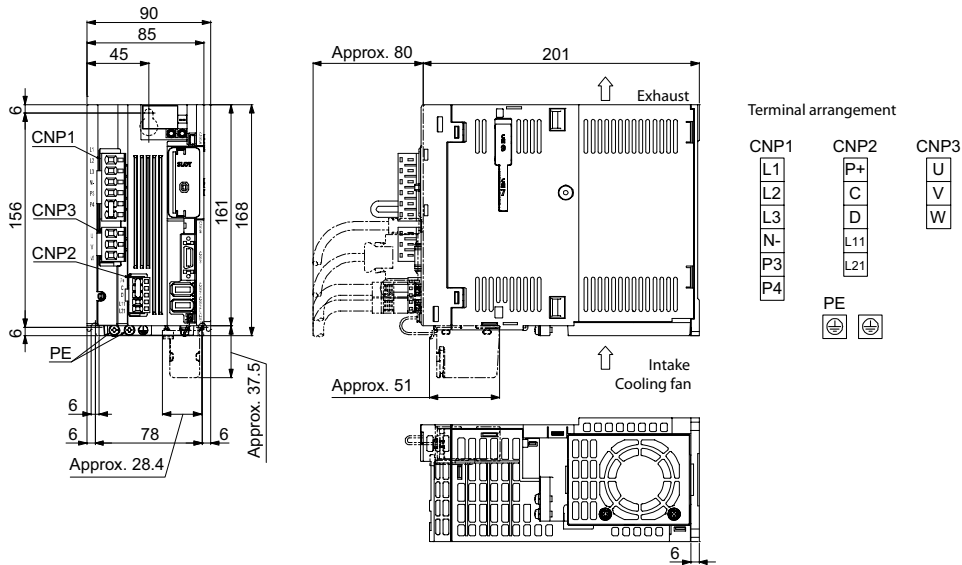
Unit: mm

MR-J4-200TM/200TM4



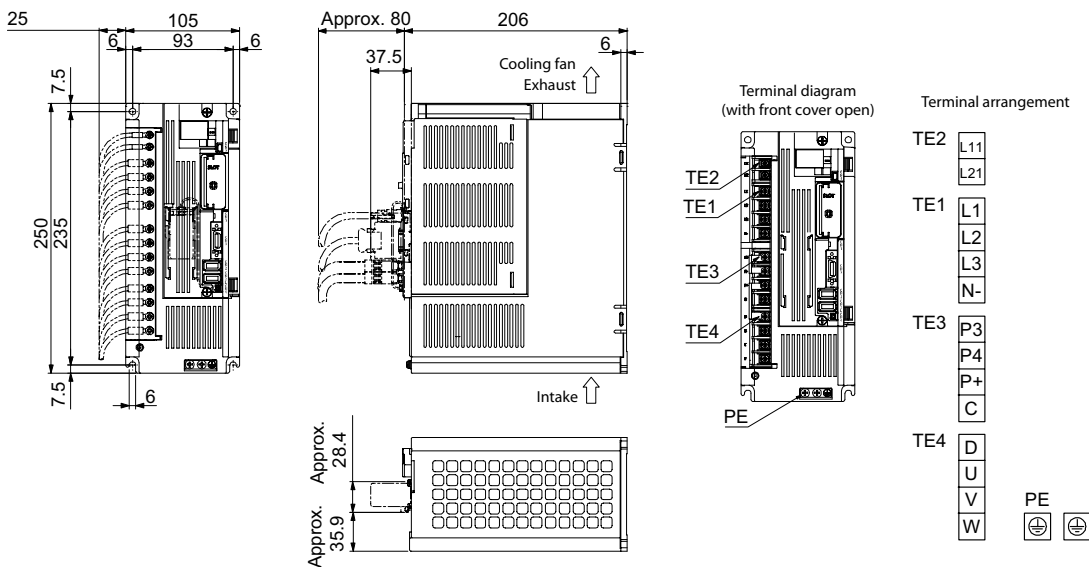
Unit: mm

MR-J4-350TM/350TM4



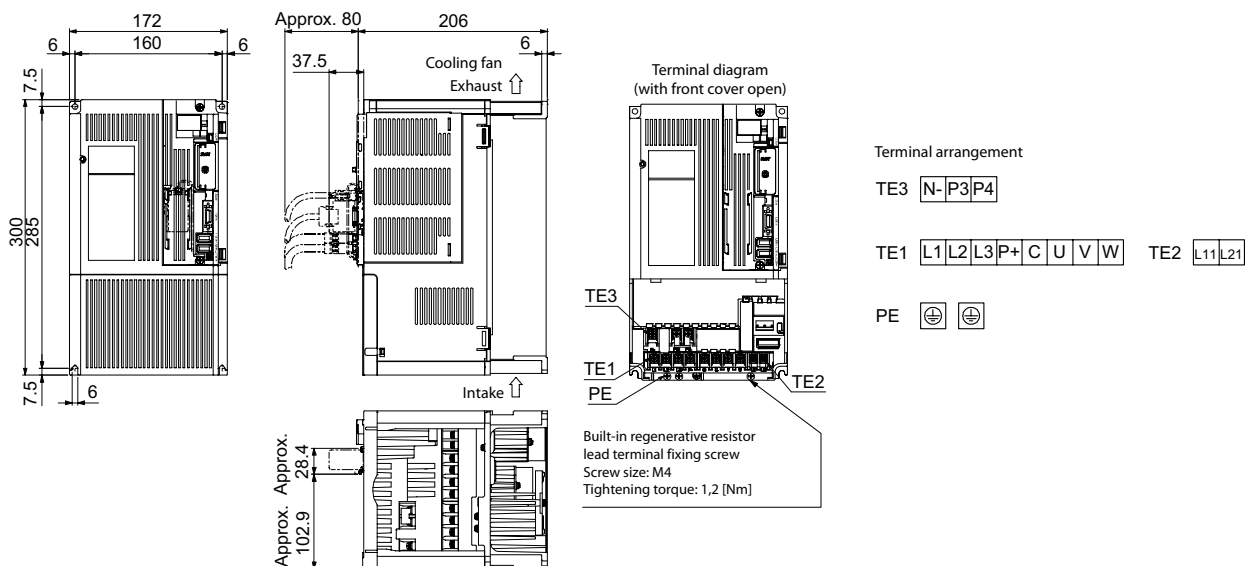
Unit: mm

MR-J4-500TM/500TM4



Unit: mm

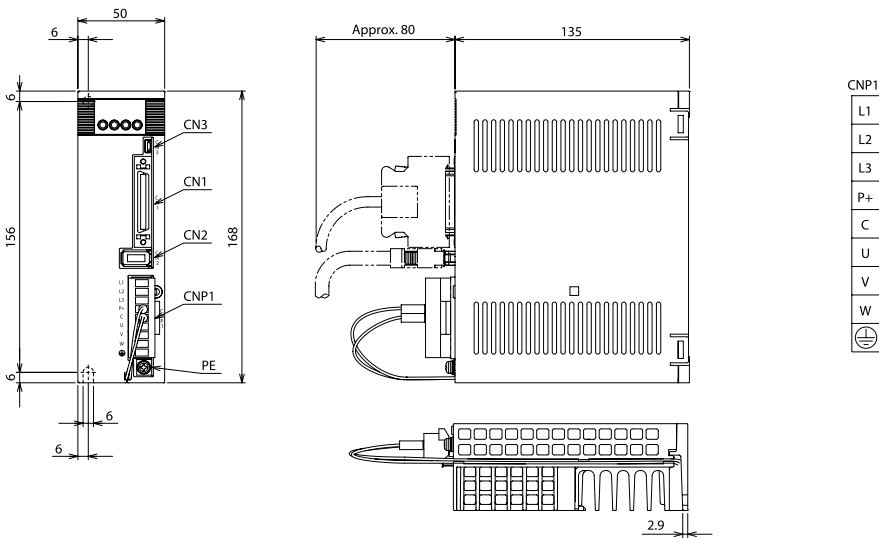
MR-J4-700TM/700TM4



Unit: mm

■ Servo Amplifiers MR-JE-A

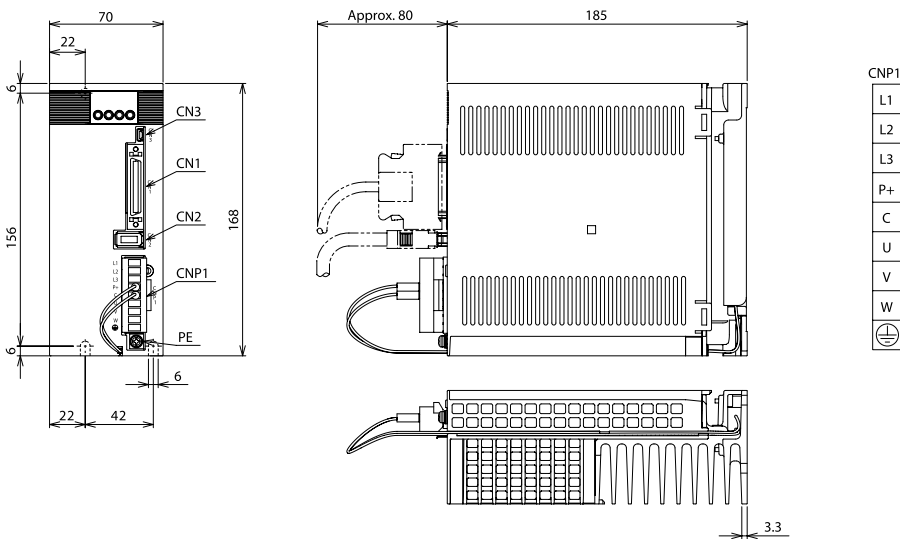
MR-JE-10A, MR-JE-20A, MR-JE-40A



Unit: mm

6

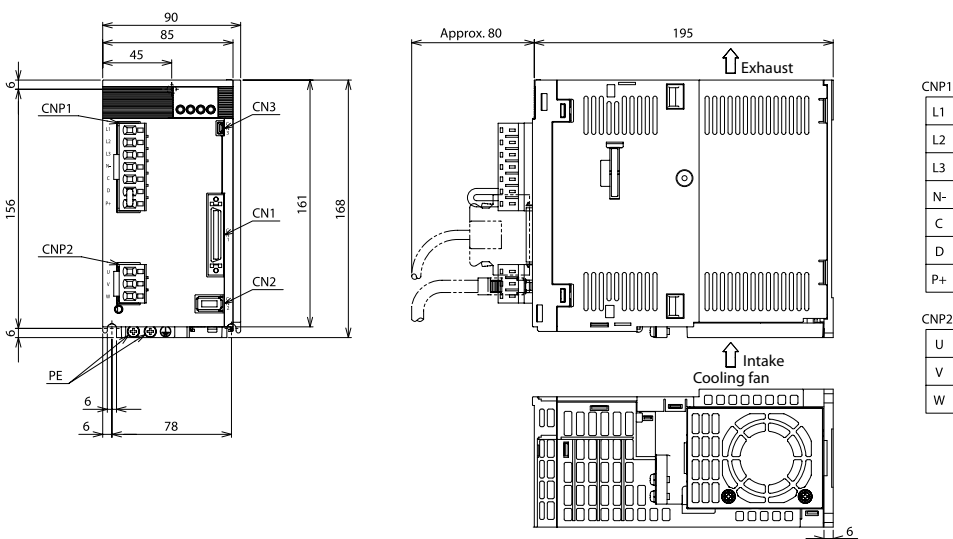
MR-JE-70A, MR-JE-100A



Unit: mm

Dimensions

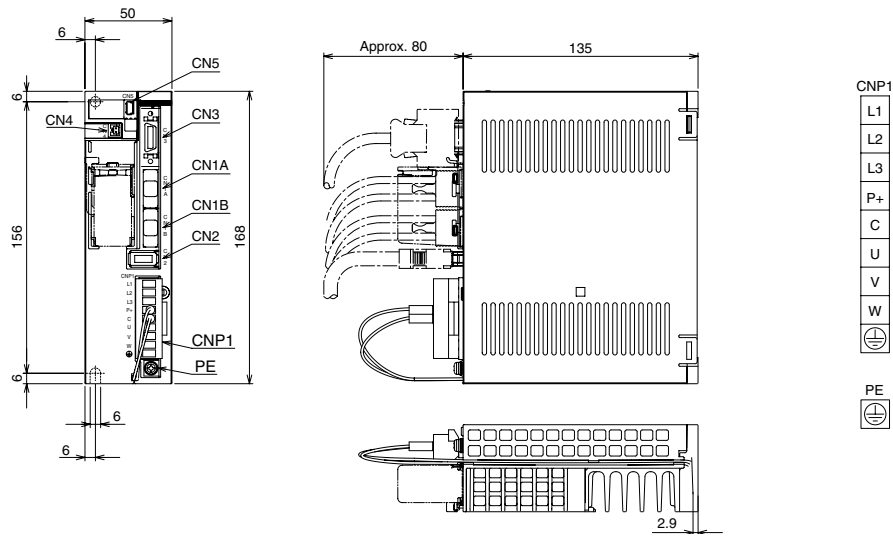
MR-JE-200A, MR-JE-300A



Unit: mm

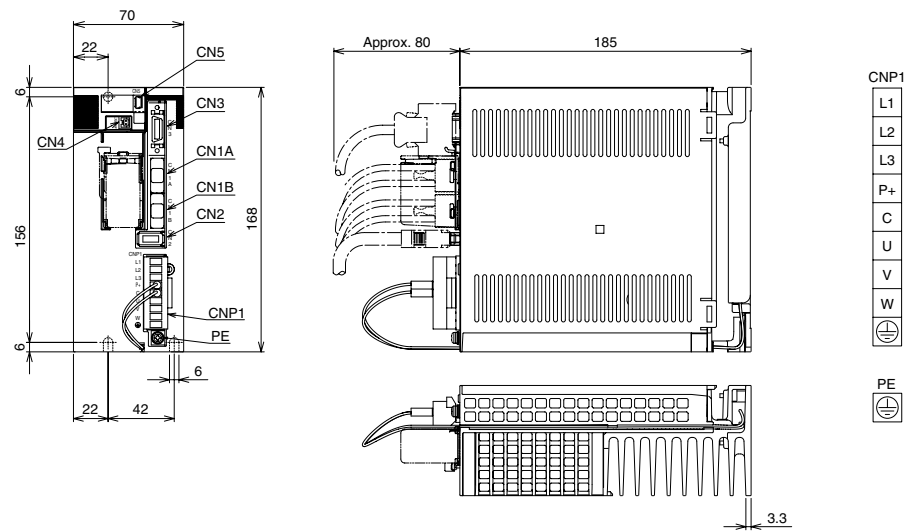
Servo Amplifiers MR-JE-B

MR-JE-10B, MR-JE-20B, MR-JE-40B



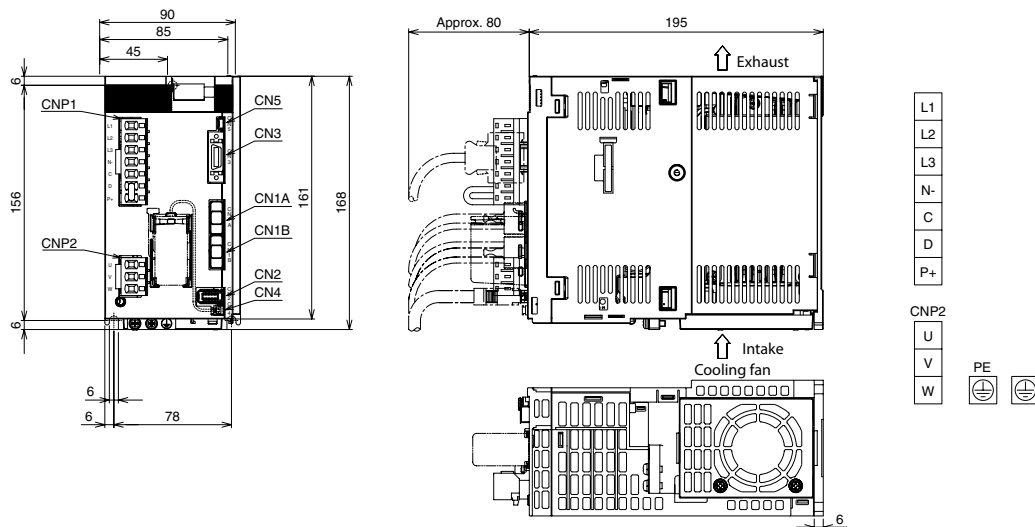
Unit: mm

MR-JE-70B, MR-JE-100B



Unit: mm

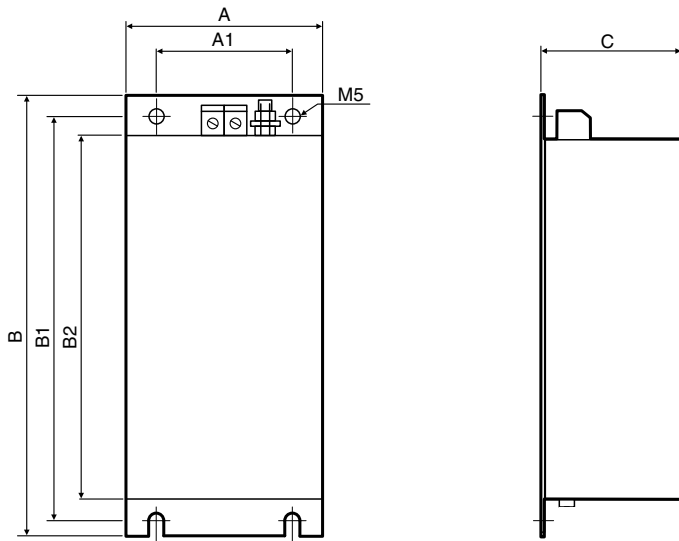
MR-JE-200B, MR-JE-300B



Unit: mm

■ EMC Filters

MF-2F230-006.230MFa to MF-3F480-015.230MF3 and MF-3F480-035.230



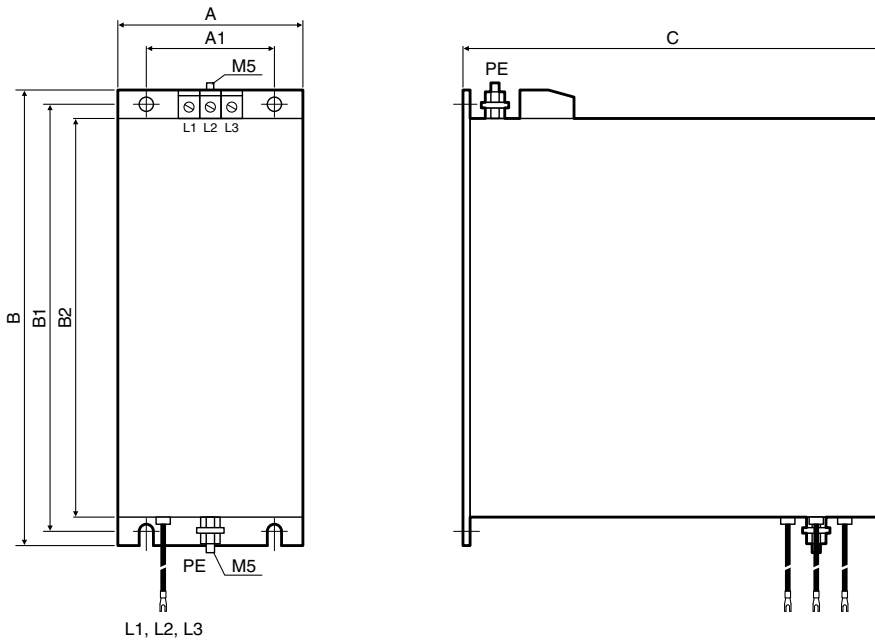
| Type | A | A1 | B | B1 | B2 | C |
|---------------------|-----|-----|-----|-----|-----|-----|
| MF-2F230-006.230MFa | 40 | 28 | 200 | 190 | 170 | 40 |
| MF-2F230-006.230MFb | 60 | 42 | 200 | 190 | 170 | 40 |
| MF-2F230-006.230MFc | 50 | 38 | 200 | 190 | 170 | 40 |
| MF-3F480-015.233MF | 130 | 118 | 282 | 270 | — | 66 |
| MF-3F480-010.233MF | 60 | 42 | 202 | 192 | 172 | 55 |
| MF-3F480-015.230MF3 | 90 | 78 | 204 | 192 | 172 | 55 |
| MF-3F480-015.234MF | 105 | 93 | 282 | 270 | 235 | 55 |
| MF-3F480-035.230 | 75 | 60 | 168 | 156 | 140 | 195 |

Unit: mm

6

Dimensions

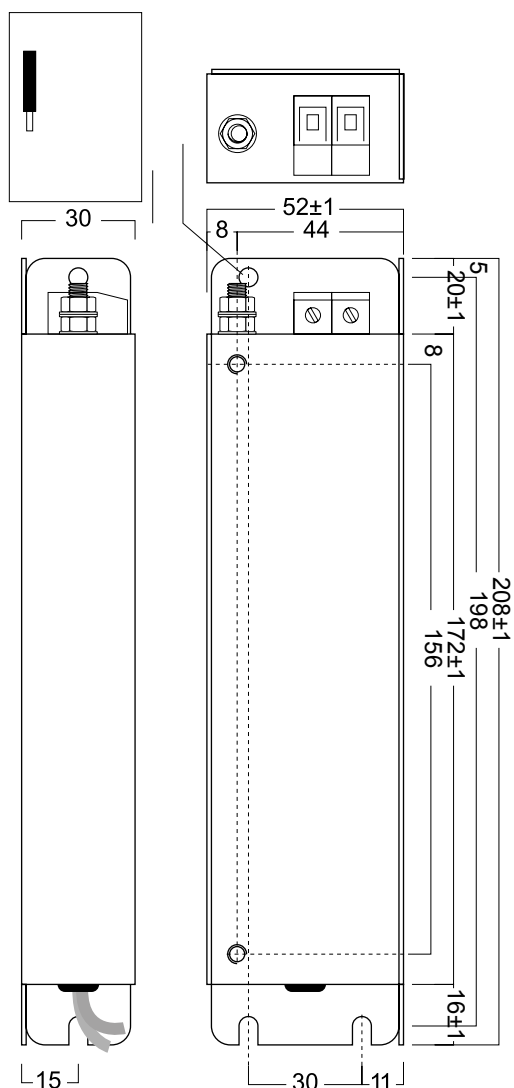
MF-3F230-011.230, MF-3F480-025.230MF3, MF-3F480-050.230MF3



| Type | A | A1 | B | B1 | B2 | C |
|---------------------|----|----|-----|-----|-----|-----|
| MF-3F230-011.230 | 45 | 36 | 168 | 156 | 140 | 135 |
| MF-3F480-025.230MF3 | 76 | 60 | 168 | 156 | 140 | 195 |
| MF-3F480-050.230MF3 | 75 | 45 | 250 | 235 | 220 | 200 |

Unit: mm

FMR-ES-3A-RS1-FP, FMR-ES-6A-RS1-FP

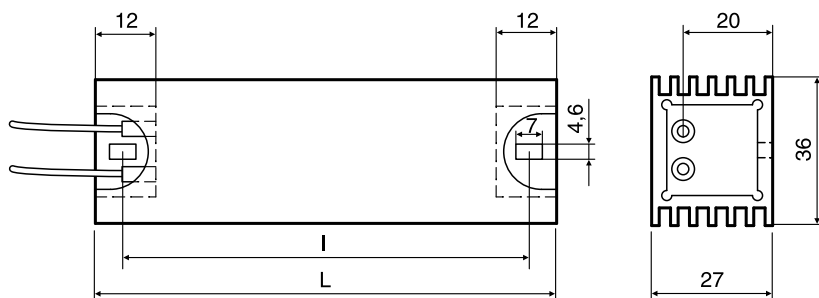


| Type | A | A1 | A2 | A3 | A4 | B | B1 | B2 | B3 | C | C1 |
|------------------|------|----|----|----|----|-----|-------|-----|-------|----|----|
| FMR-ES-3A-RS1-FP | 52±1 | 8 | 44 | 30 | 11 | 156 | 172±1 | 198 | 208±1 | 30 | 15 |
| FMR-ES-6A-RS1-FP | 72±1 | — | 42 | 50 | 11 | 156 | 172±1 | 198 | 208±1 | 30 | 15 |

Unit: mm

■ Brake Resistors

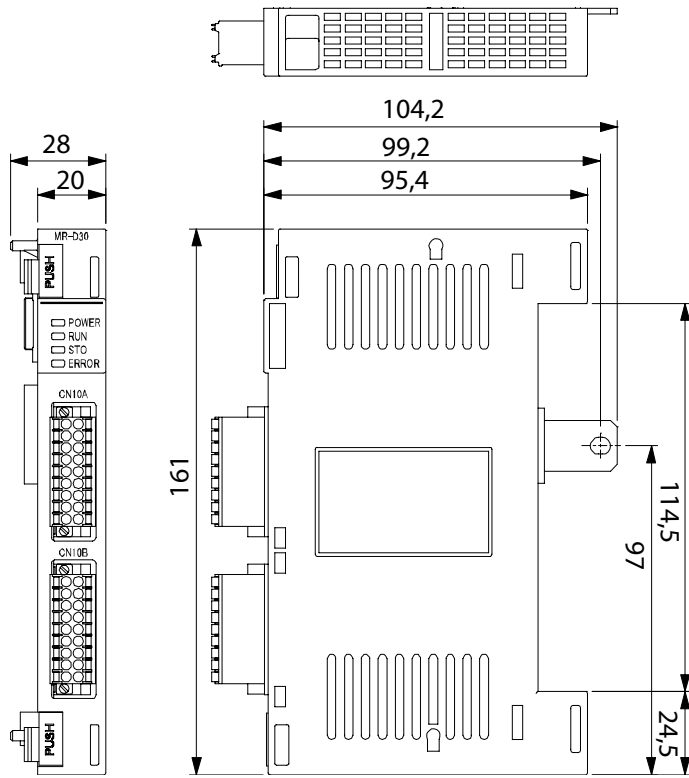
MR-RFH, MR-PWR-R



| Type | L | I |
|-------------------|-----|-----|
| MR-RFH75-40 | 90 | 79 |
| MR-RFH220-40 | 200 | 189 |
| MR-RFH400-13 | 320 | 309 |
| MR-RFH400-6.7 | 320 | 309 |
| MR-PWR-RT 400-120 | 200 | 189 |
| MR-PWR-RT 600-26 | 320 | 309 |
| MR-PWR-RT 600-9 | 320 | 309 |
| MR-PWR-RT 600-47 | 320 | 309 |

Unit: mm

■ Functional safety unit MR-D30



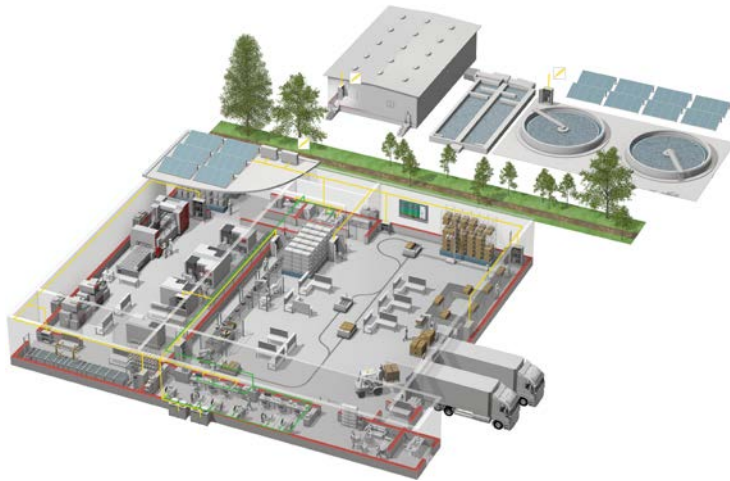
Unit: mm

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