Designed to enhance the overall manufacturing and production system capabilities

MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO

AC Servos-MELSERVO

From rotary servo motors to linear servo motors and to direct-drive motors, we have a wide range of products to meet various needs and to significantly enhance the equipment performance.

Product details P.268
Inverters-FREQROL

Our inverters with adjustable frequency power supply are designed to easily change the rotation speed of the three-phase induction motor.

Product details P.436
AC Servo

Leading the World with the industry’s Top Class Technology.
"MELSERVO" products are playing critical role in the success of manufacturers all over the world. Welcome to the world’s leading-edge drive platform.

**MR-J4 Series**
100VAC/200VAC/400VAC specifications
48VDC/24VDC specifications
The latest MELSERVO design brings harmony among machine, people, and environment. Built with advanced features of industry-leading basic performance, safety standards, Easy-to-Use designs, energy saving functions, and much more.

**MR-JE Series**
200VAC specifications
Operation has never been easier with features including the built-in one touch adjustment and positioning function. In addition, other cutting edge functions will further enhance your production lines with optimized drive.

---

**P.270**

---

**P.408**
The latest MELSERVO design brings harmony among machine, people, and environment.

Built with advanced features of industry-leading basic performance, safety standards, Easy-to-Use designs, energy saving functions, and much more.

MR-J4 Series
100VAC/200VAC/400VAC specifications
48VDC/24VDC specifications

MR-JE Series
200VAC specifications
Operation has never been easier with features including the built-in one touch adjustment and positioning function.

In addition, other cutting edge functions will further enhance your production lines with optimized drive.

Leading the World with the industry’s Top Class Technology.
“MELSERVO” products are playing critical role in the success of manufacturers all over the world.

Welcome to the world’s leading-edge drive platform.

AC Servo
MR-JE-B
MR-JE-A
MR-J4-GF(-RJ)
MR-J4W2-0303B6
MR-J4-03A6(-RJ)
MR-J4-B(-RJ)
MR-J4-A(-RJ)
MR-J4W2-B
MR-J4W3-B

200V: 0.1kW - 7kW
100V: 0.1kW - 0.4kW
200V: 0.1kW - 37kW
- 22kW (Coming soon)
- 22kW (Coming soon)
400V: 0.6kW - 7kW
400V: 0.6kW - 55kW
200V: 0.2kW - 0.4kW
200V: 0.2kW - 1kW
48VDC/24VDC: 30W

Rotary Servo Motor
High speed and high torque deliver shorter positioning time and faster performance.

Linear Servo Motor
Optimized for linear motion system with high-speed and high-precision demands.

Direct Drive Motor
With downsized and simplified rotating and driving parts, this device is a perfect choice for high-precision control.
MITSUBISHI SERVO AMPLIFIERS & MOTORS

MELSERVO-J4

MELSERVO-J4 — trusted technology makes an evolutionary leap forward

Introducing the MELSERVO-J4 series. Offering more than just improved performance, these servos are designed to drive the industries of tomorrow. Backed by Mitsubishi leadership in all-digital technology, MELSERVO has become one of the most globally respected names in factory automation. And now — with safety, ease of use, and energy-efficient design of the new MELSERVO-J4 series — man, machine and environment can at last work together in perfect harmony.

Machine

The leading edge in drive control, with unrivaled accuracy and response for next-generation machine performance.

Backed by Mitsubishi MELSERVO’s global track record of proven reliability, the new MR-J4 takes machine performance to the highest level.

Man

The leading edge in safety and convenience, designed to harmonize with the way you work.

The easy-to-use MR-J4 was created with human needs in mind. It meets world-class safety standards and is exceptionally simple to maintain, ensuring optimum setup and operating ease for both design and manufacturing personnel.

The Environment


The MR-J4 series was designed with the environment in mind. In addition to helping you reduce your energy consumption, MR-J4 servos have a small footprint and simple wiring requirements that help save space and valuable resources.

Heritage

A heritage of trust and continuity — the hallmark of every MELSERVO product.

The MR-J4 series integrates seamlessly with your existing manufacturing assets, ensuring a smooth transition to the speed and cost benefits of leading-edge MELSERVO technology.
Industry-Leading Level of Servo Amplifier Basic Performance

Our original high-speed servo control architecture is evolved from the conventional two-degrees-of-freedom model adaptive control and applied to the dedicated execution engine. Speed frequency response is increased to 2.5 kHz. Compatible servo motors are equipped with a high-resolution absolute position encoder of 4,194,304 pulses/rev (22-bit), enabling high-speed and high-accuracy operation. The performance of the high-end machine is utilized to the fullest.

Dedicated execution engine

Servo amplifier control loop

* The advanced vibration suppression control II automatically adjusts one frequency.

Advanced Vibration Suppression Control II

The advanced vibration suppression control II suppresses two types of low frequency vibrations owing to vibration suppression algorithm which supports three-inertia system. This function is effective in suppressing residual vibration with relatively low frequency of approximately 100 Hz or less generated at the end of an arm and in a machine, enabling a shorter settling time. Adjustment is easily performed on MR Configurator2.

Built-in positioning function

The MR-J4-A-RJ with a built-in positioning function (point table mode, program mode, indexer positioning operation) brings simple & easy a positioning system without the use of other controllers such as a positioning unit.

One-touch Tuning

Servo gain adjustment is complete just by turning on the one-touch tuning function. With this function, machine resonance filter, advanced vibration suppression control II*, and robust filter are automatically adjusted to maximize your machine performance. This function also sets responsivity automatically while the real-time auto tuning requires manual setting.

* The advanced vibration suppression control II automatically adjusts one frequency.

Advanced Vibration Suppression Control II

Patented

Three-inertia system

Vibration at the end of an arm

Vibration in a machine

Without vibration suppression control

Advanced vibration suppression control

Advanced vibration suppression control II

Group pulses

Torque

Speed command

Without vibration suppression control

Advanced vibration suppression control

Advanced vibration suppression control II

Point table mode

Position data

Rotation speed

Acceleration time

Deceleration time

Auxiliary travel

1 1000 2000 200 200 0 1

2 2000 1600 100 100 0 0

Indexer (turret) method

Determines positioning by specifying the station position.

Program mode

Positioning operation is made according to the preprogrammed details.

Please refer to the catalog for details on the MELSERVO-J4 series.
**Man**

### Functions According to IEC/EN 61800-5-2

- STO (Safe torque off) and SS1<sup>1</sup> are integrated as standard, enabling the safety system to be configured easily in the machine.
- Turning off the control power of servo amplifier is not required, cutting out the time for restart. Additionally, home position return is not required.
- Magnetic contactor for preventing unexpected motor start is not required.<sup>2</sup>

<sup>1</sup> Safety equipment (MR-J3-DD5, etc.) is required.

<sup>2</sup> For MR-J4 series servo amplifier, magnetic contactors are not required to meet the STO requirements. However, this figure has a magnetic contactor installed to prevent the short circuit of servo amplifier or electric shock.

### Tough Drive Function

Detects changes in use environment and automatically adjusts the servo control status.

- **Vibration tough drive**
  - The servo amplifier detects changes in the machine resonant frequency and automatically readjusts the machine resonant suppression filter during oscillation. This will reduce losses from device halt due to aging and degradation.

- **Instantaneous power failure tough drive**
  - Detects instantaneous power failure to reduce device halt due to undervoltage.

### 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.

### Large Capacity Drive Recorder

- Servo data such as motor current and position command before and after the alarm occurrence are stored in non-volatile memory of the servo amplifier. Reading the servo data on MELSOFT MR Configurator2 helps you analyze the cause of the alarm.
- Check the waveform ((analog 16 bits × 7 channels + digital 8 channels) × 256 points) and the monitor values of 16 alarms in the alarm history.

### Servo setup software

- **MELSOFT MR Configurator2**
  - Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer. This startup support tool achieves a stable machine system, optimum control, and short setup time.
The Environment

Space-saving with Industry’s Smallest* 3-axis Type
2-axis servo amplifier MR-J4W2-B requires 26% less installation space than two units of MR-J4-B. 3-axis servo amplifier MR-J4W3-B requires 30% less installation space than three units of MR-J4-B.

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*1.

*1. Regenerative option may be required depending on the conditions.

Energy-conservation Achieved by LM-H3 Linear Servo Motor Series

- Reduced motor driving power
  LM-H3 has achieved a reduction of 25% in motor driving current due to a new magnetic design with optimized magnet form, contributing to power conservation for machines. The motor coil is lighter as compared to the prior model, which also contributes to saving energy for driving the moving part.

- Space saving
  For LM-H3, widths of the motor coil and the magnet are reduced by 10% from the prior model. Increased thrust to current ratio results in using the servo amplifier in smaller capacity, contributing to more compact machine (the reduction of materials).

heritage

- MR-J4-B/MR-J4-A has the same mounting dimensions*1 with MR-J3-B/MR-J3-A. HG rotary servo motor series has the same mounting dimensions*2 and uses the same optional cables for the power, the encoder*, and the electromagnetic brake as HF series or HC-RP/HC-UP series.

- When not changing the controller to SSCNET II/H controller
  When the SSCNET II compatible products are in the system, the communication speed is 50 Mbps, and the function and the performance are equivalent to those of MR-J3.

- Parameters are automatically converted by changing MR-J3-B to MR-J4-B with MELSOFT MT Works2
Our total solution for your satisfaction

The servo system controller brings out peak performance and functionality from servo amplifier, rotary servo motor, linear servo motor, and direct drive motor. Mitsubishi Electric offer total solution to site issues.

Introducing the MELSERVO solutions for problems in production sites. We offer the optimal solutions for various problems in various production sites.

Vertical Form, Fill & Seal  For food/beverage bag filling and packing

<table>
<thead>
<tr>
<th>Solution</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Synchronous Control</td>
</tr>
<tr>
<td>02</td>
<td>Cam Control</td>
</tr>
<tr>
<td>03</td>
<td>Safety Observation Function</td>
</tr>
</tbody>
</table>

Rotary Knife  For steel & paper cutting, stamping and labeling

<table>
<thead>
<tr>
<th>Solution</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Cam creation on HMI screen</td>
</tr>
<tr>
<td>02</td>
<td>Cutting the sheet using the registration mark as a reference</td>
</tr>
</tbody>
</table>

Motion Alignment(X-Y-Θ)  For equipment requiring more accurate positioning

<table>
<thead>
<tr>
<th>Solution</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>COGNEX Vision System</td>
</tr>
<tr>
<td>02</td>
<td>Direct Drive Motor</td>
</tr>
<tr>
<td>03</td>
<td>Target Position Change Function</td>
</tr>
</tbody>
</table>

Gantry Application  For material handling, automatic assembly and scanning

<table>
<thead>
<tr>
<th>Solution</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Vibration Suppression Functions</td>
</tr>
<tr>
<td>02</td>
<td>Linear Servo Motor</td>
</tr>
<tr>
<td>03</td>
<td>Tandem Configuration</td>
</tr>
</tbody>
</table>

Pick and Place Robot  For material loading/unloading and sealing

<table>
<thead>
<tr>
<th>Solution</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Advanced Vibration Suppression Control II</td>
</tr>
<tr>
<td>02</td>
<td>Machine Analyzer and Machine Resonance Suppression Filter</td>
</tr>
<tr>
<td>03</td>
<td>3-axis Type Servo Amplifier</td>
</tr>
</tbody>
</table>
Press-fit Machine  For pressing, bonding, clamping, and cap tightening

- **Solution 01**: Pressing of the material with less shock to a machine
- **Solution 02**: Monitoring of the machine movement
- **Solution 03**: Tightening & Press-fit Control

Conveyor System Utilizing Safety Observation Function  For safety observation of printing, packing, and other lines

- **Solution 01**: Safety measures in case of a person entering in a restricted area
- **Solution 02**: Ensuring safe speed for manned assembly line
- **Solution 03**: Speed Monitoring Function (SLS)

Eco-friendly Conveyors and Product Handling Equipment  For conveyors, Motion alignment, packing, and robots

- **Solution 01**: Managing of total power consumption
- **Solution 02**: Reduction of power consumption
- **Solution 03**: Multi-axis Servo Amplifier

Film Slitting Machine  For equipment with rollers

- **Solution 01**: Sending film with a constant speed or tension
- **Solution 02**: Utilizing regenerative energy
- **Solution 03**: PN Bus Voltage Connection + Power Regeneration Common Converter

Screw Tightening Machine  For tightening, pressing, and clamping

- **Solution 01**: Tightening screws without using a torque sensor
- **Solution 02**: Repeated accuracy in screw tightening operation
- **Solution 03**: Reduced Torque Ripple During Conduction

Every production site has unique problems that require unique and innovative solutions. MELSERVO offers the best solutions you have been looking for.

**Exceptional Solutions for All of Your Production Needs**

Refer to “MELSERVO SOLUTIONS catalog (L(NA)03094)” for details.
Product Line-up

### Servo Amplifier

**MR-J4-GF**
CC-Link IE Field Network compatible servo amplifier

The command interface is the CC-Link IE Field Network. This supports position control and motion control on Ethernet-based open networks.

**MR-J4-B**
SSCNET III/H compatible servo amplifier

SSCNET III/H is the command I/F. Enables building of a full-synchronization system with the use of a high-speed serial optical communication. Brings peak performance and functionality of the servo system by combining with the servo system controller.

### Servo Motor

**HG-KR/HG-MR series**
Small capacity, low inertia/small capacity, ultra-low inertia
Suitable for general industrial machines/high-frequency operation.

**HG-SR series**
Medium capacity, medium inertia
Compatible with devices having a large load inertia.

**HG-JR series**
Medium/large capacity, low inertia
Ideal for high-frequency positioning and high acceleration and deceleration operations.

### Linear Servo Motor

**LM-H3 series**
Capable of 3 m/s maximum speed.
Core type with magnetic attraction saves space and comes with high-rigidity.

**LM-F series**
Delivers two times more continuous thrust with liquid cooling and reduced in size. A core type with magnetic attraction and high-rigidity.

**LM-K2 series**
An offset type with a core delivers improved thrust density. The magnetic attraction offset structure prolongs service life of the linear guide. Low noise design.
MR-J4W2-B
SSCNET III/H compatible 2-axis servo amplifier
SSCNET III/H is the command I/F. These multi-axis integrated servo amplifiers can drive multiple servo motors with a single unit, and come with the same high-performance, high-functionality, and ease-of-use of the MR-J4-B. Use less energy, space, wiring, and realize cost reduction.

MR-J4W3-B
SSCNET III/H compatible 3-axis servo amplifier

MR-J4-A
General-purpose interface compatible servo amplifier
Built with a general purpose pulse train and analog voltage input as command I/F. Enables position control by pulse train command and speed/torque control by analog voltage command.

HG-AK series
Ultra-compact servo motor with the flange size of 25 mm x 25 mm is suitable for small machines and machine heads.

HG-RR series
Medium capacity, ultra-low inertia Suitable for high-frequency operation.

HG-UR series
Medium capacity, flat type Ideal use for restricted mounting spaces.

LM-U2 series
A coreless type with no cogging and minimum speed variation. No magnetic attraction prolongs the linear guide service life.

TM-RFM series
Smaller and simplified device rotary drive is suitable for high precision control needs. Realized high-torque density by using the latest magnetic design technology and winding technology. Delivers a very smooth rotation by miniaturizing the torque ripple. Without the need for transmission mechanism component, it can be built with less number of parts.

MELSERVO-J4 series conforms to global standards.
* This product is not subject to China Compulsory Certification (CCC).
* Refer to “Servo Amplifier Instruction Manual” and “EMC Installation Guidelines” when your system needs to meet the EMC directive.
* For corresponding standards and models, contact your local sales office.
Wide selection of power supply capacity lineup are also designed to drive rotary, linear, and direct drive motors.

The standard servo amplifiers are compatible with various controlled drive systems.

### Servo amplifier

<table>
<thead>
<tr>
<th>Servo amplifier note 7</th>
<th>Number of control axes</th>
<th>Power supply specifications</th>
<th>Rated output [kW] (Note 1)</th>
<th>Command interface</th>
<th>Control mode</th>
<th>Compatible servo motor series</th>
</tr>
</thead>
</table>
| MR-J4-GF(-RJ)          | 1 axis                 | 3-phase 250 V AC           | 0.1, 0.2, 0.4, 0.6, 0.75, 1, 2, 3.5, 5, 7 | ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ⎯
### Rotary servo motor

<table>
<thead>
<tr>
<th>Rotary servo motor series</th>
<th>Rated speed (maximum speed) [r/min]</th>
<th>Rated output [kW] (Note 1)</th>
<th>Servo motor type</th>
<th>With electromagnetic brake (8)</th>
<th>With reducer (G1) (Note 2)</th>
<th>With reducer (G5, G7) (Note 2)</th>
<th>IP rating (Note 3, 5)</th>
<th>Replacable series</th>
<th>Features</th>
<th>Application examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KR series</td>
<td>3000</td>
<td>5 types 0.05, 0.1, 0.2, 0.4, 0.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP65</td>
<td>HF-KP series</td>
<td>Low inertia</td>
<td>Perfect for general industrial machines.</td>
</tr>
<tr>
<td>HG-MR series</td>
<td>3000</td>
<td>5 types 0.05, 0.1, 0.2, 0.4, 0.75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP65</td>
<td>HF-MP series</td>
<td>Ultra-low inertia</td>
<td>Well suited for high-throughput operations.</td>
</tr>
<tr>
<td>HG-SR series</td>
<td>1000 (1500)</td>
<td>14 types 0.5, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP67</td>
<td>HF-SP series</td>
<td>Medium inertia</td>
<td>This series is available with two rated speeds.</td>
</tr>
<tr>
<td>HG-JR series</td>
<td>3000 (6000)</td>
<td>18 types 0.5, 0.75, 1.0, 1.5, 2.0, 3.5, 5.0, 7.0, 9.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP67</td>
<td>HF-JP series</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1500 (7500)</td>
<td>14 types 7.0, 11, 15, 22, 30, 37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP67/ IP44 (Note 4)</td>
<td>HF-JP 2 series</td>
<td>Low inertia</td>
<td>Well suited for high-throughput and high-acceleration deceleration operations.</td>
</tr>
<tr>
<td></td>
<td>1000 (6000)</td>
<td>16 types 6.0, 8.0, 12, 15, 20, 25, 30, 37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP67/ IP44 (Note 4)</td>
<td>HA-LP series</td>
<td>Ultra-low inertia</td>
<td>Well suited for high-throughput operations.</td>
</tr>
<tr>
<td>HG-AK series</td>
<td>3000</td>
<td>3 types 0.01, 0.02, 0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP65</td>
<td>HC-AQ series</td>
<td>Ultra-compact size</td>
<td>Suitable for small machines.</td>
</tr>
<tr>
<td>HG-RR series</td>
<td>3000 (6000)</td>
<td>5 types 1.0, 1.5, 2.0, 3.5, 5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP65</td>
<td>HC-RR series</td>
<td>Ultra-low inertia</td>
<td>Well suited for high-throughput operations.</td>
</tr>
<tr>
<td>HG-UR series</td>
<td>2000 (3000)</td>
<td>5 types 0.75, 1.5, 2.0, 3.5, 5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IP65</td>
<td>HC-UR series</td>
<td>Flat type</td>
<td>This unit well suited for applications where installation space is limited.</td>
</tr>
</tbody>
</table>

**Notes:**
1. Connectors and gap between rotor and stator are excluded.
2. G1 for general industrial machines, G5 and G7 for high precision applications.  
3. The shaft-through portion is excluded. Refer to the asterisk 7 of “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the shaft-through portion. For geared servo motor, IP rating of the reducer portion is equivalent to IP44.
4. For HG-JR15000 r/min series, 15 kW or smaller is rated IP67, and 22 kW or larger is rated IP44. For HG-JR 1000 r/min series, 12 kW or smaller is rated IP67, and 15 kW or larger is rated IP44.
5. The servo motor with electromagnetic brake is not available for HG-JR15000 r/min series 22 kW or larger, and 1000 r/min series 15 kW or larger.

### Direct drive motor

<table>
<thead>
<tr>
<th>Direct drive motor series</th>
<th>Motor outer diameter [mm]</th>
<th>Hollow shaft diameter [mm]</th>
<th>Rated speed [r/min]</th>
<th>Maximum speed [r/min]</th>
<th>Rated torque [N•m]</th>
<th>Maximum torque [N•m]</th>
<th>IP rating (Note 1)</th>
<th>Features</th>
<th>Application examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-RFM series</td>
<td>ø130</td>
<td>ø20</td>
<td>200</td>
<td>500</td>
<td>3 types 2, 4, 6</td>
<td>6, 12, 18</td>
<td>IP42</td>
<td>Suitable for low-speed and high torque operations.</td>
<td>Suitable for low-speed and high torque operations.</td>
</tr>
<tr>
<td></td>
<td>ø180</td>
<td>ø47</td>
<td>500</td>
<td>3 types 6, 12, 18</td>
<td>18, 36, 54</td>
<td>IP42</td>
<td></td>
<td>Smooth operation with less audible noise.</td>
<td>Smooth operation with less audible noise.</td>
</tr>
<tr>
<td></td>
<td>ø230</td>
<td>ø62</td>
<td>200</td>
<td>500</td>
<td>36, 144, 216</td>
<td>IP42</td>
<td></td>
<td>The motor’s low profile design contributes to compact construction and a low center of gravity for enhanced machine stability.</td>
<td>The motor’s low profile design contributes to compact construction and a low center of gravity for enhanced machine stability.</td>
</tr>
<tr>
<td></td>
<td>ø330</td>
<td>ø104</td>
<td>100</td>
<td>200</td>
<td>120, 360, 720</td>
<td>IP42</td>
<td></td>
<td>Clean-room compatible.</td>
<td>Clean-room compatible.</td>
</tr>
</tbody>
</table>

**Note:** Connectors and gap between rotor and stator are excluded.
### Specifications/Characteristics

#### MR-J4 Series

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Power supply</th>
<th>Special specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF</td>
<td>3-phase 200 V AC or 1-phase 200 V AC</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>1-phase 100 V AC</td>
<td>Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible</td>
</tr>
<tr>
<td>B-RJ</td>
<td>3-phase 400 V AC</td>
<td>Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible</td>
</tr>
<tr>
<td>A</td>
<td>48 V DC/24 V DC</td>
<td>Without an enclosed regenerative resistor</td>
</tr>
<tr>
<td>A-RJ</td>
<td>48 V DC/24 V DC</td>
<td>Without an enclosed regenerative resistor</td>
</tr>
</tbody>
</table>

#### MR-JE Series

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Power supply</th>
<th>Special specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF</td>
<td>3-phase 200 V AC or 1-phase 200 V AC</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>1-phase 100 V AC</td>
<td>Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible</td>
</tr>
<tr>
<td>B-RJ</td>
<td>3-phase 400 V AC</td>
<td>Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible</td>
</tr>
<tr>
<td>A</td>
<td>48 V DC/24 V DC</td>
<td>Without an enclosed regenerative resistor</td>
</tr>
<tr>
<td>A-RJ</td>
<td>48 V DC/24 V DC</td>
<td>Without an enclosed regenerative resistor</td>
</tr>
</tbody>
</table>

### Drawings

#### MR-J4 Series

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Interface</th>
<th>Special specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF</td>
<td>CC-Link IE Field</td>
<td>None</td>
</tr>
<tr>
<td>A</td>
<td>General-purpose</td>
<td>Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible</td>
</tr>
</tbody>
</table>

#### MR-JE Series

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Interface</th>
<th>Special specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF</td>
<td>CC-Link IE Field</td>
<td>None</td>
</tr>
<tr>
<td>A</td>
<td>General-purpose</td>
<td>Fully closed loop control four-wire type/ load-side encoder A/B/Z-phase input compatible</td>
</tr>
</tbody>
</table>

### Notes

1. Dynamic brake which is built in 7 kW or smaller servo amplifiers is removed. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system. Refer to relevant Servo Amplifier Instruction Manual for details.
2. Servo amplifiers of 0.2 kW or smaller are available for 1-phase 200 V AC.
3. Servo amplifiers of 0.6 kW, and 1 kW or larger are available.
4. Available in 11 kW to 22 kW servo amplifiers. A regenerative resistor (standard accessory) is not enclosed. Refer to relevant Servo Amplifier Instruction Manual for details.
5. Servo amplifiers of 0.4 kW or smaller are available.
6. MR-J4-B-GF is available. Contact your local sales office for the power control compatible servo amplifiers.
7. When using MR-D30 functional safety unit, use MR-J4-B-RJ servo amplifier with software version B3 or later, or MR-J4-A-RJ servo amplifier with software version B5 or later.
8. The positioning mode is available with MR-J4-A-RJ servo amplifiers. Use MR-J4-A-RJ servo amplifiers with software version B3 or later.
9. Servo amplifiers of 0.03 kW are available for 48 V DC/24 V DC.
10. MR-J4-03A6-RJ is compatible only with positioning mode. It is not compatible with fully closed loop control, load-side encoder A/B/Z-phase input, and the functional safety unit.
11. Only 200 V is available. For MR-J4-B/RJ/MR-J4-A-RJ, servo amplifiers with software version C2 or later are compatible with DC power supply input.
12. The special coating (JIS C60721-3-3/IEC 60721-3-3 classification 3C2) is applied to the circuit board. Refer to relevant Servo Amplifier Instruction Manual for details.
### Multi-Axis Servo Amplifier Model Designation

**Symbol**

- Power supply: None
- Main circuit power supply: 3-phase 200 V AC or 1-phase 200 V AC (Note 5)
- Interface: B (SSCNET III/H)
- Number of axes: W2 2 axes, W3 3 axes
- Rated output [kW]:
  - 030 0.03
  - 030 0.03
  - 22 0.2
  - 44 0.4
  - 77 0.75
  - 1010 1.0
  - 222 0.2
  - 444 0.4

### Drive Unit Model Designation (Note 8)

**Symbol**

- Power supply: None, 3-phase 200 V AC or 1-phase 200 V AC (Note 10)
- Interface: B (SSCNET III/H), A (General-purpose)
- Rated output [kW]:
  - 30K 30
  - 37K 37
  - 45K 45
  - 55K 55

### Converter Unit Model Designation (Note 8)

**Symbol**

- Power supply: None, 3-phase 200 V AC
- Rated output [kW]: 55K 55

---

**Notes:**
1. Dynamic brake which is built in servo amplifiers is removed. When using the servo amplifier without a dynamic brake, the servo motor does not stop immediately at alarm occurrence or power failure. Take measures to ensure safety on the entire system. Refer to relevant Servo Amplifier Instruction Manual for details.
2. A-axis, B-axis, and C-axis indicate names of axes of the multi-axis servo amplifier. The C-axis is available for the 3-axis servo amplifier.
3. Servo amplifiers of 0.03 kW are available for 48 V DC/24 V DC.
4. The special coating (JIS C60721-3-3/IEC 60721-3-3 classification 3C2) is applied to the circuit board. Refer to relevant Servo Amplifier Instruction Manual for details.
5. Drive units of 37 kW or smaller are available in 3-phase 200 V AC.
6. MR-D30 functional safety unit is not compatible with the drive unit.
7. Positioning mode is available with MR-J4-DU_A_-RJ drive unit.
8. One unit of converter unit is required for each drive unit.
9. MR-J4-DU_B_-LL is available. Contact your local sales office for the pressure control compatible drive units.
10. Servo amplifiers of 0.75 kW or smaller are available for 1-phase 200 V AC.
### Combinations of 1-Axis Servo Amplifier and Servo Motor


<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-10GF(-RJ)</td>
<td>HG-KR053, 13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MR-J4-10B(-RJ)</td>
<td>HG-MR053, 13</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MR-J4-20GF(-RJ)</td>
<td>HG-KR23</td>
<td>LM-U2PAB-05M-0SS0</td>
<td>TM-RFM002C20</td>
</tr>
<tr>
<td>MR-J4-20B(-RJ)</td>
<td>HG-MR23</td>
<td>LM-U2PBB-07M-1SS0</td>
<td></td>
</tr>
<tr>
<td>MR-J4-40GF(-RJ)</td>
<td>HG-KR43</td>
<td>LM-H3P2A-07P-0SS0</td>
<td>TM-RFM004C20</td>
</tr>
<tr>
<td>MR-J4-40B(-RJ)</td>
<td>HG-MR43</td>
<td>LM-H3P3A-12P-0SS0</td>
<td></td>
</tr>
<tr>
<td>MR-J4-60GF(-RJ)</td>
<td>HG-SR51, 52</td>
<td>LM-U2PBD-15M-1SS0</td>
<td>TM-RFM006C20</td>
</tr>
<tr>
<td>MR-J4-60B(-RJ)</td>
<td>HG-JR53</td>
<td>TM-RFM006E20</td>
<td></td>
</tr>
<tr>
<td>MR-J4-70GF(-RJ)</td>
<td>HG-KR73</td>
<td>LM-H3P3B-24P-0SS0</td>
<td>TM-RFM102E20</td>
</tr>
<tr>
<td>MR-J4-70B(-RJ)</td>
<td>HG-MR73</td>
<td>LM-H3P3C-36P-0SS0</td>
<td>TM-RFM102G20</td>
</tr>
<tr>
<td>MR-J4-70A(-RJ)</td>
<td>HG-UR72</td>
<td>LM-H3P7A-24P-0SS0</td>
<td>TM-RFM040J10</td>
</tr>
<tr>
<td>MR-J4-100GF(-RJ)</td>
<td>HG-SR81, 102</td>
<td>-</td>
<td>TM-RFM018E20</td>
</tr>
<tr>
<td>MR-J4-100B(-RJ)</td>
<td>HG-JR53 (Note 2, 3)</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>MR-J4-200GF(-RJ)</td>
<td>HG-SR121, 201, 152, 202</td>
<td>LM-H3P3D-48P-0SS0</td>
<td></td>
</tr>
<tr>
<td>MR-J4-200B(-RJ)</td>
<td>HG-JR73 (Note 2, 3, 153, 203)</td>
<td>LM-H3P7B-48P-0SS0</td>
<td></td>
</tr>
<tr>
<td>MR-J4-350GF(-RJ)</td>
<td>HG-SR301, 352</td>
<td>LM-H3P7D-96P-0SS0</td>
<td>TM-RFM048G20</td>
</tr>
<tr>
<td>MR-J4-350B(-RJ)</td>
<td>HG-JR153, 203 (Note 2, 3)</td>
<td>LM-K2P2C-07M-1SS1</td>
<td>TM-RFM072G20</td>
</tr>
</tbody>
</table>
| MR-J4-DU_B/MR-J4-DU_B-RJ/MR-J4-DU_A/MR-J4-DU_A-RJ (200 V)

<table>
<thead>
<tr>
<th>Drive unit</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-DU30KB(-RJ)</td>
<td>HG-JR30K1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MR-J4-DU30KA(-RJ)</td>
<td>HG-JR30K1M</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MR-J4-DU37KB(-RJ)</td>
<td>HG-JR37K1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MR-J4-DU37KA(-RJ)</td>
<td>HG-JR37K1M</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes:
1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to "Combinations of Linear Servo Motor and Servo Amplifier" under section 3 Linear Servo Motor in this catalog.
2. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.
3. When 1-phase 200 V AC input is used, increasing the maximum torque to 400% is not possible with HG-JR servo motor series.
## Combinations of 1-Axis Servo Amplifier and Servo Motor


<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-10B1(-RJ)</td>
<td>HG-KR053, 13</td>
<td>HG-MR053, 13</td>
<td></td>
</tr>
<tr>
<td>MR-J4-20B1(-RJ)</td>
<td>HG-KR23</td>
<td>LM-U2PAB-05M-0SS0</td>
<td></td>
</tr>
<tr>
<td>MR-J4-20A1(-RJ)</td>
<td>HG-MR23</td>
<td>LM-U2PBB-07M-1SS0</td>
<td>RMF002C20</td>
</tr>
<tr>
<td>MR-J4-40B1(-RJ)</td>
<td>HG-KR43</td>
<td>LM-H3P2A-07P-BSS0</td>
<td></td>
</tr>
<tr>
<td>MR-J4-40A1(-RJ)</td>
<td>HG-MR43</td>
<td>LM-H3P3A-12P-CSS0</td>
<td>RMF004C20</td>
</tr>
</tbody>
</table>

### MR-J4-GF4/MR-J4-GF4-RJ/MR-J4-B4/MR-J4-B4-RJ/MR-J4-A4/MR-J4-A4-RJ (400 V)

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-60GF4(-RJ)</td>
<td>HG-SR524</td>
<td>HG-JR534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-60B4(-RJ)</td>
<td>HG-SR524</td>
<td>HG-JR534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-100GF4(-RJ)</td>
<td>HG-SR1024</td>
<td>HG-JR534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-100B4(-RJ)</td>
<td>HG-JR534</td>
<td>HG-JR534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-200GF4(-RJ)</td>
<td>HG-SR1524</td>
<td>HG-JR734</td>
<td></td>
</tr>
<tr>
<td>MR-J4-200B4(-RJ)</td>
<td>HG-JR734</td>
<td>HG-JR734</td>
<td></td>
</tr>
<tr>
<td>MR-J4-400GF4(-RJ)</td>
<td>HG-SR3524</td>
<td>HG-JR1534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-400B4(-RJ)</td>
<td>HG-JR3524</td>
<td>HG-JR1534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-600GF4(-RJ)</td>
<td>HG-SR5024</td>
<td>HG-JR3534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-600B4(-RJ)</td>
<td>HG-JR3534</td>
<td>HG-JR3534</td>
<td></td>
</tr>
<tr>
<td>MR-J4-700GF4(-RJ)</td>
<td>HG-SR7024</td>
<td>HG-JR5034</td>
<td></td>
</tr>
<tr>
<td>MR-J4-700B4(-RJ)</td>
<td>HG-JR5034</td>
<td>HG-JR5034</td>
<td></td>
</tr>
<tr>
<td>MR-J4-1000GF4(-RJ)</td>
<td>HG-JR9034</td>
<td>HG-JR9034</td>
<td></td>
</tr>
<tr>
<td>MR-J4-1000B4(-RJ)</td>
<td>HG-JR9034</td>
<td>HG-JR9034</td>
<td></td>
</tr>
<tr>
<td>MR-J4-2000GF4(-RJ)</td>
<td>HG-JR15K14</td>
<td>HG-JR15K14</td>
<td></td>
</tr>
<tr>
<td>MR-J4-2000B4(-RJ)</td>
<td>HG-JR15K14</td>
<td>HG-JR15K14</td>
<td></td>
</tr>
</tbody>
</table>

### MR-J4-DU_B4/MR-J4-DU_B4-RJ/MR-J4-A4/MR-J4-A4-RJ (400 V)

<table>
<thead>
<tr>
<th>Drive unit</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-DU30KB4(-RJ)</td>
<td>HG-JR30K14</td>
<td>HG-JR30K14</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU30KA4(-RJ)</td>
<td>HG-JR30K1M</td>
<td>HG-JR30K1M</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU37KB4(-RJ)</td>
<td>HG-JR37K14</td>
<td>HG-JR37K14</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU37KA4(-RJ)</td>
<td>HG-JR37K1M</td>
<td>HG-JR37K1M</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU45KB4(-RJ)</td>
<td>HG-JR45K1M</td>
<td>HG-JR45K1M</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU45KA4(-RJ)</td>
<td>HG-JR55K1M</td>
<td>HG-JR55K1M</td>
<td></td>
</tr>
</tbody>
</table>

### MR-J4-03A6 (48 V/24 V)

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-03A6(-RJ)</td>
<td>HG-AK0136</td>
<td>HG-AK0136</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to “Combinations of Linear Servo Motor and Servo Amplifier” under section 3 Linear Servo Motor in this catalog.

2. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.
Combinations of 1-Axis Servo Amplifier and Servo Motor with Functional Safety

The safety observation function can be expanded with a combination of the servo motor with functional safety, MR-J4-B-RJ/ MR-J4-A-RJ servo amplifiers, and MR-D30 functional safety unit.

**MR-J4-B-RJ/MR-J4-A-RJ (200 V)**

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Servo motor with functional safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-10B-RJ</td>
<td>HG-KR053W0C, 13W0C</td>
</tr>
<tr>
<td>MR-J4-10A-RJ</td>
<td>HG-KR32W0C</td>
</tr>
<tr>
<td>MR-J4-20B-RJ</td>
<td>HG-KR32W0C</td>
</tr>
<tr>
<td>MR-J4-20A-RJ</td>
<td>HG-KR32W0C</td>
</tr>
<tr>
<td>MR-J4-40B-RJ</td>
<td>HG-SR51W0C, 52W0C</td>
</tr>
<tr>
<td>MR-J4-40A-RJ</td>
<td>HG-JR53W0C</td>
</tr>
<tr>
<td>MR-J4-60B-RJ</td>
<td>HG-SR61W0C, 102W0C</td>
</tr>
<tr>
<td>MR-J4-100B-RJ</td>
<td>HG-JR63W0C (Note 1), 103W0C</td>
</tr>
<tr>
<td>MR-J4-100A-RJ</td>
<td>HG-JR63W0C (Note 1), 103W0C</td>
</tr>
<tr>
<td>MR-J4-200B-RJ</td>
<td>HG-JR73W0C (Note 1), 103W0C</td>
</tr>
<tr>
<td>MR-J4-200A-RJ</td>
<td>HG-JR73W0C (Note 1), 103W0C</td>
</tr>
<tr>
<td>MR-J4-350B-RJ</td>
<td>HG-JR73W0C (Note 1), 203W0C</td>
</tr>
<tr>
<td>MR-J4-350A-RJ</td>
<td>HG-JR73W0C (Note 1), 203W0C</td>
</tr>
<tr>
<td>MR-J4-500B-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-500A-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-700B-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-700A-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-11KB-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-11KA-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-15KB-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-15KA-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-22KB-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
<tr>
<td>MR-J4-22KA-RJ</td>
<td>HG-JR73W0C (Note 1), 303W0C</td>
</tr>
</tbody>
</table>

**MR-J4-B1-RJ/MR-J4-A1-RJ (100 V)**

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Servo motor with functional safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-10B1-RJ</td>
<td>HG-KR053W0C, 13W0C</td>
</tr>
<tr>
<td>MR-J4-10A1-RJ</td>
<td>HG-KR23W0C</td>
</tr>
<tr>
<td>MR-J4-20B1-RJ</td>
<td>HG-KR23W0C</td>
</tr>
<tr>
<td>MR-J4-20A1-RJ</td>
<td>HG-KR23W0C</td>
</tr>
<tr>
<td>MR-J4-40B1-RJ</td>
<td>HG-SR51W0C, 52W0C</td>
</tr>
<tr>
<td>MR-J4-40A1-RJ</td>
<td>HG-JR53W0C</td>
</tr>
</tbody>
</table>

**MR-J4-B4-RJ/MR-J4-A4-RJ (400 V)**

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Servo motor with functional safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-60B4-RJ</td>
<td>HG-SR924W0C, 13W0C</td>
</tr>
<tr>
<td>MR-J4-60A4-RJ</td>
<td>HG-JR934W0C, 103W0C</td>
</tr>
<tr>
<td>MR-J4-100B4-RJ</td>
<td>HG-JR934W0C (Note 1), 734W0C, 1034W0C</td>
</tr>
<tr>
<td>MR-J4-100A4-RJ</td>
<td>HG-JR934W0C (Note 1), 734W0C, 1034W0C</td>
</tr>
<tr>
<td>MR-J4-200B4-RJ</td>
<td>HG-JR934W0C (Note 1), 1534W0C, 2034W0C</td>
</tr>
<tr>
<td>MR-J4-200A4-RJ</td>
<td>HG-JR934W0C (Note 1), 1534W0C, 2034W0C</td>
</tr>
<tr>
<td>MR-J4-350B4-RJ</td>
<td>HG-JR934W0C (Note 1), 2034W0C, 3034W0C</td>
</tr>
<tr>
<td>MR-J4-350A4-RJ</td>
<td>HG-JR934W0C (Note 1), 2034W0C, 3034W0C</td>
</tr>
<tr>
<td>MR-J4-500B4-RJ</td>
<td>HG-JR934W0C (Note 1), 3034W0C, 4034W0C</td>
</tr>
<tr>
<td>MR-J4-500A4-RJ</td>
<td>HG-JR934W0C (Note 1), 3034W0C, 4034W0C</td>
</tr>
<tr>
<td>MR-J4-700B4-RJ</td>
<td>HG-JR934W0C (Note 1), 4034W0C, 5034W0C</td>
</tr>
<tr>
<td>MR-J4-700A4-RJ</td>
<td>HG-JR934W0C (Note 1), 4034W0C, 5034W0C</td>
</tr>
<tr>
<td>MR-J4-11KB4-RJ</td>
<td>HG-JR934W0C (Note 1), 5034W0C, 6034W0C</td>
</tr>
<tr>
<td>MR-J4-11KA4-RJ</td>
<td>HG-JR934W0C (Note 1), 5034W0C, 6034W0C</td>
</tr>
<tr>
<td>MR-J4-15KB4-RJ</td>
<td>HG-JR934W0C (Note 1), 6034W0C, 7034W0C</td>
</tr>
<tr>
<td>MR-J4-15KA4-RJ</td>
<td>HG-JR934W0C (Note 1), 6034W0C, 7034W0C</td>
</tr>
<tr>
<td>MR-J4-22KB4-RJ</td>
<td>HG-JR934W0C (Note 1), 7034W0C, 8034W0C</td>
</tr>
<tr>
<td>MR-J4-22KA4-RJ</td>
<td>HG-JR934W0C (Note 1), 7034W0C, 8034W0C</td>
</tr>
</tbody>
</table>

Notes: 1. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.
## Combinations of Multi-Axis Servo Amplifier and Servo Motors

### MR-J4W2-B

Any combination of the servo motors with different series and capacities is possible as long as the servo motors are compatible with the servo amplifier.

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HG-MR053, 13, 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-MR053, 13, 23, 43</td>
<td>LM-H3P3A-12P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-H3P3B-24P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-H3P3C-36P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-H3P7A-24P-ASS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P1A-01M-2SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P2A-02M-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAD-10M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAF-15M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PBB-07M-1SS0</td>
<td></td>
</tr>
</tbody>
</table>

### MR-J4W2-77B

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HG-MR43, 73</td>
<td>LM-H3P3A-12P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-SR61, 52</td>
<td>LM-H3P3B-24P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-JR53, 73</td>
<td>LM-H3P3C-36P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-UR72</td>
<td>LM-H3P7A-24P-ASS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P1A-01M-2SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P2A-02M-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAD-10M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAF-15M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PBB-15M-1SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PBF-22M-1SS0</td>
<td></td>
</tr>
</tbody>
</table>

### MR-J4W2-1010B

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HG-MR43, 73</td>
<td>LM-H3P3A-12P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-SR61, 81, 52, 102</td>
<td>LM-H3P3B-24P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-JR53, 73, 103</td>
<td>LM-H3P3C-36P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HG-UR72</td>
<td>LM-H3P7A-24P-ASS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P1A-01M-2SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P2A-02M-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAD-10M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAF-15M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PBB-15M-1SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PBF-22M-1SS0</td>
<td></td>
</tr>
</tbody>
</table>

### MR-J4W2-0303B

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4W2-0303B</td>
<td>HG-AK0136, 0236, 0336</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### MR-J4W3-B

Any combination of the servo motors with different series and capacities is possible as long as the servo motors are compatible with the servo amplifier.

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4W3-222B</td>
<td>HG-KR053, 13, 23</td>
<td>LM-U2PAB-05M-0SS0</td>
<td>TM-RFM002C20</td>
</tr>
<tr>
<td></td>
<td>HG-MR053, 13, 23</td>
<td>LM-U2PBB-07M-1SS0</td>
<td></td>
</tr>
</tbody>
</table>

### MR-J4W3-444B

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>Rotary servo motor</th>
<th>Linear servo motor (primary side)</th>
<th>Direct drive motor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HG-MR053, 13, 23, 43</td>
<td>LM-H3P3A-12P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-H3P3B-24P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-H3P3C-36P-CSS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-H3P7A-24P-ASS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P1A-01M-2SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-K2P2A-02M-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAD-10M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PAF-15M-0SS0</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>LM-U2PBB-07M-1SS0</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Models of the linear servo motor primary side are listed in this page. For compatible models of the secondary side, refer to “Combinations of Linear Servo Motor and Servo Amplifier” under section 3 Linear Servo Motor in this catalog.

2. The maximum torque can be increased from 300% to 400% of the rated torque with this combination.
Peripheral equipment is connected to MR-J4-GF/MR-J4-GF-RJ as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.

### MR-J4-GF/MR-J4-GF-RJ Connections with Peripheral Equipment (Note 1)

- **Display** (Note 2)
  - Servo amplifier status and alarm number are displayed.

- **Station number setting part** (Note 2)
  - Select the station with the station number selection rotary switches (SW2 and SW3).

- **USB communication connector (CN5)**
  - Connect with a personal computer, and use MR Configurator2. Parameter setting and monitoring are possible. Use an optional USB cable (MR-J3USBCBL3M).

- **STO I/O signal connector (CN8)**
  - Connect MR-J3-D05 safety logic unit or an external safety relay. Use an optional STO cable (MR-D05UDL3M-B).

- **I/O signal connector (CN3)**
  - Connect the forced stop input, the in-position, the electromagnetic brake interlock, and the malfunction signals.

- **CC-Link IE Field Network connector (CN10A/CN10B)**
  - Connect to a CC-Link IE Field Network compatible device.

- **Battery connector (CN4)**
  - Connect MR-BAT6V1SET-A battery when configuring absolute position detection system.

- **Load-side encoder connector (CN2L)**
  - CN2L connector is available only on MR-J4-GF-RJ servo amplifier.

- **Battery connector (CN2)**
  - Connect the servo motor encoder using an optional cable or a connector set.

- **Molded-case circuit breaker (MCCB)**
  - This protects the power supply line.

- **Magnetic contactor (MC)**
  - This turns off the power to the servo amplifier when an alarm is triggered.

- **Power factor improving DC reactor (optional)**
  - This boosts the power factor of servo amplifier and reduces the power supply capacity.

- **Regenerative option (optional)**

- **Servo motor power cable (optional)**

- **Charge lamp**
  - The lamp lights when the main circuit power supply is charged.

- **Encoder connector (CN2)**
  - Connect the servo motor encoder using an optional cable or a connector set.

- **Encoder connector (CN2L)**
  - CN2L connector is available only on MR-J4-GF-RJ servo amplifier.

- **I/O signal connector (CN3)**
  - Connect the forced stop input, the in-position, the electromagnetic brake interlock, and the malfunction signals.

- **CC-Link IE Field Network Simple Motion module**
  - RD77GF
  - QD77GF

**Notes:**
1. The connection with the peripheral equipment is an example for MR-J4-350GF/MR-J4-350GF-RJ or smaller servo amplifiers. Refer to "MR-J4--GF Servo Amplifier Instruction Manual (Motion Mode)" for the actual connections.
2. This picture shows when the display cover is open.
3. For specifications of the Ethernet cable, refer to "Ethernet Cable Specifications" on "SERVO AMPLIFIERS & MOTORS L(NA)03058" catalog.
## MR-J4-GF/MR-J4-GF-RJ (CC-Link IE Field Network Interface) Specifications (200 V)

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4-(-RJ)</th>
<th>10GF</th>
<th>20GF</th>
<th>40GF</th>
<th>60GF</th>
<th>70GF</th>
<th>100GF</th>
<th>200GF</th>
<th>350GF</th>
<th>500GF</th>
<th>700GF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated voltage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC input</td>
<td>DC input (Note 1)</td>
<td>AC input</td>
<td>DC input (Note 1)</td>
<td>AC input</td>
<td>DC input (Note 1)</td>
<td>AC input</td>
<td>DC input (Note 1)</td>
<td>AC input</td>
<td>DC input (Note 1)</td>
</tr>
<tr>
<td><strong>Rated current</strong></td>
<td>[A]</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>[A]</td>
<td>283 V DC to 340 V DC</td>
<td>[A]</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
<td>[A]</td>
<td>241 V DC to 374 V DC</td>
<td>[A]</td>
<td>±5% maximum</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Voltage/ frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Voltage/ frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
</tr>
<tr>
<td><strong>Permissible voltage fluctuation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
<td>AC input</td>
<td>DC input (Note 12)</td>
</tr>
<tr>
<td><strong>Permissible frequency fluctuation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>[W]</td>
<td>24 V DC ±10% (required current capacity: 0.3 A (including CN8 connector signals))</td>
<td>[W]</td>
<td>30</td>
<td>[W]</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permissible regenerative power</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Built-in regenerative resistor</strong></td>
<td>[W]</td>
<td>-</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>100</td>
<td>130</td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td></td>
<td>Built-in (Note 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CC-Link IE Field communication cycle</strong></td>
<td></td>
<td>0.5 ms, 1.0 ms, 2.0 ms, 4.0 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Encoder output pulse</strong></td>
<td></td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog monitor</strong></td>
<td></td>
<td>2 channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Positioning mode</strong></td>
<td></td>
<td>Point table method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fully closed loop control</strong></td>
<td></td>
<td>MR-J4-GF</td>
<td>Two-wire type communication method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Load-side encoder interface</strong></td>
<td></td>
<td>MR-J4-GF</td>
<td>Mitsubishi high-speed serial communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function, scale measurement function, super trace control, lost motion compensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overload protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MR-J4-GF/MR-J4-GF-RJ (CC-Link IE Field Network Interface) Specifications (200 V)

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4-(-RJ)</th>
<th>10GF</th>
<th>20GF</th>
<th>40GF</th>
<th>60GF</th>
<th>70GF</th>
<th>100GF</th>
<th>200GF</th>
<th>350GF</th>
<th>500GF</th>
<th>700GF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional safety</td>
<td>STO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards certified by CB</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response performance</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test pulse input (STO) (Note 7)</td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability of dangerous Failure per Hour (PFH)</td>
<td>PFH = 6.4 × 10⁻⁹ [1/h]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Compliance to global standards   | Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS & MOTORS L(NA)03058” catalog. |
| Close mounting                   | Natural cooling, open (IP20) | Force cooling, open (IP20) | Force cooling, open (IP20) |
| Structure (IP rating)             | Not possible | Possible (Note 6) | - |
| Ambient temperature               | Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing) |      |      |      |      |       |       |       |       |
| Ambient humidity                  | Operation/storage: 90 %RH maximum (non-condensing) |      |      |      |      |       |       |       |       |
| Ambience                          | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust |      |      |      |      |       |       |       |       |
| Altitude                          | 2000 m or less above sea level (Note 11) |      |      |      |      |       |       |       |       |
| Vibration resistance              | 5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes) |      |      |      |      |       |       |       |       |

| Mass [kg]                         | 1.0 | 1.0 | 1.0 | 1.0 | 1.4 | 1.4 | 2.1 | 2.3 | 4.0 | 6.2 |

Notes:
1. Rated output and speed of a rotary servo motor and a direct drive motor, and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to “Regenerative Option” in this catalog for the permissible regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to “MR-J4-_.GF-(-RJ) Servo Amplifier Instruction Manual (Motion Mode)” for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use the servo amplifiers with 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. The rated current is 2.9 A when the servo amplifier is used with UL or CSA compliant servo motor.
9. This value is applicable when a 3-phase power supply is used.
10. Use the servo amplifier with 75% or less of the effective load ratio when a 1-phase 200 V AC to 240 V AC power supply is used.
11. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
12. MR-J4-_.GF-RJ servo amplifiers are available for DC power input. For a connection example of power circuit with DC input, refer to relevant Servo Amplifier Instruction Manual.
13. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
14. The command communication cycle depends on the controller specifications and the number of axes connected.
### MR-J4-GF/MR-J4-GF4-RJ (CC-Link IE Field Network Interface) Specifications (400 V)

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4- (-RJ)</th>
<th>60GF4</th>
<th>100GF4</th>
<th>200GF4</th>
<th>350GF4</th>
<th>500GF4</th>
<th>700GF4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 323 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.5</td>
<td>2.8</td>
<td>5.4</td>
<td>8.6</td>
<td>14.0</td>
<td>17.0</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency [Note 1]</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.4</td>
<td>2.5</td>
<td>5.1</td>
<td>7.9</td>
<td>10.8</td>
<td>14.4</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase 323 V AC to 528 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.1</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>1-phase 323 V AC to 528 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td>30</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface power supply</strong></td>
<td>24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permissible regenerative power</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in regenerative resistor [Note 2, 3] [W]</td>
<td>15</td>
<td>15</td>
<td>100</td>
<td>100</td>
<td>130 [Note 7]</td>
<td>170 [Note 7]</td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td>Built-in [Note 4]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CC-Link IE Field communication cycle</strong> [Note 10]</td>
<td>0.5 ms, 1.0 ms, 2.0 ms, 4.0 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Encoder output pulse</strong></td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog monitor</strong></td>
<td>2 channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Positioning mode</strong></td>
<td>Point table method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fully closed loop control</strong></td>
<td>MR-J4-GF4</td>
<td>Two-wire type communication method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Load-side encoder interface</strong></td>
<td>MR-J4-GF4</td>
<td>Mitsubishi high-speed serial communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function, scale measurement function, super trace control, lost motion compensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo fault protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functional safety</strong></td>
<td>STO (IEC/EN 61800-5-2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety performance</strong></td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response performance</strong></td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test pulse input (STO)</strong> [Note 6]</td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean time to dangerous failure (MTTFd)</strong> [Note 7]</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diagnostic coverage (DC)</strong></td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Probability of dangerous Failure per Hour (PFH)</strong></td>
<td>PFH = 6.4 × 10⁻⁶ [1/h]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Natural cooling, open (IP20)</td>
<td>Force cooling, open (IP20)</td>
<td>Force cooling, open (IP20) [Note 5]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Close mounting</strong></td>
<td>Not possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>2000 m or less above sea level [Note 8]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>1.7</td>
<td>1.7</td>
<td>2.1</td>
<td>3.6</td>
<td>4.3</td>
<td>6.5</td>
</tr>
</tbody>
</table>
MR-J4-GF4/MR-J4-GF4-RJ (CC-Link IE Field Network interface) Specifications (400 V)

Notes: 1. Rated output and speed of a rotary servo motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to “Regenerative Option” in this catalog for the permissible regenerative power (W) when regenerative option is used.
4. When using the built-in dynamic brake, refer to “MR-J4-GF4(-RJ) Servo Amplifier Instruction Manual (Motion Mode)” for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
7. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.
8. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
9. The safety level depends on the setting value of [Pv. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
10. The command communication cycle depends on the controller specifications and the number of axes connected.
MR-J4-GF/MR-J4-GF-RJ Dimensions

- MR-J4-10GF, MR-J4-10GF-RJ
- MR-J4-20GF, MR-J4-20GF-RJ
- MR-J4-40GF, MR-J4-40GF-RJ
- MR-J4-60GF, MR-J4-60GF-RJ
- MR-J4-70GF, MR-J4-70GF-RJ
- MR-J4-100GF, MR-J4-100GF-RJ

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

When mounting MR-BAT6V1SET-A

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

**MR-J4-60GF4, MR-J4-60GF4-RJ**

**MR-J4-100GF4, MR-J4-100GF4-RJ**

**MR-J4-200GF, MR-J4-200GF-RJ**

**MR-J4-200GF4, MR-J4-200GF4-RJ**

---

**Terminal arrangement**

<table>
<thead>
<tr>
<th>CNP1</th>
<th>PE</th>
<th>Screw size: M4</th>
<th>Mounting screw size: M5</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNP2</td>
<td>PE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CNP3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-GF servo amplifier.
Drive Specifications/Features/Summary Outline Drawings

MR-J4 Series

MR-JE Series

Cooling fan
Exhaust
Intake

Screw size:
TE1: M4
TE2: M3.5
TE3: M4
TE4: M4
PE: M4

Mounting screw size: M5

Terminal arrangement

PE

CN5
CN8
CN3
CN1A
CN1B
CN2L(Note 2)
CN4

CN2
CN1
A
CN1
B

6
250
7.5
6
37.5
105
93
66
7.5
235

Mounting screw size: M5
Screw size: M4

Terminal diagram
(with front cover open)

ø6 mounting hole
(25)

When mounting MR-BAT6V1SET-A

6

Approx. 80
195

Exhaust

Mounting hole dimensions

PE

CNP1

CNP2

CNP3

Screw size: M4
Mounting screw size: M5

Terminal arrangement

PE

CNP1

CNP2

CNP3

When mounting MR-BAT6V1SET-A

Approx. 80
200

Cooling fan
Exhaust

[Unit: mm]

MR-J4-GF/MR-J4-GF-RJ Dimensions

● MR-J4-350GF, MR-J4-350GF-RJ

● MR-J4-350GF4, MR-J4-350GF4-RJ

● MR-J4-500GF, MR-J4-500GF-RJ

Notes:
1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN8 connectors are not available for MR-J4-GF servo amplifier.
Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-GF servo amplifier.
Peripheral equipment is connected to MR-J4-B/MR-J4-B-RJ as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.

**Display (Note 2)**
Servo amplifier status and alarm number are displayed.

**Axis setting part (Note 2)**
Select an axis with the axis selection rotary switch (SW1) and auxiliary axis number setting switches (SW2-3 and SW2-4).

**USB communication connector (CN5)**
Connect with a personal computer, and use MR Configurator2. Parameter setting and monitoring are possible. Use an optional USB cable (MR-J3USBCBL3M).

**I/O signal connector (CN3)**
Connect the forced stop input, the in-position, the electromagnetic brake interlock, and the malfunction signals.

**STO I/O signal connector (CN8)**
Connect MR-J3-D05 safety logic unit or an external safety relay. Use an optional STO cable (MR-D05UDL3M-B).

**SSCNET III/H connector (CN1A)**
Connect the servo system controller or the previous servo amplifier axis.

**SSCNET III/H connector (CN1B)**
Connect the next servo amplifier axis. Be sure to attach a cap to CN1B connector of the final axis.

**SSCNET III cable (optional)**
Connect with a personal computer, and use MR Configurator2. Parameter setting and monitoring are possible. Use an optional USB cable (MR-J3USBCBL3M).

**Servo motor power cable (optional)**

**Molded-case circuit breaker (MCCB)**
This protects the power supply line.

**Magnetic contactor (MC)**
This turns off the power to the servo amplifier when an alarm is triggered.

**Power factor improving DC reactor (optional)**
This boosts the power factor of servo amplifier and reduces the power supply capacity.

**Regenerative option (optional)**

**Battery connector (CN4)**
Connect MR-BAT6V1SET battery when configuring absolute position detection system.

**Charge lamp**
The lamp lights when the main circuit power supply is charged.

**Encoder connector (CN2)**
Connect the servo motor encoder using an optional cable or a connector set.

**Load-side encoder connector (CN2L)**
CN2L connector is available only on MR-J4-B-RJ servo amplifier.

**Battery connector (CN4)**
Connect MR-BAT6V1SET battery when configuring absolute position detection system.

**Encoder cable (optional)**

**SSCNET III/H compatible servo system controller**
R22MTOPJR16MTCPU Q170MSCPU QD77MS/QD77MS

**LD77MS**

**Regenerative option (optional)**

**Notes:**
1. The connection with the peripheral equipment is an example for MR-J4-350B/MR-J4-350B-RJ or smaller servo amplifiers. Refer to “MR-J4-____B-RJ Servo Amplifier Instruction Manual” for the actual connections.
2. This picture shows when the display cover is open.
## Specifications/ Characteristics

<table>
<thead>
<tr>
<th>Output</th>
<th>Rated voltage</th>
<th>AC Servo MELSERVO-J4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-phase 170 V AC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Main circuit power supply input

<table>
<thead>
<tr>
<th>Voltage/ frequency</th>
<th>Rated current [A]</th>
<th>Permissible voltage fluctuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC input 3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>1.1, 1.5, 2.8, 3.2, 5.8, 6.0, 11.0</td>
<td>±5% maximum</td>
</tr>
<tr>
<td>DC input 283 V DC to 340 V DC</td>
<td>1.1, 1.5, 2.8</td>
<td></td>
</tr>
</tbody>
</table>

### Control circuit power supply input

<table>
<thead>
<tr>
<th>Voltage/ frequency</th>
<th>Rated current [A]</th>
<th>Permissible voltage fluctuation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC input 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>0.9, 1.5, 2.6, 3.2, 3.8</td>
<td>±5% maximum</td>
</tr>
<tr>
<td>DC input 241 V DC to 374 V DC</td>
<td>0.9, 1.5, 2.6, 3.2, 3.8</td>
<td></td>
</tr>
</tbody>
</table>

### Interface power supply

- 24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))

### Protective functions

- Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electrical thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection

### Servo functions

- Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, master-slave operation function (Note 14), scale measurement function (Note 14), J3 compatibility mode, super trace control (Note 15), lost motion compensation (Note 16)
### MR-J4-B(1)/MR-J4-B(1)-RJ (SSCNET II/H Interface) Specifications (200 V/100 V)

<table>
<thead>
<tr>
<th>Servo amplifier model</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
<th>MR-J4-B(-RJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional safety</strong></td>
<td>Standards certified by CB</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td>Response performance</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td>Test pulse input (STO) (Note 7)</td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Natural cooling, open (IP20)</td>
<td>Force cooling, open (IP20)</td>
<td>Force cooling, open (IP20) (Note 5)</td>
<td>Natural cooling, open (IP20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Close mounting</strong></td>
<td>3-phase power input</td>
<td>Possible (Note 6)</td>
<td>Not possible</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-phase power input</td>
<td>Possible (Note 6)</td>
<td>Not possible</td>
<td>-</td>
<td>Possible (Note 6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td>Ambient humidity</td>
<td>Operation/Storage: 90 %RH maximum (non-condensing)</td>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>2000 m or less above sea level (Note 18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vibration resistance</strong></td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>kg</td>
<td>0.8</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td>1.4</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**Notes:**
1. Rated output and speed of a rotary servo motor and a direct drive motor, and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-...B(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use the servo amplifiers with 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. The rated current is 2.9 A when the servo amplifier is used with UL or CSA compliant servo motor.
9. Fully closed loop control is available with the servo amplifiers with software version A3 or later.
10. The command communication cycle depends on the controller specifications and the number of axes connected.
11. The value in brackets is applicable when cooling fans (two units of 92 mm × 92 mm, minimum air flow: 1.0 m³/min) are installed, and then [Pr. PA02] is changed.
12. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
13. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
14. This function is available with the servo amplifiers with software version A8 or later.
15. This value is applicable when a 3-phase power supply is used.
16. This function is available with the servo amplifiers with software version B4 or later.
17. Use the servo amplifier with 75% or less of the effective load ratio when a 1-phase 200 V AC to 240 V AC power supply is used.
18. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
19. MR-J4-B-RJ and MR-J4-B-EG servo amplifiers are available for DC power input. For a connection example of power circuit with DC input, refer to relevant Servo Amplifier Instruction Manual.
20. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-J4-DU_B/MR-J4-DU_B-RJ (SSCNET III/H Interface) Specifications (200 V)

<table>
<thead>
<tr>
<th>Drive unit model</th>
<th>MR-J4-DU_B</th>
<th>MR-J4-DU_B-RJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible converter unit model</td>
<td>MR-CR55K (Note 5)</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>174</td>
</tr>
<tr>
<td>Main circuit power supply input</td>
<td>Main circuit power is supplied from the converter unit to the drive unit. (Note 5)</td>
<td></td>
</tr>
<tr>
<td>Control circuit power supply input</td>
<td>Voltage/frequency</td>
<td>1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td></td>
<td>Rated current</td>
<td>[A]</td>
</tr>
<tr>
<td></td>
<td>Permissible voltage fluctuation</td>
<td>1-phase 170 V AC to 264 V AC</td>
</tr>
<tr>
<td></td>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
</tr>
<tr>
<td></td>
<td>Power consumption</td>
<td>[W]</td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
</tr>
<tr>
<td>Dynamic brake</td>
<td>External option (Note 4)</td>
<td></td>
</tr>
<tr>
<td>SSCNET III/H command communication cycle (Note 5)</td>
<td>0.222 ms, 0.444 ms, 0.888 ms</td>
<td></td>
</tr>
<tr>
<td>Communication function</td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
</tr>
<tr>
<td>Analog monitor</td>
<td>2 channels</td>
<td></td>
</tr>
<tr>
<td>Fully closed loop control</td>
<td>MR-J4-DU_B</td>
<td>Two-wire type communication method</td>
</tr>
<tr>
<td></td>
<td>MR-J4-DU_B-RJ</td>
<td>Two-wire/four-wire type communication method</td>
</tr>
<tr>
<td>Load-side encoder interface</td>
<td>MR-J4-DU_B</td>
<td>Mitsubishi high-speed serial communication</td>
</tr>
<tr>
<td></td>
<td>MR-J4-DU_B-RJ</td>
<td>Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal</td>
</tr>
<tr>
<td>Servo functions</td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, torque drive function, drive recorder function, tightening &amp; press-fit control, machine diagnosis function, power monitoring function, master-slave operation function, scale measurement function, J3 compatibility mode, super trace control, lost motion compensation</td>
<td></td>
</tr>
<tr>
<td>Protective functions</td>
<td>Overcurrent shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection</td>
<td></td>
</tr>
<tr>
<td>Functional safety</td>
<td>STO (IEC/EN 61800-5-2)</td>
<td></td>
</tr>
<tr>
<td>Safety performance</td>
<td>Standards certified by CB (Note 2)</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
</tr>
<tr>
<td></td>
<td>Response performance</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
</tr>
<tr>
<td></td>
<td>Test pulse input (STO) (Note 2)</td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
</tr>
<tr>
<td></td>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
</tr>
<tr>
<td></td>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 [%]</td>
</tr>
<tr>
<td></td>
<td>Probability of dangerous Failure per Hour (PFH)</td>
<td>PFH = 6.4 × 10⁻⁹ [1/h]</td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
</tr>
<tr>
<td>Structure (IP rating)</td>
<td>Force cooling, open (IP20) (Note 1)</td>
<td></td>
</tr>
<tr>
<td>Close mounting</td>
<td>Not possible</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 6)</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>[kg]</td>
<td>21</td>
</tr>
</tbody>
</table>

Notes:
1. Terminal blocks are excluded.
2. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the drive unit instantaneously at regular intervals.
3. The command communication cycle depends on the controller specifications and the number of axes connected.
4. Use an optional external dynamic brake with the drive unit. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
5. One unit of converter unit is required for each drive unit. Refer to “MR-CR Converter Unit Specifications (200 V/400 V)” on p. 302 in this catalog for the specifications of the converter unit.
6. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
7. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-J4-B4/MR-J4-B4-RJ (SSCNET III/H Interface) Specifications (400 V)

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4- _(-RJ)</th>
<th>60B4</th>
<th>100B4</th>
<th>200B4</th>
<th>350B4</th>
<th>500B4</th>
<th>700B4</th>
<th>11KB4</th>
<th>15KB4</th>
<th>22KB4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 323 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.5</td>
<td>2.8</td>
<td>5.4</td>
<td>8.6</td>
<td>14.0</td>
<td>17.0</td>
<td>32.0</td>
<td>41.0</td>
<td>63.0</td>
</tr>
<tr>
<td>Voltage/frequency (Note 1)</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.4</td>
<td>2.5</td>
<td>5.1</td>
<td>7.9</td>
<td>10.8</td>
<td>14.4</td>
<td>23.1</td>
<td>31.8</td>
<td>47.6</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase 323 V AC to 523 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.1</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>1-phase 323 V AC to 523 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface power supply</strong></td>
<td>24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Dynamic brake

- Built-in (Note 4)
- External option (Note 10)

#### SSCNET III/H command communication cycle (Note 7)

- 0.222 ms, 0.444 ms, 0.888 ms

#### Communication function

- USB: Connect a personal computer (MR Configurator2 compatible)

#### Encoder output pulse

- Compatible (A/B/Z-phase pulse)

#### Analog monitor

- 2 channels

#### Fully closed loop control

- MR-J4-B4: Two-wire type communication method
- MR-J4-B4-RJ: Two-wire/four-wire type communication method

#### Load-side encoder interface

- MR-J4-B4: Mitsubishi high-speed serial communication
- MR-J4-B4-RJ: Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal

#### Servo functions

- Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, touch drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, master-slave operation function (Note 12), scale measurement function (Note 12), J3 compatibility mode, super trace control (Note 13), lost motion compensation (Note 13)

#### Protective functions

- Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection

#### Functional safety

- STO (IEC/EN 61800-5-2)

#### Safety performance

- EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2

#### Mean time to dangerous failure (MTTFd)

- MTTFd ≥ 100 years (314a)

#### Diagnostic coverage (DC)

- DC = Medium, 97.6 [%]

#### Probability of dangerous failure per Hour (PFH)

- PFH = 6.4 x 10^-9 [1/h]

#### Compliance to global standards

- Refer to "Conformity with Global Standards and Regulations" on "SERVO AMPLIFIERS & MOTORS LNA/J0058" catalog.

#### Structure (IP rating)

- Natural cooling, open (IP20)
- Force cooling, open (IP20)
- Force cooling, open (IP20) (Note 5)

#### Environment

- Ambient temperature: Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)
- Ambient humidity: Operation/storage: 90 %RH maximum (non-condensing)
- Ambience: Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
- Altitude: 2000 m or less above sea level (Note 14)
- Vibration resistance: 5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)

#### Mass [kg]

- 1.7 1.7 2.1 3.6 4.3 6.5 13.4 13.4 18.2
MR-J4-B4/MR-J4-B4-RJ (SSCNET III/H Interface) Specifications (400 V)

Notes:
1. Rated output and speed of a rotary servo motor, and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to “Regenerative Option” in this catalog for the permissible regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to “MR-J4_B_- (RJ) Servo Amplifier Instruction Manual” for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
7. The command communication cycle depends on the controller specifications and the number of axes connected.
8. The value in brackets is applicable when cooling fans (two units of 92 mm × 92 mm, minimum air flow: 1.0 m³/min) are installed, and then [Pr. PA02] is changed.
9. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to “1-Axis Servo Amplifier Model Designation” in this catalog for details.
10. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
11. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.
12. This function is available with the servo amplifiers with software version A8 or later.
13. This function is available with the servo amplifiers with software version B4 or later.
14. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
15. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
## MR-J4-DU_B4/MR-J4-DU_B4-RJ (SSCNET III/H Interface) Specifications (400 V)

<table>
<thead>
<tr>
<th>Drive unit model</th>
<th>MR-J4-(-RJ)</th>
<th>DU30KB4</th>
<th>DU37KB4</th>
<th>DU45KB4</th>
<th>DU55KB4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compatible converter unit model</strong></td>
<td>MR-CR55K4 (Note 5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated voltage [V]</strong></td>
<td></td>
<td>3-phase 323 V AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated current [A]</strong></td>
<td>87</td>
<td>102</td>
<td>131</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td>Main circuit power is supplied from the converter unit to the drive unit. (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Voltage/frequency</strong></td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rated current [A]</strong></td>
<td></td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permissible voltage fluctuation</strong></td>
<td>1-phase 323 V AC to 528 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permissible frequency fluctuation [%]</strong></td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power consumption [W]</strong></td>
<td>45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface power supply</strong></td>
<td>24 V DC ± 10% (required current capacity: 0.3 A (including CN8 connector signals))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td>External option (Note 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SSCNET III/H command communication cycle</strong> (Note 3)</td>
<td>0.222 ms, 0.444 ms, 0.888 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Encoder output pulse</strong></td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog monitor</strong></td>
<td>2 channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fully closed loop control</strong></td>
<td>MR-J4-DU_B4 Two-wire type communication method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-DU_B4-RJ Two-wire/four-wire type communication method</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Load-side encoder interface</strong></td>
<td>MR-J4-DU_B4 Mitsubishi high-speed serial communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-DU_B4-RJ Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening &amp; press-fit control, machine diagnosis function, power monitoring function, master-slave operation function, scale measurement function, J3 compatibility mode, super trace control, lost motion compensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, overload shut-off (electrical thermal), servo motor overheat protection, encoder error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functional safety</strong></td>
<td></td>
<td>STO (IEC/EN 61800-5-2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety performance</strong></td>
<td>Standards certified by CB (Note 7)</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response performance</strong></td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test pulse input (STO)</strong> (Note 2)</td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean time to dangerous failure (MTTFd)</strong></td>
<td>MTTFd ≥ 100 [years] (314a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diagnostic coverage (DC)</strong></td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Probability of dangerous Failure per Hour (PFH)</strong></td>
<td>PFH = 6.4 × 10⁻⁸ [1/h]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Force cooling, open (IP20) (Note 1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Close mounting</strong></td>
<td>Not possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td>Ambient temperature: Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient humidity: Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambience: Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Altitude: 2000 m or less above sea level (Note 6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration resistance: 5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mass [kg]</strong></td>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Terminal blocks are excluded.
2. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the drive unit instantaneously at regular intervals.
3. The command communication cycle depends on the controller specifications and the number of axes connected.
4. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
5. One unit of converter unit is required for each drive unit. Refer to "MR-CR Converter Unit Specifications (200 V/400 V)" on p. 302 in this catalog for the specifications of the converter unit.
6. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
7. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-CR Converter Unit Specifications (200 V/400 V)

<table>
<thead>
<tr>
<th>Converter unit model</th>
<th>MR-CR55K</th>
<th>MR-CR55K4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>270 V DC to 324 V DC</td>
<td>513V DC to 648 V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>215.9 A</td>
<td>113.8 A</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency (Note 1)</td>
<td>3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>191.3 A</td>
<td>100.7 A</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase 170 V AC to 264 V AC</td>
<td>3-phase 323 V AC to 528 V AC</td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>≤5% maximum</td>
<td>≤5% maximum</td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>0.3 A</td>
<td>0.2 A</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>1-phase 170 V AC to 264 V AC</td>
<td>1-phase 323 V AC to 528 V AC</td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>≤5% maximum</td>
<td>≤5% maximum</td>
</tr>
<tr>
<td>Power consumption</td>
<td>24 V DC ± 10% (required current capacity: 0.15 A)</td>
<td>45 W</td>
</tr>
<tr>
<td>Rated output</td>
<td></td>
<td>55 kW</td>
</tr>
<tr>
<td>Regenerative power (when regenerative option is used)</td>
<td>1300 W (one unit of MR-RB139)</td>
<td>1300 W (one unit of MR-RB137-4)</td>
</tr>
<tr>
<td>3900 W (three units of MR-RB137)</td>
<td>3900 W (three units of MR-RB13V-4)</td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative overvoltage shut-off, overload shut-off (electronic thermal), regenerative error protection, undervoltage protection, instantaneous power failure protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Force cooling, open (IP20) (Note 2)</td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 3)</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>22 kg</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Rated output and speed of a rotary servo motor are applicable when the servo amplifier, combined with the rotary servo motor, is operated within the specified power supply voltage and frequency.
2. Terminal blocks are excluded.
3. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
MR-J4-B/MR-J4-B-RJ Dimensions

- **MR-J4-10B, MR-J4-10B-RJ, MR-J4-10B1, MR-J4-10B1-RJ**
- **MR-J4-20B, MR-J4-20B-RJ, MR-J4-20B1, MR-J4-20B1-RJ**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-10B</td>
<td>1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.</td>
</tr>
<tr>
<td>MR-J4-20B</td>
<td>2. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.</td>
</tr>
</tbody>
</table>

When mounting MR-BAT6V1SET

- **MR-J4-40B, MR-J4-40B-RJ, MR-J4-40B1, MR-J4-40B1-RJ**
- **MR-J4-60B, MR-J4-60B-RJ**

- **MR-J4-70B, MR-J4-70B-RJ**
- **MR-J4-100B, MR-J4-100B-RJ**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-40B</td>
<td>1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.</td>
</tr>
<tr>
<td>MR-J4-60B</td>
<td>2. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.</td>
</tr>
</tbody>
</table>

When mounting MR-BAT6V1SET

Notes:
- **MR-J4-B/MR-J4-B-RJ**
- **MR-J4-B/MR-J4-B-RJ**

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-70B</td>
<td>1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.</td>
</tr>
<tr>
<td>MR-J4-100B</td>
<td>2. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.</td>
</tr>
</tbody>
</table>
### MR-J4-B/MR-J4-B-RJ Dimensions

- **MR-J4-60B4, MR-J4-60B4-RJ**
- **MR-J4-100B4, MR-J4-100B4-RJ**

**Terminal arrangement**

---

**MR-J4-200B, MR-J4-200B-RJ**

**Terminal arrangement**

---

**MR-J4-200B4, MR-J4-200B4-RJ**

**Terminal arrangement**

---

**Notes:**

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

● MR-J4-350B, MR-J4-350B-RJ

[Diagram showing dimensions and layout]

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

● MR-J4-350B4, MR-J4-350B4-RJ

[Diagram showing dimensions and layout]

● MR-J4-500B, MR-J4-500B-RJ

[Diagram showing dimensions and layout]
MR-J4-B/MR-J4-B-RJ Dimensions

MR-J4-B/MR-J4-B-RJ

MR-J4-B/MR-J4-B-RJ Dimensions

MR-J4-B/MR-J4-B-RJ

MR-J4-B/MR-J4-B-RJ

MR-J4-B/MR-J4-B-RJ

MR-J4-B/MR-J4-B-RJ

Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-B servo amplifier.
MR-J4-B/MR-J4-B-RJ Dimensions

1. **MR-J4-11KB, MR-J4-11KB-RJ, MR-J4-11KB4, MR-J4-11KB4-RJ**
2. **MR-J4-15KB, MR-J4-15KB-RJ, MR-J4-15KB4, MR-J4-15KB4-RJ**

![Diagram of MR-J4-B/MR-J4-B-RJ Dimensions](image)

- **Terminal screw size:**
  - TE1-1: M6
  - TE1-2: M6
  - TE2: M4
  - PE: M6
- **Mounting screw size:** M5

**Notes:** 1. CN2L, CN7, and CN8 connectors are not available for MR-J4-B servo amplifier.

---

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

![Diagram of MR-J4-22KB, MR-J4-22KB-RJ, MR-J4-22KB4, MR-J4-22KB4-RJ](image)

- **Terminal screw size:**
  - TE1-1: M8
  - TE1-2: M8
  - TE2: M4
  - PE: M8
- **Mounting screw size:** M10

**Notes:** 1. CN2L, CN7, and CN8 connectors are not available for MR-J4-B servo amplifier.
MR-J4-DU_B/MR-J4-DU_B-RJ Dimensions

- MR-J4-DU30KB, MR-J4-DU30KB-RJ
- MR-J4-DU37KB, MR-J4-DU37KB-RJ
- MR-J4-DU45KB4, MR-J4-DU45KB4-RJ
- MR-J4-DU55KB4, MR-J4-DU55KB4-RJ

Terminal diagram (with front cover open)

Terminal arrangement

- TE1: M6
- TE2: M6
- TE3: M4
- PE: M10

Mounting screw size: M5

Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-DU_B drive unit. MR-J4-DU_B-RJ is equipped with CN7 and CN9 connectors; however, these connectors are not for use.
**MR-CR Dimensions**

- **MR-CR55K, MR-CR55K4**

Panel Cut Dimensions for Converter Unit and Drive Unit (Note 1)

<table>
<thead>
<tr>
<th>Drive unit model</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-DU5KB/A, 37KB/A, 45KB4/A4, 55KB4/A4</td>
<td>300</td>
<td>260</td>
<td>20</td>
<td>281</td>
<td>9.5</td>
<td>M6</td>
</tr>
<tr>
<td>MR-J4-DU5KB4/A4, 37KB4/A4</td>
<td>240</td>
<td>120</td>
<td>60</td>
<td>222</td>
<td>9</td>
<td>M6</td>
</tr>
</tbody>
</table>

Notes: 1. The panel cut dimensions for converter unit and drive unit are applicable for MR-J4-DU_B_/MR-J4-DU_B_-RJ/MR-J4-DU_A_/MR-J4-DU_A_-RJ.
Peripheral equipment is connected to MR-J4W2-B/MR-J4W3-B as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.

**Regenerative option** (optional)  
This turns off the power to the servo amplifier when an alarm is triggered.

**Molded-case circuit breaker (MCCB)**  
This protects the power supply line.

**Power factor improving AC reactor** (optional)  
This boosts the power factor of servo amplifier and reduces the power supply capacity.

**Charge lamp**  
The lamp lights when the main circuit power supply is charged.

**Display** (Note 2)  
Servo amplifier status and alarm number are displayed.

**Axis setting part** (Note 2)  
Select an axis with the axis selection rotary switch (SW1) and the auxiliary axis number setting switches (SW2-5 and SW2-6).

**USB communication connector (CN5)**  
Connect with a personal computer and use MR Configurator2. Parameter setting and monitoring are possible. Use an optional USB cable (MR-J3USBCL3M).

**I/O signal connector (CN3)**  
Connect the forced stop input, the in-position, the electromagnetic brake interlock, and the malfunction signals.

**STO I/O signal connector (CN8)**  
Connect MR-J3-D05 safety logic unit or an external safety relay. Use an optional STO cable (MR-D05UDL3M-B).

**SSCNET III/H connector (CN1A)**  
Connect the servo system controller or the previous servo amplifier axis.

**SSCNET III/H connector (CN1B)**  
Connect the next servo amplifier axis. Be sure to attach a cap to CN1B connector of the final axis.

**Battery case (MR-BT6VCASE)**  

**Battery case**  
Battery case (MR-BT6VCASE) and batteries (MR-BAT6V1) are required when configuring absolute position detection system with a rotary servo motor or a direct drive motor.

**Battery**  

Notes:  
1. The connection with the peripheral equipment is an example for MR-J4W2-22B. CNP3C and CN2C connectors are available for MR-J4W3-B servo amplifier. Refer to "MR-J4W2_B/MR-J4W3_B MR-J4W2-0303B6 Servo Amplifier Instruction Manual" for the actual connections of the multi-axis servo amplifier.

2. This picture shows when the display cover is open.

3. Connect the grounding terminal of the servo motor to ONE of CNP3A, CNP3B, and CNP3C. Connect the protective earth (PE) terminal ( * ) located on the lower front of the servo amplifier to the cabinet protective earth (PE).
### MR-J4W2-B (2-axis, SSCNET III/H Interface) Specifications

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4W2-</th>
<th>22B</th>
<th>44B</th>
<th>77B</th>
<th>1010B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current (each axis) [A]</td>
<td>1.5</td>
<td>2.8</td>
<td>5.8</td>
<td>6.0</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency (Note 1)</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>2.9</td>
<td>5.2</td>
<td>7.5</td>
<td>9.8</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>1-phase 170 V AC to 264 V AC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.35 A (including CN8 connector signals))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Capacitor regeneration

<table>
<thead>
<tr>
<th></th>
<th>22B</th>
<th>44B</th>
<th>77B</th>
<th>1010B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reusable regenerative energy [J]</td>
<td>17</td>
<td>21</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia [J]</td>
<td>3.45</td>
<td>4.26</td>
<td>8.92</td>
<td></td>
</tr>
<tr>
<td>Mass equivalent to permissible charging amount [kg]</td>
<td>LM-H3</td>
<td>3.8</td>
<td>4.7</td>
<td>9.8</td>
</tr>
<tr>
<td>LM-K2</td>
<td>8.5</td>
<td>10.5</td>
<td>22.0</td>
<td></td>
</tr>
<tr>
<td>LM-U2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible regenerative power of the built-in regenerative resistor [W]</td>
<td>20</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Dynamic brake

<table>
<thead>
<tr>
<th></th>
<th>22B</th>
<th>44B</th>
<th>77B</th>
<th>1010B</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS CNET III/H command communication cycle [ms]</td>
<td>0.222 ms, 0.444 ms, 0.888 ms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication function</td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td>Compatible (A/B-phase pulse)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog monitor</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully closed loop control [Note 12]</td>
<td>Available (Note 11)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load-side encoder interface [Note 9]</td>
<td>Mitsubishi high-speed serial communication</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Servo functions

- Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening & press-fit control, machine diagnosis function, power monitoring function, scale measurement function [Note 14], J3 compatibility mode

#### Protective functions

- Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overload protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection
MR-J4W2-B (2-axis, SSCNET III/H Interface) Specifications

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4W2-</th>
<th>22B</th>
<th>44B</th>
<th>77B</th>
<th>1010B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional safety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards certified by CB</td>
<td>STO (IEC/EN 61800-5-2) (Note 10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Response performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Test pulse input (STO) (Note 8)</strong></td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability of dangerous Failure per Hour (PFH)</td>
<td>PFH = 6.4 × 10^-9 [1/h]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Natural cooling, open [IP20]</td>
<td>Force cooling, open [IP20]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity</strong></td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambience</strong></td>
<td>Indoors (no direct sunlight), no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>2000 m or less above sea level (Note 16)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vibration resistance</strong></td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mass [kg]</strong></td>
<td>1.5</td>
<td>1.5</td>
<td>2.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Notes:
1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the permissible regenerative power (W) when regenerative option is used.
5. Reusable regenerative energy is equivalent to the energy generated under the following conditions.
   For rotary servo motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
   For linear servo motor: the energy that is generated when the machine, whose mass is equivalent to the permissible charging amount, decelerates from the maximum speed to a stop.
   For direct drive motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
6. This value is the moment of inertia when the rotary servo motor decelerates from the rated speed to a stop. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total moments of inertia of the two axes. Otherwise, the permissible charging amount is equivalent to the moment of inertia of each axis. The value also applies to the direct drive motor.
7. This value is the mass when the linear servo motor decelerates from maximum speed to a stop. Mass of primary side (coil) is included. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total masses of the two axes. Otherwise, the permissible charging amount is equivalent to the mass of each axis.
8. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
10. STO is common for all axes.
11. The load-side encoder and the servo motor encoder are compatible only with two-wire type communication method.
12. Fully closed loop control is available with the servo amplifiers with software version A3 or later.
13. The command communication cycle depends on the controller specifications and the number of axes connected.
14. This function is available with the servo amplifiers with software version A8 or later.
15. This value is applicable when a 3-phase power supply is used.
16. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
17. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output.
18. Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-J4W3-B (3-axis, SSCNET III/H Interface) Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>222B</th>
<th>444B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
</tr>
<tr>
<td>Rated current (each axis) [A]</td>
<td>1.5</td>
<td>2.8</td>
</tr>
<tr>
<td>Voltage/frequency (Note 1) [A]</td>
<td>4.3</td>
<td>7.8</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>1-phase 170 V AC to 264 V AC</td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.45 A (including CN8 connector signals))</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
</tr>
<tr>
<td><strong>Capacitor regeneration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reusable regenerative energy [J]</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>Equivalent to permissible charging amount ( \times 10^4 ) [kg•m²]</td>
<td>4.26</td>
<td>6.08</td>
</tr>
<tr>
<td>Mass equivalent to permissible charging amount [kg]</td>
<td>LM-H3 4.7</td>
<td>LM-K2 6.7</td>
</tr>
<tr>
<td>LM-U2 10.5</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td><strong>Permissible regenerative power of the built-in regenerative resistor [W]</strong></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td>Built-in (Note 4)</td>
<td></td>
</tr>
<tr>
<td><strong>SSCNET III/H command communication cycle (Note 10)</strong></td>
<td>0.222 ms (Note 11), 0.444 ms, 0.888 ms</td>
<td></td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
</tr>
<tr>
<td><strong>Encoder output pulse</strong></td>
<td>Not compatible</td>
<td></td>
</tr>
<tr>
<td><strong>Analog monitor</strong></td>
<td>None</td>
<td></td>
</tr>
<tr>
<td><strong>Fully closed loop control</strong></td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, tightening &amp; press-fit control, machine diagnosis function, power monitoring function, J3 compatibility mode</td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection</td>
<td></td>
</tr>
</tbody>
</table>
## MR-J4W3-B (3-axis, SSCNET III/H Interface) Specifications

<table>
<thead>
<tr>
<th>Specifications/Characteristics</th>
<th>222B</th>
<th>444B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional safety</strong></td>
<td>STO (IEC/EN 61800-5-2) [Note 9]</td>
<td></td>
</tr>
<tr>
<td><strong>Safety performance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards certified by CB (Note 14)</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
</tr>
<tr>
<td>Response performance</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td></td>
</tr>
<tr>
<td>Test pulse input (STO) [Note 8]</td>
<td>Test pulse interval: 1 Hz to 25 Hz Test pulse off time: 1 ms maximum</td>
<td></td>
</tr>
<tr>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
<td></td>
</tr>
<tr>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
</tr>
<tr>
<td>Probability of dangerous Failure per Hour (PFH)</td>
<td>PFH = 6.4 × 10⁻⁹ [1/h]</td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Force cooling, open (IP20)</td>
<td></td>
</tr>
<tr>
<td><strong>Close mounting</strong></td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 12)</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
</tr>
<tr>
<td><strong>Mass</strong> [kg]</td>
<td>1.9</td>
<td>1.9</td>
</tr>
</tbody>
</table>

**Notes:**
1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to “Regenerative Option” in this catalog for the permissible regenerative power [W] when regenerative option is used.
5. Reusable regenerative energy is equivalent to the energy generated under the following conditions.
   - For rotary servo motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the speed to a stop.
   - For linear servo motor: the energy that is generated when the machine, whose mass is equivalent to the permissible charging amount, decelerates from the maximum speed to a stop.
   - For direct drive motor: the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop.
6. This value is the moment of inertia when the rotary servo motor decelerates from the rated speed to a stop. When three axes are simultaneously decelerated, the permissible charging amount is equivalent to the total moments of inertia of the three axes. Otherwise, the permissible charging amount is equivalent to the moment of inertia of each axis. The value also applies to the direct drive motor.
7. This value is the mass when the linear servo motor decelerates from maximum speed to a stop. Mass of primary side (coil) is included. When three axes are simultaneously decelerated, the permissible charging amount is equivalent to the total masses of the three axes. Otherwise, the permissible charging amount is equivalent to the mass of each axis.
8. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
9. The command communication cycle depends on the controller specifications and the number of axes connected.
10. Servo amplifier with software version A3 or later is compatible with the command communication cycle of 0.222 ms. However, note that the following functions are not available when 0.222 ms is used: auto tuning (real time, one-touch, and vibration suppression control), adaptive filter II, vibration tough drive, and power monitoring.
11. This value is applicable when a 3-phase power supply is used.
12. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
13. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output.

Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-J4W2-0303B6 (2-axis, SSCNET III/H Interface) Specifications

<table>
<thead>
<tr>
<th>Servo amplifier model</th>
<th>MR-J4W2-0303B6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 13 V AC</td>
</tr>
<tr>
<td>Rated current (each axis)</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage (Note 1)</td>
<td>48 V DC/24 V DC (Note 1)</td>
</tr>
<tr>
<td>Rated current</td>
<td>For 48 V DC: 2.4 A</td>
</tr>
<tr>
<td></td>
<td>For 24 V DC: 4.8 A</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>For 48 V DC: 40.8 V DC to 55.2 V DC</td>
</tr>
<tr>
<td></td>
<td>For 24 V DC: 21.6 V DC to 26.4 V DC</td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>24 V DC</td>
</tr>
<tr>
<td>Rated current</td>
<td>0.5 A</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>21.6 V DC to 26.4 V DC</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>10 W</td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.25 A)</td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current control method</td>
</tr>
<tr>
<td><strong>Capacitor regeneration</strong></td>
<td></td>
</tr>
<tr>
<td>Reusable regenerative energy</td>
<td>0.9 J</td>
</tr>
<tr>
<td>Moment of inertia (J) equivalent to permissible charging amount (x 10^-4 kg•m^2)</td>
<td>0.18</td>
</tr>
<tr>
<td>Permissible regenerative power of the built-in regenerative resistor</td>
<td>1.3 W</td>
</tr>
<tr>
<td>Dynamic brake</td>
<td>Built-in (Note 6)</td>
</tr>
<tr>
<td>SSCNET III/H command communication cycle (Note 8)</td>
<td>0.222 ms, 0.444 ms, 0.888 ms</td>
</tr>
<tr>
<td>Communication function</td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td>Compatible (A/B-phase pulse)</td>
</tr>
<tr>
<td>Analog monitor</td>
<td>2 channels</td>
</tr>
<tr>
<td>Fully closed loop control</td>
<td>Not compatible</td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, vibration tough drive function, drive recorder function, tightening &amp; press-fit control, machine diagnosis function, power monitoring function, J3 compatibility mode</td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection</td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
</tr>
<tr>
<td>Structure (IP rating)</td>
<td>Natural cooling, open (IP20)</td>
</tr>
<tr>
<td>Close mounting</td>
<td>Possible (Note 7)</td>
</tr>
<tr>
<td>DIN rail mounting (35 mm wide)</td>
<td>Possible</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s^2 at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
</tr>
<tr>
<td>Mass</td>
<td>0.3 kg</td>
</tr>
</tbody>
</table>

Notes: 1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage.
2. Reusable regenerative energy is equivalent to the energy that is generated when the machine, whose moment of inertia is equivalent to the permissible charging amount, decelerates from the rated speed to a stop. This value is the moment of inertia when the rotary servo motor decelerates from the rated speed to a stop. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total moments of inertia of the two axes. Otherwise, the permissible charging amount is equivalent to the moment of inertia of each axis.
3. Initial value is 48 V DC. For 24 V DC, set [Pr. PC05] to "1. 1. 1." Servo motor characteristics vary depending whether the voltage is 48 V DC or 24 V DC. Refer to "HG-AK Series (Ultra-compact Size, Ultra-small Capacity) Specifications" and "HG-AK Series Torque Characteristics" in this catalog.
4. The dynamic brake is electronic. The electronic dynamic brake does not operate when the control circuit power is off. It may not operate depending on alarms and warnings. Refer to "MR-J4W2-, B MR-J4W3-, B MR-J4W2-0303B6 Servo Amplifier Instruction Manual" for details.
6. The command communication cycle depends on the controller specifications and the number of axes connected.
MR-J4W2-B Dimensions

MR-J4W2-22B
MR-J4W2-44B
MR-J4W2-77B
MR-J4W2-1010B

Notes: 1. CNP1, CNP2, CNP3A and CNP3B connectors (insertion type) are supplied with the servo amplifier.
## MR-J4W3-B Dimensions

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

![Diagram of MR-J4W3-B Dimensions]

### Notes:
1. CNP1, CNP2, CNP3A, CNP3B, CNP3C connectors (insertion type) are supplied with the servo amplifier.

## MR-J4W2-0303B6 Dimensions

![Diagram of MR-J4W2-0303B6 Dimensions]

### Notes:
1. CNP1, CNP2, CNP3A, CNP3B, and CNP3C connectors (insertion type) are supplied with the servo amplifier.
Peripheral equipment is connected to MR-J4-A/ MR-J4-A-RJ as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.

### Setting section (Note 2)
Parameter settings and monitoring etc. are executed with push buttons.

### Display (Note 2)
Servo amplifier status, parameter, and alarm number are displayed.

### USB communication connector (CN5)
Connect a personal computer and perform monitoring, batch parameter writing and saving, graph display, and test operation with MR Configurator2. Use an optional USB cable (MR-J3USBCL3M).

### Analog monitor output connector (CN6)
Speed and torque are output with analog voltage signals.

### RS-422/RS-485 communication connector (CN3)
Connect GOT or parameter unit.

### STO I/O signal connector (CN8)
Connect MR-J3-D05 safety logic unit or an external safety relay. Use an optional STO cable (MR-D05UDL3M-B).

### I/O signal connector (CN1)
Connect to a Mitsubishi controller or any pulse train output controller.

### Battery connector (CN4)
Connect MR-BAT6V1SET battery when configuring absolute position detection system.

### Charge lamp
The lamp lights when the main circuit power supply is charged.

### Encoder connector (CN2)
Connect the servo motor encoder using an optional cable or a connector set.

### Load-side encoder connector (CN2L)
CN2L connector is available only on MR-J4-A-RJ servo amplifier.

### Power factor improving DC reactor (optional)
This boosts the power factor of servo amplifier and reduces the power supply capacity.

### Regenerative option (optional)

Notes:
1. The connection with the peripheral equipment is an example for MR-J4-350A/ MR-J4-350A-RJ or smaller servo amplifiers. Refer to "MR-J4-A/(-RJ) MR-J4-03A(-RJ) Servo Amplifier Instruction Manual" for the actual connections.
2. This picture shows when the display cover is open.
### MR-J4-A(1)/MR-J4-A(1)-RJ (General-purpose Interface) Specifications (200 V/100 V)

#### Servo amplifier model MR-J4- ( -RJ)

<table>
<thead>
<tr>
<th>Drive Product</th>
<th>P.268</th>
<th>Inverter</th>
<th>P.436</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>1.1, 1.5, 2.8, 3.2, 5.8, 6.0, 11.0, 17.0, 28.0, 37.0, 68.0, 87.0, 126.0</td>
<td>1.1, 1.5, 2.8</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/ frequency</td>
<td>AC input</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>0.9, 1.5, 2.6, 3.2, 3.8, 5.0, 10.5, 16.0, 21.7, 28.9, 46.0, 64.0, 95.0</td>
<td>3.0, 5.0, 9.0</td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/ frequency</td>
<td>AC input</td>
<td>1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>0.2, 0.3, 0.4</td>
<td></td>
</tr>
<tr>
<td><strong>Permissible voltage fluctuation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>AC input</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>DC input (Note 16)</td>
<td>283 V DC to 340 V DC</td>
<td>241 V DC to 374 V DC</td>
</tr>
<tr>
<td>Power consumption</td>
<td>[W]</td>
<td>30, 45</td>
<td>30</td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.5 A (including CN8 connector signals))</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permissible regenerative power</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in regenerative power</td>
<td>[W]</td>
<td>10, 10, 20, 20, 100, 100, 130, 170</td>
<td>500 (800), 850 (1300), 850 (1300)</td>
</tr>
<tr>
<td>External regenerative resistor (standard accessory)</td>
<td>[W]</td>
<td>10, 10, 10, 10</td>
<td>-</td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dynamic brake</td>
<td>Built-in (Note 4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication function</td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td>RS-422/RS-485: 1 : n communication (up to 32 axes) (Note 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog monitor</td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog monitor channels</td>
<td>2 channels</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position control mode</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum input pulse frequency</td>
<td>4 M pulses/s (when using differential receiver), 200 k pulses/s (when using open collector)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning feedback pulse</td>
<td>Encoder resolution: 22 bits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command pulse multiplying factor</td>
<td>Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 &lt; A/B &lt; 4000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning complete width setting</td>
<td>0 pulse to 65535 pulses (command pulse unit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error excessive</td>
<td>±3 rotations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed control range</td>
<td>Analog speed command 1.2000, internal speed command 1.5000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed command input</td>
<td>0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed fluctuation rate</td>
<td>±0.01% maximum (load fluctuation: 0% to 100%); 0% (power fluctuation: ±10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque command input</td>
<td>0 V DC to ±8 V DC/rated speed (input impedance: 10 kΩ to 12 kΩ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed limit</td>
<td>Set by parameters or external analog input (0 V DC to ±10 V DC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Positioning mode</strong></td>
<td>MR-J4-A(1)</td>
<td>Not available</td>
<td></td>
</tr>
<tr>
<td>MR-J4-A(1)-RJ</td>
<td>Point table method, program method, indexer (turret) method</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fully closed loop control</strong></td>
<td>MR-J4-A(1)</td>
<td>Two-wire type communication method</td>
<td></td>
</tr>
<tr>
<td>MR-J4-A(1)-RJ</td>
<td>Two-wire/four-wire type communication method</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Load-side encoder interface</strong></td>
<td>MR-J4-A(1)</td>
<td>Mitsubishi high-speed serial communication</td>
<td></td>
</tr>
<tr>
<td>MR-J4-A(1)-RJ</td>
<td>Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function, super trace control (Note 13), lost motion compensation (Note 13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Specifications/Characteristics

#### Features/Summary

- **Outline**
- **Drawings**
- **MR-J4 Series**
- **MR-JE Series**
- **MR-J4-A(1)/MR-J4-A(1)-RJ (General-purpose Interface) Specifications (200 V/100 V)**

#### Specifications/Characteristics

**MR-J4-A(1)/MR-J4-A(1)-RJ**

<table>
<thead>
<tr>
<th>Functional safety</th>
<th>Specifications/Characteristics</th>
<th>Feature/Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STO</strong> (IEC/EN 61800-5-2)</td>
<td><strong>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</strong></td>
<td><strong>IEC/EN 61800-5-2</strong></td>
</tr>
<tr>
<td><strong>Response performance</strong></td>
<td><strong>8 ms or less (STO input OFF → energy shut-off)</strong></td>
<td><strong>8 ms or less</strong></td>
</tr>
<tr>
<td><strong>Test pulse input (STO)</strong></td>
<td><strong>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</strong></td>
<td><strong>Test pulse input</strong></td>
</tr>
<tr>
<td><strong>Mean time to dangerous failure (MTTFd)</strong></td>
<td><strong>MTTFd ≥ 100 [years]</strong> (314a)</td>
<td><strong>8 ms or less</strong></td>
</tr>
<tr>
<td><strong>Diagnostic coverage (DC)</strong></td>
<td><strong>DC = Medium, 97.6 [%]</strong></td>
<td><strong>Diagnostic coverage</strong></td>
</tr>
<tr>
<td><strong>Probability of dangerous Failure per Hour (PFH)</strong></td>
<td><strong>PFH = 6.4 \times 10^{-9} [1/h]</strong></td>
<td><strong>Probability of dangerous Failure per Hour</strong></td>
</tr>
</tbody>
</table>

**Compliance to global standards**

Refer to "Conformity with Global Standards and Regulations" on "SERVO AMPLIFIERS & MOTORS L(NA)03058" catalog.

**Structure (IP rating)**

- Natural cooling, open (IP20)
- Force cooling, open (IP20)
- Force cooling, open (IP20)
- Natural cooling, open (IP20)

**Close mounting**

- **3-phase power input** Possible (Note 6)
- **1-phase power input** Possible (Note 6)

**Environment**

- **Ambient temperature**
  - Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)
- **Ambient humidity**
  - Operation/storage: 90 %RH maximum (non-condensing)
- **Ambience**
  - Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
- **Altitude**
  - 2000 m or less above sea level
- **Vibration resistance**
  - 5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)

**Mass [kg]**

<table>
<thead>
<tr>
<th>10A</th>
<th>20A</th>
<th>40A</th>
<th>60A</th>
<th>70A</th>
<th>100A</th>
<th>200A</th>
<th>350A</th>
<th>500A</th>
<th>700A</th>
<th>11KA</th>
<th>15KA</th>
<th>22KA</th>
<th>10A 1</th>
<th>20A 1</th>
<th>40A 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>0.8</td>
<td>1.0</td>
<td>1.0</td>
<td>1.4</td>
<td>1.4</td>
<td>2.1</td>
<td>2.3</td>
<td>4.0</td>
<td>6.2</td>
<td>13.4</td>
<td>13.4</td>
<td>18.2</td>
<td>0.8</td>
<td>0.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Notes:

1. Rated output and speed of a rotary servo motor and a direct drive motor; and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4-_A_(-RJ) MR-J4-03A6(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use the servo amplifier with 75% or less of the effective load ratio.
7. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
8. When using the servo amplifier with 75% or less of the effective load ratio when servo amplifiers are used with a 1-phase 200 V AC to 240 V AC power supply.
9. The positioning mode is available with MR-J4-A-RJ servo amplifier with software version B3 or later.
10. This function is available with the servo amplifiers with software version B4 or later.
11. Use the servo amplifier with 75% or less of the effective load ratio when servo amplifiers are used with a 1-phase 200 V AC to 240 V AC power supply.
12. Use the servo amplifier with 75% or less of the effective load ratio when servo amplifiers are used with a 1-phase 200 V AC to 240 V AC power supply.
13. Use the servo amplifier with 75% or less of the effective load ratio when servo amplifiers are used with a 1-phase 200 V AC to 240 V AC power supply.
14. Use the servo amplifier with 75% or less of the effective load ratio when servo amplifiers are used with a 1-phase 200 V AC to 240 V AC power supply.
## MR-J4-DU_A/MR-J4-DU_A-RJ (General-purpose Interface) Specifications (200 V)

<table>
<thead>
<tr>
<th>Drive unit model</th>
<th>MR-J4-DU_A</th>
<th>MR-J4-DU_A-RJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible converter unit model</td>
<td>MR-CR55K (Note 4)</td>
<td></td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>174</td>
<td>204</td>
</tr>
<tr>
<td>Main circuit power supply input</td>
<td></td>
<td>(Note 4)</td>
</tr>
<tr>
<td>Control circuit power supply input</td>
<td></td>
<td>(Note 4)</td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ±10% (required current capacity: 0.5 A (including CN8 connector signals))</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
</tr>
<tr>
<td>Dynamic brake</td>
<td>External option (Note 3)</td>
<td></td>
</tr>
<tr>
<td>Communication function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS-422/RS-485: 1 : n communication (up to 32 axes) (Note 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog monitor</td>
<td>2 channels</td>
<td></td>
</tr>
<tr>
<td>Position control mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum input pulse frequency</td>
<td>4 M pulses/s (when using differential receiver), 200 k pulses/s (when using open collector)</td>
<td></td>
</tr>
<tr>
<td>Positioning feedback pulse</td>
<td>Encoder resolution: 22 bits</td>
<td></td>
</tr>
<tr>
<td>Command pulse multiplying factor</td>
<td>Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 &lt; A/B &lt; 4000</td>
<td></td>
</tr>
<tr>
<td>Positioning complete width setting</td>
<td>0 pulse to ±65535 pulses (command pulse unit)</td>
<td></td>
</tr>
<tr>
<td>Error excessive</td>
<td>±3 rotations</td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)</td>
<td></td>
</tr>
<tr>
<td>Speed control mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog speed command input</td>
<td>0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12].)</td>
<td></td>
</tr>
<tr>
<td>Speed fluctuation rate</td>
<td>±0.01% maximum (load fluctuation 0% to 100%), 0% (power fluctuation: ±10%)</td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)</td>
<td></td>
</tr>
<tr>
<td>Torque control mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog torque command input</td>
<td>0 V DC to ±8 V DC/maximum torque (input impedance: 10 kΩ to 12 kΩ)</td>
<td></td>
</tr>
<tr>
<td>Speed limit</td>
<td>Set by parameters or external analog input (0 V DC to ±10 V DC/rated speed)</td>
<td></td>
</tr>
<tr>
<td>Positioning mode (Note 6)</td>
<td>MR-J4-DU_A</td>
<td>Not available</td>
</tr>
<tr>
<td>MR-J4-DU_A-RJ</td>
<td>Point table method, program method, indexer (turret) method</td>
<td></td>
</tr>
<tr>
<td>Fully closed loop control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A</td>
<td>Two-wire type communication method</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A-RJ</td>
<td>Two-wire/four-wire type communication method</td>
<td></td>
</tr>
<tr>
<td>Load-side encoder interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A</td>
<td>Mitsubishi high-speed serial communication</td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A-RJ</td>
<td>Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal</td>
<td></td>
</tr>
<tr>
<td>Servo functions</td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function, super trace control, lost motion compensation</td>
<td></td>
</tr>
<tr>
<td>Protective functions</td>
<td>Overcurrent shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection</td>
<td></td>
</tr>
</tbody>
</table>
### MR-J4-DU_A/MR-J4-DU_A-RJ (General-purpose Interface) Specifications (200 V)

<table>
<thead>
<tr>
<th>Drive unit model MR-J4- (-RJ)</th>
<th>DU30KA</th>
<th>DU37KA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional safety</strong></td>
<td>STO (IEC/EN 61800-5-2)</td>
<td></td>
</tr>
<tr>
<td><strong>Safety performance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards certified by CB</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
</tr>
<tr>
<td>Test pulse input (STO)</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td></td>
</tr>
<tr>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>≥ 100 [years] (314a)</td>
<td></td>
</tr>
<tr>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Force cooling, open (IP20) (Note 1)</td>
<td></td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 7)</td>
<td></td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>21 kg</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Terminal blocks are excluded.
2. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the drive unit instantaneously at regular intervals.
3. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
4. One unit of converter unit is required for each drive unit. Refer to "MR-CR Converter Unit Specifications (200 V/400 V)” on p. 302 in this catalog for the specifications of the converter unit.
5. RS-485 communication function is available with the drive units manufactured in January 2015 or later. Refer to “MR-J4-DU_A_RJ Servo Amplifier Instruction Manual” for checking procedure of manufacture data.
6. The positioning mode is available with MR-J4-DU_A-RJ drive unit with software version B3 or later.
7. Refer to relevant Servo Amplifier Instruction Manual for checking procedure of manufacture data.
8. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOPB output. Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-J4-A4/MR-J4-A4-RJ (General-purpose Interface) Specifications (400 V)

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4- (RJ)</th>
<th>60A4</th>
<th>100A4</th>
<th>200A4</th>
<th>350A4</th>
<th>500A4</th>
<th>700A4</th>
<th>11KA4</th>
<th>15KA4</th>
<th>22KA4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 323 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.5</td>
<td>2.8</td>
<td>5.4</td>
<td>8.6</td>
<td>14.0</td>
<td>17.0</td>
<td>32.0</td>
<td>41.0</td>
<td>63.0</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency (Note 1)</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.4</td>
<td>2.5</td>
<td>5.1</td>
<td>7.9</td>
<td>10.8</td>
<td>14.4</td>
<td>23.1</td>
<td>31.8</td>
<td>47.6</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control circuit power supply input</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.1</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.5 A (including CN8 connector signals))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Permissible regenerative power</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Built-in regenerative resistor</td>
<td>15</td>
<td>15</td>
<td>100</td>
<td>100</td>
<td>130</td>
<td>170</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>External regenerative resistor (standard accessory)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td>Built-in (Note 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External option (Note 5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td>RS-422/RS-485: 1 : n communication (up to 32 axes) (Note 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog monitor</td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position control mode</strong></td>
<td>2 channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum input pulse frequency</td>
<td>4 M pulses/s (when using differential receiver), 200 k pulses/s (when using open collector)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning feedback pulse</td>
<td>Encoder resolution: 22 bits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command pulse multiplying factor</td>
<td>Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 &lt; A/B &lt; 4000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positioning complete width setting</td>
<td>0 pulse to ±65535 pulses (command pulse unit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Speed control mode</strong></td>
<td>Analog speed command 1:20000, internal speed command 1:5000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analog speed command input</td>
<td>0 V DC to ±10 V DC/maximum speed (Speed at 10 V is changeable with [Pr. PC12].)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed fluctuation rate</td>
<td>±0.1% maximum (load fluctuation 0% to 100%), 0% (power fluctuation: ± 10%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC/maximum torque)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Torque control mode</strong></td>
<td>0 V DC to ±8 V DC/maximum torque (input impedance: 10 kΩ to 12 kΩ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed limit</td>
<td>Set by parameters or external analog input (0 V DC to ±10 V DC/maximum speed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Positioning mode</strong></td>
<td>MR-J4-A4 Not available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-A4-RJ Point table method, program method, indexer (turret) method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-A4-RJ Two-wire type communication method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-A4-RJ Two-wire/four-wire type communication method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-A4 Mitsubishi high-speed serial communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-A4 Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, magnetic pole detection protection, linear servo control fault protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MR-J4-A4/MR-J4-A4-RJ (General-purpose Interface) Specifications (400 V)

<table>
<thead>
<tr>
<th>Servo amplifier model MR-J4- (RJ)</th>
<th>60A4</th>
<th>100A4</th>
<th>200A4</th>
<th>350A4</th>
<th>500A4</th>
<th>700A4</th>
<th>11KA4</th>
<th>15KA4</th>
<th>22KA4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compliance to global standards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Functional safety</th>
<th>STO (IEC/EN 61800-5-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety performance</td>
<td></td>
</tr>
<tr>
<td>Standards certified by CB</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
</tr>
<tr>
<td>Response performance</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
</tr>
<tr>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
</tr>
<tr>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 %</td>
</tr>
<tr>
<td>Probability of dangerous Failure per Hour (PFH)</td>
<td>PFH = 6.4 × 10⁻⁹ [1/h]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Structure (IP rating)</th>
<th>Natural cooling, open (IP20)</th>
<th>Force cooling, open (IP20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass [kg]</td>
<td>1.7</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Notes:
1. Rated output and speed of a rotary servo motor, and continuous thrust and maximum speed of a linear servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
4. When using the built-in dynamic brake, refer to "MR-J4- A_ (RJ) MR-J4-03A6(RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio and the permissible load to mass ratio.
5. Terminal blocks are excluded.
6. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the servo amplifier instantaneously at regular intervals.
7. The value in brackets is applicable when cooling fans (two units of 92 mm × 92 mm, minimum air flow: 1.0 m³/min) are installed, and then [Pr. PA02] is changed.
8. Servo amplifiers without an enclosed regenerative resistor are also available. Refer to "1-Axis Servo Amplifier Model Designation" in this catalog for details.
9. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
10. The servo amplifier built-in regenerative resistor is compatible with the maximum torque deceleration when the servo motor is used within the rated speed and the recommended load to motor inertia ratio. Contact your local sales office if the operating motor speed or the load to motor inertia ratio exceeds the rated speed or the recommended ratio.
11. This function is available with the servo amplifiers with software version B4 or later.
12. RS-485 communication function is available with the servo amplifiers manufactured in November 2014 or later. Refer to "MR-J4- A_ (RJ) MR-J4-03A6(RJ) Servo Amplifier Instruction Manual" for checking procedure of manufacture data.
13. The positioning mode is available with MR-J4-A4-RJ servo amplifier with software version B3 or later.
14. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
15. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
<table>
<thead>
<tr>
<th>Drive unit model MR-J4-DU_A4/RJ (General-purpose Interface) Specifications (400 V)</th>
<th>A-RJ</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compatible converter unit model</strong></td>
<td>MR-CR55K4 (Note 4)</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 323 V AC</td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>87</td>
</tr>
<tr>
<td><strong>Main circuit power supply input</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency</td>
<td>1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.2</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>1-phase 323 V AC to 528 V AC</td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td>45</td>
</tr>
<tr>
<td><strong>Interface power supply</strong></td>
<td>24 V DC ±10% (required current capacity: 0.5 A (including CN8 connector signals))</td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td>External option (Note 3)</td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
</tr>
<tr>
<td></td>
<td>RS-422/RS-485: 1: n communication (up to 32 axes) (Note 5)</td>
</tr>
<tr>
<td><strong>Encoder output pulse</strong></td>
<td>Compatible (A/B/Z-phase pulse)</td>
</tr>
<tr>
<td><strong>Analog monitor</strong></td>
<td>2 channels</td>
</tr>
<tr>
<td><strong>Position control mode</strong></td>
<td></td>
</tr>
<tr>
<td>Maximum input pulse frequency</td>
<td>4 M pulses/s (when using differential receiver), 200 k pulses/s (when using open collector)</td>
</tr>
<tr>
<td>Positioning feedback pulse</td>
<td>Encoder resolution: 22 bits</td>
</tr>
<tr>
<td>Command pulse multiplying factor</td>
<td>Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 &lt; A/B &lt; 4000</td>
</tr>
<tr>
<td>Positioning complete width setting</td>
<td>0 pulse to ±65535 pulses (command pulse unit)</td>
</tr>
<tr>
<td>Error excessive</td>
<td>±3 rotations</td>
</tr>
<tr>
<td><strong>Speed control mode</strong></td>
<td></td>
</tr>
<tr>
<td>Speed control range</td>
<td>Analog speed command 1:2000, internal speed command 1:5000</td>
</tr>
<tr>
<td>Analog speed command input</td>
<td>0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12].)</td>
</tr>
<tr>
<td>Speed fluctuation rate</td>
<td>±0.01% maximum (load fluctuation 0% to 100%), 0% (power fluctuation: ±10%)</td>
</tr>
<tr>
<td></td>
<td>±0.2% maximum (ambient temperature: 25°C ± 10°C) only when using analog speed command</td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC maximum torque)</td>
</tr>
<tr>
<td><strong>Torque control mode</strong></td>
<td></td>
</tr>
<tr>
<td>Analog torque command input</td>
<td>0 V DC to ±8 V DC maximum torque (input impedance: 10 kΩ to 12 kΩ)</td>
</tr>
<tr>
<td>Speed limit</td>
<td>Set by parameters or external analog input (0 V DC to ±10 V DC/rated speed)</td>
</tr>
<tr>
<td><strong>Positioning mode</strong></td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A4</td>
<td>Not available</td>
</tr>
<tr>
<td>MR-J4-DU_A4-RJ</td>
<td>Point table method, program method, indexer (turret) method</td>
</tr>
<tr>
<td><strong>Fully closed loop control</strong></td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A4</td>
<td>Two-wire type communication method</td>
</tr>
<tr>
<td>MR-J4-DU_A4-RJ</td>
<td>Two-wire/four-wire type communication method</td>
</tr>
<tr>
<td><strong>Load-side encoder interface</strong></td>
<td></td>
</tr>
<tr>
<td>MR-J4-DU_A4</td>
<td>Mitsubishi high-speed serial communication</td>
</tr>
<tr>
<td>MR-J4-DU_A4-RJ</td>
<td>Mitsubishi high-speed serial communication, A/B/Z-phase differential input signal</td>
</tr>
<tr>
<td><strong>Servo functions</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function, super trace control, lost motion compensation</td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection,</td>
</tr>
</tbody>
</table>
### MR-J4-DU_A4/MR-J4-DU_A4-RJ (General-purpose Interface) Specifications (400 V)

<table>
<thead>
<tr>
<th>Drive unit model MR-J4-(-RJ)</th>
<th>DU30KA4</th>
<th>DU37KA4</th>
<th>DU45KA4</th>
<th>DU55KA4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional safety</strong></td>
<td>STO (IEC/EN 61800-5-2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Safety performance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standards certified by CB</td>
<td>EN ISO 13849-1 Category 3 PL e, IEC 61508 SIL 3, EN 62061 SIL CL 3, EN 61800-5-2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response performance</td>
<td>8 ms or less (STO input OFF → energy shut-off)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test pulse input (STO)</td>
<td>Test pulse interval: 1 Hz to 25 Hz, test pulse off time: 1 ms maximum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean time to dangerous failure (MTTFd)</td>
<td>MTTFd ≥ 100 [years] (314a)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnostic coverage (DC)</td>
<td>DC = Medium, 97.6 [%]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Probability of dangerous Failure per Hour (PFH)</td>
<td>PFH = 6.4 X 10^-5 [1/h]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Force cooling, open (IP20) (Note 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Close mounting</strong></td>
<td>Not possible</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes) (Note 7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>[kg]</td>
<td>16</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

1. Terminal blocks are excluded.
2. The test pulse is a signal for the external circuit to perform self-diagnosis by turning off the signals to the drive unit instantaneously at regular intervals.
3. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system when not using the dynamic brake.
4. One unit of converter unit is required for each drive unit. Refer to "MR-CR Converter Unit Specifications (200 V/400 V)" on p. 302 in this catalog for the specifications of the converter unit.
5. RS-485 communication function is available with the drive units manufactured in January 2015 or later. Refer to "MR-J4-DU(-RJ) MR-CR-55K_Servo Amplifier Instruction Manual" for checking procedure of manufacture data.
6. The positioning mode is available with MR-J4-DU_A4-RJ drive unit with software version B3 or later.
7. Refer to relevant Servo Amplifier Instruction Manual for the restrictions when using the servo amplifiers at altitude exceeding 1000 m and up to 2000 m above sea level.
8. The safety level depends on the setting value of [Pr. PF18 STO diagnosis error detection time] and whether or not STO input diagnosis is performed by TOFB output. Refer to relevant Servo Amplifier Instruction Manual for details.
### MR-J4-03A6/MR-J4-03A6-RJ (General-purpose Interface) Specifications

<table>
<thead>
<tr>
<th>Output</th>
<th>MR-J4-03A6</th>
<th>MR-J4-03A6-RJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>3-phase 13 V AC</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Main circuit power supply input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage (Note 1)</td>
<td>48 V DC/24 V DC</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>For 48 V DC: 1.2 A</td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>For 48 V DC: 40.8 V DC to 55.2 V DC</td>
<td>For 24 V DC: 21.6 V DC to 26.4 V DC</td>
</tr>
<tr>
<td>Control circuit power supply input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>24 V DC</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>21.6 V DC to 26.4 V DC</td>
<td></td>
</tr>
<tr>
<td>Power consumption [W]</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.3 A)</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
</tr>
<tr>
<td>Permissible regenerative power of the built-in regenerative resistor [W]</td>
<td>0.7</td>
<td></td>
</tr>
<tr>
<td>Dynamic brake</td>
<td>Built-in (Note 3, 4)</td>
<td></td>
</tr>
<tr>
<td>Communication function</td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td>RS-422: 1 : n communication (up to 32 axes)</td>
</tr>
<tr>
<td>Encoder output pulse</td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
</tr>
<tr>
<td>Analog monitor</td>
<td>2 channels</td>
<td></td>
</tr>
<tr>
<td>Position control mode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum input pulse frequency</td>
<td>4 Mpulses/s (when using differential receiver), 200 k pulses/s (when using open collector)</td>
<td></td>
</tr>
<tr>
<td>Positioning feedback pulse</td>
<td>Encoder resolution: 18 bits</td>
<td></td>
</tr>
<tr>
<td>Command pulse multiplying factor</td>
<td>Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 &lt; A/B &lt; 4000</td>
<td></td>
</tr>
<tr>
<td>Positioning complete width setting</td>
<td>0 pulse to ±65535 pulses (command pulse unit)</td>
<td></td>
</tr>
<tr>
<td>Error excessive</td>
<td>±3 rotations</td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC maximum torque)</td>
<td></td>
</tr>
<tr>
<td>Speed control range</td>
<td>Analog speed command 1:2000, internal speed command 1:5000</td>
<td></td>
</tr>
<tr>
<td>Analog speed command input</td>
<td>0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12])</td>
<td></td>
</tr>
<tr>
<td>Speed fluctuation rate</td>
<td>±0.01% maximum (load fluctuation: 0% to 100%), 0% (power fluctuation: ±10%)</td>
<td></td>
</tr>
<tr>
<td>Torque limit</td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC/motor torque)</td>
<td></td>
</tr>
<tr>
<td>Torque control mode</td>
<td>Analog torque command input 0 V DC to ±8 V DC/motor torque (input impedance: 10 kΩ to 12 kΩ)</td>
<td></td>
</tr>
<tr>
<td>Speed limit</td>
<td>Set by parameters or external analog input (0 V DC to ±10 V DC/rated speed)</td>
<td></td>
</tr>
<tr>
<td>Positioning mode</td>
<td>Not available</td>
<td>Point table method, program method, indexer (turret) method</td>
</tr>
<tr>
<td>Fully closed loop control</td>
<td>Not compatible</td>
<td></td>
</tr>
<tr>
<td>Servo functions</td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, vibration tough drive function, drive recorder function, machine diagnosis function, power monitoring function</td>
<td></td>
</tr>
<tr>
<td>Protective functions</td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection</td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
</tr>
<tr>
<td>Structure (IP rating)</td>
<td>Natural cooling, open (IP20)</td>
<td></td>
</tr>
<tr>
<td>Close mounting</td>
<td>Possible [Note 5]</td>
<td></td>
</tr>
<tr>
<td>DIN rail mounting (35 mm wide)</td>
<td>Possible</td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>0.2</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage.
2. Initial value is 48 V DC. For 24 V DC, set [Pr. PC32] to "_ _1 _ _". Servo motor characteristics vary depending on whether the voltage is 48 V DC or 24 V DC. Refer to “HG-AK Series (Ultra-compact Size, Ultra-small Capacity) Specifications” and “HG-AK Series Torque Characteristics” in this catalog.
3. The dynamic brake is electronic. The electronic dynamic brake does not operate when the control circuit power is off. It may not operate depending on alarms and warnings. Refer to "MR-J4-4_A_(-RU) MR-J4-03A6(-RJ) Servo Amplifier Instruction Manual" for details.
4. When using the built-in dynamic brake, refer to "MR-J4-4_A_(-RU) MR-J4-03A6(-RJ) Servo Amplifier Instruction Manual" for the permissible load to motor inertia ratio.
5. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C.
MR-J4-A/MR-J4-A-RJ Dimensions

- MR-J4-10A, MR-J4-10A-RJ, MR-J4-10A1, MR-J4-10A1-RJ

MR-J4-10A, MR-J4-10A-RJ, MR-J4-10A1, MR-J4-10A1-RJ


MR-J4-60A, MR-J4-60A-RJ

MR-J4-70A, MR-J4-70A-RJ

MR-J4-100A, MR-J4-100A-RJ

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-A servo amplifier. CN9 connector is available with MR-J4-A-RJ servo amplifiers manufactured in November 2014 or later.
MR-J4-A/MR-J4-A-RJ Dimensions

**MR-J4-60A4, MR-J4-60A4-RJ**

**MR-J4-100A4, MR-J4-100A4-RJ**

**MR-J4-200A, MR-J4-200A-RJ**

**MR-J4-200A4, MR-J4-200A4-RJ**

---

Notes: 1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-A servo amplifier. CN9 connector is available with MR-J4-A-RJ servo amplifiers manufactured in November 2014 or later.
**MR-J4-A/MR-J4-A-RJ Dimensions**

- **MR-J4-350A, MR-J4-350A-RJ**
  - Terminal arrangement
  - Cooling fan
  - Exhaust
  - Intake
  - Mounting hole dimensions

- **MR-J4-350A4, MR-J4-350A4-RJ**
  - Terminal arrangement
  - Cooling fan
  - Exhaust
  - Intake
  - Mounting hole dimensions

- **MR-J4-500A, MR-J4-500A-RJ**
  - Terminal arrangement
  - Cooling fan
  - Exhaust
  - Intake
  - Mounting hole dimensions

**Notes:**
1. CNP1, CNP2 and CNP3 connectors (insertion type) are supplied with the servo amplifier.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-A servo amplifier. CN9 connector is available with MR-J4-A-RJ servo amplifiers manufactured in November 2014 or later.

● MR-J4-500A4, MR-J4-500A4-RJ

- 2-ø6 mounting hole
- Cooling fan
- Exhaust
- Intake
- PE
- Terminal screw size:
  - TE1: M4
  - TE2: M3.5
  - TE3: M4
  - PE: M4
- Mounting screw size: M5
- L1 L2 L3 C
- Terminal arrangement:
  - P+ U V W
  - TE1
  - TE2
  - TE3
- Built-in regenerative resistor lead terminal fixing screw
- Terminal diagram (with front cover open)

● MR-J4-700A, MR-J4-700A-RJ, MR-J4-700A4, MR-J4-700A4-RJ

- 2-ø6 mounting hole
- Cooling fan
- Exhaust
- Intake
- PE
- Terminal screw size:
  - TE1: M4
  - TE2: M3.5
  - TE3: M4
  - PE: M4
- Mounting screw size: M5
- L1 L2 L3 C
- Terminal arrangement:
  - P+ U V W
  - TE1
  - TE2
- Built-in regenerative resistor lead terminal fixing screw
- Terminal diagram (with front cover open)

Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-A servo amplifier. CN9 connector is available with MR-J4-A-RJ servo amplifiers manufactured in November 2014 or later.
Notes: 1. CN2L, CN7, and CN9 connectors are not available for MR-J4-A servo amplifier. CN8 connector is available with MR-J4-A-RJ servo amplifiers manufactured in November 2014 or later.
MR-J4-DU_A/MR-J4-DU_A-RJ Dimensions (Note 1)

- MR-J4-DU30KA, MR-J4-DU30KA-RJ
- MR-J4-DU37KA, MR-J4-DU37KA-RJ
- MR-J4-DU45KA4, MR-J4-DU45KA4-RJ
- MR-J4-DU55KA4, MR-J4-DU55KA4-RJ

Terminal diagram (with front cover open)

Terminal screw size:
- TE1: M10
- TE2: M6
- TE3: M4
- PE: M10

Mounting screw size: M6

Notes:
1. For the panel cut dimensions, refer to "Panel Cut Dimensions for Converter Unit and Drive Unit" in this catalog.
2. CN2L, CN7, and CN9 connectors are not available for MR-J4-DU_A drive unit. MR-J4-DU_A-RJ is equipped with CN7 and CN9 connectors; however, these connectors are not for use.
MR-J4-03A6/MR-J4-03A6-RJ Dimensions

<table>
<thead>
<tr>
<th>Part</th>
<th>Dimensions (Unit: mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNP1</td>
<td>27.4 x 27.4</td>
</tr>
<tr>
<td>2-e5 mounting hole</td>
<td>27.4</td>
</tr>
<tr>
<td>Approx. 80</td>
<td>30</td>
</tr>
<tr>
<td>90</td>
<td>90</td>
</tr>
</tbody>
</table>

Terminal arrangement:
- CNP1:
  - 5: 1
  - 6: 2
  - 7: 3
  - 8: 4

Mounting screw size: M4

When mounting MR-BAT6V1SET-A

[Unit: mm]
MEMO
### Model Designation

#### For 200 V class

|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|

#### Features/Summary

- **Outline**
- **Drawings**

#### Specifications/Characteristics

- **MR-J4 Series**
- **MR-JE Series**

### DD Rotary Servo Motors

#### Model Designation

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Model Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KR</td>
<td>For 200 V class</td>
</tr>
</tbody>
</table>

#### Specifications

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Oil seal</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>J</td>
<td>Installed (Note 8)</td>
</tr>
</tbody>
</table>

#### Reducer (Note 5)

- **G1**: With reducer for general industrial machines, flange mounting
- **G1H**: With reducer for general industrial machines, foot mounting
- **G5**: With flange-output type reducer for high precision applications, flange mounting
- **G7**: With shaft-output type reducer for high precision applications, flange mounting

#### Electromagnetic brake (Note 1)

- **B**: Installed

#### Rated speed [r/min]

- **1**: 1000
- **1M**: 1500
- **2**: 2000
- **3**: 3000

#### Rated output [kW]

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Rated output [kW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>05</td>
<td>0.05</td>
</tr>
<tr>
<td>1</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>0.2</td>
</tr>
<tr>
<td>4</td>
<td>0.4</td>
</tr>
<tr>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>7</td>
<td>0.75</td>
</tr>
<tr>
<td>8</td>
<td>0.85</td>
</tr>
<tr>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>12</td>
<td>1.2</td>
</tr>
<tr>
<td>15</td>
<td>1.5</td>
</tr>
<tr>
<td>20</td>
<td>2.0</td>
</tr>
<tr>
<td>30</td>
<td>3.0</td>
</tr>
<tr>
<td>35</td>
<td>3.5 (Note 8)</td>
</tr>
<tr>
<td>42</td>
<td>4.2</td>
</tr>
</tbody>
</table>

#### Inertia/capacity

- **HG-KR**: Low inertia, small capacity
- **HG-MR**: Ultra-low inertia, small capacity
- **HG-SR**: Medium inertia, medium capacity
- **HG-JR**: Low inertia, medium-large capacity
- **HG-RR**: Ultra-low inertia, medium capacity
- **HG-UR**: Flat type, medium capacity

### Notes

1. Refer to electromagnetic brake specifications of each servo motor series in this catalog for the available models and detailed specifications.
3. Oil seal is not installed in the geared servo motor.
4. Dimensions for HG-KR/HG-MR series with oil seal are different from those without oil seal. Contact your local sales office for more details. For HG-SR series, dimensions are the same regardless of whether or not oil seal is installed.
5. Refer to "Geared Servo Motor Specifications" in this catalog for the available models and detailed specifications.
6. Standard HG-SR G1/G1H has a key shaft (with key).
7. Refer to special shaft end specifications of each servo motor series in this catalog for the available models and detailed specifications.
8. Oil seal is installed in HG-JR, HG-RR, and HG-UR series as a standard.
9. For HG-JR353(B), the rated output varies depending on the servo amplifier to be combined. Refer to "HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (200 V Class) Specifications" for details.
### Model Designation

**For 400 V class**

**H G - S R 5 2 4 B**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Oil seal</th>
<th>Reducer (Note 4)</th>
<th>Shaft end</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None (Note 4)</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>J</td>
<td>Installed (Note 2, 3)</td>
<td>G1</td>
<td>With reducer for general industrial machines, flange mounting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G1H</td>
<td>With reducer for general industrial machines, foot mounting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G5</td>
<td>With flange-output type reducer for high precision applications, flange mounting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G7</td>
<td>With shaft-output type reducer for high precision applications, flange mounting</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Electromagnetic brake</th>
<th>Rated speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
<td>1 1000</td>
</tr>
<tr>
<td>B</td>
<td>Installed (Note 1)</td>
<td>1M 1500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 3000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Rated output [kW]</th>
<th>Symbol</th>
<th>Rated output [kW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.5</td>
<td>11K</td>
<td>11</td>
</tr>
<tr>
<td>7</td>
<td>0.75</td>
<td>12K</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>1.0</td>
<td>15K</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>1.5</td>
<td>20K</td>
<td>20</td>
</tr>
<tr>
<td>20</td>
<td>2.0</td>
<td>22K</td>
<td>22</td>
</tr>
<tr>
<td>35</td>
<td>3.5 (Note 6)</td>
<td>25K</td>
<td>25</td>
</tr>
<tr>
<td>50</td>
<td>5.0</td>
<td>30K</td>
<td>30</td>
</tr>
<tr>
<td>60</td>
<td>6.0</td>
<td>37K</td>
<td>37</td>
</tr>
<tr>
<td>70</td>
<td>7.0</td>
<td>45K</td>
<td>45</td>
</tr>
<tr>
<td>80</td>
<td>8.0</td>
<td>55K</td>
<td>55</td>
</tr>
<tr>
<td>90</td>
<td>9.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**HG-SR**
- Medium inertia, medium capacity

**HG-JR**
- Low inertia, medium-large capacity

Notes:
1. Refer to electromagnetic brake specifications of each servo motor series in this catalog for the available models and detailed specifications.
3. Oil seal is not installed in the geared servo motor.
4. Oil seal is installed in HG-JR series as a standard.
5. Refer to "Geared Servo Motor Specifications" in this catalog for the available models and detailed specifications.
6. Standard HG-SR G1/G1H has a key shaft (with key).
7. Refer to special shaft end specifications of each servo motor series in this catalog for the available models and detailed specifications.
8. For HG-JR35/34(B), the rated output varies depending on the servo amplifier to be combined. Refer to "HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (400 V Class) Specifications" for details.
### Model Designation

- **For 48 V DC/24 V DC**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Special specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Standard</td>
</tr>
<tr>
<td>S100</td>
<td>Vertical encoder cable lead</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Electromagnetic brake</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>B</td>
<td>Installed (Note 1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Shaft end</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Standard (Straight shaft)</td>
</tr>
<tr>
<td>D</td>
<td>D-cut shaft (Note 2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>48 V DC/24 V DC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Rated speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>3000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Inertia/capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-AK</td>
<td>Ultra-compact size, ultra-small capacity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Rated output [W]</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>10</td>
</tr>
<tr>
<td>02</td>
<td>20</td>
</tr>
<tr>
<td>03</td>
<td>30</td>
</tr>
</tbody>
</table>

Notes:
1. Refer to "HG-AK Series Electromagnetic Brake Specifications" in this catalog for the available models and detailed specifications.
2. Refer to "HG-AK Series Special Shaft End Specifications" in this catalog for details.
### Product Lines

<table>
<thead>
<tr>
<th>Series</th>
<th>Type</th>
<th>Voltage</th>
<th>Flange-mounting options</th>
<th>Flange-mounting output type</th>
<th>Flange-mounting shaft output type</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KR</td>
<td>Low inertia</td>
<td>200 V AC</td>
<td>50 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG-MR</td>
<td>Ultra-low inertia</td>
<td>200 V AC</td>
<td>50 W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG-SR</td>
<td>Medium inertia</td>
<td>200 V AC</td>
<td>0.5 kW</td>
<td>7 kW</td>
<td></td>
</tr>
<tr>
<td>HG-JR</td>
<td>Low inertia</td>
<td>200 V AC</td>
<td>0.5 kW</td>
<td>7 kW</td>
<td>37 kW</td>
</tr>
<tr>
<td>HG-AK</td>
<td>Ultra-compact</td>
<td>48/24 V DC</td>
<td>10 W</td>
<td>30 W</td>
<td></td>
</tr>
<tr>
<td>HG-RR</td>
<td>Ultra-low inertia</td>
<td>200 V AC</td>
<td>1 kW</td>
<td>5 kW</td>
<td></td>
</tr>
<tr>
<td>HG-UR</td>
<td>Flat type</td>
<td>200 V AC</td>
<td>0.75 kW</td>
<td>5 kW</td>
<td></td>
</tr>
</tbody>
</table>

1. This reduction ratio is the nominal value and may differ slightly from the actual reduction ratio.
2. Indicate the flange dimensions.
3. Refer to the “MELSERVO-J4 Catalogue (L (NA) 03056)” for available capacity options.

---

### Servo motor lineup with a reduction gear (Note 3)

<table>
<thead>
<tr>
<th>Servo motor series</th>
<th>Built-in reduction gear compatible with general industrial machineries (G1)</th>
<th>Flange-mounting output type with a built-in reduction gear for high precision applications (G5)</th>
<th>Flange-mounting shaft output type with a built-in reduction gear for high precision applications (G7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KR</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HG-MR</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HG-SR 1000 r/min</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HG-SR 2000 r/min</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HG-JR</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HG-RR</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>HG-UR</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Notes:
1. This reduction ratio is the nominal value and may differ slightly from the actual reduction ratio.
2. Indicate the flange dimensions.
3. Refer to the “MELSERVO-J4 Catalogue (L (NA) 03056)” for available capacity options.
## HG-KR Series (Low Inertia, Small Capacity) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-KR</th>
<th>053(B)</th>
<th>13(B)</th>
<th>23(B)</th>
<th>43(B)</th>
<th>73(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity</td>
<td>[kVA]</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output</td>
<td>[W]</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>Rated torque</td>
<td>[N•m]</td>
<td>0.16</td>
<td>0.32</td>
<td>0.64</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>0.56</td>
<td>1.1</td>
<td>2.2</td>
<td>4.5</td>
<td>8.4</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity</td>
<td>[kVA]</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output</td>
<td>[W]</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>Rated torque</td>
<td>[N•m]</td>
<td>0.16</td>
<td>0.32</td>
<td>0.64</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>0.56</td>
<td>1.1</td>
<td>2.2</td>
<td>4.5</td>
<td>8.4</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>0.9</td>
<td>0.8</td>
<td>1.3</td>
<td>2.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Maximum current</td>
<td>[A]</td>
<td>3.2</td>
<td>2.5</td>
<td>4.6</td>
<td>9.1</td>
<td>17</td>
</tr>
<tr>
<td>Regenerative braking frequency</td>
<td>[times/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-</td>
<td>(Note 4)</td>
<td>(Note 4)</td>
<td>453</td>
<td>268</td>
<td>157</td>
<td></td>
</tr>
<tr>
<td>MR-J4W-</td>
<td>(Note 4)</td>
<td>2500</td>
<td>1350</td>
<td>451</td>
<td>268</td>
<td>393</td>
</tr>
<tr>
<td>Moment of inertia J</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>0.0450</td>
<td>0.0777</td>
<td>0.221</td>
<td>0.371</td>
<td>1.26</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>0.0472</td>
<td>0.0837</td>
<td>0.243</td>
<td>0.393</td>
<td>1.37</td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio</td>
<td>17 times or less</td>
<td>26 times or less</td>
<td>25 times or less</td>
<td>17 times or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>None</td>
<td>None</td>
<td>Servo motors with oil seal are available. (HG-KR_J)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>130 (B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>X: 49 m/s² Y: 49 m/s²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations* on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft</td>
<td>L</td>
<td>25</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Radial</td>
<td>[N]</td>
<td>88</td>
<td>88</td>
<td>245</td>
<td>245</td>
<td>392</td>
</tr>
<tr>
<td>Thrust</td>
<td>[N]</td>
<td>59</td>
<td>59</td>
<td>98</td>
<td>98</td>
<td>147</td>
</tr>
<tr>
<td>Mass</td>
<td>Standard</td>
<td>0.34</td>
<td>0.54</td>
<td>0.91</td>
<td>1.4</td>
<td>2.8</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kg]</td>
<td>0.54</td>
<td>0.74</td>
<td>1.3</td>
<td>1.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. For geared servo motor, IP rating of the reducer portion is equivalent to IP65. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. When the servo motor accelerates to a stop from the rated speed, the regenerative frequency will not be limited if the effective torque is within the rated torque range.
5. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
HG-KR Series Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-KR 053B</th>
<th>13B</th>
<th>23B</th>
<th>43B</th>
<th>73B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 15%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Power consumption [W] at 20 °C: 6.3, 6.3, 7.9, 7.9, 10
- Electromagnetic brake static friction torque [N•m]: 0.32, 0.32, 1.3, 1.3, 2.4
- Permissible braking work per braking [J]: 5.6, 5.6, 22, 22, 64
- Per hour [J]: 56, 56, 220, 220, 640
- Electromagnetic brake life (Note 2) [Times]: 20000, 20000, 20000, 20000, 20000

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-KR Series Torque Characteristics

- HG-KR053(B) (Note 1, 2, 3, 4)
- HG-KR13(B) (Note 1, 2, 3, 4)
- HG-KR23(B) (Note 1, 2, 3, 4)
- HG-KR43(B) (Note 1, 2, 3, 4)
- HG-KR73(B) (Note 1, 3, 4)

HG-KR Series Special Shaft End Specifications

Motors with the following specifications are also available.

D-cut shaft (Note 1): 50 W and 100 W

Key shaft (with key) (Note 1, 2): 200 W, 400 W, and 750 W
# HG-MR Series (Ultra-low Inertia, Small Capacity) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-MR</th>
<th>053(B)</th>
<th>13(B)</th>
<th>23(B)</th>
<th>43(B)</th>
<th>73(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity</td>
<td>[kVA]</td>
<td>0.3</td>
<td>0.3</td>
<td>0.5</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output</td>
<td>[W]</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>Rated torque</td>
<td>[N•m]</td>
<td>0.16</td>
<td>0.32</td>
<td>0.64</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>0.48</td>
<td>0.95</td>
<td>1.9</td>
<td>3.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
<td>3000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td>6000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td>6000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>[kW/s]</td>
<td>15.6</td>
<td>33.8</td>
<td>46.9</td>
<td>114.2</td>
<td>97.3</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kW/s]</td>
<td>11.3</td>
<td>28.0</td>
<td>37.2</td>
<td>98.8</td>
<td>82.1</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>1.0</td>
<td>0.9</td>
<td>1.5</td>
<td>2.6</td>
<td>5.8</td>
</tr>
<tr>
<td>Maximum current</td>
<td>[A]</td>
<td>3.1</td>
<td>2.5</td>
<td>5.3</td>
<td>9.0</td>
<td>20</td>
</tr>
<tr>
<td>Regenerative braking frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR-J4-</td>
<td>[times/min]</td>
<td>(Note 4)</td>
<td>(Note 4)</td>
<td>1180</td>
<td>713</td>
<td>338</td>
</tr>
<tr>
<td>MR-J4W-</td>
<td>[times/min]</td>
<td>7310</td>
<td>3620</td>
<td>1170</td>
<td>710</td>
<td>846</td>
</tr>
<tr>
<td>Moment of inertia J</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td>[× 10^{-4} kg•m^2]</td>
<td>0.0162</td>
<td>0.0300</td>
<td>0.0865</td>
<td>0.142</td>
<td>0.586</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[× 10^{-4} kg•m^2]</td>
<td>0.0224</td>
<td>0.0362</td>
<td>0.109</td>
<td>0.164</td>
<td>0.694</td>
</tr>
<tr>
<td>Recommended load for motor inertia ratio</td>
<td></td>
<td>35 times or less</td>
<td>32 times or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>None</td>
<td>None (Servo motors with oil seal are available. (HG-MR_J))</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>130 (B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>X: 49 m/s^2; Y: 49 m/s^2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>[mm]</td>
<td>25</td>
<td>25</td>
<td>30</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Radial</td>
<td>[N]</td>
<td>88</td>
<td>88</td>
<td>245</td>
<td>245</td>
<td>392</td>
</tr>
<tr>
<td>Thrust</td>
<td>[N]</td>
<td>59</td>
<td>59</td>
<td>98</td>
<td>98</td>
<td>147</td>
</tr>
<tr>
<td>Mass</td>
<td>[kg]</td>
<td>0.34</td>
<td>0.54</td>
<td>0.91</td>
<td>1.4</td>
<td>2.8</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kg]</td>
<td>0.54</td>
<td>0.74</td>
<td>1.3</td>
<td>1.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. When the servo 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.
5. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
HG-MR Series Electromagnetic Brake Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-MR053(B)</th>
<th>HG-MR13(B)</th>
<th>HG-MR23(B)</th>
<th>HG-MR43(B)</th>
<th>HG-MR73(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>[W] at 20 °C</td>
<td>6.3</td>
<td>6.3</td>
<td>7.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Power consumption</td>
<td>[N-m]</td>
<td>0.32</td>
<td>0.32</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque</td>
<td>Per braking [J]</td>
<td>5.6</td>
<td>5.6</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Permissible braking work</td>
<td>Per hour [J]</td>
<td>56</td>
<td>56</td>
<td>220</td>
<td>220</td>
</tr>
<tr>
<td>Number of brakings</td>
<td>Number of brakings</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Electromagnetic brake life</td>
<td>Work per braking [J]</td>
<td>5.6</td>
<td>5.6</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-MR Series Torque Characteristics

HG-MR053(B) (Note 1, 2, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>1000</td>
</tr>
<tr>
<td>0.4</td>
<td>2000</td>
</tr>
<tr>
<td>0.6</td>
<td>3000</td>
</tr>
<tr>
<td>0.8</td>
<td>4000</td>
</tr>
</tbody>
</table>

HG-MR13(B) (Note 1, 2, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.75</td>
<td>1000</td>
</tr>
<tr>
<td>0.5</td>
<td>2000</td>
</tr>
<tr>
<td>0.25</td>
<td>3000</td>
</tr>
<tr>
<td>1.0</td>
<td>4000</td>
</tr>
</tbody>
</table>

HG-MR23(B) (Note 1, 2, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>1000</td>
</tr>
<tr>
<td>1.0</td>
<td>2000</td>
</tr>
<tr>
<td>0.5</td>
<td>3000</td>
</tr>
<tr>
<td>2.0</td>
<td>4000</td>
</tr>
</tbody>
</table>

HG-MR43(B) (Note 1, 2, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
<td>1000</td>
</tr>
<tr>
<td>2.0</td>
<td>2000</td>
</tr>
<tr>
<td>1.0</td>
<td>3000</td>
</tr>
<tr>
<td>4.0</td>
<td>4000</td>
</tr>
</tbody>
</table>

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

HG-MR Series Special Shaft End Specifications

Motors with the following specifications are also available.

D-cut shaft (Note 1): 50 W and 100 W

Key shaft (with key) (Note 1, 2): 200 W, 400 W, and 750 W

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-MR23(B)/K, HG-MR43(B)/K</td>
<td>T 5 14h6 S 30 R 26 Q 5 W 20 QK 3 QL 3 U 3 Y 3</td>
</tr>
<tr>
<td>HG-MR73(B)/K</td>
<td>T 6 19h6 S 40 R 36 Q 6 W 25 QK 5 QL 3.5</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. 2 round end key is attached.
HG-SR 1000 r/min Series (Medium Inertia, Medium Capacity) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-SR</th>
<th>51(B)</th>
<th>81(B)</th>
<th>121(B)</th>
<th>201(B)</th>
<th>301(B)</th>
<th>421(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W_-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (^1) [kVA]</td>
<td>1.0</td>
<td>1.5</td>
<td>2.1</td>
<td>3.5</td>
<td>4.8</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output [kW]</td>
<td>0.5</td>
<td>0.85</td>
<td>1.2</td>
<td>2.0</td>
<td>3.0</td>
<td>4.2</td>
<td></td>
</tr>
<tr>
<td>Rated torque [N-m] (Note 3)</td>
<td>4.8</td>
<td>8.1</td>
<td>11.5</td>
<td>19.1</td>
<td>28.6</td>
<td>40.1</td>
<td></td>
</tr>
<tr>
<td>Maximum torque [N-m]</td>
<td>14.3</td>
<td>24.4</td>
<td>34.4</td>
<td>57.3</td>
<td>85.9</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Rated speed [r/min]</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed [r/min]</td>
<td></td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed [r/min]</td>
<td></td>
<td>1725</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque Standard [kW/s]</td>
<td>19.7</td>
<td>41.2</td>
<td>28.1</td>
<td>46.4</td>
<td>82.3</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [kW/s]</td>
<td>16.5</td>
<td>36.2</td>
<td>23.2</td>
<td>41.4</td>
<td>75.3</td>
<td>99.9</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>2.8</td>
<td>5.2</td>
<td>7.1</td>
<td>9.4</td>
<td>13</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Maximum current [A]</td>
<td>9.0</td>
<td>17</td>
<td>23</td>
<td>30</td>
<td>42</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Regenerative braking frequency (^2) [times/min]</td>
<td>MR-J4-</td>
<td>77</td>
<td>114</td>
<td>191</td>
<td>113</td>
<td>89</td>
<td>76</td>
</tr>
<tr>
<td>With electromagnetic brake [times/min]</td>
<td>MR-J4W_-</td>
<td>392</td>
<td>286</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Moment of inertia J Standard [×10^-4 kg•m(^2)]</td>
<td>11.6</td>
<td>16.0</td>
<td>46.8</td>
<td>78.6</td>
<td>99.7</td>
<td>151</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [×10^-4 kg•m(^2)]</td>
<td>13.8</td>
<td>18.2</td>
<td>56.5</td>
<td>88.2</td>
<td>109</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio (Note 1)</td>
<td>17 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/Incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>None (Servo motors with oil seal are available. (HG-SR_J))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP67) (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment (^3)</td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance (^4) X: 24.5 m/s(^2) Y: 24.5 m/s(^2) X: 24.5 m/s(^2) Y: 49 m/s(^2) X: 24.5 m/s(^2) Y: 29.4 m/s(^2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft (^5) L [mm]</td>
<td>55</td>
<td>55</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Radial [N]</td>
<td>980</td>
<td>980</td>
<td>2058</td>
<td>2058</td>
<td>2058</td>
<td>2058</td>
<td></td>
</tr>
<tr>
<td>Thrust [N]</td>
<td>490</td>
<td>490</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td></td>
</tr>
<tr>
<td>Mass Standard [kg]</td>
<td>6.2</td>
<td>7.3</td>
<td>11</td>
<td>16</td>
<td>20</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [kg]</td>
<td>6.2</td>
<td>9.3</td>
<td>17</td>
<td>22</td>
<td>26</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. The servo motor with oil seal is rated IP67 as well (excluding the shaft-through portion). Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
HG-SR 1000 r/min Series Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-SR</th>
<th>51B</th>
<th>81B</th>
<th>121B</th>
<th>201B</th>
<th>301B</th>
<th>421B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>[W] at 20 °C</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Power consumption</td>
<td>24 V DC</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque</td>
<td>[N-m]</td>
<td>8.5</td>
<td>8.5</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Permissible braking work</td>
<td>Per braking [J]</td>
<td>400</td>
<td>400</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
</tr>
<tr>
<td>Number of brakings</td>
<td>Per hour [J]</td>
<td>4000</td>
<td>4000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
</tr>
<tr>
<td>Electromagnetic brake life (Note 2)</td>
<td>Work per braking [J]</td>
<td>200</td>
<td>200</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-SR 1000 r/min Series Torque Characteristics

Key shaft (without key) (Note 1, 2)

### HG-SR 1000 r/min Series Special Shaft End Specifications

Motors with the following specifications are also available.

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-SR51(B)</td>
<td>S: 24h6, 55, 50, 8, 0, W: 36, 5, 4, 0, U: 4, 5, Y: 4, M8 screw Depth: 0.2</td>
</tr>
<tr>
<td>HG-SR81(B)</td>
<td>S: 24h6, 55, 50, 8, 0, W: 36, 5, 4, 0, U: 4, 5, Y: 4, M8 screw Depth: 0.2</td>
</tr>
<tr>
<td>HG-SR121(B)</td>
<td>S: 24h6, 55, 50, 8, 0, W: 36, 5, 4, 0, U: 4, 5, Y: 4, M8 screw Depth: 0.2</td>
</tr>
<tr>
<td>HG-SR201(B)</td>
<td>S: 24h6, 55, 50, 8, 0, W: 36, 5, 4, 0, U: 4, 5, Y: 4, M8 screw Depth: 0.2</td>
</tr>
<tr>
<td>HG-SR301(B)</td>
<td>S: 24h6, 55, 50, 8, 0, W: 36, 5, 4, 0, U: 4, 5, Y: 4, M8 screw Depth: 0.2</td>
</tr>
<tr>
<td>HG-SR421(B)</td>
<td>S: 24h6, 55, 50, 8, 0, W: 36, 5, 4, 0, U: 4, 5, Y: 4, M8 screw Depth: 0.2</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-SR 2000 r/min Series (Medium Inertia, Medium Capacity) (200 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-SR</th>
<th>52(B)</th>
<th>102(B)</th>
<th>152(B)</th>
<th>202(B)</th>
<th>352(B)</th>
<th>502(B)</th>
<th>702(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity *1</td>
<td>[kVA]</td>
<td>1.0</td>
<td>1.7</td>
<td>2.5</td>
<td>3.5</td>
<td>5.5</td>
<td>7.5</td>
<td>10</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td>Rated output</td>
<td>[kW]</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>3.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Maximum torque *3</td>
<td>[N•m]</td>
<td>7.2</td>
<td>14.3</td>
<td>21.5</td>
<td>28.6</td>
<td>50.1</td>
<td>71.6</td>
<td>100</td>
</tr>
<tr>
<td>Rated speed *5</td>
<td>[r/min]</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td>3000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td>3450</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque Standard</td>
<td>[kW/s]</td>
<td>7.85</td>
<td>19.7</td>
<td>32.1</td>
<td>19.5</td>
<td>35.5</td>
<td>57.2</td>
<td>74.0</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kW/s]</td>
<td>6.01</td>
<td>16.5</td>
<td>28.2</td>
<td>16.1</td>
<td>31.7</td>
<td>52.3</td>
<td>69.4</td>
</tr>
<tr>
<td>Rated current MR-J4-</td>
<td>[A]</td>
<td>2.9</td>
<td>5.6</td>
<td>9.4</td>
<td>9.6</td>
<td>14</td>
<td>22</td>
<td>26</td>
</tr>
<tr>
<td>MR-J4W-</td>
<td>[A]</td>
<td>9.0</td>
<td>17</td>
<td>29</td>
<td>31</td>
<td>45</td>
<td>70</td>
<td>83</td>
</tr>
<tr>
<td>Regenerative braking frequency *2</td>
<td>MR-J4-</td>
<td>[times/min]</td>
<td>31</td>
<td>38</td>
<td>139</td>
<td>47</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[times/min]</td>
<td>154</td>
<td>96</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Moment of inertia J Standard</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>7.26</td>
<td>11.6</td>
<td>16.0</td>
<td>46.8</td>
<td>78.6</td>
<td>99.7</td>
<td>151</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>9.48</td>
<td>13.8</td>
<td>18.2</td>
<td>56.5</td>
<td>88.2</td>
<td>109</td>
<td>161</td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio *4</td>
<td>15 times or less</td>
<td>17 times or less</td>
<td>15 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>None (Servo motors with oil seal are available. (HG-SR_J))</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP67)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level *5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance *6</td>
<td>X: 24.5 m/s²; Y: 24.5 m/s²; Z: 49 m/s²;</td>
<td>X: 24.5 m/s²; Y: 24.5 m/s²; Z: 29.4 m/s²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft *5</td>
<td>L</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>79</td>
<td>79</td>
<td>79</td>
<td>79</td>
</tr>
<tr>
<td>Radial</td>
<td>[N]</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>2058</td>
<td>2058</td>
<td>2058</td>
<td>2058</td>
</tr>
<tr>
<td>Thrust</td>
<td>[N]</td>
<td>490</td>
<td>490</td>
<td>490</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>980</td>
</tr>
<tr>
<td>Mass</td>
<td>[kg]</td>
<td>4.8</td>
<td>6.2</td>
<td>7.3</td>
<td>11</td>
<td>16</td>
<td>20</td>
<td>27</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kg]</td>
<td>6.7</td>
<td>8.2</td>
<td>9.3</td>
<td>17</td>
<td>22</td>
<td>26</td>
<td>33</td>
</tr>
</tbody>
</table>

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. The servo motor with oil seal is rated IP67 as well (excluding the shaft-through portion), and for geared servo motor, IP rating of the reducer portion is equivalent to IP44. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
HG-SR 2000 r/min Series (200 V Class) Electromagnetic Brake Specifications  (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-SR</th>
<th>52B</th>
<th>102B</th>
<th>152B</th>
<th>202B</th>
<th>352B</th>
<th>502B</th>
<th>702B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage [W] at 20 °C</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Permissible braking work Per braking [J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
<td></td>
</tr>
<tr>
<td>Per hour [J]</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
<td></td>
</tr>
<tr>
<td>Number of brakings (Times)</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td></td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-SR 2000 r/min Series (200 V Class) Torque Characteristics

HG-SR52(B) (Note 1, 2, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>1500</td>
</tr>
<tr>
<td>6</td>
<td>2000</td>
</tr>
<tr>
<td>3</td>
<td>2500</td>
</tr>
<tr>
<td>0</td>
<td>3000</td>
</tr>
</tbody>
</table>

HG-SR102(B) (Note 1, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1500</td>
</tr>
<tr>
<td>6</td>
<td>2000</td>
</tr>
<tr>
<td>3</td>
<td>2500</td>
</tr>
<tr>
<td>0</td>
<td>3000</td>
</tr>
</tbody>
</table>

HG-SR152(B) (Note 1, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>1500</td>
</tr>
<tr>
<td>8</td>
<td>2000</td>
</tr>
<tr>
<td>4</td>
<td>2500</td>
</tr>
<tr>
<td>2</td>
<td>3000</td>
</tr>
</tbody>
</table>

HG-SR202(B) (Note 1, 3, 4)

<table>
<thead>
<tr>
<th>Torque [N•m]</th>
<th>Speed [r/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>1500</td>
</tr>
<tr>
<td>10</td>
<td>2000</td>
</tr>
<tr>
<td>5</td>
<td>2500</td>
</tr>
<tr>
<td>2</td>
<td>3000</td>
</tr>
</tbody>
</table>

Notes: 1. : For 3-phase 200 V AC.
2. : For 1-phase 200 V AC.
3. : For 1-phase 230 V AC.
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-SR 2000 r/min Series (200 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-SR52(B)/K, 102(B)/K</td>
<td>S: 24; R: 50; Q: 8; W: 36; QK: 4; QL: 4; U: 4</td>
</tr>
<tr>
<td>HG-SR202(B)/K, 352(B)/K</td>
<td>S: 35; R: 75; Q: 10; W: 55; QK: 5; QL: 5; U: 5</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-SR 2000 r/min Series (Medium Inertia, Medium Capacity) (400 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-SR</th>
<th>Compatible servo amplifier model</th>
<th>MR-J4-</th>
<th>Ref. to “Combinations of Rotary Servo Motor and Servo Amplifier” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power supply capacity</strong></td>
<td>[kVA]</td>
<td>1.0</td>
<td>1.7</td>
<td>2.5</td>
</tr>
<tr>
<td><strong>Continuous running duty</strong></td>
<td><strong>Rated output</strong> [kW]</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td><strong>Rated torque</strong> [N•m]</td>
<td>2.4</td>
<td>4.8</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td><strong>Maximum torque</strong> [N•m]</td>
<td>7.2</td>
<td>14.3</td>
<td>21.5</td>
</tr>
<tr>
<td></td>
<td><strong>Rated speed</strong> [r/min]</td>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Maximum speed</strong> [r/min]</td>
<td>3000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Permissible instantaneous speed</strong> [r/min]</td>
<td>3450</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power rate at continuous rated torque</strong></td>
<td><strong>Standard</strong> [kW/s]</td>
<td>7.85</td>
<td>19.7</td>
<td>32.1</td>
</tr>
<tr>
<td></td>
<td><strong>With electromagnetic brake</strong> [kW/s]</td>
<td>6.01</td>
<td>16.5</td>
<td>28.2</td>
</tr>
<tr>
<td><strong>Rated current</strong> [A]</td>
<td>1.5</td>
<td>2.8</td>
<td>4.7</td>
<td>4.9</td>
</tr>
<tr>
<td><strong>Maximum current</strong> [A]</td>
<td>4.5</td>
<td>8.9</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td><strong>Regenerative braking frequency</strong></td>
<td>MR-J4- [times/min]</td>
<td>46</td>
<td>29</td>
<td>139</td>
</tr>
<tr>
<td><strong>Moment of inertia J</strong></td>
<td><strong>Standard</strong> [× 10⁻⁴ kg•m²]</td>
<td>2.76</td>
<td>11.6</td>
<td>16.0</td>
</tr>
<tr>
<td></td>
<td><strong>With electromagnetic brake</strong> [× 10⁻⁴ kg•m²]</td>
<td>9.48</td>
<td>13.8</td>
<td>18.2</td>
</tr>
<tr>
<td><strong>Recommended load to motor inertia ratio</strong></td>
<td><strong>15 times or less</strong></td>
<td>17 times or less</td>
<td>15 times or less</td>
<td></td>
</tr>
<tr>
<td><strong>Speed/position detector</strong></td>
<td><strong>Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil seal</strong></td>
<td>None (Servo motors with oil seal are available. (HG-SR_J))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Insulation class</strong></td>
<td>155 (F)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Environment

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vibration resistance X: 24.5 m/s²/ Y: 24.5 m/s²</th>
</tr>
</thead>
<tbody>
<tr>
<td>X: 24.5 m/s²/ Y: 49 m/s²/ X: 24.5 m/s²/ Y: 29.4 m/s²</td>
</tr>
</tbody>
</table>

#### Vibration rank

V10

#### Compliance to global standards

Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS & MOTORS L(NA)03058” catalog.

<table>
<thead>
<tr>
<th>Permissible load for the shaft</th>
<th>[N]</th>
<th>55</th>
<th>55</th>
<th>55</th>
<th>79</th>
<th>79</th>
<th>79</th>
<th>79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial</td>
<td></td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>2058</td>
<td>2058</td>
<td>2058</td>
<td>2058</td>
</tr>
<tr>
<td>Thrust</td>
<td></td>
<td>490</td>
<td>490</td>
<td>490</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>980</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mass</th>
<th>[kg]</th>
<th>4.8</th>
<th>6.2</th>
<th>7.3</th>
<th>11</th>
<th>16</th>
<th>20</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td></td>
<td>6.7</td>
<td>8.2</td>
<td>9.3</td>
<td>17</td>
<td>22</td>
<td>26</td>
<td>33</td>
</tr>
</tbody>
</table>

| With electromagnetic brake | [kg] | 6.7 | 8.2 | 9.3 | 17 | 22 | 26 | 33 |

#### Notes

1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. The servo motor with oil seal is rated IP67 as well (excluding the shaft-through portion), and for geared servo motor, IP rating of the reducer portion is equivalent to IP44. Refer to the asterisk 7 of “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the asterisks 1 to 6.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. Refer to “Servo Motor Instruction Manual (Vol. 3)” for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the asterisks 1 to 6.
HG-SR 2000 r/min Series (400 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>[W] at 20 °C</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque</td>
<td>[N•m]</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Permissible braking work Per braking</td>
<td>[J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
</tr>
<tr>
<td>Per hour</td>
<td>[J]</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
</tr>
<tr>
<td>Electromagnetic brake life Number of brakings (Note 2)</td>
<td>[Times]</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking</td>
<td>[J]</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-SR 2000 r/min Series (400 V Class) Torque Characteristics

HG-SR524(B) (Note 1, 2, 3)

HG-SR1024(B) (Note 1, 2, 3)

HG-SR1524(B) (Note 1, 2, 3)

HG-SR2024(B) (Note 1, 2, 3)

HG-SR3524(B) (Note 1, 2, 3)

HG-SR5024(B) (Note 1, 2, 3)

HG-SR7024(B) (Note 1, 2, 3)

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.

HG-SR 2000 r/min Series (400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-SR524(B)</td>
<td>S 24H6 R 55 Q 50 W 8 QK 0 QL -0.006</td>
</tr>
<tr>
<td>HG-SR524(B)</td>
<td>U 35</td>
</tr>
<tr>
<td>HG-SR524(B)</td>
<td>r 4</td>
</tr>
<tr>
<td>HG-SR524(B)</td>
<td>Y 4</td>
</tr>
<tr>
<td>HG-SR524(B)</td>
<td>MB screw Depth: 20</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (200 V Class) Specifications

<table>
<thead>
<tr>
<th>Compatible servo amplifier model</th>
<th>MR-J4-</th>
<th>MR-J4W-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating output [kW]</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Rated torque [N•m]</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td>1.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>3.0</td>
<td>17</td>
</tr>
<tr>
<td>Maximum torque [N•m]</td>
<td>4.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Maximum speed [r/min]</td>
<td>3000</td>
<td>6000</td>
</tr>
<tr>
<td>Power rate at continuous rated torque [kW/s]</td>
<td>16.7</td>
<td>22.0</td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>3.0</td>
<td>17</td>
</tr>
<tr>
<td>Maximum current [A]</td>
<td>9.0</td>
<td>17</td>
</tr>
<tr>
<td>Regenerative braking frequency [times/min]</td>
<td>67</td>
<td>98</td>
</tr>
<tr>
<td>Moment of inertia [x 10^4 kg•m²]</td>
<td>1.52</td>
<td>2.09</td>
</tr>
<tr>
<td>Permissible load for the shaft [N]</td>
<td>323</td>
<td>323</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>4.4</td>
<td>5.1</td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>Attached</td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP67)</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambient class</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance [times/min]</td>
<td>X: 24.5 m/s² Y: 24.5 m/s²</td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. The value in angle brackets is applicable when the servo motor is used with MR-J4-500GF/MR-J4-500GF-RJ/MR-J4-500B/MR-J4-500B-RJ/MR-J4-500A/MR-J4-500A-RJ.
5. 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.
6. The value is applicable when the external regenerative resistors, GRZG400-Ω (standard accessory) are used with cooling fans (two units of 92 mm × 92 mm, minimum airflow: 1.0 m³/min). Note that [Pr. PA02] must be changed.
7. Refer to “Servo Motor Instruction Manual (Vol. 3)” for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the asterisks 1 to 6.
### HG-JR 3000 r/min Series (200 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR</th>
<th>53B</th>
<th>73B</th>
<th>103B</th>
<th>153B</th>
<th>203B</th>
<th>353B</th>
<th>503B</th>
<th>703B</th>
<th>903B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>[W] at 20 °C</td>
<td>11.7</td>
<td>11.7</td>
<td>11.7</td>
<td>11.7</td>
<td>23</td>
<td>23</td>
<td>23</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Power consumption</td>
<td>24 V DC, 100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque</td>
<td>[N•m]</td>
<td>6.6</td>
<td>6.6</td>
<td>6.6</td>
<td>6.6</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Permissible braking work</td>
<td>Per braking</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Per hour</td>
<td>640</td>
<td>640</td>
<td>640</td>
<td>640</td>
<td>640</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Electromagnetic brake life (Note 2)</td>
<td>Number of brakings</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td>Work per braking</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>Per hour</td>
<td>640</td>
<td>640</td>
<td>640</td>
<td>640</td>
<td>640</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

### HG-JR 3000 r/min Series (200 V Class) Torque Characteristics

#### HG-JR53(B) (Note 1, 2, 3, 5, 6)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR53(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>16</td>
<td>30</td>
</tr>
</tbody>
</table>

#### HG-JR73(B) (Note 1, 3, 5, 6)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR73(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>28</td>
<td>50</td>
</tr>
</tbody>
</table>

#### HG-JR103(B) (Note 1, 3, 5, 6, 7)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR103(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>35</td>
<td>75</td>
</tr>
</tbody>
</table>

#### HG-JR153(B) (Note 1, 3, 5, 6, 7)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR153(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>42</td>
<td>90</td>
</tr>
</tbody>
</table>

#### HG-JR203(B) (Note 1, 3, 5, 6, 7)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR203(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>30</td>
<td>60</td>
</tr>
</tbody>
</table>

#### HG-JR353(B) (Note 1, 5)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR353(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>54</td>
<td>108</td>
</tr>
</tbody>
</table>

#### HG-JR503(B) (Note 1, 5)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR503(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>75</td>
<td>150</td>
</tr>
</tbody>
</table>

#### HG-JR703(B) (Note 1, 5)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR703(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>90</td>
<td>180</td>
</tr>
</tbody>
</table>

#### HG-JR903(B) (Note 1, 5)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR903(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
</tr>
<tr>
<td>2000</td>
<td>4000</td>
</tr>
<tr>
<td>120</td>
<td>240</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
3. This line is drawn only where differs from the other two lines.
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” on “SERVO AMPLIFIERS & MOTORS L(NA)03058” catalog.
5. Torque drops when the power supply voltage is below the specified value.
6. When 1-phase 200 V AC input is used, increasing the maximum torque to 400% is not possible with HG-JR servo motor series.
7. Contact your local sales office for the torque characteristics when using the servo amplifier with 1-phase 200 V AC input.

### HG-JR 3000 r/min Series (200 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

**Key shaft (without key) (Note 1, 2)**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR53(B), 73(B), 103(B), 153(B), 203(B)</td>
<td>S 16h6 R 40 W 30 O 5 U 0.030</td>
</tr>
<tr>
<td>HG-JR353(B), 503(B)</td>
<td>R 55 8 0.036</td>
</tr>
<tr>
<td>HG-JR703(B), 903(B)</td>
<td>R 79 10 0.036</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-JR 3000 r/min Series (Low Inertia, Medium Capacity) (400 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-JR</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-6000</td>
<td>6000</td>
</tr>
<tr>
<td>MR-J4-5000</td>
<td>5000</td>
</tr>
</tbody>
</table>

#### Compatible servo amplifier model: MR-J4-
- Refer to "Combinations of HG-JR Servo Motor Series and Servo Amplifier (400 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque" on "SERVO AMPLIFIERS & MOTORS L(NA)03058" catalog.

<table>
<thead>
<tr>
<th>Power supply capacity *1</th>
<th>[kVA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous running duty</td>
<td></td>
</tr>
<tr>
<td>Rated output</td>
<td>[kW]</td>
</tr>
<tr>
<td>Rated torque</td>
<td>[N-m]</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N-m]</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
</tr>
<tr>
<td>Rated output</td>
<td>[kW]</td>
</tr>
<tr>
<td>Rated torque</td>
<td>[N-m]</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N-m]</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power rate at continuous rated torque</th>
<th>[kW/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated current</th>
<th>[A]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum current</td>
<td>[A]</td>
</tr>
<tr>
<td>Regenerative braking frequency *2</td>
<td>[times/min]</td>
</tr>
<tr>
<td>MR-J4-</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia J</td>
<td>[x 10^{-4} kg•m²]</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended load for the shaft *5</th>
<th>[N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial</td>
<td>323</td>
</tr>
<tr>
<td>Thrust</td>
<td>284</td>
</tr>
<tr>
<td>Mass</td>
<td>4.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Compliance to global standards</th>
<th>V10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP67)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level</td>
</tr>
<tr>
<td>Vibration rank</td>
<td>X: 24.5 m/s²</td>
</tr>
<tr>
<td>Permissible load for the shaft *5</td>
<td></td>
</tr>
<tr>
<td>L [mm]</td>
<td>40 40 40 40 40 55 55 79 79</td>
</tr>
<tr>
<td>Radial [N]</td>
<td>323 323 323 323 323 980 980 2450 2450</td>
</tr>
<tr>
<td>Thrust [N]</td>
<td>284 284 284 284 284 490 490 980 980</td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>3.0 3.0 4.5 4.5 5.9 7.5 13 18 29</td>
</tr>
<tr>
<td>With electromagnetic brake [kg]</td>
<td>4.4 5.1 5.9 7.3 8.9 15 20 35 42</td>
</tr>
</tbody>
</table>

**Notes:**
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisks 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. 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.
5. The value in angle brackets is applicable when the external regenerative resistors, GRZG4000-Ω (standard accessory) are used with cooling fans (two units of 92 mm X 92 mm, minimum airflow: 1.0 m³/min). Note that [Pr. PA02] must be changed.
6. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.
HG-JR 3000 r/min Series (400 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR 534B</th>
<th>734B</th>
<th>1034B</th>
<th>1534B</th>
<th>2034B</th>
<th>3534B</th>
<th>5034B</th>
<th>7034B</th>
<th>9034B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W] at 20 °C</td>
<td>11.7 11.7 11.7 11.7 11.7 23 23 34 34</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>6.6 6.6 6.6 6.6 6.6 16 16 44 44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible braking work</td>
<td>64 64 64 64 64 400 400 400 400</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake life (Note 2) Number of brakings [Times]</td>
<td>5000 5000 5000 5000 5000 5000 5000 20000 20000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>64 64 64 64 64 400 400 1000 1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-JR 3000 r/min Series (400 V Class) Torque Characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR534(B) (Note 1, 2, 4)</th>
<th>HG-JR734(B) (Note 1, 2, 4)</th>
<th>HG-JR1034(B) (Note 1, 2, 4)</th>
<th>HG-JR1534(B) (Note 1, 2, 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
<td>Torque [N•m]</td>
<td>Speed [r/min]</td>
<td>Torque [N•m]</td>
</tr>
<tr>
<td>Short-duration running range</td>
<td>Continuous running range</td>
<td>Short-duration running range</td>
<td>Continuous running range</td>
<td>Short-duration running range</td>
</tr>
</tbody>
</table>

HG-JR9034(B) (Note 1, 2, 4)

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 (400 V Class) for Increasing the Maximum Torque to 400% of the Rated Torque” on “SERVO AMPLIFIERS & MOTORS LIN04S06F” catalog.
4. Torque drops when the power supply voltage is below the specified value.

HG-JR 3000 r/min Series (400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR534(B)K, 734(B)K, 1034(B)K, 1534(B)K, 2034(B)K</td>
<td>S: 16h6, R: 40, Q: 30, W: 5, QK: 0.030, QL: 25, U: 0, T: 2, Y: 3, M4 screw Depth: 15</td>
</tr>
<tr>
<td>HG-JR534(B)K, 5034(B)K</td>
<td>S: 28h6, R: 56, Q: 50, W: 8, QK: 0.036, QL: 36, U: 5, T: 4, Y: 0, M8 screw Depth: 15</td>
</tr>
<tr>
<td>HG-JR7034(B)K, 9034(B)K</td>
<td>S: 35, R: 79, Q: 75, W: 10, QK: 0.036, QL: 55, U: 5, T: 5, Y: 0, M8 screw Depth: 20</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
## HG-JR 1000 r/min Series (Low Inertia, Medium/Large Capacity) (200 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-JR</th>
<th>601(B)</th>
<th>801(B)</th>
<th>12K1(B)</th>
<th>15K1</th>
<th>20K1</th>
<th>25K1</th>
<th>30K1</th>
<th>37K1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Specifications

#### Power supply capacity

- Rated output [kW]: 6.0, 8.0, 12, 15, 20, 25, 30, 38, 48, 59
- Rated current [A]: 31, 47, 60, 67, 94, 95, 121, 152

#### Power rate at continuous rated torque

<table>
<thead>
<tr>
<th>Standard [kW/s]</th>
<th>187</th>
<th>265</th>
<th>420</th>
<th>418</th>
<th>582</th>
<th>748</th>
<th>594</th>
<th>761</th>
</tr>
</thead>
<tbody>
<tr>
<td>With electromagnetic brake [kW/s]</td>
<td>167</td>
<td>243</td>
<td>394</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Maximum speed

- Continuous running duty [kW]: 6.0, 8.0, 12, 15, 20, 25, 30, 37
- Maximum speed [r/min]: 2000, 1500

#### Rated current

- Standard [A]: 108, 165, 208, 231, 318, 313, 399, 495
- With electromagnetic brake [A]: 116, 170, 210, 300, 400, 405, 500, 600

#### Regenerative braking frequency

| MR-J4- [times/min] | 82 | 322 | 224 | 234 | 183 | 150 | -   | -   |

#### Moment of inertia J

<table>
<thead>
<tr>
<th>Standard [x 10⁻⁴ kg·m²]</th>
<th>176</th>
<th>220</th>
<th>315</th>
<th>489</th>
<th>627</th>
<th>764</th>
<th>1377</th>
<th>1637</th>
</tr>
</thead>
<tbody>
<tr>
<td>With electromagnetic brake [x 10⁻⁴ kg·m²]</td>
<td>196</td>
<td>240</td>
<td>336</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Recommended load for the shaft

<table>
<thead>
<tr>
<th>L [mm]</th>
<th>85</th>
<th>116</th>
<th>116</th>
<th>140</th>
<th>140</th>
<th>140</th>
<th>140</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial [N]</td>
<td>2450</td>
<td>2940</td>
<td>2940</td>
<td>3234</td>
<td>3234</td>
<td>3234</td>
<td>4900</td>
<td>4900</td>
</tr>
<tr>
<td>Thrust [N]</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>1470</td>
<td>1470</td>
<td>1470</td>
<td>1960</td>
<td>1960</td>
</tr>
</tbody>
</table>

#### Mass

<table>
<thead>
<tr>
<th>Standard [kg]</th>
<th>53</th>
<th>62</th>
<th>86</th>
<th>120</th>
<th>145</th>
<th>165</th>
<th>215</th>
<th>240</th>
</tr>
</thead>
<tbody>
<tr>
<td>With electromagnetic brake [kg]</td>
<td>65</td>
<td>74</td>
<td>97</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Permissible load for the shaft

- Power supply Voltage/frequency [V AC]: 200, 240, 50 Hz, 60 Hz
- Input [W]: -
- Rated current [A]: 0.20 (50 Hz), 0.22 (60 Hz), 0.39 (50 Hz), 0.52 (60 Hz)

#### Compliance to global standards

Refer to "Conformity with Global Standards and Regulations" on "SERVO AMPLIFIERS & MOTORS L(NA)03058" catalog.

#### Permissible load for the shaft

- Power supply Voltage/frequency [V AC]: 200, 240, 50 Hz, 60 Hz
- Input [W]: -
- Rated current [A]: 0.20 (50 Hz), 0.22 (60 Hz), 0.39 (50 Hz), 0.52 (60 Hz)

---

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. The value is applicable when the external regenerative resistors, GRZG400-Ω (standard accessory) are used with cooling fans (two units of 92 mm × 92 mm, minimum airflow: 1.0 m³/min). Note that [Pr. PA02] must be changed.
5. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
HG-JR 1000 r/min Series (200 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>Type</th>
<th>HG-JR 601B</th>
<th>HG-JR 801B</th>
<th>HG-JR 12K1B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>[W] at 20 °C</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Power consumption</td>
<td>[N•m]</td>
<td>126</td>
<td>126</td>
<td>126</td>
</tr>
<tr>
<td>Permissible braking work</td>
<td>[J]</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Electromagnetic brake life (Note 2)</td>
<td>[J]</td>
<td>45200</td>
<td>45200</td>
<td>45200</td>
</tr>
<tr>
<td>Number of brakings</td>
<td>[Times]</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking</td>
<td>[J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-JR 1000 r/min Series (200 V Class) Torque Characteristics

HG-JR601(B) (Note 1, 2)

HG-JR801(B) (Note 1, 2)

HG-JR12K1(B) (Note 1, 2)

HG-JR15K1 (Note 1, 2)

HG-JR20K1 (Note 1, 2)

HG-JR25K1 (Note 1, 2)

HG-JR30K1 (Note 1, 2)

HG-JR37K1 (Note 1, 2)

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

HG-JR 1000 r/min Series (200 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
<th>Fig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR601(B)K</td>
<td>42h6 85 79 12 0.040 70 5 6 0</td>
<td>A</td>
</tr>
<tr>
<td>HG-JR801(B)K, 12K1(B)K</td>
<td>55m6 116 110 16 0.040 90 5 6 0</td>
<td>A</td>
</tr>
<tr>
<td>HG-JR15K1K, 20K1K, 25K1K</td>
<td>65m6 140 130 18 0.040 120 5 7 0</td>
<td>A</td>
</tr>
<tr>
<td>HG-JR30K1K, 37K1K</td>
<td>80m6 140 140 22 0.040 132 7 9 0</td>
<td>B</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
## HG-JR 1000 r/min Series (Low Inertia, Medium/Large Capacity) (400 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-JR</th>
<th>6014(B)</th>
<th>8014(B)</th>
<th>12K14(B)</th>
<th>15K14</th>
<th>20K14</th>
<th>25K14</th>
<th>30K14</th>
<th>37K14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity</td>
<td>[kVA]</td>
<td>8.6</td>
<td>12</td>
<td>18</td>
<td>22</td>
<td>30</td>
<td>38</td>
<td>48</td>
<td>59</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td>Rated output</td>
<td>[kW]</td>
<td>6.0</td>
<td>8.0</td>
<td>12</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rated torque</td>
<td>[N•m]</td>
<td>57.3</td>
<td>76.4</td>
<td>115</td>
<td>143</td>
<td>191</td>
<td>239</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>172</td>
<td>229</td>
<td>345</td>
<td>429</td>
<td>573</td>
<td>717</td>
<td>858</td>
<td>1059</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
<td>2000</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td>2300</td>
<td>1725</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque</td>
<td>Standard</td>
<td>[kW/s]</td>
<td>187</td>
<td>265</td>
<td>420</td>
<td>418</td>
<td>582</td>
<td>748</td>
<td>594</td>
</tr>
<tr>
<td></td>
<td>With electromagnetic brake</td>
<td>[kW/s]</td>
<td>167</td>
<td>243</td>
<td>394</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>16</td>
<td>23</td>
<td>30</td>
<td>33</td>
<td>47</td>
<td>48</td>
<td>60</td>
<td>76</td>
</tr>
<tr>
<td>Maximum current</td>
<td>[A]</td>
<td>54</td>
<td>80</td>
<td>104</td>
<td>114</td>
<td>161</td>
<td>160</td>
<td>202</td>
<td>248</td>
</tr>
<tr>
<td>Regenerative braking frequency</td>
<td>MR-J4-</td>
<td>[times/min]</td>
<td>83</td>
<td>331</td>
<td>229</td>
<td>239</td>
<td>187</td>
<td>152</td>
<td>-</td>
</tr>
<tr>
<td>Moment of inertia J</td>
<td>Standard</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>176</td>
<td>220</td>
<td>315</td>
<td>489</td>
<td>627</td>
<td>764</td>
<td>1377</td>
</tr>
<tr>
<td></td>
<td>With electromagnetic brake</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>196</td>
<td>240</td>
<td>336</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Recommended load for motor inertia ratio</td>
<td>10 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>Attached</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP67) (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Altitude</td>
<td>2000 m or less above sea level (Note 5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>X: 24.5 m/s² Y: 24.5 m/s²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10 (Note 6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft</td>
<td>L</td>
<td>[mm]</td>
<td>85</td>
<td>116</td>
<td>116</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>Radial</td>
<td>[N]</td>
<td>2450</td>
<td>2940</td>
<td>2940</td>
<td>3234</td>
<td>3234</td>
<td>3234</td>
<td>4900</td>
</tr>
<tr>
<td></td>
<td>Thrust</td>
<td>[N]</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>1470</td>
<td>1470</td>
<td>1470</td>
<td>1960</td>
</tr>
<tr>
<td>Mass</td>
<td>Standard</td>
<td>[kg]</td>
<td>53</td>
<td>62</td>
<td>86</td>
<td>120</td>
<td>145</td>
<td>165</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>With electromagnetic brake</td>
<td>[kg]</td>
<td>65</td>
<td>74</td>
<td>97</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cooling fan</td>
<td>Power supply</td>
<td>Voltage/frequency</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Input</td>
<td>[W]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65 (50 Hz)/85 (60 Hz)</td>
<td>65 (50 Hz)/85 (60 Hz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rated current</td>
<td>[A]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.12 (50 Hz)/0.14 (60 Hz)</td>
<td>0.20 (50 Hz)/0.22 (60 Hz)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. The value is applicable when the external regenerative resistors, GRZG400-Ω (standard accessory) are used with cooling fans (two units of 92 mm × 92 mm, minimum airflow: 1.0 m³/min). Note that [Pr. PA02] must be changed.
5. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
HG-JR 1000 r/min Series (400 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR6014B</th>
<th>8014B</th>
<th>12K14B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W] at 20 °C</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>126</td>
<td>126</td>
<td>126</td>
</tr>
<tr>
<td>Permissible braking work Per braking [J]</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Per hour [J]</td>
<td>45200</td>
<td>45200</td>
<td>45200</td>
</tr>
<tr>
<td>Electromagnetic brake life Number of brakings (Times)</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

HG-JR 1000 r/min Series (400 V Class) Torque Characteristics

**HG-JR6014(B)** (Note 1, 2, 3)

**HG-JR8014(B)** (Note 1, 2, 3)

**HG-JR12K14(B)** (Note 1, 2, 3)

**HG-JR15K14(B)** (Note 1, 2, 3)

**HG-JR20K14** (Note 1, 2, 3)

**HG-JR25K14** (Note 1, 2, 3)

**HG-JR30K14** (Note 1, 2, 3)

**HG-JR37K14** (Note 1, 2, 3)

Notes: 1. : For 3-phase 400 V AC.
2. : For 3-phase 380 V AC.
3. Torque drops when the power supply voltage is below the specified value.

HG-JR 1000 r/min Series (400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
<th>Fig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR60(B)K</td>
<td>S: 42h6</td>
<td>R: 85</td>
</tr>
<tr>
<td>HG-JR80(B)K, 12K14(B)K</td>
<td>S: 55m6</td>
<td>R: 116</td>
</tr>
<tr>
<td>HG-JR30K14K, 37K14K</td>
<td>S: 80m6</td>
<td>R: 140</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-JR 1500 r/min Series (Low Inertia, Medium/Large Capacity) (200 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-JR</th>
<th>701M(B)</th>
<th>11K1M(B)</th>
<th>15K1M(B)</th>
<th>22K1M</th>
<th>30K1M</th>
<th>37K1M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>Refer to “Combinations of Rotary Servo Motor and Servo Amplifier” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply capacity *1</th>
<th>[kVA]</th>
<th>10</th>
<th>16</th>
<th>22</th>
<th>33</th>
<th>48</th>
<th>59</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous running duty</td>
<td>Rated output</td>
<td>[kW]</td>
<td>7.0</td>
<td>11</td>
<td>15</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Rated torque (Note 3)</td>
<td>[N•m]</td>
<td>44.6</td>
<td>70.0</td>
<td>95.5</td>
<td>140</td>
<td>191</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>134</td>
<td>210</td>
<td>286</td>
<td>420</td>
<td>573</td>
<td>707</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated speed</th>
<th>[r/min]</th>
<th>1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td>3000</td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td>3450</td>
</tr>
</tbody>
</table>

| Power rate at continuous rated torque | Standard | [kW/s] | 113 | 223 | 289 | 401 | 582 | 726 |
| With electromagnetic brake | [kW/s] | 101 | 204 | 271 | - | - | - |
| Rated current | [A] | 34 | 61 | 76 | 99 | 139 | 151 |
| Maximum current | [A] | 111 | 200 | 246 | 315 | 479 | 561 |

<table>
<thead>
<tr>
<th>Regenerative braking frequency *2</th>
<th>MR-J4-</th>
<th>36</th>
<th>143</th>
<th>162</th>
<th>104</th>
<th>-</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moment of inertia J</td>
<td>Standard</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>176</td>
<td>220</td>
<td>315</td>
<td>489</td>
<td>627</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[× 10⁻⁴ kg•m²]</td>
<td>196</td>
<td>240</td>
<td>336</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended load for the shaft *5</th>
<th>L [mm]</th>
<th>85</th>
<th>116</th>
<th>116</th>
<th>140</th>
<th>140</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radial load</td>
<td>[N]</td>
<td>2940</td>
<td>2940</td>
<td>3234</td>
<td>3234</td>
<td>3234</td>
<td>3234</td>
</tr>
<tr>
<td>Thrust</td>
<td>[N]</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>1470</td>
<td>1470</td>
<td>1470</td>
</tr>
</tbody>
</table>

| Mass | Standard | [kg] | 53 | 62 | 86 | 120 | 145 | 165 |
| With electromagnetic brake | [kg] | 65 | 74 | 97 | - | - | - |

<table>
<thead>
<tr>
<th>Cooling fan</th>
<th>Power supply Voltage/ frequency</th>
<th>3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input [W]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Voltage/ frequency</td>
<td>65 (50 Hz)/85 (60 Hz)</td>
<td>0.20 (50 Hz)/0.22 (60 Hz)</td>
</tr>
</tbody>
</table>

**Notes:**
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. The value is applicable when the external regenerative resistors, GRZ400-Ω (standard accessory) are used with cooling fans (two units of 92 mm × 92 mm, minimum airflow: 1.0 m³/min). Note that [Pr. PA02] must be changed.
5. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.
6. Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
### HG-JR 1500 r/min Series (200 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR 701MB</th>
<th>HG-JR 11K1MB</th>
<th>HG-JR 15K1MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage [W] at 20 °C</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>126</td>
<td>126</td>
<td>126</td>
</tr>
<tr>
<td>Permissible braking work Per braking [J]</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Per hour [J]</td>
<td>45200</td>
<td>45200</td>
<td>45200</td>
</tr>
<tr>
<td>Electromagnetic brake life (Times)</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

### HG-JR 1500 r/min Series (200 V Class) Torque Characteristics

#### HG-JR701MB(B) (Note 1, 2)

![Short-duration running range](image1)

#### HG-JR11K1MB(B) (Note 1, 2)

![Short-duration running range](image2)

#### HG-JR15K1MB(B) (Note 1, 2)

![Short-duration running range](image3)

#### HG-JR22K1M (Note 1, 2)

![Short-duration running range](image4)

#### HG-JR30K1M (Note 1, 2)

![Short-duration running range](image5)

#### HG-JR37K1M (Note 1, 2)

![Short-duration running range](image6)

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

### HG-JR 1500 r/min Series (200 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

#### Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR701MB(B)</td>
<td>S: 42h6, R: 85, Q: 79, W: 12, OK: 0.040, U: 70, f: 5, Y: 6</td>
</tr>
<tr>
<td>HG-JR11K1MB(B), 15K1MB(B)</td>
<td>S: 55h6, R: 116, Q: 110, W: 16, OK: 0.040, U: 90, f: 5, Y: 6</td>
</tr>
<tr>
<td>HG-JR22K1M, 30K1MK, 37K1MK</td>
<td>S: 65h6, R: 140, Q: 130, W: 18, OK: 0.040, U: 120, f: 5, Y: 7</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
## HG-JR 1500 r/min Series (Low Inertia, Medium/Large Capacity) (400 V Class) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-JR</th>
<th>701M4(B)</th>
<th>11K1M4(B)</th>
<th>15K1M4(B)</th>
<th>22K1M4</th>
<th>30K1M4</th>
<th>37K1M4</th>
<th>45K1M4</th>
<th>55K1M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity *1</td>
<td>[kVA]</td>
<td>10</td>
<td>16</td>
<td>22</td>
<td>33</td>
<td>48</td>
<td>59</td>
<td>71</td>
<td>80</td>
</tr>
<tr>
<td>Continuous running duty Rated output</td>
<td>[kW]</td>
<td>7.0</td>
<td>11</td>
<td>15</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Rated torque (Note 3)</td>
<td>[N•m]</td>
<td>44.6</td>
<td>70.0</td>
<td>95.5</td>
<td>140</td>
<td>191</td>
<td>236</td>
<td>286</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>134</td>
<td>210</td>
<td>286</td>
<td>420</td>
<td>573</td>
<td>707</td>
<td>859</td>
<td>1050</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td>3000</td>
<td>2500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td>3450</td>
<td>2875</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque Standard</td>
<td>[kW/s]</td>
<td>113</td>
<td>223</td>
<td>289</td>
<td>401</td>
<td>582</td>
<td>726</td>
<td>596</td>
<td>749</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kW/s]</td>
<td>104</td>
<td>204</td>
<td>271</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>17</td>
<td>31</td>
<td>38</td>
<td>50</td>
<td>68</td>
<td>88</td>
<td>79</td>
<td>85</td>
</tr>
<tr>
<td>Maximum current</td>
<td>[A]</td>
<td>56</td>
<td>100</td>
<td>123</td>
<td>170</td>
<td>235</td>
<td>263</td>
<td>288</td>
<td>357</td>
</tr>
<tr>
<td>Regenerative braking frequency *2 MR-J4- times/min</td>
<td>36</td>
<td>143 (Note 4)</td>
<td>162</td>
<td>104 (Note 4)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia J Standard [x 10^-4 kg•m^2]</td>
<td>176</td>
<td>220</td>
<td>315</td>
<td>489</td>
<td>627</td>
<td>764</td>
<td>1377</td>
<td>1637</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [x 10^-4 kg•m^2]</td>
<td>196</td>
<td>240</td>
<td>336</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Recommended load for the shaft *5</td>
<td>10 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaft length</td>
<td>L [mm]</td>
<td>85</td>
<td>116</td>
<td>116</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>Radial</td>
<td>[N]</td>
<td>2450</td>
<td>2940</td>
<td>2940</td>
<td>3234</td>
<td>3234</td>
<td>3234</td>
<td>4900</td>
<td>4900</td>
</tr>
<tr>
<td>Thrust</td>
<td>[N]</td>
<td>980</td>
<td>980</td>
<td>980</td>
<td>1470</td>
<td>1470</td>
<td>1470</td>
<td>1960</td>
<td>1960</td>
</tr>
<tr>
<td>Mass Standard [kg]</td>
<td>53</td>
<td>62</td>
<td>86</td>
<td>120</td>
<td>145</td>
<td>165</td>
<td>215</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [kg]</td>
<td>65</td>
<td>74</td>
<td>97</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Cooling fan Power supply Voltage/frequency</td>
<td>3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz</td>
<td>3-phase 380 V AC to 460 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input [W]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65 (50 Hz)/85 (60 Hz)</td>
<td>110 (50 Hz)/150 (60 Hz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.12 (50 Hz)/0.14 (60 Hz)</td>
<td>0.20 (50 Hz)/0.22 (60 Hz)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. The value is applicable when the external regenerative resistors, GRZ54004... (standard accessory) are used with cooling fans (two units of 92 mm × 92 mm, minimum airflow: 1.0 m/min). Note that [Pr. PA02] must be changed.
5. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
### HG-JR 1500 r/min Series (400 V Class) Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-JR701M4B</th>
<th>HG-JR11K1M4B</th>
<th>HG-JR15K1M4B</th>
<th>HG-JR22K1M4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
<td>Spring actuated type safety brake</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 10%</td>
<td>24 V DC, 10%</td>
<td>24 V DC, 10%</td>
<td>24 V DC, 10%</td>
</tr>
<tr>
<td>Power consumption [W] at 20 °C</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>126</td>
<td>126</td>
<td>126</td>
<td>126</td>
</tr>
<tr>
<td>Permissible braking work Per braking [J]</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
<td>5000</td>
</tr>
<tr>
<td>Per hour [J]</td>
<td>45200</td>
<td>45200</td>
<td>45200</td>
<td>45200</td>
</tr>
<tr>
<td>Electromagnetic brake life Number of brakings (Note 2)</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

### HG-JR 1500 r/min Series (400 V Class) Torque Characteristics

#### HG-JR701M4(B) (Note 1, 2, 3)

![Graph](image1)

#### HG-JR11K1M4(B) (Note 1, 2, 3)

![Graph](image2)

#### HG-JR15K1M4(B) (Note 1, 2, 3)

![Graph](image3)

#### HG-JR22K1M4 (Note 1, 2, 3)

![Graph](image4)

Notes: 1. For 3-phase 400 V AC.
2. For 3-phase 380 V AC.
3. Torque drops when the power supply voltage is below the specified value.

### HG-JR 1500 r/min Series (400 V Class) Special Shaft End Specifications

Motors with the following specifications are also available.

#### Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
<th>Fig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR701M4(B)K</td>
<td>S: 42h6, R: 85, Q: 79, W: 12</td>
<td><img src="image5" alt="Fig. A" /></td>
</tr>
<tr>
<td>HG-JR11K1M4(B)K</td>
<td>S: 55m6, R: 116, Q: 110, W: 18</td>
<td><img src="image6" alt="Fig. B" /></td>
</tr>
<tr>
<td>HG-JR15K1M4(B)K</td>
<td>S: 65m6, R: 140, Q: 130, W: 18</td>
<td><img src="image7" alt="Fig. C" /></td>
</tr>
<tr>
<td>HG-JR22K1M4K</td>
<td>S: 80m6, R: 140, Q: 140, W: 32</td>
<td><img src="image8" alt="Fig. D" /></td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-RR Series (Ultra-low Inertia, Medium Capacity) Specifications

<table>
<thead>
<tr>
<th>Compatible servo amplifier model</th>
<th>Power supply capacity (^1) [kVA]</th>
<th>Continuous running duty Rated output [kW]</th>
<th>Maximum torque [N•m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-J4-</td>
<td>1.7</td>
<td>1.0</td>
<td>8.0</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>1.5</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>3.5</td>
<td>2.0</td>
<td>15.9</td>
</tr>
<tr>
<td></td>
<td>5.5</td>
<td>3.5</td>
<td>27.9</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>5.0</td>
<td>39.8</td>
</tr>
</tbody>
</table>

| Continuous running duty Rated torque \(^3\) [N•m] |
|---------------------------------|-------------------|
|                                 | 3.2               |
|                                 | 4.8               |
|                                 | 6.4               |
|                                 | 11.1              |
|                                 | 15.9              |

<table>
<thead>
<tr>
<th>Maximum speed [r/min]</th>
<th>3000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum speed [r/min]</td>
<td>4500</td>
</tr>
<tr>
<td>Permissible instantaneous speed [r/min]</td>
<td>5175</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power rate at continuous rated torque Standard [kW/s]</th>
<th>With electromagnetic brake [kW/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>67.4</td>
<td>54.8</td>
</tr>
<tr>
<td>120</td>
<td>101</td>
</tr>
<tr>
<td>176</td>
<td>153</td>
</tr>
<tr>
<td>150</td>
<td>105</td>
</tr>
<tr>
<td>211</td>
<td>163</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated current [A]</th>
<th>6.1</th>
<th>8.8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum current [A]</td>
<td>18</td>
<td>23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regenerative braking frequency (^2) MR-J4- [times/min]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1090</td>
</tr>
<tr>
<td>860</td>
</tr>
<tr>
<td>710</td>
</tr>
<tr>
<td>174</td>
</tr>
<tr>
<td>125</td>
</tr>
</tbody>
</table>

| Moment of inertia J Standard \([\times 10^{-4} \text{ kg} \cdot \text{m}^2]\) With electromagnetic brake \([\times 10^{-4} \text{ kg} \cdot \text{m}^2]\) |
|-------------------------------------------------|---------------------------------|
| 1.50                                            | 1.85                            |
| 1.90                                            | 2.25                            |
| 2.30                                            | 2.65                            |
| 8.30                                            | 11.8                            |
| 12.0                                            | 15.5                            |

| Recommended load to motor inertia ratio \(^1\) 5 times or less |
| Speed/position detector Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev) |
| Oil seal Attached |
| Insulation class 155 (F) |
| Structure Totally enclosed, natural cooling (IP rating: IP65) \(^{\text{Note 4}}\) |
| Environment Ambient temperature Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing) |
| Ambient humidity Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing) |
| Ambience Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust |
| Altitude 2000 m or less above sea level \(^{\text{Note 4}}\) |
| Vibration resistance \(^{4}\) X: 24.5 m/s² Y: 24.5 m/s² |
| Vibration rank V10 |

| Compliance to global standards Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS & MOTORS L(NA)03058” catalog. |
|-------------------|-------------------------------------------------|
| Permissible load for the shaft \(^{5}\) L [mm] | Radial [N] 686 686 686 980 980 |
|                   | Thrust [N] 196 196 196 392 392 |
|                   | Mass Standard [kg] 3.9 5.0 6.2 12 17 |
|                   | With electromagnetic brake [kg] 6.0 7.0 8.3 15 21 |

**Notes:**
1. Contact your local sales office if the load to motor inertia ratio exceeds the values in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. Refer to “Servo Motor Instruction Manual (Vol. 3)” for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the asterisks 1 to 6.
### HG-RR Series Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-RR103(B)</th>
<th>HG-RR153(B)</th>
<th>HG-RR203(B)</th>
<th>HG-RR353(B)</th>
<th>HG-RR503(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W] at 20 °C</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>7.0</td>
<td>7.0</td>
<td>7.0</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Permissible braking work (J)</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Per hour (J)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Electromagnetic brake life (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of brakings (Times)</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking (J)</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

Notes:
1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

### HG-RR Series Torque Characteristics

#### HG-RR103(B) (Note 1, 2, 3)

- **HG-RR103(B)K, 153(B)K, 203(B)K**
  - 24h6
  - 45 40 8
  - 0.036
  - 25 5 4
  - 0.2 0
  - 4
  - M8 screw
  - Depth: 20

#### HG-RR153(B) (Note 1, 2, 3)

- **HG-RR153(B)K, 203(B)K**
  - 24h6
  - 63 58 8
  - 0.036
  - 53 3 4
  - 0.2 0
  - 4

#### HG-RR203(B) (Note 1, 2)

- **HG-RR203(B)K, 353(B)K**
  - 28h6
  - 63 58 8
  - 0.036
  - 53 3 4
  - 0.2 0

Notes:
1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. Torque drops when the power supply voltage is below the specified value.
3. Contact your local sales office for the torque characteristics when using the servo amplifier with 1-phase 200 V AC input.

### HG-RR Series Special Shaft End Specifications

Motors with the following specifications are also available.

#### Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-RR103(B)K, 153(B)K, 203(B)K</td>
<td>S 46 58 8 0.036 25 5 4 0.2 4</td>
</tr>
<tr>
<td>HG-RR353(B)K, 503(B)K</td>
<td>S 63 58 8 0.036 53 3 4 0.2 4</td>
</tr>
</tbody>
</table>

Notes:
1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
## HG-UR Series (Flat Type, Medium Capacity) Specifications

<table>
<thead>
<tr>
<th>Rotary servo motor model</th>
<th>HG-UR</th>
<th>72(B)</th>
<th>152(B)</th>
<th>202(B)</th>
<th>352(B)</th>
<th>502(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W-</td>
<td>Refer to &quot;Combinations of Rotary Servo Motor and Servo Amplifier&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (^1) [kVA]</td>
<td>1.3</td>
<td>2.5</td>
<td>3.5</td>
<td>5.5</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output [kW]</td>
<td>0.75</td>
<td>1.5</td>
<td>2.0</td>
<td>3.5</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Rated torque (^3) [N•m]</td>
<td>3.6</td>
<td>7.2</td>
<td>9.5</td>
<td>16.7</td>
<td>23.9</td>
<td></td>
</tr>
<tr>
<td>Maximum torque [N•m]</td>
<td>10.7</td>
<td>21.5</td>
<td>28.6</td>
<td>50.1</td>
<td>71.6</td>
<td></td>
</tr>
<tr>
<td>Rated speed [r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Maximum speed [r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3000</td>
</tr>
<tr>
<td>Permissible instantaneous speed [r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td>Power rate at continuous rated torque</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard [kW/s]</td>
<td>12.3</td>
<td>23.2</td>
<td>23.9</td>
<td>36.5</td>
<td>49.6</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [kW/s]</td>
<td>10.3</td>
<td>21.2</td>
<td>19.5</td>
<td>32.8</td>
<td>46.0</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>5.4</td>
<td>9.7</td>
<td>14</td>
<td>23</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Maximum current [A]</td>
<td>16</td>
<td>29</td>
<td>42</td>
<td>69</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>Regenerative braking frequency (^2) MR-J4- [times/min]</td>
<td>53</td>
<td>124</td>
<td>68</td>
<td>44</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>MR-J4W- [times/min]</td>
<td>107</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia J Standard ([\times 10^{-4} \text{ kg•m}^2])</td>
<td>10.4</td>
<td>22.1</td>
<td>38.2</td>
<td>76.5</td>
<td>115</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake ([\times 10^{-4} \text{ kg•m}^2])</td>
<td>12.5</td>
<td>24.2</td>
<td>46.8</td>
<td>85.1</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio (^1) ([\times 10^{-1} \text{ kg•m}^2])</td>
<td>15 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector Absolute/incremental 22-bit encoder (resolution: 4194304 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>Attached</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP65) (^6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor (no direct sunlight), no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>2000 m or less above sea level (^5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance X: 24.5 m/s(^2) Y: 24.5 m/s(^2) X: 24.5 m/s(^2) Y: 49 m/s(^2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank V10 (^\circ)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft (^5) L [mm]</td>
<td>55</td>
<td>55</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Radial [N]</td>
<td>637</td>
<td>637</td>
<td>882</td>
<td>1176</td>
<td>1176</td>
<td></td>
</tr>
<tr>
<td>Thrust [N]</td>
<td>490</td>
<td>490</td>
<td>784</td>
<td>784</td>
<td>784</td>
<td></td>
</tr>
<tr>
<td>Mass Standard [kg]</td>
<td>8.0</td>
<td>11</td>
<td>16</td>
<td>20</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [kg]</td>
<td>10</td>
<td>13</td>
<td>22</td>
<td>26</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 7 of "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the restrictions when using the servo motors at altitude exceeding 1000 m and up to 2000 m above sea level.

Refer to "Annotations for Rotary Servo Motor Specifications" on p. 368 in this catalog for the asterisks 1 to 6.
## HG-UR Series Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-UR72(B)</th>
<th>HG-UR152(B)</th>
<th>HG-UR202(B)</th>
<th>HG-UR352(B)</th>
<th>HG-UR502(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>72B</td>
<td>152B</td>
<td>202B</td>
<td>352B</td>
<td>502B</td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W] at 20 °C</td>
<td>19</td>
<td>19</td>
<td>34</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>8.5</td>
<td>8.5</td>
<td>44</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Permissible braking work Per braking [J]</td>
<td>400</td>
<td>400</td>
<td>4500</td>
<td>4500</td>
<td>4500</td>
</tr>
<tr>
<td>Per hour [J]</td>
<td>4000</td>
<td>4000</td>
<td>45000</td>
<td>45000</td>
<td>45000</td>
</tr>
<tr>
<td>Electromagnetic brake life Number of brakings [Times] (Note 2)</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>200</td>
<td>200</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

## HG-UR Series Torque Characteristics

### HG-UR72(B) (Note 1, 2, 3, 4)

### HG-UR152(B) (Note 1, 4, 5)

### HG-UR202(B) (Note 1, 4)

### HG-UR352(B) (Note 1, 4)

### HG-UR502(B) (Note 1, 4)

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.

## HG-UR Series Special Shaft End Specifications

Motors with the following specifications are also available.

### Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-UR72(B)K</td>
<td>S 22h6 56 50 6 0.036 42 3 3.5 0.1 0 3</td>
</tr>
<tr>
<td>HG-UR152(B)K</td>
<td>S 28h6 56 50 8 0.036 40 3 4 0.2 0 4</td>
</tr>
<tr>
<td>HG-UR202(B)K</td>
<td>S 35h6 60 60 10 0.036 50 5 5 0.2 0 5</td>
</tr>
<tr>
<td>HG-UR352(B)K</td>
<td>S 35h6 60 60 10 0.036 50 5 5 0.2 0 5</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
### HG-AK Series (Ultra-compact Size, Ultra-small Capacity) Specifications (Note 4)

<table>
<thead>
<tr>
<th>Servo motor model</th>
<th>HG-AK</th>
<th>0136(B)</th>
<th>0236(B)</th>
<th>0336(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>Refer to “Combinations of Rotary Servo Motor and Servo Amplifier” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity *8</td>
<td>[W]</td>
<td>230</td>
<td>360</td>
<td>480</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output</td>
<td>[W]</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Rated output (Note 3)</td>
<td>[N•m]</td>
<td>0.032</td>
<td>0.064</td>
<td>0.095</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>[N•m]</td>
<td>0.095</td>
<td>0.191</td>
<td>0.286</td>
</tr>
<tr>
<td>Rated speed</td>
<td></td>
<td>3000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>48 V DC</td>
<td>[r/min]</td>
<td>6000</td>
<td></td>
</tr>
<tr>
<td>24 V DC</td>
<td>[r/min]</td>
<td>6000</td>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>48 V DC</td>
<td>[r/min]</td>
<td>6900</td>
<td></td>
</tr>
<tr>
<td>24 V DC</td>
<td>[r/min]</td>
<td>6900</td>
<td>5750</td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque</td>
<td>Standard</td>
<td>[kW/s]</td>
<td>3.54</td>
<td>9.01</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kW/s]</td>
<td>2.41</td>
<td>6.99</td>
<td>12.32</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>2.1</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Maximum current</td>
<td>[A]</td>
<td>6.3</td>
<td>6.3</td>
<td>6.6</td>
</tr>
<tr>
<td>Regenerative braking frequency *2</td>
<td>[times/min]</td>
<td>1700</td>
<td>1200</td>
<td>900</td>
</tr>
<tr>
<td>Moment of inertia J</td>
<td>Standard</td>
<td>[× 10^-4 kg•m²]</td>
<td>0.0029</td>
<td>0.0045</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[× 10^-4 kg•m²]</td>
<td>0.0042</td>
<td>0.0058</td>
<td>0.0074</td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio (Note 1)</td>
<td>30 times or less</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 18-bit encoder (resolution: 262144 pulses/r)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>130 (B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP55) (Note 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment *3</td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance *4</td>
<td>X: 49 m/s² Y: 49 m/s²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10 *6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to “Conformity with Global Standards and Regulations” on “SERVO AMPLIFIERS &amp; MOTORS L(NA)03058” catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible load for the shaft *5</td>
<td>L</td>
<td>[mm]</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Radial</td>
<td>[N]</td>
<td>34</td>
<td>44</td>
<td>49</td>
</tr>
<tr>
<td>Thrust</td>
<td>[N]</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Mass</td>
<td>Standard</td>
<td>[kg]</td>
<td>0.12</td>
<td>0.14</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kg]</td>
<td>0.22</td>
<td>0.24</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion, the connector, and the power cable leading part are excluded. Refer to the asterisk 7 of “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. Specifications of HG-AK_-S100 are the same as those of HG-AK_ except for the dimensions.

Refer to “Annotations for Rotary Servo Motor Specifications” on p. 368 in this catalog for the asterisks 2 to 6 and 8.
**HG-AK Series Electromagnetic Brake Specifications** *(Note 1)*

<table>
<thead>
<tr>
<th>Model</th>
<th>HG-AK</th>
<th>0136B</th>
<th>0236B</th>
<th>0336B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Spring actuated type safety brake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>[W] at 20 °C</td>
<td>1.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque</td>
<td>[N•m]</td>
<td>0.095</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible braking work</td>
<td>Per braking [J]</td>
<td>4.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of brakings</td>
<td>Per hour [J]</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

**HG-AK Series Torque Characteristics**

- **HG-AK0136(B)** *(Note 1, 2, 3, 4)*
- **HG-AK0236(B)** *(Note 1, 2, 3, 4)*
- **HG-AK0336(B)** *(Note 1, 2, 3, 4)*

**Notes:**
1. For 48 V DC.
2. For 24 V DC.
3. Torque drops when the power supply voltage is below the specified value.
4. The torque characteristics are applicable when optional MR-J4W03PWCB5M-H or MR-J4W03PWBCB5M-H is used between the servo amplifier and the servo motor.

When an option cable longer than 5 m is used, the torque characteristics in the short-duration running range may be lower because of voltage drop.

**HG-AK Series Special Shaft End Specifications** *(Note 1)*

Motors with the following specifications are also available.

- **D-cut shaft**

**Notes:**
1. Specifications of HG-AK-S100 are the same as those of HG-AK except for the dimensions.
Annotations for Rotary Servo Motor Specifications

1. The power supply capacity varies depending on the power supply impedance.

2. The regenerative braking frequency shows the permissible frequency when the servo motor, without a load and a regenerative option, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Moment of inertia of load/Moment of inertia of servo motor. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). Take measures to keep the regenerative power [W] during operation below the permissible regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.

3. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

4. The vibration direction is shown in the diagram below. The numerical value indicates the maximum value of the component (commonly the bracket in the opposite direction of the servo motor shaft). Fretting more likely occurs on the bearing when the servo motor stops. Thus, maintain vibration level at approximately one-half of the allowable value.

5. Refer to the diagram below for the permissible load for the shaft. Do not apply a load exceeding the value specified in the table on the shaft. The values in the table are applicable when each load is applied singly.

6. V10 indicates that the amplitude of the servo motor itself is 10 µm or less. The following shows mounting posture and measuring position of the servo motor during the measurement:

7. Refer to the diagram below for shaft-through portion.

8. The power supply capacity varies depending on the DC power supply and the wiring impedance.
HG-KR/HG-MR Series Dimensions (Note 1, 5, 6)

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

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

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

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

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
HG-SR Series Dimensions (Note 1, 5)

- HG-SR51(B), HG-SR81(B)
- HG-SR52(B), HG-SR102(B), HG-SR152(B), HG-SR524(B), HG-SR1024(B), HG-SR1524(B)

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

HG-SR Series Dimensions (Note 1, 5)

- HG-SR121(B), HG-SR201(B), HG-SR301(B), HG-SR421(B)
- HG-SR202(B), HG-SR352(B), HG-SR502(B), HG-SR702(B), HG-SR2024(B), HG-SR3524(B), HG-SR5024(B), HG-SR7024(B)

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
HG-JR Series Dimensions (Note 1, 5)

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

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

---

### Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
HG-JR Series Dimensions (Note 1, 5)

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

![Diagram of HG-JR3534(B), HG-JR5034(B) dimensions]

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

![Diagram of HG-JR703(B), HG-JR903(B), HG-JR7034(B), HG-JR9034(B) dimensions]

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (Note 4)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-JR3534(B)</td>
<td>213 (251.5)</td>
<td>161</td>
<td></td>
</tr>
<tr>
<td>HG-JR5034(B)</td>
<td>267 (305.5)</td>
<td>215</td>
<td></td>
</tr>
</tbody>
</table>

[Note: Unit: mm]

**Model**

- HG-JR3534(B)
- HG-JR5034(B)
- HG-JR703(B)
- HG-JR7034(B)
- HG-JR903(B)
- HG-JR9034(B)

**Notes:**
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
**HG-JR Series Dimensions (Note 1, 5)**

- **HG-JR601(B), HG-JR701M(B), HG-JR6014(B), HG-JR701M4(B)**

  ![Diagram 1](image1)

- **HG-JR801(B), HG-JR12K1(B), HG-JR8014(B), HG-JR12K14(B)**

  ![Diagram 2](image2)

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

  ![Diagram 3](image3)

*1, *2, *3, and *4 are screw holes (M10) for eyebolt.

**Notes:**
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
HG-JR Series Dimensions (Note 1, 2, 6)

- HG-JR22K1M (Note 7), HG-JR30K1M, HG-JR37K1M, HG-JR22K1M4 (Note 7), HG-JR30K1M4, HG-JR37K1M4

**Notes:**
1. For dimensions without tolerance, general tolerance applies.
2. Use a friction coupling to fasten a load.
3. Leave a clearance of at least 150 mm between the intake side of the servo motor and wall.
4. Prevent oil, water, dust, and other foreign matter from entering the servo motor through the lead hole.
5. A washer is placed between the eyebolt and the servo motor to adjust the bolt angle.
6. The terminal block in the terminal box consists of M10 screws for the motor power input (U, V, and W).
7. HG-JR22K1M/HG-JR22K1M4 have been modified from September 2014 production. Refer to "Servo Motor Instruction Manual (Vol. 3)" for the previous dimensions.
8. When using the servo motor without the eyebolt, plug the threaded hole with a bolt of M12 x 20 or shorter.
9. When using the servo motor without the eyebolt, plug the threaded hole with a bolt of M16 x 20 or shorter.
## HG-RR Series Dimensions (Note 1, 5)

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

![Diagram](image1)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-RR103(B)</td>
<td>145.5 (183)</td>
<td>69.5</td>
<td></td>
</tr>
<tr>
<td>HG-RR153(B)</td>
<td>170.5 (208)</td>
<td>94.5</td>
<td></td>
</tr>
<tr>
<td>HG-RR203(B)</td>
<td>195.5 (233)</td>
<td>119.5</td>
<td></td>
</tr>
</tbody>
</table>

[Unit: mm]

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

![Diagram](image2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-RR353(B)</td>
<td>215.5 (252)</td>
<td>147.5</td>
<td></td>
</tr>
<tr>
<td>HG-RR503(B)</td>
<td>272.5 (309)</td>
<td>204.5</td>
<td></td>
</tr>
</tbody>
</table>

[Unit: mm]

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
### HG-UR Series Dimensions (Note 1, 5)

#### HG-UR72(B), HG-UR152(B)

![Diagram of HG-UR72(B), HG-UR152(B)]

#### HG-UR202(B), HG-UR352(B), HG-UR502(B)

![Diagram of HG-UR202(B), HG-UR352(B), HG-UR502(B)]

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td>HG-UR72(B)</td>
<td>109</td>
</tr>
<tr>
<td>HG-UR152(B)</td>
<td>118.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td>HG-UR202(B)</td>
<td>116.5</td>
</tr>
<tr>
<td>HG-UR352(B)</td>
<td>140.5</td>
</tr>
<tr>
<td>HG-UR502(B)</td>
<td>164.5</td>
</tr>
</tbody>
</table>

**Notes:**
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
HG-AK Series Dimensions (Note 1, 4)

HG-AK0136(B), HG-AK0236(B), HG-AK0336(B)

[Diagram showing dimensions of HG-AK Series motors with notes and specifications]

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Dimensions in brackets are for the models with electromagnetic brake.
4. Use a friction coupling to fasten a load.
5. Select a mounting screw whose length is within this dimension.

HG-AK0136(B)-S100, HG-AK0236(B)-S100, HG-AK0336(B)-S100

[Diagram showing dimensions of HG-AK Series motors with notes and specifications]
### Model Designation

#### LM-H3 series

**L M - H 3 P 2 A - 0 7 P - [ ] (Primary side: coil)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSS0</td>
<td>LM-H3P2A-07P</td>
</tr>
<tr>
<td>CSS0</td>
<td>LM-H3P3B-24P</td>
</tr>
<tr>
<td>ASS0</td>
<td>LM-H3P7A-48P</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Maximum speed [m/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Continuous thrust [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>07</td>
<td>70</td>
</tr>
<tr>
<td>12</td>
<td>120</td>
</tr>
<tr>
<td>24</td>
<td>240</td>
</tr>
<tr>
<td>36</td>
<td>360</td>
</tr>
<tr>
<td>48</td>
<td>480</td>
</tr>
<tr>
<td>72</td>
<td>720</td>
</tr>
<tr>
<td>96</td>
<td>960</td>
</tr>
</tbody>
</table>

**LM-H3 series**

- **LM-H3P2A-07P**
- **LM-H3P3B-24P**
- **LM-H3P7A-48P**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Length (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>128</td>
</tr>
<tr>
<td>B</td>
<td>224</td>
</tr>
<tr>
<td>C</td>
<td>320</td>
</tr>
<tr>
<td>D</td>
<td>416</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Width (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>65</td>
</tr>
<tr>
<td>7</td>
<td>100</td>
</tr>
</tbody>
</table>

**LM-H3 series**

- **LM-H3P2A-07P**
- **LM-H3P3B-24P**
- **LM-H3P7A-48P**

**LM-H3S20-288-[ ] (Secondary side: magnet)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSS0</td>
<td>LM-H3S20-288</td>
</tr>
<tr>
<td>CSS0</td>
<td>LM-H3S30-384</td>
</tr>
<tr>
<td>ASS0</td>
<td>LM-H3S70-768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Length (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>288</td>
<td>288</td>
</tr>
<tr>
<td>384</td>
<td>384</td>
</tr>
<tr>
<td>480</td>
<td>480</td>
</tr>
<tr>
<td>768</td>
<td>768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Width (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>95</td>
</tr>
</tbody>
</table>

**LM-H3 series**

- **LM-H3S20-288**
- **LM-H3S30-384**
- **LM-H3S70-768**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSS0</td>
<td>LM-H3S20-288</td>
</tr>
<tr>
<td>CSS0</td>
<td>LM-H3S30-384</td>
</tr>
<tr>
<td>ASS0</td>
<td>LM-H3S70-768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Length (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>288</td>
<td>288</td>
</tr>
<tr>
<td>384</td>
<td>384</td>
</tr>
<tr>
<td>480</td>
<td>480</td>
</tr>
<tr>
<td>768</td>
<td>768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Width (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>42</td>
</tr>
<tr>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>95</td>
</tr>
</tbody>
</table>
## Model Designation

### LM-F series

**LM - F P 2 B - 0 6 M - □ (primary side: coil)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>LM-FP2B-06M</td>
</tr>
<tr>
<td>D</td>
<td>LM-FP2D-12M</td>
</tr>
<tr>
<td>F</td>
<td>LM-FP2F-18M</td>
</tr>
<tr>
<td>H</td>
<td>LM-FP2H-24M</td>
</tr>
<tr>
<td>06</td>
<td>LM-FP4B-36M</td>
</tr>
<tr>
<td>12</td>
<td>LM-FP4D-48M</td>
</tr>
<tr>
<td>18</td>
<td>LM-FP4H-48M</td>
</tr>
<tr>
<td>24</td>
<td>LM-FP5H-60M</td>
</tr>
<tr>
<td>30</td>
<td>LM-FP5B-06M</td>
</tr>
<tr>
<td>48</td>
<td>LM-FP5D-12M</td>
</tr>
<tr>
<td>60</td>
<td>LM-FP5F-18M</td>
</tr>
<tr>
<td>66</td>
<td>LM-FP5H-24M</td>
</tr>
<tr>
<td>72</td>
<td>LM-FP6B-36M</td>
</tr>
<tr>
<td>90</td>
<td>LM-FP6D-48M</td>
</tr>
<tr>
<td>108</td>
<td>LM-FP6H-48M</td>
</tr>
<tr>
<td>120</td>
<td>LM-FP7H-60M</td>
</tr>
</tbody>
</table>

### LM - F S 2 0 - 4 8 0 - □ (Secondary side: magnet)

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>480</td>
<td>LM-FS20-480</td>
</tr>
<tr>
<td>576</td>
<td>LM-FS20-576</td>
</tr>
<tr>
<td>480</td>
<td>LM-FS40-480</td>
</tr>
<tr>
<td>576</td>
<td>LM-FS40-576</td>
</tr>
<tr>
<td>480</td>
<td>LM-FS50-480</td>
</tr>
<tr>
<td>576</td>
<td>LM-FS50-576</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Length (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>290</td>
</tr>
<tr>
<td>D</td>
<td>530</td>
</tr>
<tr>
<td>F</td>
<td>770</td>
</tr>
<tr>
<td>H</td>
<td>1010</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Width (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>120</td>
</tr>
<tr>
<td>4</td>
<td>200</td>
</tr>
<tr>
<td>5</td>
<td>240</td>
</tr>
</tbody>
</table>

Primary side (coil)

Secondary side (magnet)
### Model Designation

#### LM-K2 series

**LM - K 2 P 1 A - 0 1 M - □ (Primary side: coil)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SS1</td>
<td>LM-K2P1A-01M</td>
</tr>
<tr>
<td></td>
<td>LM-K2P1C-03M</td>
</tr>
<tr>
<td></td>
<td>LM-K2P2A-02M</td>
</tr>
<tr>
<td></td>
<td>LM-K2P2C-07M</td>
</tr>
<tr>
<td></td>
<td>LM-K2P2E-12M</td>
</tr>
<tr>
<td></td>
<td>LM-K2P3C-14M</td>
</tr>
<tr>
<td></td>
<td>LM-K2P3E-24M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Maximum speed [m/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>2.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Continuous thrust [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>120</td>
</tr>
<tr>
<td>02</td>
<td>240</td>
</tr>
<tr>
<td>03</td>
<td>360</td>
</tr>
<tr>
<td>07</td>
<td>720</td>
</tr>
<tr>
<td>12</td>
<td>1200</td>
</tr>
<tr>
<td>14</td>
<td>1440</td>
</tr>
<tr>
<td>24</td>
<td>2400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Length (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>138</td>
</tr>
<tr>
<td>C</td>
<td>330</td>
</tr>
<tr>
<td>E</td>
<td>522</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Height (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>74.5</td>
</tr>
<tr>
<td>3</td>
<td>114.5</td>
</tr>
</tbody>
</table>

**LM - K 2 S 1 0 - 2 8 8 - □ (Secondary side: magnet)**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Linear servo motor model</th>
</tr>
</thead>
<tbody>
<tr>
<td>2SS1</td>
<td>LM-K2S10-288</td>
</tr>
<tr>
<td></td>
<td>LM-K2S10-384</td>
</tr>
<tr>
<td></td>
<td>LM-K2S10-480</td>
</tr>
<tr>
<td></td>
<td>LM-K2S10-768</td>
</tr>
<tr>
<td></td>
<td>LM-K2S20-288</td>
</tr>
<tr>
<td></td>
<td>LM-K2S20-384</td>
</tr>
<tr>
<td></td>
<td>LM-K2S20-480</td>
</tr>
<tr>
<td></td>
<td>LM-K2S20-768</td>
</tr>
<tr>
<td></td>
<td>LM-K2S30-288</td>
</tr>
<tr>
<td></td>
<td>LM-K2S30-384</td>
</tr>
<tr>
<td></td>
<td>LM-K2S30-480</td>
</tr>
<tr>
<td></td>
<td>LM-K2S30-768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Length (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>288</td>
<td>288</td>
</tr>
<tr>
<td>384</td>
<td>384</td>
</tr>
<tr>
<td>480</td>
<td>480</td>
</tr>
<tr>
<td>768</td>
<td>768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Width (nominal) [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>61</td>
</tr>
<tr>
<td>3</td>
<td>101</td>
</tr>
</tbody>
</table>
### Model Designation

#### LM-U2 (medium thrust) series

**LM - U 2 P A B - 0 5 M - □ (Primary side: coil)**

- **Symbol**: Length (nominal) [mm]
  - B: 130
  - D: 250
  - F: 370

- **Symbol**: Width (nominal) [mm]
  - A: 66.5
  - B: 86.5

- **Primary side (coil)**

**LM - U 2 S A 0 - 2 4 0 - □ (Secondary side: magnet)**

- **Symbol**: Length (nominal) [mm]
  - A: 62
  - B: 82

- **Secondary side (magnet)**

#### LM-U2 (large thrust) series

**LM - U 2 P 2 B - 4 0 M - □ (Primary side: coil)**

- **Symbol**: Length (nominal) [mm]
  - B: 286
  - C: 406
  - D: 526

- **Symbol**: Width (nominal) [mm]
  - A: 62
  - B: 82

- **Primary side (coil)**

**LM - U 2 S 2 0 - 3 0 0 - □ (Secondary side: magnet)**

- **Symbol**: Length (nominal) [mm]
  - 300: 300
  - 480: 480

- **Secondary side (magnet)**
### LM-H3 Series Specifications

| Linear servo motor model | Primary side (coil) | Secondary side (magnet) | LM-H3 | P2A-07P-assy | P3A-12P-assy | P3B-24P-assy | P3C-36P-assy | P3D-48P-assy | P7A-24P-assy | P7B-48P-assy | P7C-72P-assy | P7D-96P-assy |
|-------------------------|---------------------|-------------------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| MR-J4                   | LM-H3               | S20-28-PSS0             | S30-28-PSS0 | S70-28-ASS0  | S30-38-CSS0  | S70-38-ASS0  | S30-48-CSS0  | S70-48-ASS0  | S30-76-ASS0  | S70-76-ASS0  |
| MR-J4W-                 | LM-H3               | S20-36-PSS0             | S30-36-PSS0 | S70-36-ASS0  | S30-48-CSS0  | S70-48-ASS0  | S30-76-CSS0  | S70-76-ASS0  |
| MR-J4                   | LM-H3               | S20-48-PSS0             | S30-48-PSS0 | S70-48-ASS0  | S30-76-CSS0  | S70-76-ASS0  |
| MR-J4                   | LM-H3               | S20-76-PSS0             | S30-76-PSS0 | S70-76-ASS0  |               |               |               |               |

#### Compatible servo amplifier

<table>
<thead>
<tr>
<th>Compatible servo amplifier model</th>
<th>MR-J4-</th>
<th>MR-J4W-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply capacity [kVA]</td>
<td>0.9</td>
<td>0.9</td>
</tr>
<tr>
<td>Refrigeration capacity [kVA]</td>
<td>1.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Refrigeration capacity [kVA]</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Refrigeration capacity [kVA]</td>
<td>3.8</td>
<td>5.5</td>
</tr>
</tbody>
</table>

#### Cooling method

- Natural cooling

#### Thrust

<table>
<thead>
<tr>
<th>Type</th>
<th>LM-H3</th>
<th>P2A-07P-assy</th>
<th>P3A-12P-assy</th>
<th>P3B-24P-assy</th>
<th>P3C-36P-assy</th>
<th>P3D-48P-assy</th>
<th>P7A-24P-assy</th>
<th>P7B-48P-assy</th>
<th>P7C-72P-assy</th>
<th>P7D-96P-assy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous [Note 1] [N]</td>
<td>70</td>
<td>120</td>
<td>240</td>
<td>360</td>
<td>480</td>
<td>240</td>
<td>480</td>
<td>720</td>
<td>960</td>
<td></td>
</tr>
<tr>
<td>Maximum [N]</td>
<td>175</td>
<td>300</td>
<td>600</td>
<td>900</td>
<td>1200</td>
<td>600</td>
<td>1200</td>
<td>1800</td>
<td>2400</td>
<td></td>
</tr>
</tbody>
</table>

#### Maximum speed [Note 1] [m/s]

- Nil

#### Magnetic attraction force [N]

<table>
<thead>
<tr>
<th>LM-H3</th>
<th>P2A-07P-assy</th>
<th>P3A-12P-assy</th>
<th>P3B-24P-assy</th>
<th>P3C-36P-assy</th>
<th>P3D-48P-assy</th>
<th>P7A-24P-assy</th>
<th>P7B-48P-assy</th>
<th>P7C-72P-assy</th>
<th>P7D-96P-assy</th>
</tr>
</thead>
<tbody>
<tr>
<td>630</td>
<td>1100</td>
<td>2200</td>
<td>3300</td>
<td>4400</td>
<td>2200</td>
<td>4400</td>
<td>6600</td>
<td>8800</td>
<td></td>
</tr>
</tbody>
</table>

#### Rated current [A]

<table>
<thead>
<tr>
<th>LM-H3</th>
<th>P2A-07P-assy</th>
<th>P3A-12P-assy</th>
<th>P3B-24P-assy</th>
<th>P3C-36P-assy</th>
<th>P3D-48P-assy</th>
<th>P7A-24P-assy</th>
<th>P7B-48P-assy</th>
<th>P7C-72P-assy</th>
<th>P7D-96P-assy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8</td>
<td>1.7</td>
<td>3.4</td>
<td>5.1</td>
<td>6.8</td>
<td>3.4</td>
<td>6.8</td>
<td>10.2</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>5.8</td>
<td>5.0</td>
<td>9.9</td>
<td>14.9</td>
<td>19.8</td>
<td>9.6</td>
<td>19.1</td>
<td>28.6</td>
<td>38.1</td>
<td></td>
</tr>
</tbody>
</table>

#### Regenerative braking frequency [Note 2] [times/min]

<table>
<thead>
<tr>
<th>LM-H3</th>
<th>P2A-07P-assy</th>
<th>P3A-12P-assy</th>
<th>P3B-24P-assy</th>
<th>P3C-36P-assy</th>
<th>P3D-48P-assy</th>
<th>P7A-24P-assy</th>
<th>P7B-48P-assy</th>
<th>P7C-72P-assy</th>
<th>P7D-96P-assy</th>
</tr>
</thead>
<tbody>
<tr>
<td>175</td>
<td>95</td>
<td>108</td>
<td>78</td>
<td>300</td>
<td>108</td>
<td>300</td>
<td>210</td>
<td>159</td>
<td></td>
</tr>
<tr>
<td>173</td>
<td>95</td>
<td>271</td>
<td>197</td>
<td>-</td>
<td>241</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

#### Recommended load to motor mass ratio

<table>
<thead>
<tr>
<th>LM-H3</th>
<th>P2A-07P-assy</th>
<th>P3A-12P-assy</th>
<th>P3B-24P-assy</th>
<th>P3C-36P-assy</th>
<th>P3D-48P-assy</th>
<th>P7A-24P-assy</th>
<th>P7B-48P-assy</th>
<th>P7C-72P-assy</th>
<th>P7D-96P-assy</th>
</tr>
</thead>
<tbody>
<tr>
<td>155 (F)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Environment

<table>
<thead>
<tr>
<th>Environment</th>
<th>Operation:</th>
<th>0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>49 m/s²</td>
<td></td>
</tr>
</tbody>
</table>

#### Compliance to global standards

Refer to "Conformity with Global Standards and Regulations" on "SERVO AMPLIFIERS & MOTORS L(NA)03058" catalog.

#### Mass

<table>
<thead>
<tr>
<th>Mass</th>
<th>Primary side (coil) [kg]</th>
<th>Secondary side (magnet) [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>288 mm/pc: 1.0</td>
<td>288 mm/pc: 2.8</td>
</tr>
<tr>
<td></td>
<td>384 mm/pc: 1.4</td>
<td>384 mm/pc: 3.7</td>
</tr>
<tr>
<td></td>
<td>480 mm/pc: 2.7</td>
<td>480 mm/pc: 4.7</td>
</tr>
<tr>
<td></td>
<td>768 mm/pc: 7.4</td>
<td>768 mm/pc: 11.8</td>
</tr>
</tbody>
</table>

#### Notes:

1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.
2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the permissible regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
3. This value is applicable when MR-J4W2-44B or MR-J4W3-444B is used. The value is 942 for MR-J4W2-77B or MR-J4W2-1010B.
4. This value is applicable when MR-J4W2-44B or MR-J4W3-444B is used. The value is 497 for MR-J4W2-77B or MR-J4W2-1010B.
5. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.
### LM-H3 Series Thrust Characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>Note(s)</th>
<th>Details</th>
<th>Thrust [N]</th>
<th>Speed [m/s]</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-H3P3A-07P-CSS0</td>
<td>1, 2, 4</td>
<td>Short-duration running</td>
<td>300</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>range</td>
<td>240</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous running range</td>
<td>120</td>
<td>1</td>
</tr>
<tr>
<td>LM-H3P3C-36P-CSS0</td>
<td>1, 3, 4</td>
<td>Short-duration running</td>
<td>960</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>range</td>
<td>720</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous running range</td>
<td>360</td>
<td>3</td>
</tr>
<tr>
<td>LM-H3P7B-48P-ASS0</td>
<td>1, 3, 4</td>
<td>Short-duration running</td>
<td>1200</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>range</td>
<td>960</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous running range</td>
<td>480</td>
<td>3</td>
</tr>
<tr>
<td>LM-H3P3D-48P-CSS0</td>
<td>1, 3, 4</td>
<td>Short-duration running</td>
<td>1800</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>range</td>
<td>1440</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous running range</td>
<td>720</td>
<td>3</td>
</tr>
<tr>
<td>LM-H3P7C-72P-ASS0</td>
<td>1, 3, 4</td>
<td>Short-duration running</td>
<td>2400</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>range</td>
<td>1920</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continuous running range</td>
<td>960</td>
<td>3</td>
</tr>
</tbody>
</table>

**Notes:**
1. For 3-phase 200 V AC.
2. For 1-phase 200 V AC or 1-phase 100 V AC.
3. For 1-phase 200 V AC.
4. Thrust drops when the power supply voltage is below the specified value.
LM-F Series Specifications

<table>
<thead>
<tr>
<th>Linear servo motor model</th>
<th>Primary side (coil)</th>
<th>Secondary side (magnet)</th>
<th>Compatible servo amplifier model</th>
<th>Power supply capacity [kVA]</th>
<th>Cooling method</th>
<th>Thrust</th>
<th>Magnetic attraction force</th>
<th>Rated current</th>
<th>Maximum current</th>
<th>Regenerative braking frequency</th>
<th>Recommended load to motor mass ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2B-06M-1SS0</td>
<td>S20-480-1SS0</td>
<td>MR-J4-</td>
<td>3.5</td>
<td>Natural cooling or liquid cooling</td>
<td>Continuous (natural cooling) [N]</td>
<td>300</td>
<td>4500</td>
<td>Natural cooling [A]</td>
<td>4.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
</tr>
<tr>
<td>P2D-12M-1SS0</td>
<td>S20-576-1SS0</td>
<td>MR-J4-</td>
<td>7.5</td>
<td>Continuous (liquid cooling) [N]</td>
<td>600</td>
<td>9000</td>
<td>Liquid cooling [A]</td>
<td>7.8</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
<tr>
<td>P2F-18M-1SS0</td>
<td>S40-480-1SS0</td>
<td>MR-J4-</td>
<td>10</td>
<td>Continuous (liquid cooling) [N]</td>
<td>1200</td>
<td>13500</td>
<td>Liquid cooling [A]</td>
<td>16.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
<tr>
<td>P4B-12M-1SS0</td>
<td>S40-576-1SS0</td>
<td>MR-J4-</td>
<td>10</td>
<td>Natural cooling [A]</td>
<td>600</td>
<td>900</td>
<td>Natural cooling [A]</td>
<td>17.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
<tr>
<td>P4D-24M-1SS0</td>
<td>S50-480-1SS0</td>
<td>MR-J4-</td>
<td>14</td>
<td>Natural cooling [A]</td>
<td>1200</td>
<td>1800</td>
<td>Liquid cooling [A]</td>
<td>17.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
<tr>
<td>P4F-36M-1SS0</td>
<td>S50-576-1SS0</td>
<td>MR-J4-</td>
<td>18</td>
<td>Natural cooling [A]</td>
<td>1800</td>
<td>27000</td>
<td>Natural cooling [A]</td>
<td>22.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
<tr>
<td>P4H-48M-1SS0</td>
<td>S50-480-1SS0</td>
<td>MR-J4-</td>
<td>22</td>
<td>Natural cooling [A]</td>
<td>1800</td>
<td>36000</td>
<td>Liquid cooling [A]</td>
<td>44.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
<tr>
<td>PSH-60M-1SS0</td>
<td>S50-576-1SS0</td>
<td>MR-J4-</td>
<td>22</td>
<td>Natural cooling [A]</td>
<td>1800</td>
<td>45000</td>
<td>Liquid cooling [A]</td>
<td>45.0</td>
<td>671</td>
<td>Maximum of 15 times the mass of the linear servo motor primary side</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.
2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected, however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the permissible regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
3. Use 400 V AC type servo amplifier for this linear servo motor.
4. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.
**LM-F Series Thrust Characteristics**

**LM-FP2B-06M-1SS0** (Note 1, 3, 4)

<table>
<thead>
<tr>
<th>Speed [m/s]</th>
<th>Thrust [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1800</td>
</tr>
<tr>
<td>1</td>
<td>300</td>
</tr>
</tbody>
</table>

Notes: 1. : For 3-phase 200 V AC.
2. : For 3-phase 400 V AC.
3. : For 1-phase 200 V AC.
4. Thrust drops when the power supply voltage is below the specified value.
5. Continuous running range (liquid cooling)
6. Continuous running range (natural cooling)
## LM-K2 Series Specifications

<table>
<thead>
<tr>
<th>Linear servo motor model</th>
<th>Primary side (coil)</th>
<th>LM-K2</th>
<th>Secondary side (magnet)</th>
<th>LM-K2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S10-288-2SS1</td>
<td></td>
<td>S10-288-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S10-384-2SS1</td>
<td></td>
<td>S10-384-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S10-480-2SS1</td>
<td></td>
<td>S10-480-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S10-768-2SS1</td>
<td></td>
<td>S10-768-1SS1</td>
<td></td>
</tr>
<tr>
<td>MR-J4-</td>
<td>S10-288-2SS1</td>
<td></td>
<td>S10-288-1SS1</td>
<td></td>
</tr>
<tr>
<td>MR-J4W_-</td>
<td>S10-384-2SS1</td>
<td></td>
<td>S10-384-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S10-480-2SS1</td>
<td></td>
<td>S10-480-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S10-768-2SS1</td>
<td></td>
<td>S10-768-1SS1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-</td>
<td></td>
<td>MR-J4W_-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4W_-</td>
<td></td>
<td>MR-J4W_-</td>
<td></td>
</tr>
</tbody>
</table>

### Power supply capacity [kVA]

- 0.9
- 3.5
- 1.3
- 5.5
- 7.5
- 5.5
- 7.5

### Cooling method

Natural cooling

### Thrust [N]

- Continuous (Note 5)
- 120
- 360
- 240
- 720
- 1200
- 1440
- 2400

### Maximum speed [m/s]

- 2.0

### Magnetic attraction force (one side) [N]

- 800
- 2400
- 1100
- 3200
- 5300
- 6400
- 10700

### Rated current [A]

- 2.3
- 6.8
- 3.7
- 12
- 19
- 15
- 25

### Maximum current [A]

- 7.6
- 23
- 13
- 39
- 65
- 47
- 79

### Regenerative braking frequency (Note 2) [times/min]

- MR-J4-
- 111
- 427
- 142
- 281
- 226
- 152
- 124

### Regenerative braking frequency (Note 2) [times/min]

- MR-J4W_-
- 110 (Note 3)
- -
- -
- -
- -
- -
- -

### Recommended load to motor mass ratio

- Maximum of 30 times the mass of the linear servo motor primary side

### Insulation class

- 155 (F)

### Environment

- Ambient temperature: Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)
- Ambient humidity: Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)
- Ambience: Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust
- Altitude: 1000 m or less above sea level
- Vibration resistance: 49 m/s²

### Compliance to global standards

Refer to "Conformity with Global Standards and Regulations" on "SERVO AMPLIFIERS & MOTORS L(NA)03058" catalog.

### Mass [kg]

<table>
<thead>
<tr>
<th>Primary side (coil)</th>
<th>Secondary side (magnet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5</td>
<td>288 mm/ppc: 1.5</td>
</tr>
<tr>
<td>6.5</td>
<td>288 mm/ppc: 2.0</td>
</tr>
<tr>
<td>4.0</td>
<td>480 mm/ppc: 2.5</td>
</tr>
<tr>
<td>10</td>
<td>768 mm/ppc: 3.9</td>
</tr>
<tr>
<td>16</td>
<td>288 mm/ppc: 1.9</td>
</tr>
<tr>
<td>18</td>
<td>288 mm/ppc: 2.5</td>
</tr>
<tr>
<td>18</td>
<td>480 mm/ppc: 3.2</td>
</tr>
<tr>
<td>27</td>
<td>768 mm/ppc: 5.0</td>
</tr>
</tbody>
</table>

### Notes:

1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.
2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected, however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the permissible regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
3. This value is applicable when MR-J4W2-44B or MR-J4W3-444B is used. The value is 584 for MR-J4W2-77B or MR-J4W2-1010B.
4. LM-K2 series has a structure of magnetic attraction counter-force and requires at least two blocks of identical secondary side (magnet).
5. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.
6. Magnetic attraction force is caused by assembly precision, etc.
7. Magnetic attraction force which occurs on one side of the secondary side is shown.
## LM-K2 Series Thrust Characteristics

<table>
<thead>
<tr>
<th>Model</th>
<th>Thrust [N]</th>
<th>Speed [m/s]</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-K2P1A-01M-2SS1</td>
<td>900</td>
<td>100</td>
<td>(Note 1, 3, 5)</td>
</tr>
<tr>
<td>LM-K2P1C-03M-2SS1</td>
<td>3000</td>
<td>120</td>
<td>(Note 2, 4, 5)</td>
</tr>
<tr>
<td>LM-K2P2A-02M-1SS1</td>
<td>600</td>
<td>200</td>
<td>(Note 1, 5)</td>
</tr>
<tr>
<td>LM-K2P2C-07M-1SS1</td>
<td>1800</td>
<td>360</td>
<td>(Note 2, 5)</td>
</tr>
<tr>
<td>LM-K2P3E-24M-1SS1</td>
<td>6000</td>
<td>2400</td>
<td>(Note 2, 5)</td>
</tr>
</tbody>
</table>

Notes: 1. : For 3-phase 200 V AC or 1-phase 200 V AC.
2. : For 3-phase 200 V AC.
3. : For 1-phase 100 V AC.
4. : For 1-phase 200 V AC.
5. Thrust drops when the power supply voltage is below the specified value.
## LM-U2 Series Specifications

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-U2</td>
<td>PA0-05M/0SS0</td>
<td>SAB-240-0SS0</td>
<td>MR-J4</td>
<td>0.5</td>
<td>Natural cooling</td>
<td>50</td>
<td>2.0</td>
<td>0.9</td>
<td>1.9</td>
<td>2.7</td>
<td>No limit</td>
<td>Maximum of 30 times the mass of the linear servo motor primary side</td>
<td>155 (F)</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td>49 m/s²</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS (NA)03058&quot; catalog.</td>
</tr>
<tr>
<td></td>
<td>PA0-10M/0SS0</td>
<td>SAB-300-0SS0</td>
<td></td>
<td>0.9</td>
<td></td>
<td>100</td>
<td>3.0</td>
<td>1.5</td>
<td>3.0</td>
<td>4.5</td>
<td>No limit</td>
<td></td>
<td></td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td>1000 m or less above sea level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PA0-15M/0SS0</td>
<td>SAB-420-0SS0</td>
<td></td>
<td>1.0</td>
<td></td>
<td>150</td>
<td>4.6</td>
<td>3.0</td>
<td>6.6</td>
<td>9.8</td>
<td>No limit</td>
<td></td>
<td></td>
<td>1000 m or less above sea level</td>
<td>49 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PA0-20M/0SS0</td>
<td>SBB-07M/1SS0</td>
<td></td>
<td>1.3</td>
<td></td>
<td>450</td>
<td>5.5</td>
<td>4.5</td>
<td>13.7</td>
<td>26.7</td>
<td>No limit</td>
<td></td>
<td></td>
<td>1000 m or less above sea level</td>
<td>49 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAB-05M/0SS0</td>
<td>SBB-15M/1SS0</td>
<td></td>
<td>3.5</td>
<td></td>
<td>675</td>
<td>8.3</td>
<td>8.9</td>
<td>3480</td>
<td>1820</td>
<td>No limit</td>
<td>3480</td>
<td></td>
<td>1000 m or less above sea level</td>
<td>1190 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAB-10M/0SS0</td>
<td>SBB-20M/2SS0</td>
<td></td>
<td>5.5</td>
<td></td>
<td>1600</td>
<td>8.3</td>
<td>8.9</td>
<td>3480</td>
<td>1820</td>
<td>No limit</td>
<td></td>
<td></td>
<td>1000 m or less above sea level</td>
<td>1190 m/s²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PAB-15M/0SS0</td>
<td>SBB-25M/2SS0</td>
<td></td>
<td>7.5</td>
<td></td>
<td>2400</td>
<td>10.0</td>
<td>10.0</td>
<td>3480</td>
<td>1820</td>
<td>No limit</td>
<td>3480</td>
<td></td>
<td>1000 m or less above sea level</td>
<td>1190 m/s²</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. The maximum speed of the linear servo motor or the rated speed of the linear encoder, whichever is smaller, is the upper limit of the linear servo motor speed.
2. The regenerative braking frequency shows the permissible frequency when the linear servo motor, without a load and a regenerative option, decelerates from the maximum speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Mass of load/Mass of motor primary side (coil). Take measures to keep the regenerative power [W] during operation below the permissible regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the permissible regenerative power [W] when regenerative option is used.
3. Use the linear servo motor with 70% or less of the effective load ratio when it is in the servo lock state or in a small reciprocating motion.
LM-U2 Series Thrust Characteristics

LM-U2PAB-05M-0SS0 (Note 1, 3, 5)

---

LM-U2PAD-10M-0SS0 (Note 1, 3, 5)

---

LM-U2PAF-15M-0SS0 (Note 1, 3, 5)

---

LM-U2PBB-07M-1SS0 (Note 1, 3, 5)

---

LM-U2PBD-15M-1SS0 (Note 1, 5)

---

LM-U2PBF-22M-1SS0 (Note 1, 5)

---

LM-U2PAF-15M-0SS0 (Note 1, 3, 5)

---

LM-U2P2D-80M-2SS0 (Note 2, 5)

---

LM-U2PAF-15M-0SS0 (Note 1, 3, 5)

---

LM-U2P2B-40M-2SS0 (Note 2, 4, 5)

---

LM-U2P2C-60M-2SS0 (Note 2, 5)

---

LM-U2P2D-80M-2SS0 (Note 2, 5)

---

Notes: 1. : For 3-phase 200 V AC or 1-phase 200 V AC.
2. : For 3-phase 200 V AC.
3. : For 1-phase 100 V AC.
4. : For 1-phase 200 V AC.
5. Thrust drops when the power supply voltage is below the specified value.
### LM-H3 Series Primary Side (Coil) Dimensions (Note 1, 2)

#### LM-H3P2A-07P-BSS0

- **Model**: LM-H3P2A-07P-BSS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P3A-12P-CSS0

- **Model**: LM-H3P3A-12P-CSS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P3B-24P-CSS0

- **Model**: LM-H3P3B-24P-CSS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P3C-36P-CSS0

- **Model**: LM-H3P3C-36P-CSS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P3D-48P-CSS0

- **Model**: LM-H3P3D-48P-CSS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P7A-24P-ASS0

- **Model**: LM-H3P7A-24P-ASS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P7B-48P-ASS0

- **Model**: LM-H3P7B-48P-ASS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P7C-72P-ASS0

- **Model**: LM-H3P7C-72P-ASS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

#### LM-H3P7D-96P-ASS0

- **Model**: LM-H3P7D-96P-ASS0
- **Power lead wire (U, V, and W)**: black
- **Grounding lead wire (E)**: green/yellow
- **Effective length**: 400 mm

### Notes:
1. Power, grounding and thermistor lead wires do not have a long bending life. Fix the lead wires led from the primary side (coil) to a moving part to prevent the lead wires from repetitive bending.
2. Minimum bending radius of the lead wire equals to six times the standard overall diameter of the lead wire.
## LM-H3 Series Secondary Side (Magnet) Dimensions

### LM-H3S20\-288\-BSS0  
LM-H3S20\-384\-BSS0  
LM-H3S20\-768\-BSS0

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
<th>L</th>
<th>M</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-H3S20-288-BSS0</td>
<td>288 5 x 48 = 240</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>LM-H3S20-384-BSS0</td>
<td>384 7 x 48 = 336</td>
<td>2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>LM-H3S20-480-BSS0</td>
<td>480 9 x 48 = 432</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>LM-H3S20-768-BSS0</td>
<td>768 15 x 48 = 720</td>
<td>2</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

### LM-H3S30\-288\-CSS0  
LM-H3S30\-384\-CSS0  
LM-H3S30\-768\-CSS0

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
<th>L</th>
<th>M</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-H3S30-288-CSS0</td>
<td>288 5 x 48 = 240</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>LM-H3S30-384-CSS0</td>
<td>384 7 x 48 = 336</td>
<td>2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>LM-H3S30-480-CSS0</td>
<td>480 9 x 48 = 432</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>LM-H3S30-768-CSS0</td>
<td>768 15 x 48 = 720</td>
<td>2</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

### LM-H3S70\-288\-ASS0  
LM-H3S70\-384\-ASS0  
LM-H3S70\-480\-ASS0  
LM-H3S70\-768\-ASS0

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
<th>L</th>
<th>M</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-H3S70-288-ASS0</td>
<td>288 5 x 48 = 240</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>LM-H3S70-384-ASS0</td>
<td>384 7 x 48 = 336</td>
<td>2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>LM-H3S70-480-ASS0</td>
<td>480 9 x 48 = 432</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>LM-H3S70-768-ASS0</td>
<td>768 15 x 48 = 720</td>
<td>2</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>
Notes: 1. Power and thermistor cables do not have a long bending life. Fix the cables led from the primary side (coil) to a moving part to prevent the cables from repetitive bending.
2. Minimum bending radius of the cable equals to six times the standard overall diameter of the cable.
**LM-F Series Secondary Side (Magnet) Dimensions**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-FS20-480-1SS0</td>
<td>480 4 x 96 = 384 2 x 5 432</td>
</tr>
<tr>
<td>LM-FS20-576-1SS0</td>
<td>576 5 x 96 = 480 2 x 6 528</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-FS40-480-1SS0</td>
<td>480 4 x 96 = 384 2 x 5 432</td>
</tr>
<tr>
<td>LM-FS40-576-1SS0</td>
<td>576 5 x 96 = 480 2 x 6 528</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-FS50-480-1SS0</td>
<td>480 4 x 96 = 384 2 x 5 432</td>
</tr>
<tr>
<td>LM-FS50-576-1SS0</td>
<td>576 5 x 96 = 480 2 x 6 528</td>
</tr>
</tbody>
</table>
### LM-K2 Series Primary Side (Coil) Dimensions (Note 1, 2)

**LM-K2P1A-01M-2SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

**LM-K2P1C-03M-2SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

**LM-K2P2A-02M-1SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

**LM-K2P2C-07M-1SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

**LM-K2P2E-12M-1SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

**LM-K2P3C-14M-1SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

**LM-K2P3E-24M-1SS1**
- Power lead wire (U, V, and W): black, Grounding lead wire (E): green/yellow
- Effective length: 300 mm

<table>
<thead>
<tr>
<th>Model</th>
<th>L</th>
<th>M</th>
<th>K</th>
<th>B</th>
<th>Effective lead wire length</th>
</tr>
</thead>
<tbody>
<tr>
<td>LM-K2P1A-01M-2SS1</td>
<td>138</td>
<td>2 x 48 = 96</td>
<td>115</td>
<td>2 x 3</td>
<td>3.5 or longer</td>
</tr>
<tr>
<td>LM-K2P1C-03M-2SS1</td>
<td>330</td>
<td>6 x 48 = 288</td>
<td>307</td>
<td>2 x 7</td>
<td>1.5</td>
</tr>
<tr>
<td>LM-K2P2A-02M-1SS1</td>
<td>138</td>
<td>2 x 48 = 96</td>
<td>115</td>
<td>2 x 3</td>
<td>3.5 or longer</td>
</tr>
<tr>
<td>LM-K2P2C-07M-1SS1</td>
<td>330</td>
<td>6 x 48 = 288</td>
<td>307</td>
<td>2 x 7</td>
<td>1.5</td>
</tr>
<tr>
<td>LM-K2P2E-12M-1SS1</td>
<td>322</td>
<td>10 x 48 = 480</td>
<td>499</td>
<td>2 x 11</td>
<td></td>
</tr>
<tr>
<td>LM-K2P3C-14M-1SS1</td>
<td>330</td>
<td>6 x 48 = 288</td>
<td>307</td>
<td>2 x 7</td>
<td>1.5</td>
</tr>
<tr>
<td>LM-K2P3E-24M-1SS1</td>
<td>322</td>
<td>10 x 48 = 480</td>
<td>499</td>
<td>2 x 11</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Power, grounding and thermistor lead wires do not have a long bending life. Fix the lead wires led from the primary side (coil) to a moving part to prevent the lead wires from repetitive bending.
2. Minimum bending radius of the lead wire equals to six times the standard overall diameter of the lead wire.
### LM-K2 Series Secondary Side (Magnet) Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions [Unit: mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td>LM-K2S10-288-2SS1</td>
<td>288</td>
</tr>
<tr>
<td>LM-K2S10-384-2SS1</td>
<td>384</td>
</tr>
<tr>
<td>LM-K2S10-480-2SS1</td>
<td>480</td>
</tr>
<tr>
<td>LM-K2S10-768-2SS1</td>
<td>768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions [Unit: mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td>LM-K2S20-288-1SS1</td>
<td>288</td>
</tr>
<tr>
<td>LM-K2S20-384-1SS1</td>
<td>384</td>
</tr>
<tr>
<td>LM-K2S20-480-1SS1</td>
<td>480</td>
</tr>
<tr>
<td>LM-K2S20-768-1SS1</td>
<td>768</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions [Unit: mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td>LM-K2S30-288-1SS1</td>
<td>288</td>
</tr>
<tr>
<td>LM-K2S30-384-1SS1</td>
<td>384</td>
</tr>
<tr>
<td>LM-K2S30-480-1SS1</td>
<td>480</td>
</tr>
<tr>
<td>LM-K2S30-768-1SS1</td>
<td>768</td>
</tr>
</tbody>
</table>

Notes: 1. Longitudinal deviation of the secondary side must be within ±0.1 mm.
## LM-U2 Series Primary Side (Coil) Dimensions (Note 1, 2)

### LM-U2PAB-05M-0SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

### LM-U2PAD-10M-0SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

### LM-U2PAF-15M-0SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

---

### LM-U2PBB-07M-1SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

### LM-U2PBD-15M-1SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

### LM-U2PBF-22M-1SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

---

### LM-U2P2B-40M-2SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

### LM-U2P2C-60M-2SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

### LM-U2P2D-80M-2SS0

- **Power lead wire (U, V, W):** black
- **Grounding lead wire (E):** green/yellow
- **Effective length:** 400 mm, Round crimp terminal (0.5-4)

---

### Notes:

1. Power, grounding and thermistor lead wires do not have a long bending life. Fix the lead wires led from the primary side (coil) to a moving part to prevent the lead wires from repetitive bending.
2. Minimum bending radius of the lead wire equals to six times the standard overall diameter of the lead wire.
### LM-U2 Series Secondary Side (Magnet) Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L (mm)</td>
</tr>
<tr>
<td>LM-U2SA0-240-0SS0</td>
<td>240</td>
</tr>
<tr>
<td>LM-U2SA0-300-0SS0</td>
<td>300</td>
</tr>
<tr>
<td>LM-U2SA0-420-0SS0</td>
<td>420</td>
</tr>
<tr>
<td>LM-U2SB0-240-1SS0</td>
<td>240</td>
</tr>
<tr>
<td>LM-U2SB0-300-1SS0</td>
<td>300</td>
</tr>
<tr>
<td>LM-U2SB0-420-1SS0</td>
<td>420</td>
</tr>
<tr>
<td>LM-U2S20-300-2SS0</td>
<td>300</td>
</tr>
<tr>
<td>LM-U2S20-480-2SS0</td>
<td>480</td>
</tr>
</tbody>
</table>

### Outline Drawings

- **LM-U2SA0-240-0SS0**
- **LM-U2SA0-300-0SS0**
- **LM-U2SA0-420-0SS0**
- **LM-U2SB0-240-1SS0**
- **LM-U2SB0-300-1SS0**
- **LM-U2SB0-420-1SS0**
- **LM-U2S20-300-2SS0**
- **LM-U2S20-480-2SS0**
List of Linear Encoders (Note 1)

<table>
<thead>
<tr>
<th>Linear encoder type</th>
<th>Manufacturer</th>
<th>Model</th>
<th>Resolution</th>
<th>Rated speed (Note 2)</th>
<th>Maximum effective measurement length (Note 2)</th>
<th>Communication method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnescale Co., Ltd.</td>
<td>SR77</td>
<td>0.05 µm/0.01 µm</td>
<td>3.3 m/s</td>
<td>2040 mm</td>
<td>3040 mm</td>
<td>Two-wire type</td>
</tr>
<tr>
<td></td>
<td>SR87</td>
<td>2.0 m/s</td>
<td>3000 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT343A</td>
<td>2.5 m/s</td>
<td>2200 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT543A-SC</td>
<td>20 µm/4096 (Approx. 0.005 µm)</td>
<td>2.5 m/s</td>
<td>2200 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AT545A-SC</td>
<td>0.5 µm</td>
<td>4.0 m/s</td>
<td>6000 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST741A</td>
<td>0.1 µm</td>
<td>1 µm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST742A</td>
<td>4.0 m/s</td>
<td>6000 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST743A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST744A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ST748A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renishaw RESOLUTE RL40M</td>
<td>1 mm/50 mm</td>
<td>4.0 m/s</td>
<td>10000 mm</td>
<td>Two-wire type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heidenhain LC 493M</td>
<td>0.05 µm/0.01 µm</td>
<td>3.0 m/s</td>
<td>2040 mm</td>
<td>4240 mm</td>
<td>Four-wire type (Note 4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LC 193M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIC 4193M</td>
<td>0.01 µm</td>
<td>4.0 m/s</td>
<td>3040 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIC 4195M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIC 4197M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIC 4199M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnescale Co., Ltd.</td>
<td>SR75</td>
<td>0.05 µm/0.01 µm</td>
<td>3.3 m/s</td>
<td>2040 mm</td>
<td>3040 mm</td>
<td>Two-wire type</td>
</tr>
<tr>
<td></td>
<td>SR85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SL710 + PL101-RM/RHM</td>
<td>0.1 µm</td>
<td>4.0 m/s</td>
<td>100000 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heidenhain LIDA 483</td>
<td>+ EIB 392M (16384)</td>
<td>20 µm/16384 (Approx. 1.22 nm)</td>
<td>4.0 m/s</td>
<td>3040 mm</td>
<td>30400 mm</td>
<td>Four-wire type (Note 4)</td>
</tr>
<tr>
<td></td>
<td>LIDA 485</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIDA 487</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIDA 489</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIDA 287</td>
<td>+ EIB 392M (16384)</td>
<td>200 µm/16384 (Approx. 12.2 nm)</td>
<td>1020 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIDA 289</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIF 481</td>
<td>+ EIB 392M (14096)</td>
<td>4 µm/4096 (Approx. 0.977 nm)</td>
<td>1.2 m/s</td>
<td>1020 mm</td>
<td>1440 mm</td>
</tr>
<tr>
<td></td>
<td>LIP 581</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nidec Sankyo Corporation</td>
<td>PSLH041 (Note 7)</td>
<td>0.1 µm</td>
<td>5.0 m/s</td>
<td>2400 mm</td>
<td>Two-wire type</td>
<td></td>
</tr>
<tr>
<td>A/B/Z-phase differential output type (Note 5, 6)</td>
<td>Not designated</td>
<td>0.001 µm to 5 µm</td>
<td>Depends on the linear encoder</td>
<td>Depends on the linear encoder</td>
<td>A/B/Z-phase differential output method</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Contact the relevant linear encoder manufacturer for details on operating environment and specifications of the linear encoder such as ambient temperature, vibration resistance and IP rating.
2. The rated speed of the linear encoder is applicable when the linear encoder is used with MR-J4 series servo amplifier. The values may differ from the manufacturers’ specifications.
3. The length is specified by the linear encoder manufacturers. The maximum length of the encoder cable between linear encoder and servo amplifier is 30 m.
4. When using the four-wire type linear encoder in fully closed loop control system, use MR-J4-_B_-RJ or MR-J4-_A_-RJ servo amplifier. When using four-wire type linear encoder with the scale measurement function, use MR-J4-_B_-RJ servo amplifier.
5. When using the A/B/Z-phase differential output type linear encoder, use MR-J4-_B_-RJ or MR-J4-_A_-RJ servo amplifier.
6. Select the linear encoder within this range.
7. Use MR-J4-_B_-RJ or MR-J4W-_B/MR-J4-_A_-RJ servo amplifier with software version B3 or later.
8. Output A-phase, B-phase, and Z-phase signals in the differential line driver. The phase difference of the A-phase pulse and the B-phase pulse, and the width of the Z-phase pulse must be 200 ns or wider. The output pulse of A-phase and B-phase of the A/B/Z-phase differential output linear encoder is in the multiply-by-four count method. Home position return is not possible with a linear encoder without Z-phase.
### Combinations of Direct Drive Motor and Servo Amplifier

<table>
<thead>
<tr>
<th>Direct drive motor</th>
<th>Servo amplifier</th>
<th>Servo amplifier</th>
<th>Servo amplifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-RFM002C20</td>
<td>MR-J4-20GF(-RJ),</td>
<td>MR-J4W2-22B,</td>
<td>MR-J4W2-44B,</td>
</tr>
<tr>
<td></td>
<td>MR-J4-20B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-20B1(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-20A(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-20A1(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM004C20</td>
<td>MR-J4-40GF(-RJ),</td>
<td>MR-J4W2-44B,</td>
<td>MR-J4W2-77B,</td>
</tr>
<tr>
<td></td>
<td>MR-J4-40B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-40B1(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-40A(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-40A1(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM006C20</td>
<td>MR-J4-60GF(-RJ),</td>
<td>MR-J4W2-77B,</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-60B(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-60A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM006E20</td>
<td>MR-J4-60GF(-RJ),</td>
<td>MR-J4W2-77B,</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-60B(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-60A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM012E20</td>
<td>MR-J4-70GF(-RJ),</td>
<td>MR-J4W2-77B,</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-70B(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-70A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM018E20</td>
<td>MR-J4-100GF(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-100B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-100A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM012G20</td>
<td>MR-J4-70GF(-RJ),</td>
<td>MR-J4W2-77B,</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-70B(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-70A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM048G20</td>
<td>MR-J4-350GF(-RJ),</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-350B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-350A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM072G20</td>
<td>MR-J4-350GF(-RJ),</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-350B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-350A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM040J10</td>
<td>MR-J4-70GF(-RJ),</td>
<td>MR-J4W2-77B,</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-70B(-RJ),</td>
<td>MR-J4W2-1010B</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-70A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM120J10</td>
<td>MR-J4-350GF(-RJ),</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-350B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-350A(-RJ)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TM-RFM240J10</td>
<td>MR-J4-500GF(-RJ),</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>MR-J4-500B(-RJ),</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MR-J4-500A(-RJ)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. Any combination of the servo motors is available. Refer to "Combinations of Multi-Axis Servo Amplifier and Servo Motors" on p. 285 in this catalog.
## TM-RFM Series Specifications

<table>
<thead>
<tr>
<th>Direct drive motor model</th>
<th>TM-RFM</th>
<th>002C20</th>
<th>004C20</th>
<th>006C20</th>
<th>006E20</th>
<th>012E20</th>
<th>018E20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor outer diameter (frame dimensions) [mm]</td>
<td></td>
<td>ø130</td>
<td></td>
<td></td>
<td>ø180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity [kVA]</td>
<td>0.25</td>
<td>0.38</td>
<td>0.53</td>
<td>0.46</td>
<td>0.81</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Continuous running duty Rated output [W]</td>
<td>42</td>
<td>84</td>
<td>126</td>
<td>126</td>
<td>251</td>
<td>377</td>
<td></td>
</tr>
<tr>
<td>Rated torque [N•m]</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Maximum torque [N•m]</td>
<td>6</td>
<td>12</td>
<td>18</td>
<td>18</td>
<td>36</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Rated speed [r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Maximum speed [r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Permissible instantaneous speed [r/min]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>575</td>
</tr>
<tr>
<td>Power rate at continuous rated torque [kWs]</td>
<td>3.7</td>
<td>9.6</td>
<td>16.1</td>
<td>4.9</td>
<td>12.9</td>
<td>21.8</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.3</td>
<td>2.1</td>
<td>3.2</td>
<td>3.2</td>
<td>3.8</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Maximum current [A]</td>
<td>3.9</td>
<td>6.3</td>
<td>9.6</td>
<td>9.6</td>
<td>12</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Regenerative braking frequency [times/min]</td>
<td>MR-J4-</td>
<td>No limit</td>
<td>5830</td>
<td>2950</td>
<td>464</td>
<td>572</td>
<td>421</td>
</tr>
<tr>
<td>MR-J4W- [times/min]</td>
<td>No limit</td>
<td>5620</td>
<td>No limit</td>
<td>2370</td>
<td>1430</td>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia J [× 10^-4 kg•m²]</td>
<td>10.9</td>
<td>16.6</td>
<td>22.4</td>
<td>74.0</td>
<td>111</td>
<td>149</td>
<td></td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio (Note 1)</td>
<td>50 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute accuracy [s]</td>
<td>±15</td>
<td>±12.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Absolute/incremental 20-bit encoder (resolution: 1048576 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP42) (Note 2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment [°C]</td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, dust or splash of oil or water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance (°G)</td>
<td>X: 49 m/s² Y: 49 m/s²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10  (Note 7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with Global Standards and Regulations&quot; on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. Connectors and gap between rotor and stator are excluded.
3. When unbalanced torque is generated, such as in a vertical lift machine, be sure to use the absolute position detection system, and keep the unbalanced torque under 70% of the servo motor rated torque.

Refer to "Annotations for Direct Drive Motor Specifications" on p. 404 in this catalog for the asterisks 1 to 7.
## TM-RFM Series Specifications

<table>
<thead>
<tr>
<th>Direct drive motor model</th>
<th>TM-RFM</th>
<th>012G20</th>
<th>048G20</th>
<th>072G20</th>
<th>040J10</th>
<th>120J10</th>
<th>240J10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>MR-J4-</td>
<td>MR-J4W-</td>
<td>Refer to “Combinations of Direct Drive Motor and Servo Amplifier” on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor outer diameter (frame dimensions) [mm]</td>
<td>ø230</td>
<td>ø330</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity [kVA]</td>
<td>0.71</td>
<td>2.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Power supply capacity [kVA]</td>
<td>3.8</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum torque [N•m]</td>
<td>12</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed [r/min]</td>
<td>500</td>
<td>200</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated speed [r/min]</td>
<td>36</td>
<td>144</td>
<td>216</td>
<td>120</td>
<td>360</td>
<td>720</td>
<td></td>
</tr>
<tr>
<td>Regenerative braking frequency [times/min] MR-J4-</td>
<td>202</td>
<td>373</td>
<td>251</td>
<td>125</td>
<td>281</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>Regenerative braking frequency [times/min] MR-J4W-</td>
<td>507</td>
<td>-</td>
<td>-</td>
<td>313</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia J [× 10⁻⁴ kg•m²]</td>
<td>238</td>
<td>615</td>
<td>875</td>
<td>1694</td>
<td>3519</td>
<td>6303</td>
<td></td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio</td>
<td>50 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute accuracy [μ]</td>
<td>±12.5</td>
<td>±10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP42)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist, dust or splash of oil or water</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance X: 49 m/s² Y: 49 m/s²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X: 24.5 m/s² Y: 24.5 m/s²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to “Conformity with Global Standards and Regulations” on &quot;SERVO AMPLIFIERS &amp; MOTORS L(NA)03058&quot; catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotor permissible load [N]</td>
<td>93</td>
<td>5500</td>
<td>350</td>
<td>16000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>17</td>
<td>38</td>
<td>52</td>
<td>48</td>
<td>85</td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. Connectors and gap between rotor and stator are excluded.
3. When unbalanced torque is generated, such as in a vertical lift machine, be sure to use the absolute position detection system, and keep the unbalanced torque under 70% of the servo motor rated torque.

Refer to “Annotations for Direct Drive Motor Specifications” on p. 404 in this catalog for the asterisks 1 to 7.
TM-RFM Series Torque Characteristics

Notes:
1. : For 3-phase 200 V AC or 1-phase 230 V AC.
   The following direct drive motors are compatible with 1-phase 230 V AC:
2. : For 1-phase 200 V AC or 1-phase 100 V AC.
3. : For 1-phase 200 V AC.
   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.
Direct Drive Motor Machine Accuracy

The machine accuracy related to the direct drive motor rotor (output shaft) and installation is indicated below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Measuring position</th>
<th>Accuracy [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runout of flange surface about rotor (output shaft)</td>
<td>a</td>
<td>0.05</td>
</tr>
<tr>
<td>Runout of fitting outer diameter of flange surface</td>
<td>b</td>
<td>0.07</td>
</tr>
<tr>
<td>Runout of rotor (output shaft)</td>
<td>c</td>
<td>0.04</td>
</tr>
<tr>
<td>Runout of rotor (output shaft) end</td>
<td>d</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Annotations for Direct Drive Motor Specifications

1. The power supply capacity varies depending on the power supply impedance.
2. The regenerative braking frequency shows the permissible frequency when the direct drive motor, without a load and a regenerative option, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m + 1), where m = Moment of inertia of load/Moment of inertia of direct drive motor. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). Take measures to keep the regenerative power [W] during operation below the permissible regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to “Regenerative Option” in this catalog for the permissible regenerative power [W] when regenerative option is used.
3. Be sure to connect the following options for absolute position detection system.
   - MR-J4: battery (MR-BAT6V1SET) and absolute position storage unit (MR-BTAS01).
   - MR-J4W_: battery case (MR-BT6VCASE), battery (MR-BAT6V1) x 5 pcs, and absolute position storage unit (MR-BTAS01).
   Refer to relevant Servo Amplifier Instruction Manual for details.
4. In the environment where the direct drive motor is exposed to oil mist, oil and/or water, a standard specification direct drive motor may not be usable. Contact your local sales office for more details.
5. The vibration direction is shown in the diagram below. The numerical value indicates the maximum value of the component. Fretting more likely occurs on the bearing when the direct drive motor stops. Thus, maintain vibration level at approximately one-half of the allowable value.
6. The following is calculation examples of axial and moment loads to the rotor (output shaft) of the direct drive motor. The axial and moment loads must be maintained equal to or below the permissible value.

\[
\text{Axial load} = F \times (L + A) \\
\text{Moment load} = F \times L \\
\text{Axial load} = F + \text{Load mass} \\
\text{Axial load} = F + \text{Load mass} \\
\text{Load} = \text{F (External force)} \\
\text{Load} = \text{F (External force)} \\
\text{Load} = \text{F (External force)} \\
\text{Load} = \text{F (External force)} \\
\text{Load} = \text{F (External force)}
\]

7. V10 indicates that the amplitude of the direct drive motor itself is 10 µm or less. The following shows mounting posture and measuring position of the direct drive motor during the measurement:
TM-RFM Series Dimensions (Note 1, 2)

- **TM-RFM002C20, TM-RFM004C20, TM-RFM006C20**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimension L</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-RFM002C20</td>
<td>58.5</td>
</tr>
<tr>
<td>TM-RFM004C20</td>
<td>75.5</td>
</tr>
<tr>
<td>TM-RFM006C20</td>
<td>92.5</td>
</tr>
</tbody>
</table>

- **TM-RFM006E20, TM-RFM012E20, TM-RFM018E20**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimension L</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-RFM006E20</td>
<td>62</td>
</tr>
<tr>
<td>TM-RFM012E20</td>
<td>83</td>
</tr>
<tr>
<td>TM-RFM018E20</td>
<td>104</td>
</tr>
</tbody>
</table>

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated. Make allowances for the tolerance when designing a machine.
2. indicates rotor.
### TM-RFM Series Dimensions (Note 1, 2)

#### ● TM-RFM012G20, TM-RFM048G20, TM-RFM072G20

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-RFM012G20</td>
<td>69</td>
</tr>
<tr>
<td>TM-RFM048G20</td>
<td>144</td>
</tr>
<tr>
<td>TM-RFM072G20</td>
<td>194</td>
</tr>
</tbody>
</table>

#### ● TM-RFM040J10, TM-RFM120J10, TM-RFM240J10

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>TM-RFM040J10</td>
<td>88.5 254</td>
</tr>
<tr>
<td>TM-RFM120J10</td>
<td>162.5 254.8</td>
</tr>
<tr>
<td>TM-RFM240J10</td>
<td>273.5 254</td>
</tr>
</tbody>
</table>

Notes: 1. For dimensions without tolerance, general tolerance applies. The actual dimensions may be 1 mm to 3 mm larger than the dimensions indicated. Make allowances for the tolerance when designing a machine.
2. D indicates rotor.
With Mitsubishi’s commitment to total system solutions and global supports, the MELSERVO-JE becomes the answer to the world-wide needs in driving control.

Fast, Trouble-Free Setup

Mitsubishi Electric’s unique “Advanced one-touch tuning” enables servo gain adjustment with one-touch ease. The increased tolerance against instantaneous power failure, the ease of maintenance, and the simple setup software would add further usability for all MELSERVO-JE users.

High-Precision Tuning

Servo gain adjustment with one-touch ease

**Advanced One-Touch Tuning Function**

Servo gain adjustment is complete just by turning on the one-touch tuning function. With this function, machine resonance suppression filter, advanced vibration suppression control II*, and robust filter are automatically adjusted to maximize your machine performance.

* The advanced vibration suppression control II automatically adjusts one frequency.

Suppress two types of low frequency vibrations at once

**Advanced Vibration Suppression Control II**

The advanced vibration suppression control II suppresses two types of low frequency vibrations owing to vibration suppression algorithm which supports three-inertia system. This function is effective in suppressing residual vibration generated at the end of an arm and in a machine, enabling a shorter settling time. Adjustment is easily performed on MR Configurator2.
### 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 a machine.

Wide frequency range

**Machine Resonance Suppression Filter**

![Applicable frequency range diagram](image)

Five filters are settable in a range of 10 Hz to 4500 Hz.

#### High responsivity and stability

**Robust Filter**

Achieving both high responsivity and stability was difficult with the conventional control in high-inertia systems with belts and gears 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 gradually reduces the fluctuation of torque in wide frequency range and achieves more stability as compared to the prior model.

- Machine with a high-inertia ratio

#### For Changes in Power Supply Environment

**Reduce machine downtime**

**Large Capacity Main Circuit Capacitor**

The capacity of main circuit capacitor is increased by 20% as compared to the previous model, increasing the tolerance against instantaneous power failure. The increased tolerance reduces machine downtime and then improves productivity.

![Previous model MR-JE series](image)

Enlarged capacity of main circuit capacitor increases the tolerance against instantaneous power failure.

**Reduce undervoltage alarms**

**Instantaneous Power Failure Tough Drive**

When an instantaneous power failure is detected, this function allows the servo amplifier to use the electric energy charged in the main circuit capacitor in the servo amplifier to avoid an alarm occurrence, increasing the machine availability even with an unstable power supply.

![Tough drive enabled](image)

Operation continues even after an instantaneous power failure occurs.

### Wide power supply voltage input range

**Compatible with 1-phase 200 to 240 V AC Input**

Servo amplifiers of 2 kW or smaller are compatible with power supply voltage of 1-phase 200 V AC to 240 V AC.

*When 1-phase 200 V AC to 240 V AC power supply is used with servo amplifiers of 1 kW and 2 kW, use the servo amplifiers with 75% or less of the effective load ratio. The servo amplifiers of 1 kW and 2 kW cannot be mounted closely when 1-phase power is input.*
Positioning operation with point table and program based methods became capable by built-in positioning function in MR-JE-A\(^*1\), allowing to configure positioning system without controller such as Positioning module.

Features:
- Equipped with simple cam, encoder following, and mark detection functions, making it possible to increase machine functionality.
- Command interface compatible with DIO or RS-422/RS-485 serial communication (maximum 32 axes)
- Easy setting of positioning data from MR Configurator2.

\(^*1\). Use MR-JE-A servo amplifiers with software version B7 or later when using the positioning function.

A Variety of Positioning Functions

Easy to set a positioning data

Point Table Method

Setting position data (target position), servo motor speed, and acceleration/deceleration time constants in point table is as easy as setting a parameter. Up to 31 points are settable for the point table. The positioning operation is performed with a start signal after selecting the point table No.

Program Method

Create positioning programs with dedicated commands. The positioning operation is performed with a start signal after selecting the program No. The program method enables more complex positioning operation than the point table method. Maximum of 16 programs are settable. (The total number of steps of program: 480)

\(^*\)MR Configurator2 is required to create programs.
Simple Cam Function

Various patterns of cam data* can be created easily by using MR Configurator2. Command pulse or point table/program start signal can be used as input to the simple cam. The input command will be outputted to the servo motor according to the cam data.

* Cam curve can be selected from 12 types (constant speed/constant acceleration/5th curve/single hypotenuse/cycloid/distorted trapezoid/distorted sine/distorted constant speed/trapezoid/reverse trapezoid/double hypotenuse/reverse double hypotenuse).

Synchronous operation by encoder signal input

Encoder Following Function/Command Pulse Input Through Function

With the encoder following function, the servo amplifier receives A/B-phase output signal from the synchronous encoder as command pulse, and the input command will be outputted to the servo motor according to the cam data. By setting cam data that matches with sheet length, a diameter of the rotary knife axis, and synchronous section of the sheet; a system in which the conveyor axis and the rotary knife axis are synchronized can be configured. Up to 4 Mpulses/s of input from synchronous encoder is compatible with the servo amplifier.

The command pulse input through function allows the first axis to output A/B-phase pulse from the synchronous encoder to the next axis, enabling a system the second and later axes are synchronized with the synchronous encoder.

Mark Sensor Input Compensation Function

The actual position of the servo motor can be obtained based on the inputs from the sensor that detects the registration marks printed on the high-speed moving film. The servo amplifier calculates compensation amounts and corrects position errors of the rotary knife axis based on those inputs from the sensor so that the film can be cut at the set position.
**Positioning Using Communication Function**

Compatible with MODBUS® protocol

Communication Function (MODBUS® RTU)

In addition to RS-422 communication (Mitsubishi general-purpose AC servo protocol), RS-485 communication (MODBUS® RTU protocol) is supported. MODBUS® RTU protocol is compatible with function code 03h (Read holding registers), etc. Controlling and monitoring the servo amplifier by external devices is possible.

Compatible function code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>03h</td>
<td>Read holding registers</td>
</tr>
<tr>
<td>08h</td>
<td>Diagnostics</td>
</tr>
<tr>
<td>10h</td>
<td>Preset multiple registers</td>
</tr>
</tbody>
</table>

**Point to Point positioning**

While the point table is in operation, the next target position of the point table can be overwritten.

**Current position latch**

While the point table is in operation, the position data is latched by the mark detection function, and the current position latch function let the controller to obtain the latched data.

**Easy Monitoring and Maintenance**

Analyze cause of alarm

Large Capacity Drive Recorder

- Servo data such as motor current and position command before and after the alarm occurrence are stored in non-volatile memory of the servo amplifier. Reading the servo data on MELSOFT MR Configurator2 helps you analyze the cause of the alarm.
- Check the waveform (analog 16 bits × 7 channels + digital 8 channels) × 256 points) and the monitor values of 16 alarms in the alarm history.

Reduce machine downtime incurred by age-related deterioration

Vibration Tough Drive

Machine resonance suppression filter is automatically readjusted when a change in machine resonance frequency is detected by the servo amplifier. Losses from the machine stop due to age-related deterioration are reduced.
Support optimal maintenance of driving parts

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.

Easy troubleshooting

Three-Digit Alarm

MR-JE series displays the alarm No. in three digits to show the servo alarm in more details, making troubleshooting easy.

User-Friendly Motors

Even in severe environment

Improved Environment Safety

HG-KN series and HG-SN series are rated IP65 and IP67 respectively.

* The shaft-through portion is excluded.

Cable leading in both ways

Selectable Cable Leading Direction

The power cable, the encoder cable, and the electromagnetic brake cable are led out to either in direction of or in opposite direction of the load side, depending on the selected cables. (HG-KN series)
The easy-to-use design MR-JE series makes startup and adjustment that simple.

Servo setup software

**MR Configurator2** *(SW1DNC-MRC2-E)*

Tuning, monitor display, diagnosis, reading/writing parameters, and test operations are easily performed on a personal computer. This startup support tool achieves a stable machine system, optimum control, and short setup time.

### Preparation

- **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.

- **Supporting replacement from conventional system**
  - **Parameter Converter Function**
    - With this function, parameter files for MR-E series or MR-E Super series are converted to those for MR-JE-A series.

### Setting and Start-up

- **Easy and fast parameter setting**
  - **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.

- **Visible operation and power status**
  - **Monitor Function**
    - Monitor operation status on the [Display all] window. Check power consumption without any measurement equipment such as electric power meter, assign input/output signals, and monitor ON/OFF status on the [I/O monitor] window.
### Servo Adjustment

**Tuning is just one click away**

**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 setting time and overshoot.

- **Easy adjustment**
  - Click
  - Display adjustment results.

- **Convenient with overwrite and graph history functions**
  - Convenient functions such as [Overwrite] for overwriting multiple data and [Graph history] for displaying graph history are available.

- **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.

- **Analyse the frequency characteristics**
  - 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.

- **Machine Analyzer Function**
  - Find out the aging deterioration of machines
  - 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 a machine and is beneficial for preventive maintenance.

### Maintenance

**For timely parts replacement**

**Servo Amplifier Life Diagnosis Function**

Check cumulative operation time and on/off times of inrush relay. This function provides an indication of replacement time for servo amplifier parts such as capacitor and relays.

**Find out the aging deterioration of machines**

**Machine Diagnosis Function**

Support the preventive maintenance of the servo amplifier.

- **Support the preventive maintenance of the servo amplifier.**
  - Prevent machine failure with advanced preventive maintenance beforehand.
Further Reduction of Cycle Time

Top-level basic performance is achieved, including speed frequency response of 2.0 kHz. The MELSERVO-JE series that utilizes regenerative energy maximizes the machine performance and energy saving.

Fast and Accurate

Class top-level speed frequency response

2.0 kHz Speed Frequency Response

The top-level speed frequency response of 2.0 kHz shortens the settling time substantially, reducing the cycle time of a machine.

[Setting time comparison with the prior model]

Speed

Prior motor speed

Motor speed

In-position signal

Shorter settling time

Time

Further smooth operation

Max Command Pulse Frequency of 4 Mpulses/s

MR-JE-A having a general-purpose interface is compatible with the maximum command pulse frequency of 4 Mpulses/s, enabling smooth operation.

Flexible Command Interface

Compatible with pulse train and analog

The command interface of MR-JE-A is compatible with both pulse train command and analog voltage command. The MR-JE-A servo amplifier enables position control with pulse train command, and speed and torque control with analog voltage command.

High-Resolution Encoder

Exact positioning

The servo motor equipped with an incremental encoder* of 131072 pulses/rev (17-bit) enables high-accuracy positioning and smooth rotation.

*MR-JE-A is not compatible with absolute position detection system.

Reduced Torque Ripple during Conduction

Smooth, constant-speed operation

By optimizing the combination of the number of motor poles and the number of slots, torque ripple during conduction is greatly reduced. Smooth constant-velocity operation of a machine is achieved.

Compatible with pulse train and analog
Eco-Friendly Performance

Reduce waste in energy consumption

Efficient Utilization of Regenerative Energy

Capacity of the main circuit capacitor is increased by 20% as compared to that of the prior model, and thus the charging capacity is increased, enabling larger regenerative energy to be reused as driving power energy. Additionally, because the control circuit and the main circuit use a common power supply, the regenerative energy is also used for the control circuit, reducing waste in energy consumption.

Visualize power consumption

Power Monitor

Driving power and regenerative energy are calculated from the data in the servo amplifier such as speed and current, and the power consumption is monitored with MR Configurator2. Visualization of the power consumption helps to save energy.

Achieve further energy saving

Saving Energy with Advanced Technologies

Reducing energy loss of the servo amplifier

Efficiency is increased by the use of a new power module. Energy loss of the servo amplifier itself is reduced.

Saving energy by improving machine performance

The servo amplifiers and the servo motors with the industry-leading level of high performance reduce machine cycle time and operation time, resulting less energy consumption.
Fully Compliant Worldwide

To satisfy growing needs in driving control throughout the world, the MR-JE series complies with global standards. Command pulse input and digital input/output are compatible with both sink and source type connections.

Global Servo Meets Global Standards

Best quality all over the world

Conformity with Global Standards and Regulations

Use the MR-JE series globally. The servo amplifiers and the servo motors conform to global standards as standard.

Conformity with global standards and regulations

<table>
<thead>
<tr>
<th>European EC directive</th>
<th>Servo amplifier</th>
<th>Servo motor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage directive</td>
<td>EN 61800-5-1</td>
<td>EN 60034-1</td>
</tr>
<tr>
<td>EMC directive</td>
<td>EN 61800-3</td>
<td>Compliant</td>
</tr>
<tr>
<td>RoHS directive</td>
<td>Compliant</td>
<td>Compliant</td>
</tr>
<tr>
<td>UL standard</td>
<td>UL 508C</td>
<td>UL 1004-1/UL 1004-6</td>
</tr>
<tr>
<td>CSA standard</td>
<td>CSA C22.2 No.14</td>
<td>CSA C22.2 No.100</td>
</tr>
<tr>
<td>Measures for Adminstration of the Pollution Control of Electronic Information Products (Chinese RoHS)</td>
<td>Compliant (optional cables and connectors)</td>
<td>Compliant (optional cables and connectors)</td>
</tr>
<tr>
<td>China Compulsory Certification (CCC)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Korea Radio Wave Law (KC)</td>
<td>Compliant</td>
<td>N/A</td>
</tr>
</tbody>
</table>

1. Refer to “Servo Amplifier Instruction Manual” and “EMC Installation Guidelines” when your system needs to meet the EMC directive.
2. When exporting the product, follow the local laws and regulations.

Flexible connections for the global use

Sink and Source Connections

Command pulse input and digital input/output are compatible with both sink and source type connections.

Example of digital input
MELSERVO-JE

Servo Amplifiers

Servo Amplifier Model Designation

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>SSCNET III/H</td>
</tr>
<tr>
<td>A</td>
<td>General-purpose</td>
</tr>
</tbody>
</table>

Symbol | Rated output [kW] |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.1</td>
</tr>
<tr>
<td>20</td>
<td>0.2</td>
</tr>
<tr>
<td>40</td>
<td>0.4</td>
</tr>
<tr>
<td>70</td>
<td>0.75</td>
</tr>
<tr>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
</tr>
<tr>
<td>300</td>
<td>3</td>
</tr>
</tbody>
</table>

Combinations of Servo Amplifier and Servo Motor

<table>
<thead>
<tr>
<th>Servo amplifier</th>
<th>HG-KN series</th>
<th>HG-SN series</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR-JE-10B/MR-JE-10A</td>
<td>HG-KN13J</td>
<td>-</td>
</tr>
<tr>
<td>MR-JE-20B/MR-JE-20A</td>
<td>HG-KN23J</td>
<td>-</td>
</tr>
<tr>
<td>MR-JE-40B/MR-JE-40A</td>
<td>HG-KN43J</td>
<td>-</td>
</tr>
<tr>
<td>MR-JE-100B/MR-JE-100A</td>
<td>-</td>
<td>HG-SN102J</td>
</tr>
<tr>
<td>MR-JE-300B/MR-JE-300A</td>
<td>-</td>
<td>HG-SN302J</td>
</tr>
</tbody>
</table>
Peripheral equipment is connected to MR-JE-B as described below. Connectors, cables, options, and other necessary equipment are available so that users can set up the servo amplifier easily and start using it right away.

**Regenerative option** (optional)
Install this unit in situations involving frequent regeneration and large moment of inertia of load.

**Encoder connector (CN2)**
Connect the servo motor encoder using an optional cable or a connector set.

**Battery connector (CN4)**
Connect MR-BAT6V1SET-A battery when configuring absolute position detection system.

**Display**
Servo amplifier status and alarm number are displayed.

**USB communication connector (CN5)**
Connect with a personal computer and use MR Configurator2. Parameter setting and monitoring are possible. Use an optional USB cable (MR-J3USBCBL3M).

**Axis setting part**
Select an axis with the axis selection rotary switch (SW1).

**I/O signal connector (CN3)**
This connector is used for forced stop input and electromagnetic brake interlock signal.

**SSCNET III/H connector (CN1A)**
Connect the servo system controller or the previous servo amplifier axis.

**SSCNET III/H connector (CN1B)**
Connect the next servo amplifier axis. Be sure to attach a cap to CN1B connector of the final axis.

**Molded-case circuit breaker (MCCB)**
This protects the power supply line.

**Magnetic contactor (MC)**
This turns off the power to the servo amplifier when an alarm is triggered.

**Power factor improving AC reactor (optional)**
This boosts the power factor of servo amplifier and reduces the power supply capacity.

**Charge lamp**
The lamp lights when the main circuit power supply is charged.

**Notes:**
1. The connection with the peripheral equipment is an example for MR-JE-100B or smaller servo amplifiers. Refer to "MR-JE_B Servo Amplifier Instruction Manual" for the actual connections.
## MR-JE-B (SSCNET II/H Interface) Specifications

<table>
<thead>
<tr>
<th>Servo amplifier model MR-JE-B</th>
<th>10B</th>
<th>20B</th>
<th>40B</th>
<th>70B</th>
<th>100B</th>
<th>200B</th>
<th>300B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current   [A]</td>
<td>1.1</td>
<td>1.5</td>
<td>2.8</td>
<td>5.8</td>
<td>6.0</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Voltage/frequency [Note 1]</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td>3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>0.9</td>
<td>1.5</td>
<td>2.6</td>
<td>3.8</td>
<td>5.0</td>
<td>10.5</td>
<td>14.0</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC [Note 8]</td>
<td>3-phase 170 V AC to 264 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>±5% maximum</td>
</tr>
<tr>
<td>Interface power supply</td>
<td>24 V DC ± 10% (required current capacity: 0.1 A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>Sine-wave PWM control/current method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tolerable regenerative power of the built-in regenerative resistor [W] [Note 3]</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Dynamic brake</td>
<td>Built-in [Note 4]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSCNET III/H command communication cycle [Note 6]</td>
<td>0.444 ms, 0.888 ms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication function</td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servo function</td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto-tuning, one-touch tuning, tough drive function, drive recorder function, tightening &amp; press-fit function, machine diagnosis function, power monitoring function, lost motion compensation function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective functions</td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection, hotline forced stop function [Note 9]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compliance to global standards</td>
<td>Refer to &quot;Conformity with global standards and regulations&quot; on p. 418 in this catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure (IP rating)</td>
<td>Natural cooling, open (IP20)</td>
<td>Force cooling, open (IP20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Close mounting [Note 5]</td>
<td>3-phase power supply input Possible</td>
<td>Possible</td>
<td>Not possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-phase power supply input</td>
<td>Possible</td>
<td>Possible</td>
<td>Not possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>Operation/Storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass [kg]</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>1.5</td>
<td>1.5</td>
<td>2.1</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Notes:
1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.
5. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use them with 75% or less of the effective load ratio.
6. The command communication cycle depends on the controller specifications and the number of axes connected.
7. This value is applicable when a 3-phase power supply is used.
8. When a 1-phase 200 V AC to 240 V AC power supply is used, use the servo amplifiers with 75% or less of the effective load ratio.
9. When an alarm occurs on MR-JE-B servo amplifier, the hot line forced stop signal will be sent to other servo amplifiers through a controller, and all the servo motors that are operated normally by MR-JE-B servo amplifiers decelerate to a stop. Refer to "MR-JE-B Servo Amplifier Instruction Manual" for details.
MR-JE-B Dimensions

- **MR-JE-10B** (Note 1)
- **MR-JE-20B** (Note 1)
- **MR-JE-40B** (Note 1)

Built-in regenerative resistor (lead wires) is mounted in MR-JE-40B only.

- **MR-JE-70B** (Note 1)
- **MR-JE-100B** (Note 1)

- **MR-JE-200B** (Note 2)
- **MR-JE-300B** (Note 2)

Notes: 1. CNP1 connector (insertion type) is supplied with the servo amplifier.
2. CNP1 and CNP2 connectors (insertion type) are supplied with the servo amplifier.
**MR-JE-A Connections with Peripheral Equipment** *(Note 1)*

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

- **Molded-case circuit breaker (MCCB)**
  This protects the power supply line.

- **Magnetic contactor (MC)**
  This turns off the power to the servo amplifier when an alarm is triggered.

- **Power factor improving AC reactor (optional)**
  This boosts the power factor of servo amplifier and reduces the power supply capacity.

- **Display**
  Servo amplifier status, parameter, and alarm number are displayed.

- **Setting section**
  Parameter settings and monitoring etc. are executed with push buttons. Push the MODE and SET buttons for 3 s or more to switch to the one-touch tuning mode.

- **USB communication connector (CN3)**
  Connect a personal computer and perform monitoring, batch parameter writing and saving, graph display, and test operation with MR Configurator2. Use an optional USB cable (MR-J3USBCBL3M).

- **I/O signal connector (CN1)**
  Connect to a Mitsubishi controller or any pulse train output controller.

- **Encoder connector (CN2)**
  Connect the servo motor encoder using an optional cable or a connector set.

- **Regenerative option (optional)**
  Install this unit in situations involving frequent regeneration and large moment of inertia of load.

- **Charge lamp**
  The lamp lights when the power supply is charged.

- **Servo motor power cable (optional)**

- **Servo motor**
  (The picture is as of HG-KN13J.)

**Notes:**
1. The connection with the peripheral equipment is an example for MR-JE-100A or smaller servo amplifiers. Refer to “MR-JE-_A Servo Amplifier Instruction Manual” for the actual connections.
### MR-JE-A (General-purpose Interface) Specifications

<table>
<thead>
<tr>
<th>Servo amplifier model MR-JE-</th>
<th>10A</th>
<th>20A</th>
<th>40A</th>
<th>70A</th>
<th>100A</th>
<th>200A</th>
<th>300A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>3-phase 170 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>1.1</td>
<td>1.5</td>
<td>2.8</td>
<td>5.8</td>
<td>6.0</td>
<td>11.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Voltage/frequency [Note 1]</td>
<td>3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current [Note 7] [A]</td>
<td>0.9</td>
<td>1.5</td>
<td>2.6</td>
<td>3.8</td>
<td>5.0</td>
<td>10.5</td>
<td>14.0</td>
</tr>
<tr>
<td>Permissible voltage fluctuation</td>
<td>3-phase or 1-phase 170 V AC to 264 V AC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5% maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interface power supply</strong></td>
<td>24 V DC ± 10% (required current capacity: 0.3 A)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control method</strong></td>
<td>Sine-wave PWM control/current control method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tolerable regenerative power of the built-in regenerative resistor [Note 2, 3] [W]</strong></td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Dynamic brake</strong></td>
<td>Built-in [Note 4, 8]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Communication function</strong></td>
<td>USB: Connect a personal computer (MR Configurator2 compatible)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Encoder output pulse</strong></td>
<td>Compatible (A/B/Z-phase pulse)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analog monitor</strong></td>
<td>2 channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Position control mode</strong></td>
<td>Maximum input pulse frequency</td>
<td>4 Mpulses/s (when using differential receiver), 200 kpulses/s (when using open-collector)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positioning feedback pulse</td>
<td>Encoder resolution: 131072 pulses/rev</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Command pulse multiplying factor</td>
<td>Electronic gear A/B multiple, A: 1 to 16777215, B: 1 to 16777215, 1/10 &lt; A/B &lt; 4000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Positioning complete width setting</td>
<td>0 pulse to ±65535 pulses (command pulse unit)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Error excessive</td>
<td>±3 rotations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Torque limit</strong></td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC maximum torque)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Speed control mode</strong></td>
<td>Speed control range</td>
<td>Analog speed command 1:2000, internal speed command 1:5000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analog speed command input</td>
<td>0 V DC to ±10 V DC/rated speed (Speed at 10 V is changeable with [Pr. PC12] )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Speed fluctuation rate</td>
<td>±0.01% maximum (load fluctuation 0% to 100%), 0% (power fluctuation: ±10%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Torque limit</strong></td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC maximum torque)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Speed limit</strong></td>
<td>Set by parameters or external analog input (0 V DC to +10 V DC/rated speed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Positioning mode</strong></td>
<td>Point table method, program method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Servo function</strong></td>
<td>Advanced vibration suppression control II, adaptive filter II, robust filter, auto tuning, one-touch tuning, tough drive function, drive recorder function, machine diagnosis function, power monitoring function</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Protective functions</strong></td>
<td>Overcurrent shut-off, regenerative overvoltage shut-off, overload shut-off (electronic thermal), servo motor overheat protection, encoder error protection, regenerative error protection, undervoltage protection, instantaneous power failure protection, overspeed protection, error excessive protection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compliance to global standards</strong></td>
<td>Refer to “Conformity with global standards and regulations” on p. 418 in this catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Structure (IP rating)</strong></td>
<td>Natural cooling, open (IP20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Close mounting</strong></td>
<td>Possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td>Possible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient temperature</strong></td>
<td>Operation: 0 °C to 55 °C (non-freezing), storage: -20 °C to 65 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambient humidity</strong></td>
<td>Operation/Storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ambience</strong></td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>1000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vibration resistance</strong></td>
<td>5.9 m/s² at 10 Hz to 55 Hz (directions of X, Y and Z axes)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mass</strong> [kg]</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>1.5</td>
<td>1.5</td>
<td>2.1</td>
<td>2.1</td>
</tr>
</tbody>
</table>

**Notes:**
1. Rated output and speed of a servo motor are applicable when the servo amplifier, combined with the servo motor, is operated within the specified power supply voltage and frequency.
2. Select the most suitable regenerative option for your system with our capacity selection software.
3. Refer to “Regenerative Option” in this catalog for the tolerable regenerative power [W] when regenerative option is used.
5. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use them with 75% or less of the effective load ratio.
6. RS-422 communication function is available with the servo amplifiers manufactured on December 2013 or later. RS-485 communication function is available with the servo amplifiers manufactured on May 2015 or later. Refer to “MR-JE-A Servo Amplifier Instruction Manual” for how to verify the manufacturing date of the products.
7. This value is applicable when a 3-phase power supply is used.
8. When the servo amplifiers are closely mounted, keep the ambient temperature within 0 °C to 45 °C, or use them with 75% or less of the effective load ratio.
9. Compatible with Mitsubishi general-purpose AC servo protocol (RS-422/RS-485 communication) and MODBUS® RTU protocol (RS-485 communication).
MR-JE-A Dimensions

- MR-JE-10A (Note 1)
- MR-JE-20A (Note 1)
- MR-JE-40A (Note 1)


- MR-JE-70A (Note 1)
- MR-JE-100A (Note 1)

[Diagram of MR-JE-70A, MR-JE-100A]

- MR-JE-200A (Note 2)
- MR-JE-300A (Note 2)

[Diagram of MR-JE-200A, MR-JE-300A]

Notes:
1. CNP1 connector (insertion type) is supplied with the servo amplifier.
2. CNP1 and CNP2 connectors (insertion type) are supplied with the servo amplifier.
Servo Motors

Model Designation

HG-KN13BJ

Symbol | Oil seal
-------|----------
J       | Installed (Note 5)
None    | None (Note 6)

Symbol | Electromagnetic brake
-------|------------------------
None    | None (Note 1)
B       | Installed (Note 1)

Symbol | Rated speed [r/min]
-------|------------------------
2       | 2000 (Note 2)
3       | 3000 (Note 3)

Symbol | Rated output [kW]
-------|-------------------
1       | 0.1
2       | 0.2
4       | 0.4
5       | 0.5
7       | 0.75
10      | 1.0
15      | 1.5
20      | 2.0
30      | 3.0

Symbol | Inertia/capacity
-------|-------------------
HG-KN  | Low inertia, small capacity
HG-SN  | Medium inertia, medium capacity

Notes:
1. Refer to electromagnetic brake specifications of each servo motor series in this catalog for the available models and detailed specifications.
2. 2000 r/min is for HG-SN series only.
3. 3000 r/min is for HG-KN series only.
4. Refer to special shaft end specifications of each servo motor series in this catalog for the available models and detailed specifications.
5. An oil seal is attached as a standard for all servo motors.

Combinations of Servo Motor and Servo Amplifier

<table>
<thead>
<tr>
<th>Servo motor</th>
<th>Servo amplifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KN series</td>
<td></td>
</tr>
<tr>
<td>HG-KN13(BJ)</td>
<td>MR-JE-10B/MR-JE-10A</td>
</tr>
<tr>
<td>HG-KN23(BJ)</td>
<td>MR-JE-20B/MR-JE-20A</td>
</tr>
<tr>
<td>HG-KN43(BJ)</td>
<td>MR-JE-40B/MR-JE-40A</td>
</tr>
<tr>
<td>HG-KN73(BJ)</td>
<td>MR-JE-70B/MR-JE-70A</td>
</tr>
<tr>
<td>HG-SN series</td>
<td></td>
</tr>
<tr>
<td>HG-SN52(BJ)</td>
<td>MR-JE-70B/MR-JE-70A</td>
</tr>
<tr>
<td>HG-SN102(BJ)</td>
<td>MR-JE-100B/MR-JE-100A</td>
</tr>
<tr>
<td>HG-SN152(BJ)</td>
<td>MR-JE-200B/MR-JE-200A</td>
</tr>
<tr>
<td>HG-SN202(BJ)</td>
<td>MR-JE-200B/MR-JE-200A</td>
</tr>
<tr>
<td>HG-SN302(BJ)</td>
<td>MR-JE-300B/MR-JE-300A</td>
</tr>
</tbody>
</table>
## HG-KN Series (Low Inertia, Small Capacity) Specifications

<table>
<thead>
<tr>
<th>Servo motor model</th>
<th>HG-KN</th>
<th>13(BJ)</th>
<th>23(BJ)</th>
<th>43(BJ)</th>
<th>73(BJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>HG-KN</td>
<td>Refer to &quot;Combinations of Servo Motor and Servo Amplifier&quot; on p. 426 in this catalog.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity</td>
<td>kW</td>
<td>0.3</td>
<td>0.5</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Continuous running duty</td>
<td>[W]</td>
<td>100</td>
<td>200</td>
<td>400</td>
<td>750</td>
</tr>
<tr>
<td>Rated output</td>
<td>N/m</td>
<td>0.32</td>
<td>0.64</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Maximum torque</td>
<td>N/m</td>
<td>0.95</td>
<td>1.9</td>
<td>3.8</td>
<td>7.2</td>
</tr>
<tr>
<td>Rated speed</td>
<td>[r/min]</td>
<td>3000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td>[r/min]</td>
<td>5000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed</td>
<td>[r/min]</td>
<td>5750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque</td>
<td>[kW/s]</td>
<td>12.9</td>
<td>18.0</td>
<td>43.2</td>
<td>44.5</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[kW/s]</td>
<td>12.0</td>
<td>16.4</td>
<td>40.8</td>
<td>41.0</td>
</tr>
<tr>
<td>Rated current</td>
<td>[A]</td>
<td>0.8</td>
<td>1.3</td>
<td>2.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Maximum current</td>
<td>[A]</td>
<td>2.4</td>
<td>3.9</td>
<td>7.8</td>
<td>14</td>
</tr>
<tr>
<td>Regenerative braking frequency</td>
<td>[times/min]</td>
<td>(Note 4)</td>
<td>(Note 5)</td>
<td>276</td>
<td>159</td>
</tr>
<tr>
<td>Moment of inertia J</td>
<td>[× 10^-4 kg•m^2]</td>
<td>0.0783</td>
<td>0.225</td>
<td>0.375</td>
<td>1.28</td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>[× 10^-4 kg•m^2]</td>
<td>0.0843</td>
<td>0.247</td>
<td>0.397</td>
<td>1.39</td>
</tr>
<tr>
<td>Recommended load to motor inertia ratio</td>
<td>15 times or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed/position detector</td>
<td>Combination with MR-JE-B</td>
<td>Absolute/incremental 17-bit encoder (resolution: 131072 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combination with MR-JE-A</td>
<td>Incremental 17-bit encoder (resolution: 131072 pulses/rev)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil seal</td>
<td>Installed</td>
<td>Without oil seal is also available.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>130 (B)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment</td>
<td>Ambient temperature</td>
<td>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambient humidity</td>
<td>Operation: 90 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>X: 49 m/s^2; Y: 49 m/s^2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vibration rank</td>
<td>V10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Compliance to global standards
Refer to "Conformity with global standards and regulations" on p. 418 in this catalog.

### Permissible load for the shaft
| L | [mm] | 25 | 30 | 30 | 40 |
| Radial | [N] | 88 | 245 | 245 | 392 |
| Thrust | [N] | 59 | 98 | 98 | 147 |
| Mass | Standard | [kg] | 0.6 | 0.98 | 1.5 | 3.0 |
| | With electromagnetic brake | [kg] | 0.8 | 1.4 | 1.9 | 4.0 |

### Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 8 of "Annotations for Servo Motor Specifications" on p. 431 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.
4. When the servo motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited. When the servo motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load to motor inertia ratio is 11 times or less.
5. When the servo motor decelerates to a stop from the rated speed, the regenerative frequency will not be limited if the load to motor inertia ratio is 9 times or less. When the servo motor decelerates to a stop from the maximum speed, the regenerative frequency will not be limited if the load to motor inertia ratio is 3 times or less.

Refer to "Annotations for Servo Motor Specifications" on p. 431 in this catalog for the asterisks 1 to 7.
**HG-KN Series Electromagnetic Brake Specifications** *(Note 1)*

<table>
<thead>
<tr>
<th>Servo motor model</th>
<th>HG-KN</th>
<th>13BJ</th>
<th>23BJ</th>
<th>43BJ</th>
<th>73BJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption</td>
<td>[W] at 20 °C</td>
<td>6.3</td>
<td>7.9</td>
<td>7.9</td>
<td>10</td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque</td>
<td>[N-m]</td>
<td>0.32</td>
<td>1.3</td>
<td>1.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Per braking work</td>
<td>[J]</td>
<td>5.6</td>
<td>22</td>
<td>22</td>
<td>64</td>
</tr>
<tr>
<td>Per hour</td>
<td>[J]</td>
<td>56</td>
<td>220</td>
<td>220</td>
<td>640</td>
</tr>
<tr>
<td>Electromagnetic brake life <em>(Note 2)</em></td>
<td>Number of brakings [Times]</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
</tr>
<tr>
<td>Work per braking[J]</td>
<td></td>
<td>5.6</td>
<td>22</td>
<td>22</td>
<td>64</td>
</tr>
</tbody>
</table>

Notes:
1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

**HG-KN Series Torque Characteristics**

**HG-KN Series Special Shaft End Specifications**

Motors with the following specifications are also available.

**D-cut shaft** *(Note 1)*: 100 W

**Key shaft (with key)** *(Note 1, 2)*: 200 W, 400 W, and 750 W

### Variable dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KN23(B)JK, 43(B)JK</td>
<td>T 5 S 14H6 R 30 Q 27 W 5 QK 20 OL 3 U 3 Y 3 M4 screw Depth: 15</td>
</tr>
<tr>
<td>HG-KN73(B)JK</td>
<td>T 6 S 19H6 R 40 Q 37 W 6 QK 25 OL 5 QL 3.5 M5 screw Depth: 20</td>
</tr>
</tbody>
</table>

Notes:
1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. 2 round end key is attached.
## HG-SN Series (Medium Inertia, Medium Capacity) Specifications

<table>
<thead>
<tr>
<th>Servo motor model</th>
<th>HG-SN</th>
<th>52(B)J</th>
<th>102(B)J</th>
<th>152(B)J</th>
<th>202(B)J</th>
<th>302(B)J</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compatible servo amplifier model</td>
<td>Refer to “Combinations of Servo Motor and Servo Amplifier” on p. 426 in this catalog.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity $^1$ [kVA]</td>
<td>1.0</td>
<td>1.7</td>
<td>2.5</td>
<td>3.5</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Continuous running duty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output [kW]</td>
<td>0.5</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>Rated torque $^{(3)}$ [N•m]</td>
<td>2.39</td>
<td>4.77</td>
<td>7.16</td>
<td>9.55</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>Maximum torque [N•m]</td>
<td>7.16</td>
<td>14.3</td>
<td>21.5</td>
<td>28.6</td>
<td>42.9</td>
<td></td>
</tr>
<tr>
<td>Rated speed [r/min]</td>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum speed [r/min]</td>
<td>3000</td>
<td></td>
<td>2500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible instantaneous speed [r/min]</td>
<td>3450</td>
<td></td>
<td>2875</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power rate at continuous rated torque</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard [kW/s]</td>
<td>7.85</td>
<td>19.7</td>
<td>32.1</td>
<td>19.5</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake [kW/s]</td>
<td>6.01</td>
<td>16.5</td>
<td>28.2</td>
<td>16.1</td>
<td>23.3</td>
<td></td>
</tr>
<tr>
<td>Rated current [A]</td>
<td>2.9</td>
<td>5.6</td>
<td>9.4</td>
<td>9.6</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Maximum current [A]</td>
<td>9.0</td>
<td>17</td>
<td>29</td>
<td>31</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Regenerative braking frequency $^{1,3}$ [times/min]</td>
<td>62</td>
<td>38</td>
<td>139</td>
<td>47</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>Moment of inertia I $^{[× 10^{-4} kg•m^2]}$</td>
<td>7.26</td>
<td>11.6</td>
<td>16.0</td>
<td>46.8</td>
<td>78.6</td>
<td></td>
</tr>
<tr>
<td>With electromagnetic brake</td>
<td>9.48</td>
<td>13.8</td>
<td>18.2</td>
<td>56.5</td>
<td>88.2</td>
<td></td>
</tr>
</tbody>
</table>

**Recommended load to motor inertia ratio $^{(3)}$** 15 times or less

<table>
<thead>
<tr>
<th>Speed/position detector</th>
<th>Combination with MR-JE-B</th>
<th>Absolute/incremental 17-bit encoder (resolution: 131072 pulses/rev)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Combination with MR-JE-A</td>
<td>Incremental 17-bit encoder (resolution: 131072 pulses/rev)</td>
</tr>
<tr>
<td>Oil seal</td>
<td>Installed</td>
<td></td>
</tr>
<tr>
<td>Insulation class</td>
<td>155 (F)</td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Totally enclosed, natural cooling (IP rating: IP67) $^{(3)}$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environment $^4$</th>
<th>Ambient temperature</th>
<th>Operation: 0 °C to 40 °C (non-freezing), storage: -15 °C to 70 °C (non-freezing)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ambient humidity</td>
<td>Operation: 80 %RH maximum (non-condensing), storage: 90 %RH maximum (non-condensing)</td>
</tr>
<tr>
<td>Ambience</td>
<td>Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust</td>
<td></td>
</tr>
<tr>
<td>Altitude</td>
<td>1000 m or less above sea level</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vibration resistance $^5$</th>
<th>X: 24.5 m/s² Y: 24.5 m/s²</th>
<th>X: 24.5 m/s² Y: 49 m/s²</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Compliance to global standards</th>
<th>Refer to “Conformity with global standards and regulations” on p. 418 in this catalog.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible load for the shaft $^6$</td>
<td></td>
</tr>
<tr>
<td>L [mm]</td>
<td>55</td>
</tr>
<tr>
<td>Radial [N]</td>
<td>980</td>
</tr>
<tr>
<td>Thrust [N]</td>
<td>490</td>
</tr>
<tr>
<td>Mass</td>
<td></td>
</tr>
<tr>
<td>Standard [kg]</td>
<td>4.8</td>
</tr>
<tr>
<td>With electromagnetic brake [kg]</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Notes:
1. Contact your local sales office if the load to motor inertia ratio exceeds the value in the table.
2. The shaft-through portion is excluded. Refer to the asterisk 8 of “Annotations for Servo Motor Specifications” on p. 431 in this catalog for the shaft-through portion.
3. When unbalanced torque is generated, such as in a vertical lift machine, keep the unbalanced torque of the machine under 70% of the servo motor rated torque.

Refer to “Annotations for Servo Motor Specifications” on p. 431 in this catalog for the asterisks 1 to 7.
### HG-SN Series Electromagnetic Brake Specifications (Note 1)

<table>
<thead>
<tr>
<th>Servo motor model</th>
<th>HG-SN</th>
<th>52BJ</th>
<th>102BJ</th>
<th>152BJ</th>
<th>202BJ</th>
<th>302BJ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage</td>
<td>24 V DC, 10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power consumption [W] at 20 °C</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Electromagnetic brake static friction torque [N•m]</td>
<td>8.5</td>
<td>8.5</td>
<td>8.5</td>
<td>44</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Per braking [J]</td>
<td>400</td>
<td>400</td>
<td>400</td>
<td>4500</td>
<td>4500</td>
<td></td>
</tr>
<tr>
<td>Per hour [J]</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td>45000</td>
<td>45000</td>
<td></td>
</tr>
<tr>
<td>Number of brakings [Times]</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td>20000</td>
<td></td>
</tr>
<tr>
<td>Work per braking [J]</td>
<td>200</td>
<td>200</td>
<td>200</td>
<td>1000</td>
<td>1000</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1. The electromagnetic brake is for holding. It should not be used for deceleration applications.
2. Brake gap is not adjustable. Electromagnetic brake life is defined as the time period until the readjustment is needed.

### HG-SN Series Torque Characteristics

#### HG-SN52(B)J (Note 1, 2, 3)

- **Speed [r/min]**:
  - 1000
  - 2000
  - 3000

#### HG-SN102(B)J (Note 1, 2, 3)

- **Speed [r/min]**:
  - 1000
  - 2000
  - 3000

#### HG-SN152(B)J (Note 1, 2, 3)

- **Speed [r/min]**:
  - 1000
  - 2000
  - 3000

### HG-SN Series Special Shaft End Specifications

Motors with the following specifications are also available.

#### Key shaft (without key) (Note 1, 2)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-SN52(B)J, 102(B)J, 152(B)J</td>
<td>S: 24h6 R: 55 Q: 50 W: 8 QK: 0 QL: 06 U: 36 f: 5 r: +0.2 Y: 4</td>
</tr>
<tr>
<td>HG-SN202(B)J, 302(B)J</td>
<td>S: 35 QK: 75 QL: 10 U: 55 f: 5 r: +0.2 Y: 5</td>
</tr>
</tbody>
</table>

Notes: 1. The servo motors with special shaft end are not suitable for frequent start/stop applications.
2. A key is not supplied with the servo motor. The key shall be installed by the user.
Annotations for Servo Motor Specifications

*1. The power supply capacity varies depending on the power supply impedance.

*2. The regenerative braking frequency shows the permissible frequency when the servo motor, without a load and a regenerative option, decelerates from the rated speed to a stop. When a load is connected; however, the value will be the table value/(m+1), where m = Moment of inertia of load/Moment of inertia of servo motor. When the operating speed exceeds the rated speed, the regenerative braking frequency is inversely proportional to the square of (operating speed/rated speed). Take measures to keep the regenerative power [W] during operation below the tolerable regenerative power [W]. Use caution, especially when the operating speed changes frequently or when the regeneration is constant (as with vertical feeds). Select the most suitable regenerative option for your system with our capacity selection software. Refer to "Regenerative Option" in this catalog for the tolerable regenerative power [W] when regenerative option is used.

*3. For 400 W or smaller servo amplifiers, the regenerative braking frequency may change affected by the power supply voltage due to the large ratio of the energy charged into the electrolytic capacitor in the servo amplifier.

*4. In the environment where the servo motor is exposed to oil mist, oil and/or water, a standard specification servo motor may not be usable. Contact your local sales office for more details.

*5. The vibration direction is shown in the diagram below. The numerical value indicates the maximum value of the component (commonly the bracket in the opposite direction of the servo motor shaft). Fretting more likely occurs on the bearing when the servo motor stops. Thus, maintain vibration level at approximately one-half of the allowable value.

*6. Refer to the diagram below for the permissible load for the shaft. Do not apply a load exceeding the value specified in the table on the shaft. The values in the table are applicable when each load is applied singly.

*7. V10 indicates that the amplitude of the servo motor itself is 10 µm or less. The following shows mounting posture and measuring position of the servo motor during the measurement:

*8. Refer to the diagram below for shaft-through portion.
**HG-KN Series Dimensions (Note 1, 5)**

**HG-KN13(B)J**

- **Power connector**
  - Pin No. | Signal name
  - 1 | (PE)
  - 2 | U
  - 3 | V
  - 4 | W

- **Electromagnetic brake connector (Note 2)**
  - Pin No. | Signal name
  - 1 | B1
  - 2 | B2

- **HG-KN13(B)**

- **Power connector**
  - Pin No. | Signal name
  - 1 | (PE)
  - 2 | U
  - 3 | V
  - 4 | W

- **Electromagnetic brake connector (Note 3)**
  - Pin No. | Signal name
  - 1 | B1
  - 2 | B2

---

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
**HG-KN Series Dimensions (Note 1, 5)**

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

- **Pin No.** Signal name
  - 1: (PE)
  - 2: U
  - 3: V
  - 4: W

**Outline**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KN23(B)J</td>
<td>88</td>
<td>124.8</td>
<td>45.6</td>
</tr>
<tr>
<td>HG-KN43(B)J</td>
<td>109.7</td>
<td>146.5</td>
<td>67.3</td>
</tr>
</tbody>
</table>

**Drawings**

- **Power connector**
  - Pin No. | Signal name
  - 1: (PE)
  - 2: U
  - 3: V
  - 4: W

- **Electromagnetic brake connector**
  - Pin No. | Signal name
  - 1: B1
  - 2: B2

**Model**

- HG-KN23(B)J: 88 (124.8) mm
- HG-KN43(B)J: 109.7 (146.5) mm

**Notes:**

1. For dimensions without tolerances, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.

---

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

- **Pin No.** Signal name
  - 1: B1
  - 2: B2

**Outline**

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-KN23(B)</td>
<td>76.6</td>
<td>113.4</td>
<td>36.4</td>
</tr>
<tr>
<td>HG-KN43(B)</td>
<td>98.3</td>
<td>135.1</td>
<td>58.1</td>
</tr>
</tbody>
</table>

**Drawings**

- **Power connector**
  - Pin No. | Signal name
  - 1: (PE)
  - 2: U
  - 3: V
  - 4: W

- **Electromagnetic brake connector**
  - Pin No. | Signal name
  - 1: B1
  - 2: B2

**Model**

- HG-KN23(B): 76.6 (113.4) mm
- HG-KN43(B): 98.3 (135.1) mm

**Notes:**

1. For dimensions without tolerances, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
**HG-KN Series Dimensions** (Note 1, 5)

**HG-KN73(B)J**

- **Electrical Connector Pinouts**
  - Power connector
  - Electromagnetic brake connector (Note 3)

- **Dimensions**
  - Use a friction coupling to fasten a load.

**Notes:**
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals (B1, B2) do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
### HG-SN Series Dimensions (Note 1, 5)

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-SN52(B)J</td>
<td>118.5 (153)</td>
<td>57.8</td>
<td></td>
</tr>
<tr>
<td>HG-SN102(B)J</td>
<td>132.5 (167)</td>
<td>71.8</td>
<td></td>
</tr>
<tr>
<td>HG-SN152(B)J</td>
<td>146.5 (181)</td>
<td>85.8</td>
<td></td>
</tr>
</tbody>
</table>

[Unit: mm]

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

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable dimensions (mm)</th>
<th>L</th>
<th>KL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG-SN202(B)J</td>
<td>138.5 (188)</td>
<td>74.8</td>
<td></td>
</tr>
<tr>
<td>HG-SN302(B)J</td>
<td>162.5 (212)</td>
<td>98.8</td>
<td></td>
</tr>
</tbody>
</table>

[Unit: mm]

Notes:
1. For dimensions without tolerance, general tolerance applies.
2. The electromagnetic brake terminals do not have polarity.
3. Only for the models with electromagnetic brake.
4. Dimensions in brackets are for the models with electromagnetic brake.
5. Use a friction coupling to fasten a load.
Inverter

Offers best choices that cover all needs

Our inverters with adjustable frequency power supply are designed to easily change the rotation speed of three-phase induction motors. High-performance, environmental friendly, and complies with global standards. Select from our product lineup for different applications.

Inverter FREQROL

A800 Series

New & high standard inverter with high-performance and high-quality. Enhanced drive performance and easy use while complying with safety standards.

A800Plus Series

The FR-A800 advanced-function, high-performance inverter has been enhanced with features that make it ideal for use in special fields.

F800 Series

Enhanced next-generation energy-saving inverter with functions ideal for fans and pumps.

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Line up</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-</td>
<td>P.448</td>
<td>P.444</td>
</tr>
<tr>
<td>FR-A840-</td>
<td>P.469</td>
<td>P.468</td>
</tr>
<tr>
<td>FR-A842-</td>
<td>P.500</td>
<td>P.498</td>
</tr>
<tr>
<td>FR-A846-</td>
<td>P.528</td>
<td>P.526</td>
</tr>
<tr>
<td>FR-F820-</td>
<td>P.466</td>
<td>P.465</td>
</tr>
<tr>
<td>FR-F840-</td>
<td>P.522</td>
<td>P.520</td>
</tr>
<tr>
<td>FR-F842-</td>
<td>P.549</td>
<td>P.547</td>
</tr>
<tr>
<td>FR-F720PJ-</td>
<td>P.483</td>
<td>P.482</td>
</tr>
<tr>
<td>FR-F740PJ-</td>
<td>P.562</td>
<td>P.560</td>
</tr>
<tr>
<td>FR-D720-</td>
<td>P.476</td>
<td>P.475</td>
</tr>
<tr>
<td>FR-D740-</td>
<td>P.542</td>
<td>P.540</td>
</tr>
<tr>
<td>FR-D720S-</td>
<td>P.556</td>
<td>P.554</td>
</tr>
<tr>
<td>FR-D710W-</td>
<td>P.490</td>
<td>P.488</td>
</tr>
<tr>
<td>FR-E720-</td>
<td>P.450</td>
<td>P.448</td>
</tr>
<tr>
<td>FR-E740-</td>
<td>P.500</td>
<td>P.498</td>
</tr>
<tr>
<td>FR-E720S-</td>
<td>P.528</td>
<td>P.526</td>
</tr>
<tr>
<td>FR-E710W-</td>
<td>P.556</td>
<td>P.554</td>
</tr>
</tbody>
</table>

Capacity table

<table>
<thead>
<tr>
<th>Model</th>
<th>Line up</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-</td>
<td>P.448</td>
<td>P.444</td>
</tr>
<tr>
<td>FR-A840-</td>
<td>P.469</td>
<td>P.468</td>
</tr>
<tr>
<td>FR-A842-</td>
<td>P.500</td>
<td>P.498</td>
</tr>
<tr>
<td>FR-A846-</td>
<td>P.528</td>
<td>P.526</td>
</tr>
<tr>
<td>FR-F820-</td>
<td>P.466</td>
<td>P.465</td>
</tr>
<tr>
<td>FR-F840-</td>
<td>P.522</td>
<td>P.520</td>
</tr>
<tr>
<td>FR-F842-</td>
<td>P.549</td>
<td>P.547</td>
</tr>
<tr>
<td>FR-F720PJ-</td>
<td>P.483</td>
<td>P.482</td>
</tr>
<tr>
<td>FR-F740PJ-</td>
<td>P.562</td>
<td>P.560</td>
</tr>
<tr>
<td>FR-D720-</td>
<td>P.476</td>
<td>P.475</td>
</tr>
<tr>
<td>FR-D740-</td>
<td>P.542</td>
<td>P.540</td>
</tr>
<tr>
<td>FR-D720S-</td>
<td>P.556</td>
<td>P.554</td>
</tr>
<tr>
<td>FR-D710W-</td>
<td>P.490</td>
<td>P.488</td>
</tr>
<tr>
<td>FR-E720-</td>
<td>P.450</td>
<td>P.448</td>
</tr>
<tr>
<td>FR-E740-</td>
<td>P.500</td>
<td>P.498</td>
</tr>
<tr>
<td>FR-E720S-</td>
<td>P.528</td>
<td>P.526</td>
</tr>
<tr>
<td>FR-E710W-</td>
<td>P.556</td>
<td>P.554</td>
</tr>
</tbody>
</table>

(Note) The output is three-phase 200 V.

To be released soon
Drive Product

**E700 Series**
Top level performer among compact inverters with more persistence and power.

**F700PJ Series**
Capable of operating both general-purpose and IPM motors, and built with various functions to fully meet the needs for fan and pumps.

**D700 Series**
Enhanced reliability and integrity with simplified operation and stronger performance.

---

### Capacity table

<table>
<thead>
<tr>
<th>Model</th>
<th>Inverter Capacity*1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-CK</td>
<td>37</td>
</tr>
<tr>
<td>FR-A840-CK</td>
<td></td>
</tr>
<tr>
<td>FR-A842-CK*2</td>
<td></td>
</tr>
<tr>
<td>FR-A846-CK*3</td>
<td></td>
</tr>
<tr>
<td>FR-F820-CK</td>
<td></td>
</tr>
<tr>
<td>FR-F840-CK</td>
<td></td>
</tr>
<tr>
<td>FR-F842-CK*2</td>
<td></td>
</tr>
<tr>
<td>FR-E720-CK*4</td>
<td></td>
</tr>
<tr>
<td>FR-E740-CK*4</td>
<td></td>
</tr>
<tr>
<td>FR-E720S-CK*4</td>
<td></td>
</tr>
<tr>
<td>FR-E710W-CK</td>
<td></td>
</tr>
<tr>
<td>FR-F720PJ-CK(PY)*5</td>
<td></td>
</tr>
<tr>
<td>FR-F740PJ-CK(PY)*6</td>
<td></td>
</tr>
<tr>
<td>FR-D720-CK</td>
<td></td>
</tr>
<tr>
<td>FR-D740-CK</td>
<td></td>
</tr>
<tr>
<td>FR-D720S-CK</td>
<td></td>
</tr>
<tr>
<td>FR-D710W-CK</td>
<td></td>
</tr>
</tbody>
</table>

*1 ND rated capacity for the FR-A800 series, and LD rated capacity for the FR-F800 series.
*2 Separated converter type. Always install the converter unit (FR-CC2). Not required when a high power factor converter (FR-HC2) is used.
*3 IP55 compatible model.
*4 SC at the end of the model name indicates the safety stop function model.
*5 NF at the end of the model name indicates the FL remote communication model.
*6 NC at the end of the model name indicates the CC-Link communication model.
*7 FR-BFP2 is enclosed for the inverter with Filterpack. (F is marked at the end of its model names on the packaging box.)

---

Voltage class

- Three-phase 200 V
- Three-phase 400 V
- Single-phase 200 V (Note)
- Single-phase 100 V (Note)

(Note) The output is three-phase 200 V.

To be released soon
Inverter FREQROL-A800 Series

Unparalleled high-performance; Promising high-quality

Approach to the Leading Drive Performance

The enhanced Real sensorless vector control and vector control serve the needs for all machinery types.

High-Quality Products

High response

<table>
<thead>
<tr>
<th>Response speed</th>
<th>Real sensorless vector control 50Hz*1</th>
<th>A700: 20 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vector control 130Hz*2</td>
<td>A700: 50 Hz</td>
</tr>
</tbody>
</table>

*1. At 3.7 kW with no load. Differs depending on the load conditions and motor capacity.

Fast response terminal

| Terminal response | A700: 5 to 20 ms | A800: 2 to 3 ms |

Line control

Line control is necessary for the machining of elongated products such as paper, thread, wires, all kinds of sheet, and tape. This will respond rapidly to changes in line speed and suppress the occurrences of winding unevenness. This contributes to a steady supply of high-quality products.

Ultra-Fine Processing

High-speed rotation

<table>
<thead>
<tr>
<th>Operating frequency</th>
<th>Real sensorless vector control and vector control 400Hz</th>
<th>V/F control 590Hz*3</th>
<th>A700: 400 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vector control 120 Hz</td>
<td>V/F control 1:10</td>
<td>A700: 120 Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Running frequency</th>
<th>FR-A700 120 Hz</th>
<th>FR-A800 90 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed (r/min)</td>
<td>120 Hz</td>
<td>90 Hz</td>
</tr>
<tr>
<td>Torque (%)</td>
<td>1.3 times</td>
<td>1.5 times</td>
</tr>
</tbody>
</table>

Machine tool

Cutting-edge machine tools are harder and thinner than ever before to be applicable to diverse new materials. High-speed rotation is required more than ever before in order to be applicable for fine and precise cutting on hard and difficult-to-grind materials.

Swiftly Move Heavy Weights

High torque at low speed

<table>
<thead>
<tr>
<th>Starting torque</th>
<th>Real sensorless vector control 200% (ND rating)*4</th>
<th>Vector control 200% (ND rating)*4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(When at 0.3 Hz)</td>
<td>(150% of initial setting for 5.5 K and higher)</td>
<td>(Select HD rating)*4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Zero-speed torque</th>
<th>V/F control 1:10 (6 to 60 Hz: Driving)</th>
<th>Advanced magnetic flux vector control 1:120 (0.5 to 60 Hz: Driving)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed control range</td>
<td>V/F control 1:120 (0.5 to 60 Hz: Driving)</td>
<td>Real sensorless vector control 1:200 (0.3 to 60 Hz: Driving)</td>
</tr>
<tr>
<td></td>
<td>Vector control 1:1500 (1 to 1500 r/min: Both driving/regeneration)</td>
<td></td>
</tr>
</tbody>
</table>

Cranes

Cranes are in operation daily at ports carrying fully-laden containers in response to strong demand from all over the world. Our new inverter realizes smooth cargo handling work at low speed and high torque for the slow and stable movements required for heavy objects.

*4: Refer to page 442 for the multiple rating setting.
For Accurate and Stable Transport between Machines

PM sensorless vector control

- What is a permanent magnet (PM) motor?
  A PM motor is a synchronous motor with strong permanent magnets embedded in its rotor. The two major PM motor types are: the interior permanent magnet (IPM) motor with its magnets embedded inside the rotor, and the surface permanent magnet (SPM) motor with its permanent magnets attached on the rotor surface.

- What is PM sensorless vector control?
  The speed and magnetic pole positions, the two essential bits of information to control a PM motor, are detected without a sensor (encoder). The speed detection internally-performed in an inverter enables highly accurate control of a PM motor, almost as accurate as an AC servo system, without the need of a sensor (encoder)*5. Combining with Mitsubishi MM-CF series IPM motors facilitates aspects of high-level control with no encoder such as "simple positioning"*6 and "zero speed torque".

Easy maintenance for sensor (encoder)-less motor

- No additional cables means less wiring space required.
- Improved reliability is obtained in unfavorable operating environments. (e.g. high vibration)
- PM motors are usually smaller and lighter than induction motors.

Transfer of circuit boards

The simple positioning control delivers a precision workpiece, such as a printed substrate, to a precise position. Transfer of fragile glass substrates can be performed with a highly accurate driving system.

Taking Motor Performance to the Max

Induction motors and magnet motors can be combined freely

- The cutting-edge auto tuning function
  The PM motor auto tuning function, which has been newly developed, enables sensorless operation of other manufacturers' permanent magnet (PM) motors.
  Operation with all Mitsubishi induction motors and PM motors, in addition to induction motors and PM motors from other manufacturers*, is possible. That means you need less motors for spare and stocks.
  (With IPM motors other than MM-CF and PM motors manufactured by other companies, starting torque is limited to 50%, and simple positioning control and zero speed torque cannot be used even if tuned.)

- Low speed, high torque realized with SF-PR motor
  By combining with Mitsubishi's high-performance, energy-saving motor SF-PR, 100% continuous operation is possible from a low speed of 0.3 Hz for inverters of any capacity.
  (when using Real sensorless vector control)

- Sharing the spare inverter
  One spare inverter is enough for the two types of motors (IM and PM).

<table>
<thead>
<tr>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spare inverters for each type</td>
<td>One spare inverter for both IM and PM</td>
</tr>
</tbody>
</table>

*5: Speed fluctuation ratio: ±0.05% (digital input)
*6: Positional accuracy (with no load) of 1.5K and lower: ±1.8°, 2K and higher: ±3.6°

Comparison of SF-PRF 1.5 kW 4P and MM-CF152

- The simple positioning control delivers a precision workpiece, such as a printed substrate, to a precise position.
- Transfer of fragile glass substrates can be performed with a highly accurate driving system.

SF-JR continuous operation torque characteristics
(Motor input voltage: 200 V)

SF-PR continuous operation torque characteristics
(Motor input voltage: 200 V)
Security & Safety ——— For Improved Equipment Reliability

Rapid response is obtained when an unexpected trouble occurs.

**Improved Safety System**

**Safety standards compliance**

- PLd and SIL2 are supported as standard. (STO)
  - EN ISO 13849-1 PLd / Cat.3
  - EN 61508, EN61800-5-2 SIL2
- Compatible with PLe and SIL3 using a built-in option (to be released soon).
  - EN ISO 13849-1 PLe / Cat.4 (to be supported soon)
  - EN 61508, EN61800-5-2 SIL3
- In addition to STO, also compatible with SS1, SS2, SLS, and SOS by using an option (to be released soon).

**Functions for IEC/EN 61800-5-2:2007**

- STO (Safe Torque Off)
- SS1 (Safe Stop 1)
- SS2 (Safe Stop 2)
- SOS (Safe Operating Stop)
- SLS (Safety Limited Speed)

**Reliable and Secure Maintenance**

**Standard 24 VDC power supply for the control circuit**

In addition to the existing power supply input terminals (R1 and S1) of the control circuit, 24 VDC input is equipped as standard. The 24 VDC power supplied from outside can be fed to the control circuit locally, enabling the parameter settings, communication operation and safety maintenance without turning ON the main power.

**Quick Reaction to Malfunction**

**Easy fault diagnosis**

- The operating status (output frequency, etc.) immediately before the protection function activates can be stored in the inverter built-in RAM with the trace function. Stored data (trace data) can be copied to a USB memory device, facilitating easy malfunction analysis at a separate location by reading into the Inverter Setup Software (FR Configurator2).

- Trace data stored in the built-in RAM is deleted when the power is turned OFF or the inverter is reset.

**Renewal Assurance**

**Enhanced life diagnosis function**

- An internal thermal sensor is equipped to all inverters as standard, which enables monitoring of the installation environment. Use this function as a guide for the life diagnosis.
- Maintenance timers are available for up to three peripheral devices, such as motor and bearing.

**Intercompatibility with existing models**

- The inverter installation method is the same as that for the FR-A700 series, eliminating any concerns over replacement.
- Furthermore, FR-A700 series control circuit terminal blocks can be installed with the use of an option (FR-A8TAT).

- The terminal response adjustment function allows a user to adjust the response speed in accordance with the existing facility.

- The conversion function of Inverter Setup Software (FR Configurator2) enables parameter copy from an FR-A700 and even from an FR-A500 (to be supported soon).
Easy Setup & Easy to Use — From Startup to Maintenance

Fully equipped with a variety of simple functions and equipment to improve work efficiency.

Streamlining the Startup Process

Parameter copying with USB memory [NEW]
- A USB host connector (A type), which allows external device connections, has been added. Parameters can be copied to commercial USB memory devices.
  
  USB 2.0 (full speed) supported

Easy setup with the Inverter Setup Software (FR Configurator2)
- It is a software which is easy to use and has unity as Mitsubishi FA products with MELSOFT common design and good operability.
- Easy plug-and-play connection to USB terminal equipped as standard

- Free trial version, which contains start-up functions, is available. It can be downloaded at Mitsubishi Electric FA Global Website.
  
  For FR Configurator2, please refer to page 446.

Easy wiring to the control circuit [NEW]
Spring clamp terminals have been adopted for control circuit terminals. Wires can be protected against loosening under vibrations during transportation of the inverter. Ten additional terminals are used as compared to the FR-A700 series. Round crimping terminals can also be used by employing a control terminal option (FR-A8TR).

Easy-to-Follow Display Improves the Operability

Easy operation with GOT [NEW]
- Automatic communication is possible without specifying any parameter settings simply by connecting to the GOT2000 series.
- The PLC function device monitor can be displayed at the GOT2000 series. Batch control of multiple inverter device monitors is possible with a single GOT unit.
- The sample screen data for the A800 can be found in the screen design software of the GOT2000 series. The newest version of the screen design software can be downloaded from the Mitsubishi Electric FA Global Website.

Easy-to-follow parameter configuration [NEW]
One of the selectable mode by the operation panel is the Group parameter mode, which provides intuitive and simple parameter settings.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr. 8</td>
<td>Environment</td>
</tr>
<tr>
<td>Pr. 1</td>
<td>Acceleration/deceleration</td>
</tr>
<tr>
<td>Pr. 18</td>
<td>Start and frequency commands</td>
</tr>
<tr>
<td>Pr. M</td>
<td>Protective function</td>
</tr>
<tr>
<td>Pr. T</td>
<td>Multi function I/O terminal</td>
</tr>
<tr>
<td>Pr. C</td>
<td>Motor constant</td>
</tr>
<tr>
<td>Pr. A</td>
<td>Applications</td>
</tr>
<tr>
<td>Pr. B</td>
<td>Applications (position control)</td>
</tr>
<tr>
<td>Pr. N</td>
<td>Communication</td>
</tr>
<tr>
<td>Pr. G</td>
<td>Control</td>
</tr>
</tbody>
</table>

Easy-to-read operation panel [NEW]
A 5-digit, 12-seg display has been adopted for the operation panel (FR-DU08) for a more natural character display. Furthermore, an optional LCD operation panel (FR-LU08) adopting an LCD panel capable of displaying text and menus is also available.

(Sample screen data for the A800 can be found in the screen design software of the GOT2000 series. The newest version of the screen design software can be downloaded from the Mitsubishi Electric FA Global Website.)

Maintenance

Reduced wiring check time
Split-type covers are adapted for all capacity models.
Maintenance is now easy because all an operator has to do is to remove the cover for the target wiring area.

Maintenance and control of multiple inverters (Option) [NEW]
Serial number reading is possible using the optional LCD operation panel (FR-LU08) or the Inverter Setup Software (FR Configurator2). Administration of different inverters has become much more simple.
System Support (Function) ——— High Equipment Functionality

Numerous functions and the extensive lineup of models are ready to support various systems.

Various Network Compatibility Brings All the Control in Your Hand

Compatibility to various open networks

- A controller can control and monitor an inverter via networks. RS-485 communication (Mitsubishi inverter protocol, MODBUS® RTU protocol), which is supported as standard, conveys data up to 115200 bps.
- A function block (FB) programming for CC-Link communication is available for the MELSEC-Q/L series. Inverter control sequence programs can be created easily. (An FB library (FB part library) can be downloaded from the Mitsubishi Electric FA Global Website.)
- The FR-A800-GF series inverter has a built-in CC-Link IE Network communication function. The CC-Link IE Network communication is ready for immediate operation.
- Communication options are also available for the major network protocols such as CC-Link and SSCNET III(H) as well as DeviceNet™, PROFIBUS-DPv0, and LonWorks® (to be supported soon). Other Ethernet networks are also supported.
  - CC-Link IE Field Network communication
  - FL remote communication

Selection of Optimum Capacity to Suit the Application

Multiple rating

Rated current and four different overload capacity ratings (SLD rating (super light duty), LD rating (light duty), ND rating (normal duty), HD rating (heavy duty)) can be selected with parameters. The optimum inverter can be selected to suit the application, and by selecting an inverter with SLD or LD rating, equipment size can be reduced when compared with the FR-A700 series. The HD rating is best suited for applications requiring low speed and high torque.

If using an inverter with capacity of 75K or higher, or motor with capacity of 75 kW or higher, always select and install the inverter based on the capacity of the motor with DC reactor.

<table>
<thead>
<tr>
<th>Rating</th>
<th>SLD</th>
<th>LD</th>
<th>ND</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Fan and Pump</td>
<td>Shield Machines, Winding and Unwinding, Printing Machines</td>
<td>Cranes, Press</td>
<td>Conveyor</td>
</tr>
<tr>
<td>Pr.570 (E301) setting</td>
<td>0</td>
<td>1</td>
<td>2 (Initial value)</td>
<td>3</td>
</tr>
<tr>
<td>Overload current rating (inverse-time characteristics)</td>
<td>110% 60 s, 120% 3 s</td>
<td>120% 60 s, 150% 3 s</td>
<td>150% 60 s, 200% 3 s</td>
<td>200% 60 s, 250% 3 s</td>
</tr>
<tr>
<td>Surrounding air temperature</td>
<td>40°C</td>
<td>50°C</td>
<td>50°C</td>
<td>50°C</td>
</tr>
</tbody>
</table>
System Support (Environment Adaptability) — Installation Anywhere

Compliant with a variety of standards, our extensive range of the FR-A800 series inverter covers various applications.

Comprehensive Noise Countermeasures

Compliance with EU EMC Directive with inverter alone

Troublesome acquisition of standards is unnecessary.

- The FR-A800 series is equipped with an EMC filter as standard for compliance with EMC Directive with the inverter alone. (EN 61800-3 2nd Environment Category C3)
- The newly developed drive technology and the power supply technology minimize the EMI emitted from inverters.

<table>
<thead>
<tr>
<th>Frequency [MHz]</th>
<th>Capacitive filter (radio noise filter)</th>
<th>Input-side common mode choke (line noise filter)</th>
<th>DC reactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>55K or lower</td>
<td>Standard (built-in)</td>
<td>Standard (built-in)</td>
<td>Option (sold separately)</td>
</tr>
<tr>
<td>75K or higher</td>
<td>Standard (built-in)</td>
<td>Option (sold separately)</td>
<td>Option (sold separately)</td>
</tr>
</tbody>
</table>

Protected in Hazardous Environments

Compliance with a variety of standards

- Complies with UL, cUL, and EC Directives (CE marking), and the Radio Waves Act (South Korea) (KC marking). It is also certified as compliant with the Eurasian Conformity (EAC).
- Being RoHS compliant, the FR-A800 series inverters are friendly to people and to the environment.
- For the 400 V class*, compliance with various countries ship classifications allows use on ship equipment. (A noise filter is required for the FR-A840 inverter and the FR-CC2 converter unit, and a ferrite core is required for the FR-A846 inverter.

Certification body

- NK (Nippon Kaiji Kyokai)
- ABS (American Bureau of Shipping)
- BV (Bureau Veritas)
- LR (Lloyd's Register of British and Foreign Shipping)
- DNV GL (DNV GL AS)
- CCS (China Classification Society)*1
- KR (Korean Register of Shipping)*1

*1: The IP55 compatible model with a built-in C3 filter is not compliant with the ship classification standards.

*2: The IP55 compatible model will be certified as compliant with the ship classification standards soon.

Wire Saving, Space Saving

Built-in brake transistor

In addition to the 22K and lower, 400 V class 30 to 55K models have also been equipped with a built-in brake transistor. In an application where the motor is hardly decelerated, connecting a brake resistor can shorten the deceleration time; no brake unit or power regeneration converter is required. Wiring, space, and ultimately the cost will be all saved.

Global Compatibility

Circuit board coating

The inverters with PCB coating (IEC60721-3-3 3C2/3S2) and conductive plating are available for improved environmental resistance. ("-60" or "-06" is affixed to the end of the inverter model name.)

Certification body

NK (Nippon Kaiji Kyokai)
ABS (American Bureau of Shipping)
BV (Bureau Veritas)
LR (Lloyd's Register of British and Foreign Shipping)
DNV GL (DNV GL AS)
CCS (China Classification Society)*1
KR (Korean Register of Shipping)*1

*1: The IP55 compatible model with a built-in C3 filter is not compliant with the ship classification standards.

*2: The IP55 compatible model will be certified as compliant with the ship classification standards soon.

Direct Installation by the Machine

IP55 compatible

- Inverters can be installed nearby the machine, minimizing cable length between the inverter and motor.
- Support is available for use even in high-humidity or dusty environments, facilitating a more flexible choice of installation locations.
- By enclosing a DC reactor, it requires less wiring and less space.
- Compatible with cable glands to meet the IP55 specification at the wiring section.
### Extensive lineup

#### Standard model

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure, functionality</th>
<th>Description</th>
<th>Symbol Type</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820</td>
<td>200 V class</td>
<td>Standard model</td>
<td>0.4K to 280K</td>
<td>FM</td>
<td>Without</td>
<td>Without</td>
</tr>
<tr>
<td>(06^{12})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Separated converter type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure, functionality</th>
<th>Description</th>
<th>Symbol Type</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A842</td>
<td>400 V class</td>
<td>Separated converter type</td>
<td>315K to 500K</td>
<td>FM</td>
<td>Without</td>
<td>Without</td>
</tr>
<tr>
<td>(06^{12})</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Converter unit

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure, functionality</th>
<th>Description</th>
<th>Symbol Type</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-CC2</td>
<td>400 V class</td>
<td>IP55 compatible model</td>
<td>315K to 630K</td>
<td>FM</td>
<td>Without</td>
<td>Without</td>
</tr>
</tbody>
</table>

#### IP55 compatible model

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure, functionality</th>
<th>Description</th>
<th>Symbol Type</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A846</td>
<td>400 V class</td>
<td>IP55 compatible model</td>
<td>0.4K to 132K</td>
<td>FM</td>
<td>Without</td>
<td>Without</td>
</tr>
</tbody>
</table>

#### Notes

1: Models can be alternatively indicated with the rated inverter current (SLD rating).
2: Specification differs by the type as follows.
3: Available for the 5.5K or higher.
4: For using the 75K or higher inverter and a 75 kW or higher motor, always install a DC reactor (FR-HC2), which is available as an option.
5: Always install the converter unit (FR-CC2). (Not required when a high power factor converter (FR-HC2) is used.)

[Refer to the table for detailed specifications and functions.]
Freely Control Machines

The PLC function will help you to provide the control sequence best suited for the machine specifications.

Inverter Operation Sequence Customized for the Machine

- A set of operations (operation at different signal inputs, signal and monitor outputs at different inverter status, etc.) can be freely programmed in accordance with the machine specifications. For example, a shutter opening/closing can be performed based on a signal from a sensor, or based on the opening/closing times.

- Control programs can be created in sequence ladders using the inverter setup software (FR Configurator2).

Realizes the Decentralized Control

- The control of the whole system is decentralized to inverters that manage their subordinate devices individually.

- A group of dedicated sequence programs is created and saved in each inverter. The master controller no longer has to process all the sequence programs, and the decentralized system accepts program changes more flexibly.

Parameter Setting, Protection, and Monitoring Functions can be Set

- Up to 50 parameters, which are linked with the data registers, can be saved. The variables (data registers) used in the PLC function can be saved as inverter parameters. Furthermore, parameter settings can be saved in the EEPROM of inverter. When results of calculation using the PLC function are saved in the parameters, the data can be retained after the power is turned OFF.

- Inverter output can be shut off under conditions other than those of the existing protective functions. Up to five specific fault-initiating conditions can be set to activate a protective function and shut off the inverter output.

- Special register values can be displayed for monitoring on the operation panel. Arbitrary data designated by the user such as results of calculation using the PLC function can be displayed.

Automatic Operation in Accordance with the Time

- With the real-time clock, automatic operation can be performed at certain times (when the optional LCD operation panel (FR-LU08) is used).

Useful Functions

- Parameter settings can be changed using sequence programs. The acceleration/deceleration patterns can also be set with sequence programs to be changed at certain operation statuses. You can choose RAM or EEPROM to save the parameter settings.

- When the settings are changed frequently, choose RAM.

- Two different loops of PID inverter operations can be preset, and those can be controlled using sequence programs.

- The inverter operation can be restricted for the command sources other than the sequence programs.

PLC function

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/O</td>
<td>Sequence programs enable I/O signal transmission to/from the inverter and its plug-in options.</td>
</tr>
<tr>
<td>Analog I/O</td>
<td>Sequence programs enable reading of analog input values or analog output transmission by the inverter, and analog output transmission to the plug-in options.</td>
</tr>
<tr>
<td>Pulse train I/O</td>
<td>Sequence programs enable pulse train inputs (to terminal JOG) and pulse train outputs (from terminal F/C/FM).</td>
</tr>
<tr>
<td>Inverter parameter read/write</td>
<td>Sequence programs enable inverter parameter write/read.</td>
</tr>
<tr>
<td>User parameter</td>
<td>Fifty user parameters (Pr.1150 to Pr.1199) are available and are linked with the data registers D206 to D255, which accept direct access by sequence programs.</td>
</tr>
<tr>
<td>CC-Link</td>
<td>A plug-in option (FR-A8NC) enables handling of remote registers as arbitrary data in the sequence programs.</td>
</tr>
<tr>
<td>PID operation</td>
<td>Inverter’s PID operations can be set (up to two loops).</td>
</tr>
<tr>
<td>User initiated fault</td>
<td>Up to five fault-initiating conditions can be set to activate a protective function.</td>
</tr>
<tr>
<td>Fault clear</td>
<td>The protective function occurring in the inverter can be reset.</td>
</tr>
<tr>
<td>Inverter operation lock</td>
<td>Inverters can start up while the PLC function is running.</td>
</tr>
<tr>
<td>Monitored item for the user</td>
<td>Desired data is displayable on the operation panel.</td>
</tr>
</tbody>
</table>
Free trial version Supported

The function with the marking above is available in the free trial version (usable free of charge with limited functions). It can be downloaded at Mitsubishi Electric FA Global Website.

<table>
<thead>
<tr>
<th>Function</th>
<th>Free trial version</th>
<th>Function</th>
<th>Free trial version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter list</td>
<td>◯</td>
<td>Convert</td>
<td>◯</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>◯</td>
<td>Developer</td>
<td>×</td>
</tr>
<tr>
<td>Graph</td>
<td>◯</td>
<td>USB memory</td>
<td>×</td>
</tr>
<tr>
<td>Batch monitor</td>
<td>×</td>
<td>parameter copy file edit</td>
<td>×</td>
</tr>
<tr>
<td>Test operation</td>
<td>◯</td>
<td>Help</td>
<td>◯</td>
</tr>
<tr>
<td>I/O terminal monitor</td>
<td>◯</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The try-and-buy version (usable free of charge for a limited period of 20 days with the same functions as the release version) is also offered.

**Easy connection with a USB cable**
A USB connector (Mini-B connector) is provided as standard. Easy connection to the computer without the need for a converter.

**Intuitive user interface**
Connected inverters are displayed in tree view format. Windows for each function can be accessed by changing the tab for maximum efficiency.

**Work can be carried out away from the equipment using a USB memory device**
By loading trace data and parameter settings copied to a USB memory device into FR Configurator2, analysis and adjustments can be carried out with ease away from the equipment.

**Sequence control (Developer function)**
The Developer function is used for creating sequence programs and writing them to the inverter to enable the use of the PLC function of the inverter.

**Delivering a Comfortable Inverter Operating Environment**
From inverter startup to maintenance, this versatile software allows the user to specify settings easily with the computer.

**Compatible operating systems**
Windows® 7, Windows® 8, Windows® 8.1/Pro/Enterprise (32-bit, 64-bit), Windows Vista® (32-bit), Windows® XP Professional SP3 or later, Windows® XP Home Edition SP3 or later

"Windows is a registered trademark of Microsoft Corporation in the United States and other countries."
Installation Example

Three-phase AC power supply
Must be within the permissible power supply specifications of the inverter. (Refer to page 448)

Moulded case circuit breaker (MCCB) or earth leakage current breaker (ELB), fuse
Must be selected carefully since an inrush current flows in the inverter at power ON.

Magnetic contactor (MC)
Install this to ensure safety. Do not use this to start and stop the inverter. Doing so will shorten the life of the inverter.

AC reactor (FR-HAL)
DC reactor (FR-HEL)

Line noise filter (FR-BLF)
The FR-A800-03160(35K) or lower and the FR-A800-01800(25K) or lower or the FR-A800-01800(25K) or lower are equipped with the common mode choke.

For the FR-A820-03800(75K) or higher, the FR-A800-03160(35K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor. (IP55 compatible models are equipped with the DC reactor.)

USB connector
USB host
A connector
Communication status indicator (LED) (USB host)
USB device (Mini B connector)

Personal computer (FR Configurator2)

High-duty brake resistor (FR-ABR)

Moulded case circuit breaker (MCCB) or earth leakage current breaker (ELB), fuse

AC reactor (FR-HAL)
DC reactor (FR-HEL)

For the FR-A820-03800(75K) or higher, the FR-A800-03160(35K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor. (IP55 compatible models are equipped with the DC reactor.)

The FR-A820-03160(55K) or lower and the FR-A840-01800(55K) or lower are equipped with the common mode choke.

Connect this for an application where a PM motor is driven by the load even while the inverter power is OFF. Do not open or close the contactor while the inverter is running (outputting).

Personal computer (FR Configurator2)

USB host
A connector
USB device (Mini B connector)

Communication status indicator (LED) (USB host)

AC Servo
P.268

Inverter
P.436
### Standard Specifications

#### Rating (Standard model)

**200 V class**

<table>
<thead>
<tr>
<th>Model</th>
<th>FR-A820- [ ] (GF)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Applicable motor capacity (kW)</strong></td>
<td>0.4K</td>
</tr>
<tr>
<td>SLD</td>
<td>0.75</td>
</tr>
<tr>
<td>LD</td>
<td>0.75</td>
</tr>
<tr>
<td>NO (initial setting)</td>
<td>0.4</td>
</tr>
<tr>
<td>ND</td>
<td>0.2 [1]</td>
</tr>
<tr>
<td><strong>Rated capacity (kVA)</strong></td>
<td>1.8</td>
</tr>
<tr>
<td>SLD</td>
<td>1.8</td>
</tr>
<tr>
<td>LD</td>
<td>1.6</td>
</tr>
<tr>
<td>NO (initial setting)</td>
<td>1.1</td>
</tr>
<tr>
<td>ND</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Rated current (A)</strong></td>
<td>4.6</td>
</tr>
<tr>
<td>SLD</td>
<td>4.6</td>
</tr>
<tr>
<td>LD</td>
<td>4.2</td>
</tr>
<tr>
<td>NO (initial setting)</td>
<td>3</td>
</tr>
<tr>
<td>HD</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Overload rating</strong></td>
<td>SLD</td>
</tr>
<tr>
<td>LD</td>
<td>120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
<tr>
<td>NO (initial setting)</td>
<td>150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
<tr>
<td>HD</td>
<td>200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
<tr>
<td><strong>Rated voltage</strong></td>
<td>Three-phase 200 to 240 V</td>
</tr>
<tr>
<td>SLD</td>
<td>Three-phase 200 to 240 V 50 Hz/60 Hz</td>
</tr>
<tr>
<td>LD</td>
<td>Three-phase 200 to 240 V 50 Hz/60 Hz</td>
</tr>
<tr>
<td>NO (initial setting)</td>
<td>Three-phase 200 to 240 V 50 Hz/60 Hz</td>
</tr>
<tr>
<td>HD</td>
<td>Three-phase 200 to 240 V 50 Hz/60 Hz</td>
</tr>
<tr>
<td><strong>Power supply capacity (kVA)</strong></td>
<td>2</td>
</tr>
<tr>
<td>SLD</td>
<td>2</td>
</tr>
<tr>
<td>LD</td>
<td>1.9</td>
</tr>
<tr>
<td>NO (initial setting)</td>
<td>1.5</td>
</tr>
<tr>
<td>HD</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Protective structure (IEC 60529)</strong></td>
<td>Enclose type (IP20)</td>
</tr>
<tr>
<td>FR-DU08: IP40 (except for the PU connector section)</td>
<td></td>
</tr>
</tbody>
</table>

---

1. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
2. The 0.2 kW motor capacity is applicable under V/F control only.
3. The rated output capacity indicated assumes that the output voltage is 220 V for 200 V class.
4. The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
5. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 2\( \sqrt{2} \).
6. Value for the built-in brake resistor
7. Value for the ND rating
8. The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
9. The power capacity is the value when at a rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
10. FR-DU08: IP40 (except for the PU connector section)
### 400 V class

<table>
<thead>
<tr>
<th>Model</th>
<th>FR-A840-<a href="GF"> </a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage (V)</td>
<td>400 V class</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated capacity (kVA)</th>
<th>Built-in</th>
<th>FR-BU2(Option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum brake torque</td>
<td>100% torque/2%ED*4</td>
<td>20% torque/continuous</td>
</tr>
<tr>
<td>when the option is used</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Output

<table>
<thead>
<tr>
<th>Overload current rating*6</th>
<th>LD</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND (initial setting)</td>
<td>1.9</td>
<td>1.1</td>
</tr>
<tr>
<td>LD</td>
<td>3.8</td>
<td>4.8</td>
</tr>
<tr>
<td>HD</td>
<td>2.3</td>
<td>3.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated voltage**</th>
<th>Three-phase 380 to 500 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake transistor</td>
<td>Built-in</td>
</tr>
<tr>
<td>FR-BU2(Option)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permissible AC voltage fluctuation</th>
<th>Three-phase 380 to 500 V 50 Hz/60 Hz**</th>
</tr>
</thead>
<tbody>
<tr>
<td>RATED INPUT CURRENT (A)**</td>
<td>3.2, 4.9, 6.3, 8.3, 12.3, 17.4, 22.3, 31.0, 40.3, 58.4, 78.6, 115.7, 140.8, 180.9, 216.0, 260.0, 325.6, 361.4, 428.1, 481.7, 547.0, 683.2</td>
</tr>
<tr>
<td>RATED INPUT CURRENT (A)**</td>
<td>1.4, 2.3, 3.7, 6.2, 12.3, 17.4, 22.3, 31.0, 40.3, 58.4, 78.6, 115.7, 140.8, 180.9, 216.0, 260.0, 325.6, 361.4, 428.1, 481.7, 547.0, 683.2</td>
</tr>
<tr>
<td>RATED INPUT CURRENT (A)**</td>
<td>2.3, 3.7, 5.5, 7.7, 12.7, 17.4, 22.3, 31.0, 40.3, 58.4, 78.6, 115.7, 140.8, 180.9, 216.0, 260.0, 325.6, 361.4, 428.1, 481.7, 547.0, 683.2</td>
</tr>
<tr>
<td>RATED INPUT CURRENT (A)**</td>
<td>1.7, 2.8, 4.7, 6.3, 9.4, 13.7, 24.7, 31, 40.3, 58.4, 78.6, 115.7, 140.8, 180.9, 216.0, 260.0, 325.6, 361.4, 428.1, 481.7, 547.0, 683.2</td>
</tr>
<tr>
<td>RATED INPUT CURRENT (A)**</td>
<td>1.1, 1.7, 2.8, 4.7, 8.3, 9.4, 13, 24.7, 31, 40.3, 58.4, 78.6, 115.7, 140.8, 180.9, 216.0, 260.0, 325.6, 361.4, 428.1, 481.7, 547.0, 683.2</td>
</tr>
</tbody>
</table>

### Cooling system

- **Self-cooling**
- **Forced air cooling**

#### Protective structure (IEC 60529)**7**

<table>
<thead>
<tr>
<th>Enclose type (IP20)</th>
<th>Open type (IP00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mass (kg)</td>
<td>9.2, 13.7, 22.3, 31, 40.3, 58.4, 78.6, 115.7, 140.8, 180.9, 216.0, 260.0, 325.6, 361.4, 428.1, 481.7, 547.0, 683.2</td>
</tr>
</tbody>
</table>

---

1. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.  
2. The 0.2 kW motor capacity is applicable under V/F control only.  
3. The rated output capacity indicated assumes that the output voltage is 440 V for 400 V class.  
4. The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the specified load.  
5. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 1.72.  
6. Value for the built-in brake resistor  
7. Value for the ND rating  
8. Value for the LD rating  
9. The braking capability of the inverter built-in brake can be improved with a commercial brake resistor. For the details, please contact your sales representative.  
10. The braking rating indicated assumes that the output voltage is 440 V. Set F-R:377 input voltage mode selection.
### Inverter FREQROL-A800 Series

#### 400 V class

**Model FR-A842- [ ](GF) 07700 08660 09620 10940 12120**

<table>
<thead>
<tr>
<th>Applicable motor capacity (kW)<strong>1</strong></th>
<th>315K</th>
<th>355K</th>
<th>400K</th>
<th>450K</th>
<th>500K</th>
<th>560K</th>
<th>630K</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLD</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td>280</td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLD</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
<td>924</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td>417</td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1094</td>
<td>1212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>610</td>
<td>683</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td>547</td>
<td>610</td>
<td>683</td>
<td>770</td>
<td>866</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output</th>
<th>SLD</th>
<th>SLD</th>
<th>SLD</th>
<th>SLD</th>
<th>SLD</th>
<th>SLD</th>
<th>SLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload current rating<strong>2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLD (with FR-CC2)</td>
<td>110%</td>
<td>60 s</td>
<td>120%</td>
<td>3 s</td>
<td>120%</td>
<td>60 s</td>
<td>120%</td>
</tr>
<tr>
<td>LD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Rated voltage**3**               |      |      |      |      |      |      |      |
| DC power supply voltage          | 430  | 780  | VDC  |      |      |      |      |

<table>
<thead>
<tr>
<th>Control power supply auxiliary input</th>
<th>Single phase 380 to 500 V 50 Hz/60 Hz</th>
<th>Frequency ±5%, voltage ±10%</th>
</tr>
</thead>
</table>

| Overload current rating**4**       | 110% | 60 s | 120% | 3 s  | 120% | 60 s | 120% |
| ND (initial setting)               |      |      |      |      |      |      |      |
| HD (with FR-CC2)                   |      |      |      |      |      |      |      |

| Rated voltage**5**               |      |      |      |      |      |      |      |
| Regenerative braking torque**6**  | 10%  | torque/continuous | Maximum brake torque |

**1**: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

**2**: The overload current rating indicates the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

**3**: The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about √3.

**4**: ND rating reference value

**5**: FR-DU08: IP40 (except for the PU connector section)

**6**: For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.

---

**Model FR-CC2- [ ](GF) 315K 355K 400K 450K 500K 560K 630K**

<table>
<thead>
<tr>
<th>Applicable motor capacity (kW)<strong>1</strong></th>
<th>315</th>
<th>355</th>
<th>400</th>
<th>450</th>
<th>500</th>
<th>560</th>
<th>630</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload current rating<strong>2</strong></td>
<td>200% 60 s, 250% 3 s</td>
<td>150% 60 s, 200% 3 s</td>
<td>150% 60 s, 200% 3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage<strong>3</strong></td>
<td>430 to 780 VDC</td>
<td>Three-phase 380 to 500 V 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Rated input AC voltage/frequency | Three-phase 380 to 500 V 50 Hz/60 Hz |
| Permissible AC voltage fluctuation | Three-phase 323 to 550 V 50 Hz/60 Hz |
| Permissible frequency fluctuation | ±5% |

| Rated input current (A)          | 610  | 683  | 770  | 866  | 962  | 1094 | 1212 |
| Rated power supply capacity (kVA)**4** | 465  | 521  | 587  | 660  | 733  | 833  | 924  |

| Protective structure (IEC 60529)**5** | Open type (IP00) |
| Protection system                  | Forced air cooling |

**1**: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

**2**: The overload current rating indicates the ratio of the overload current to the converter unit’s rated output current. The overload current rating varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by √3.

**3**: The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).

**4**: The permissible voltage imbalance ratio is 3% or less. (Imbalance ratio = (highest voltage between lines - average voltage between three lines) / average voltage between three lines × 100)

**5**: ND rating reference value

**6**: For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.

---

**Converter unit (FR-CC2)**

<table>
<thead>
<tr>
<th>Applicable motor capacity (kW)</th>
<th>315</th>
<th>355</th>
<th>400</th>
<th>450</th>
<th>500</th>
<th>560</th>
<th>630</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload current rating<strong>2</strong></td>
<td>200% 60 s, 250% 3 s</td>
<td>150% 60 s, 200% 3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage<strong>3</strong></td>
<td>430 to 780 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Rated input AC voltage/frequency | Three-phase 380 to 500 V 50 Hz/60 Hz |
| Permissible AC voltage fluctuation | Three-phase 323 to 550 V 50 Hz/60 Hz |
| Permissible frequency fluctuation | ±5% |

| Rated input current (A) | 610  | 683  | 770  | 866  | 962  | 1094 | 1212 |
| Rated power supply capacity (kVA)**4** | 465  | 521  | 587  | 660  | 733  | 833  | 924  |

| Protective structure (IEC 60529)**5** | Open type (IP00) |
| Protection system                  | Forced air cooling |

**1**: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

**2**: The overload current rating indicates the ratio of the overload current to the converter unit’s rated output current. The overload current rating varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by √3.

**3**: The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).

**4**: The permissible voltage imbalance ratio is 3% or less. (Imbalance ratio = (highest voltage between lines - average voltage between three lines) / average voltage between three lines × 100)

---

*1: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.*

*2: The overload current capacity indicated assumes that the output voltage is 440 V.*

*3: The % value of the overload current rating indicated is the ratio of the overload current to the converter unit’s rated output current. For repeated duty, allow time for the converter unit and the inverter to return to or below the temperatures under 100% load.*

*4: The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the converter unit output side is the power supply voltage multiplied by about √3.*

*5: ND rating reference value

*6: FR-DU08: IP40 (except for the PU connector section)*

*7: For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.*
### Frequency Inverter Specification

#### FR-E846 Series

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rating (IP55 compatible model)</td>
<td>400 V class</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable motor capacity (kW)*1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>0.7</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>1.2</td>
<td>2.7</td>
<td>3.5</td>
<td>6.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>2.1</td>
<td>4.8</td>
<td>5.6</td>
<td>10.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>3.7</td>
<td>6.9</td>
<td>10.6</td>
<td>18.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>7.3</td>
<td>13.9</td>
<td>23.8</td>
<td>40.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>3</td>
<td>6</td>
<td>9</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>12.7</td>
<td>23.3</td>
<td>41.8</td>
<td>70.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>17.6</td>
<td>32.6</td>
<td>57.8</td>
<td>96.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>7</td>
<td>14</td>
<td>21</td>
<td>44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD (initial setting)</td>
<td>23.4</td>
<td>43.1</td>
<td>79.6</td>
<td>132.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>9</td>
<td>18</td>
<td>27</td>
<td>57</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Specifications

- **Model:** FR-E846-
- **Rating (IP55 compatible model):** 400 V class
- **Applicable motor capacity (kW):**
  - LD: 0.4, 0.75, 1.5, 2.2, 3.7, 5.5, 7.5, 11, 15, 18.5, 22, 30, 37, 45, 55, 75, 90, 110, 132, 160
  - ND: 0.7, 1.5, 2.2, 3.7, 5.5, 7.5, 11, 15, 18.5, 22, 30, 37, 45, 55, 75, 90, 110, 132

### Protection

- **Proper structure:**
  - IEC60529: Dust- and water-proof type (IP55)
  - UL Type 12

- **Cooling system:**
  - Self-cooling + internal fan
  - Forced-air-cooling + internal fan

### Power Supply

- **Rated input AC voltage/frequency:** Three-phase 380 to 500V 50Hz/60Hz
- **Permissible AC voltage fluctuation:** ±5%
- **Rated input current (A):**
  - LD: 2.1, 3.5, 4.8, 7.6, 11.5, 16, 23, 29, 35, 43, 57, 70, 85, 106, 144, 180, 216, 260, 325
  - ND: 1.5, 2.5, 4, 6, 9, 12, 17, 23, 31, 38, 44, 57, 71, 86, 110, 144, 180, 216, 260

### Notes:

1. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
2. The rated output capacity indicated assumes that the output voltage is 440 V.
3. The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
4. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about √2.
5. Value for the ND rating
6. The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
7. The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
8. For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.
9. UL Type 12 Enclosure-Suitable for Installation in a Compartment Handling Conditioned Air (Plenum)
10. For compliance with IP55, remove the protective bushings and install the recommended cable glands.
<table>
<thead>
<tr>
<th><strong>Common specifications</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control method</strong></td>
</tr>
<tr>
<td><strong>Output frequency range</strong></td>
</tr>
<tr>
<td><strong>Frequency setting resolution</strong></td>
</tr>
<tr>
<td><strong>Output frequency</strong></td>
</tr>
<tr>
<td><strong>Frequency accuracy</strong></td>
</tr>
<tr>
<td><strong>Voltage/frequency characteristics</strong></td>
</tr>
<tr>
<td><strong>Starting torque</strong></td>
</tr>
<tr>
<td><strong>Torque boost</strong></td>
</tr>
<tr>
<td><strong>Acceleration/deceleration time setting</strong></td>
</tr>
<tr>
<td><strong>DC injection brake (induction motor)</strong></td>
</tr>
<tr>
<td><strong>Stall prevention operation level</strong></td>
</tr>
<tr>
<td><strong>Torque limit level</strong></td>
</tr>
<tr>
<td><strong>Frequency setting signal</strong></td>
</tr>
<tr>
<td><strong>Operation panel</strong></td>
</tr>
<tr>
<td><strong>Operation panel lock</strong></td>
</tr>
<tr>
<td><strong>Analog input</strong></td>
</tr>
<tr>
<td><strong>Warning</strong></td>
</tr>
</tbody>
</table>

**Operational functions**

| **Pulse train output (FM type)** | 100kpps |
| **Frequency setting value** | Max. 10 VDC: one terminal (output voltage) |
| **For meter** | Max. 2.4 kHz: one terminal (output frequency) |
| **Output current** | The monitored item can be changed using Pr.54 FM/CA terminal function selection. |
| **Output frequency** | The monitored item can be changed using Pr.54 FM/CA terminal function selection. |
| **Output voltage** | The monitored item can be changed using Pr.158 AM terminal function selection. |
| **Fault record** | A fault record is displayed when a fault occurs. Past 8 fault records and the conditions immediately before the fault (output voltage/current/frequency/cumulative energization time/year/month/date/time) are saved. |

**Protective/warning function**

| **Protective function** | Overcurrent trip during acceleration, Overcurrent trip during constant speed, Overcurrent trip during deceleration or stop, Regenerative overvoltage trip during acceleration, Regenerative overvoltage trip during constant speed, Overload warning, DC overheat, Instantaneous power failure<sup>4</sup>, Undervoltage<sup>4</sup>, Input phase loss<sup>4,5</sup>, Stall prevention stop, Loss of synchronism detection<sup>3</sup>, Brake transistor alarm detection<sup>3</sup>, Brake resistor alarm detection<sup>3</sup>, Output side earth fault detection<sup>3</sup>, Overcurrent, Output short circuit, Output phase loss, External thermal relay operation<sup>6</sup>, PTC thermistor operation<sup>6</sup>, Option fault, Communication option fault, Parameter storage device fault, PU disconnection, Retry count excess<sup>3</sup>, Parameter storage device fault, CPU fault, Operation panel power supply short circuit, 24 VDC power fault, Abnormal output current detection<sup>3</sup>, Inrush current limit circuit fault<sup>6</sup>, Communication fault (inverter), Analog input fault, USB communication fault, Safety circuit fault, Overspeed occurrence<sup>4</sup>, Speed deviation excess detection<sup>5</sup>, Signal loss detection<sup>5</sup>, Excessive position fault<sup>5</sup>, Brake sequence fault<sup>5</sup>, Encoder phase fault<sup>4</sup>, 4 mA input fault<sup>4</sup>, Pre-charge fault<sup>4</sup>, PID signal fault<sup>4</sup>, Option fault, Opposite rotation deceleration fault<sup>4</sup>, Internal circuit fault, Abnormal internal temperature<sup>4</sup>, Magnetic pole position unknown<sup>4</sup> |
| **Warning function** | Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Regenerative brake pre-alarm<sup>4</sup>, Electronic thermal relay function pre-alarm, PU stop, Speed limit indication<sup>6</sup>, Parameter copy, Safety stop, Maintenance signal output<sup>5</sup>, USB host error, Home position return setting error<sup>5</sup>, Home position return uncompleted<sup>5</sup>, Home position return parameter setting error<sup>5</sup>, Operation panel lock<sup>6</sup>, Password locked<sup>6</sup>, Parameter write error, Copy operation error, 24 V external power supply operation, Internal fan alarm<sup>4</sup> |
### PLC function specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>A800 PLC function specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control method</td>
<td>Repeated operation (by stored program)</td>
</tr>
<tr>
<td>I/O control mode</td>
<td>Refresh</td>
</tr>
<tr>
<td>Programming language</td>
<td>Relay symbolic language (ladder)</td>
</tr>
<tr>
<td>No. of instructions</td>
<td>Function block</td>
</tr>
<tr>
<td>Sequence instructions</td>
<td>25</td>
</tr>
<tr>
<td>Basic instructions</td>
<td>84</td>
</tr>
<tr>
<td>Application instructions</td>
<td>37</td>
</tr>
<tr>
<td>Processing speed</td>
<td>Sequence instructions 1.9 µs to 12 µs/step(^*1)</td>
</tr>
<tr>
<td>Number of I/O device points</td>
<td>128 (input: 64 points, output: 64 points) (^*2)</td>
</tr>
<tr>
<td></td>
<td>19 points built-in (input: 12 points, output: 7 points)(^*2)</td>
</tr>
<tr>
<td></td>
<td>FR-ABAX (input: 16 points)</td>
</tr>
<tr>
<td></td>
<td>FR-ABAY (output: 7 points)</td>
</tr>
<tr>
<td></td>
<td>FR-ABAR (output: 3 points)</td>
</tr>
<tr>
<td>Number of analog I/O points</td>
<td>3 input points built-in (Terminals 1, 2, and 4)</td>
</tr>
<tr>
<td></td>
<td>FR-ABAZ. 1 input point (Terminal 6)</td>
</tr>
<tr>
<td></td>
<td>2 output points built-in (Terminals F/C/CM/C/A) and AM,</td>
</tr>
<tr>
<td></td>
<td>FR-ABAY: 2 output points (Terminals AM0 and AM1),</td>
</tr>
<tr>
<td></td>
<td>FR-ABAZ. 1 output point (Terminal DA1)</td>
</tr>
<tr>
<td>Pulse train I/O</td>
<td>Input</td>
</tr>
<tr>
<td></td>
<td>Terminal JOG maximum input pulse: 100k pulses/s(^*2)</td>
</tr>
<tr>
<td></td>
<td>Output</td>
</tr>
<tr>
<td></td>
<td>Terminal FM maximum output pulse: 50k pulses/s(^*2)</td>
</tr>
<tr>
<td>Watchdog timer</td>
<td>10 to 2000 (ms)</td>
</tr>
<tr>
<td>Program capacity</td>
<td>6K steps (24k bytes) (0 to 6144 steps can be set)</td>
</tr>
<tr>
<td></td>
<td>Contained in one program</td>
</tr>
</tbody>
</table>

### Environment

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surrounding air temperature</td>
<td>-10°C to +50°C (0°C to +50°C for the FR-A800-GF) (non-freezing) (LD, ND, HD ratings)</td>
</tr>
<tr>
<td></td>
<td>-10°C to +40°C (0°C to +40°C for the FR-A800-GF) (non-freezing) (SLD rating, IP55 compatible model)</td>
</tr>
<tr>
<td>Surrounding air humidity</td>
<td>95% RH or less (non-condensing) (With circuit board coating (conforming to IEC60721-3-3 3C2/3S2), IP55 compatible model)</td>
</tr>
<tr>
<td></td>
<td>90% RH or less (non-condensing) (Without circuit board coating)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to +65°C</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)</td>
</tr>
<tr>
<td>Altitude/vibration</td>
<td>Maximum 1000 m above sea level(^*3); 5.9 m/s(^*4) or less at 10 to 55 Hz (directions of X, Y, Z axes)</td>
</tr>
</tbody>
</table>

\( ^*1 \) Available only when a vector control compatible option is installed.

\( ^*2 \) For PM sensorless vector control, refer to FREQROL-A000 catalog.

\( ^*3 \) In the initial setting of the FR-A400-00340(5.5k) or higher and the FR-A400-00170(5.5k) or higher, it is limited to 150% by the torque limit level.

\( ^*4 \) Enabled only for standard models and IP55 compatible models.

\( ^*5 \) This protective function is not available in the initial status.

\( ^*6 \) Enabled only for standard models.

\( ^*7 \) Available for the IP55 compatible model only.

\( ^*8 \) Temperature applicable for a short time, e.g. in transit.

\( ^*9 \) For the installation at an altitude above 1,000 m up to 2,500 m, derate the rated current 3% per 500 m.

\( ^*10 \) 2.3m/s or less for the FR-A400-04320(160K) or higher.

\( ^*11 \) Available only for the FR-A800-GF series.

---

### Device

<table>
<thead>
<tr>
<th>Device</th>
<th>128 (M0 to M127)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latch relay (L)</td>
<td>Not used (Can be set with parameters but will not latch)(^*15)</td>
</tr>
<tr>
<td>Timer (T)</td>
<td>Specifications</td>
</tr>
<tr>
<td>Number of points</td>
<td>16 (T0 to T15)</td>
</tr>
<tr>
<td>Specified</td>
<td>100 ms timer: 0.1 to 3276.7 s can be set</td>
</tr>
<tr>
<td></td>
<td>10 ms timer: 0.01 to 327.67 s can be set</td>
</tr>
<tr>
<td>Retentive timer (ST)</td>
<td>Specifications</td>
</tr>
<tr>
<td>Number of points</td>
<td>0 (up to 16 by parameter assignment)</td>
</tr>
<tr>
<td>Specified</td>
<td>100 ms retentive timer: 0.1 to 3276.7 s can be set</td>
</tr>
<tr>
<td></td>
<td>10 ms retentive timer: 0.01 to 327.67 s can be set</td>
</tr>
<tr>
<td>Counter (C)</td>
<td>Specifications</td>
</tr>
<tr>
<td>Number of points</td>
<td>16 (C0 to C15)</td>
</tr>
<tr>
<td>Specified</td>
<td>Normal counter: Setting range 1 to 32767</td>
</tr>
<tr>
<td></td>
<td>Interrupt program counter: Not used</td>
</tr>
<tr>
<td>Data register (D)</td>
<td>Specifications</td>
</tr>
<tr>
<td>Special relay (SM)</td>
<td>2048 (SM0 to SM2047) with limited functions</td>
</tr>
<tr>
<td>Special register (SD)</td>
<td>2048 (SD0 to SD2047) with limited functions</td>
</tr>
</tbody>
</table>

\( ^*1 \) The scan time is approximately 40 ms for 1K steps as inverter control is also performed in actual operations.

\( ^*2 \) The signals same as the ones assigned to the inverter I/O terminals are used.

\( ^*3 \) One point is always required for a sequence start (RUN/STOP).

\( ^*4 \) This protective function is not available in the initial status.

\( ^*5 \) Enabled only for standard models and IP55 compatible models.

\( ^*6 \) There is no device latch function for power failures.

\( ^*7 \) Use the Pr.1150 to Pr.1199 PLC function user parameters 1 to 50 (D206 to D255) to store device values in the EEPROM.

\( ^*8 \) Available for the IP55 compatible model only.

\( ^*9 \) Available only when a vector control compatible option is installed.

\( ^*10 \) For PM sensorless vector control, refer to FREQROL-A000 catalog.

\( ^*11 \) In the initial setting of the FR-A400-00340(5.5k) or higher and the FR-A400-00170(5.5k) or higher, it is limited to 150% by the torque limit level.

\( ^*12 \) Enabled only for standard models and IP55 compatible models.

\( ^*13 \) Available only for the FR-A800-GF series.

\( ^*14 \) This protective function is not available in the initial status.

\( ^*15 \) Contains in one program.

---

There is no buffer memory.
# Inverter FREQROL-A800 Series

## Drive Product

### Inverter FREQROL-A800 Series

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-00046(0.4K)</td>
<td>110</td>
<td>20</td>
</tr>
<tr>
<td>FR-A820-00077(0.75K)</td>
<td>125</td>
<td>35</td>
</tr>
</tbody>
</table>

*1 The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>H</th>
<th>H1</th>
<th>H2</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-00046(0.4K)</td>
<td>260</td>
<td>245</td>
<td>1.5</td>
<td>170</td>
<td>84</td>
</tr>
<tr>
<td>FR-A820-00077(0.75K)</td>
<td>300</td>
<td>285</td>
<td>3</td>
<td>190</td>
<td>101.5</td>
</tr>
</tbody>
</table>

*2 FR-A800-00023(0.4K) to 00052(1.5K) are not provided with a cooling fan. The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.

## Outline Dimension Drawings

### Standard model

**Outline Dimension Drawings**

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-00770(15K)</td>
<td>260</td>
<td>245</td>
</tr>
<tr>
<td>FR-A820-00930(18.5K)</td>
<td>230</td>
<td>210</td>
</tr>
</tbody>
</table>

*1 The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>H</th>
<th>H1</th>
<th>H2</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-000340(5.5K)</td>
<td>260</td>
<td>245</td>
<td>1.5</td>
<td>170</td>
<td>84</td>
</tr>
<tr>
<td>FR-A820-000470(18.5K)</td>
<td>300</td>
<td>285</td>
<td>3</td>
<td>190</td>
<td>101.5</td>
</tr>
</tbody>
</table>

*2 The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.
Outline Dimension Drawings

- FR-A820-01540(30K)(GF)
- FR-A840-00770(30K)(GF)
- FR-A820-01870(37K), 02330(45K), 03160(55K), 03800(75K), 04750(90K)(GF)
- FR-A840-00930(37K), 01160(45K), 01800(55K), 02160(75K), 02600(90K), 03250(110K), 03610(132K)(GF)
- FR-A840-04320(160K), 04810(185K)(GF)
- FR-A840-04320(160K), 04810(185K)(GF)
- FR-A840-05470(220K), 06100(250K), 06830(280K)(GF)

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W</th>
<th>W1</th>
<th>H</th>
<th>H1</th>
<th>H2</th>
<th>d</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-01870(37K), 02330(45K), 03160(55K), 03800(75K), 04750(90K)(GF)</td>
<td>435</td>
<td>380</td>
<td>550</td>
<td>525</td>
<td>514</td>
<td>25</td>
<td>250</td>
<td>24</td>
</tr>
<tr>
<td>FR-A820-03160(55K)(GF)</td>
<td>465</td>
<td>410</td>
<td>700</td>
<td>675</td>
<td>664</td>
<td>25</td>
<td>250</td>
<td>22</td>
</tr>
<tr>
<td>FR-A820-03800(75K)*1, 04750(90K)*1</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>704</td>
<td>24</td>
<td>360</td>
<td>22</td>
</tr>
<tr>
<td>FR-A820-02160(75K)*2, 02600(90K)*2</td>
<td>465</td>
<td>400</td>
<td>620</td>
<td>595</td>
<td>584</td>
<td>24</td>
<td>300</td>
<td>22</td>
</tr>
<tr>
<td>FR-A840-03250(110K)*3, 03610(132K)*3</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>704</td>
<td>25</td>
<td>360</td>
<td>22</td>
</tr>
</tbody>
</table>

*1 When using a motor with a capacity of 75 kW or higher, always connect a DC reactor (FR-HEL), which is available as an option.

Always connect a DC reactor (FR-HEL), which is available as an option.

*1 The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.

*2 The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.

(Unit: mm)
Inverter FREQROL-A800 Series

- Separated converter type

Outline Dimension Drawings

- Inverter
  - FR-A842-07700(315K), 08660(355K)(GF)
  - FR-A842-09620(400K), 10940(450K), 12120(500K)(GF)

  (Unit: mm)

- Converter unit
  Equipped with a DC reactor.
  - FR-CC2-H315K, H355K
  - FR-CC2-H400K, H450K, H500K, H560K, H630K

*1 The LED display cover attached to the FR-A800-GF in this position has an additional 2.1 mm depth.

*1 Do not remove the cover on the side of the converter unit.

(Unit: mm)
- IP55 compatible mode
- Equipped with a DC reactor.

**Outline Dimension Drawings**

- **FR-A846-00023(0.4K), 00038(0.75K), 00052(1.5K), 00083(2.2K), 00126(3.7K), 00170(5.5K)**

- **FR-A846-00250(7.5K), 00310(11K), 00380(15K), 00470(18.5K)**

- **FR-A846-00620(22K), 00770(30K), 00930(37K), 01160(45K)**

- **FR-A846-01800(55K), 02160(75K), 02600(90K), 03250(110K), 03610(132K)**

---

**Inverter model** |  |  |  |  |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A846-01800(55K) to 02600(90K)</td>
<td>1360</td>
<td>1334</td>
<td>16</td>
<td>1314</td>
</tr>
<tr>
<td>FR-A846-03250(110K), 03610(132K)</td>
<td>1510</td>
<td>1482</td>
<td>18</td>
<td>1464</td>
</tr>
</tbody>
</table>
Inverter FREQROL-A800 Series

IP55 compatible model

Outline Dimension Drawings

Operation panel (FR-DU08, FR-LU08)

* Denotes the space required to connect an optional operation panel connection cable (FR-CB2[]). When using another cable, leave the space required for the cable specification.

(Unit: mm)
Standard models and IP55 compatible models

- **FM type**

For the FR-A820-03600(75K) or higher, the FR-A840-03000(75K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option. (To select a DC reactor, refer to page 448, and select one according to the applicable motor capacity.)

For the FR-A820-03800(75K) or higher, the FR-A840-02160(75K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option. (To select a DC reactor, refer to page 448, and select one according to the applicable motor capacity.)

Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter (IP55 compatible model). The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-A820-00800(15K) to FR-A840-00470(18.5K) are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.

- **Forward rotation start**
- **Reverse rotation start**
- **Start self-holding selection**
- **High speed**
- **Middle speed**
- **Low speed**
- **Jog operation**
- **Output stop**
- **Reset**
- **Terminal 4 input selection**
- **Selection of automatic restart after instantaneous power failure**
- **Contact input common**
- **24VDC power supply**
- (Common for external power supply transistor)
- 24V external power supply input
- **Frequency setting signals (Analog)**
  - **1/2W1kΩ**
  - **1/4W1kΩ**
  - **DC0 to ±10V**
  - **DC0 to 10V selectable**
  - **DC0 to 5V selectable**
  - **DC0 to 20mA**
  - **DC4 to 20mA**

- **Connectivity**
  - **RS-485 terminals**
  - **Data transmission**
  - **Data reception**
  - **GND**
  - **5V (Permissible load current 100mA)**

- **Drive Product**
  - **Series**
  - **Features**
  - **Specifications**

- **Outline Drawing**
- **Features/Specifications**
- **Lineup/Functions**
- **Specifications/Lineup/Functions**
- **Features/Specifications/Lineup/Functions**
- **Safety stop input (Channel 1)**
- **Safety stop input (Channel 2)**
- **Safety stop common**
- **Safety stop signal**
- **Braking wire**
- **Output shutoff circuit**

- **Terminal Input Specifications can be changed by analog input specification switchover**

- **Terminal JOG is also used as a pulse train input terminal. Use Pr.291 to choose JOG or pulse.**

- **The function of these terminals can be changed with the input terminal assignment (Pr.178 to Pr.189).**

- **Do not connect the DC power supply (under DC feeding mode) to terminal P3.**

- **Connect a brake resistor across terminals P/+ (P3) and PR. (The terminal PR is equipped in FR-A820-00046(0.4K) to 00490(7.5K), FR-A840-00023(0.4K) to 00250(7.5K).) Install a thermal relay to prevent overheating.**

- **If connecting a brake resistor, remove the jumper between PR and PX (FR-A820-00046(0.4K) to 00490(7.5K), FR-A840-00023(0.4K) to 00250(7.5K)).**

- **Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter (IP55 compatible model). The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-A820-00800(15K) to FR-A840-00470(18.5K) are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.**
Inverter FREQROL-A800 Series

1. For the FR-A820-03600(75K) or higher, the FR-A840-02160(75K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option. (To select a DC reactor, refer to page 448, and select one according to the applicable motor capacity.) When connecting a DC reactor to the FR-A820-03600(75K) or lower or the FR-A840-02160(75K) or lower, remove the jumper across the terminals P1 and P2 before connecting the DC reactor.

The IP55 compatible model has a built-in DC reactor.

2. When using separate power supply for the control circuit, remove the jumper between R/L1 and S/L2 of the IP55 compatible models. Do not remove the jumpers of terminals R/L1 and S/L2 of other models.

3. When using a brake resistor, refer to page 448 for selecting one according to the applicable motor capacity.

4. For the FR-A820-03800(75K) or higher, the FR-A840-02160(75K) or higher, and when a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option. (To select a DC reactor, refer to page 448, and select one according to the applicable motor capacity.) When connecting a DC reactor to the FR-A820-03600(75K) or lower or the FR-A840-02160(75K) or lower, remove the jumper across the terminals P1 and P2 before connecting the DC reactor.

5. The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196). The function of these terminals can be changed with the output terminal assignment (Pr.190 to Pr.194).

6. When changing the initial set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter (IP55 compatible model). The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-A840-00470(18.5K)-C2 to FR-A860-00170(18.5K)-C2 are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.

7. It is recommended to use 2W1kΩ terminal resistors.

8. Terminal JOG is also used as a pulse train input terminal. Use Pr.291 to choose JOG or pulse.

9. When connecting a brake resistor, remove the jumper between PR and PX of the IP55 compatible models. Do not remove the jumper of terminals PR and PX of other models.

10. In the case of the inverter with a built-in C2 filter (IP55 compatible model). The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-A840-00470(18.5K)-C2 to FR-A860-00170(18.5K)-C2 are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.

11. Do not change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter (IP55 compatible model). The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-A840-00470(18.5K)-C2 to FR-A860-00170(18.5K)-C2 are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.

12. To change the initially set ON (enabled) position of the EMC filter ON/OFF connector in the case of the inverter with a built-in C2 filter (IP55 compatible model). The Class C2 compatibility condition is not satisfied with the EMC filter OFF. The FR-A840-00470(18.5K)-C2 to FR-A860-00170(18.5K)-C2 are not provided with the EMC filter ON/OFF connector. The EMC filter is always ON.
**Separated converter type**

- Inverter (FM type)

---

To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as PTC input. **(Pr.561)**

The terminal FM can be used to output pulse trains as open collector output by setting. **No function is assigned in the initial setting. Use**

The function of these terminals can be changed with the output terminal assignment.

It is recommended to use 2W1k when the frequency setting signal is changed frequently. **Ω**

**Reverse rotation start**

**Forward rotation start**

Terminal 4 input (Current Input)

**Auxiliary input**

**Terminal 4 input (Current input)**

**Connector for plug-in option connection**

**Safety stop signal**

**Safety stop input (Channel 1)**

**Safety stop input (Channel 2)**

**Safety stop input common**

**Safety monitor output**

**Safety monitor output common**

---

1. The terminals R1/L11 and S1/L21 are connected to the terminals P+/N- with a jumper respectively. When using separate power supply for the control circuit, remove the jumpers from R1/L11 and S1/L21.
2. The function of these terminals can be changed with the input terminal assignment (Pr.178 to Pr.189).
3. Terminal JOG is also used as the pulse train input terminal. Use Pr.291 to choose JOG or pulse.
4. The X10 signal (NC contact input specification) is assigned to the terminal MRS in the initial setting. Set Pr.599 = “0” to change the input specification of the X10 signal to NO contact.
5. Terminal input specifications can be changed by analog input specification switchover (Pr.73, Pr.287). To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. **(Pr.561)**
6. It is recommended to use 2W1k when the frequency setting signal is changed frequently. **Ω**
7. The function of these terminals can be changed with the output terminal assignment (Pr.156, Pr.196).
8. The function of these terminals can be changed with the output terminal assignment (Pr.150 to Pr.154).
9. No function is assigned in the initial setting. Use Pr.152 for function assignment.
10. The terminal FM can be used to output pulse trains as open collector output by setting Pr.291.
11. Not required when calibrating the scale with the operation panel.
Position control

Vector control dedicated motor (SF-V5RU, SF-THY), 12 V complementary

- **Speed, control, torque control, and position control by pulse train input are available with or without the Z-phase being connected.**

- **For the complementary, set the terminating resistor selection switch to OFF position.** (Refer to the Instruction Manual (Detailed).)

- **A separate power supply of 5 V/12 V/15 V/24 V is necessary according to the encoder power specification.**

- **The pin number differs according to the encoder used.**

- **Connect the encoder so that there is no looseness between the motor and motor shaft. Speed ratio must be 1:1.**

- **Earth (ground) the shield of the encoder cable to the enclosure using a tool such as a P-clip. (Refer to the Instruction Manual (Detailed).)**

- **For terminal compatibility of the FR-JCBL, FR-V7CBL, and FR-A8AP, refer to the Instruction Manual (Detailed).**

- **For the fan of the 7.5 kW or lower dedicated motor, the power supply is single phase. (200 V/50 Hz, 200 to 230 V/60 Hz)**

- **Connect the recommended 2W1k resistor between the terminal PC and OH. (Recommended product: MOS2C102J 2W1kΩ by KOA Corporation)**

- **To use a terminal as the terminal OH, assign the OH (external thermal O/L relay input) signal to an input terminal. (Set “7” in any of Pr.178 to Pr.189.)**

- **Assign the function using Pr.178 to Pr.184, Pr.187 to Pr.189 (input terminal function selection).**

- **When position control is selected, terminal JOG function is invalid and simple position pulse train input terminal becomes valid.**

- **Assign the function using Pr.190 to Pr.194 (output terminal function selection).**
### Main Circuit

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/L1, S/L2, T/L3*</td>
<td>AC power input</td>
<td>Connect to the commercial power supply.</td>
<td></td>
</tr>
<tr>
<td>U, V, W</td>
<td>Inverter power</td>
<td>Connect a three-phase squirrel-cage motor or PM motor.</td>
<td></td>
</tr>
<tr>
<td>R/L1, S/L2, T/L3*</td>
<td>Power supply for control circuit</td>
<td>Connected to the AC power supply terminals R/L1 and S/L2. To retain alarm display and alarm output, apply external power to this terminal.</td>
<td></td>
</tr>
<tr>
<td>P+, PR*</td>
<td>Brake resistor connection</td>
<td>Connect an optional brake resistor across the terminals P+ and PR. Remove the jumper across the terminals PR and FX for the inverter capacity that has the terminal FX. (FR-A820-00630 (11k) or lower, FR-A840-00030 (15k) or lower).</td>
<td></td>
</tr>
<tr>
<td>P3, PR*</td>
<td>Brake resistor connection</td>
<td>Connect an optional brake resistor across the terminals P3 and PR. (FR-A820-00770 (15k) to 01250 (22k), FR-A840-00470 (18.5K) to 01800 (50K)).</td>
<td></td>
</tr>
<tr>
<td>P+, N-</td>
<td>Brake unit connection</td>
<td>Connect the brake unit (FR-BU2), power regeneration common converter (FR-CV) or regeneration common converter (MT-RC) and high power factor converter (FR-HC2). Do not connect the DC power supply between terminals P3 and N-. Use terminals P+ and N- for DC feeding. Connect the separated converter type to the terminals P+ and N- of the converter unit.</td>
<td></td>
</tr>
<tr>
<td>P-, N-</td>
<td>Brake unit connection</td>
<td>Connect the separate converter type to the terminals P+ and N- of the converter unit.</td>
<td></td>
</tr>
<tr>
<td>PR, PX*</td>
<td>Built-in brake circuit connection</td>
<td>When the jumper is connected across terminals PX and PR (initial status), the built-in brake circuit is valid. The built-in brake circuit is equipped in the FR-A820-00480 (7.5K) and lower and FR-A820-00250 (7.5K) or lower.</td>
<td></td>
</tr>
<tr>
<td>Earth (Ground)</td>
<td></td>
<td>For earthing (grounding) the inverter chassis. Must be earthed (grounded).</td>
<td></td>
</tr>
</tbody>
</table>

### Control Circuit Input

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STF</td>
<td>Forward rotation start</td>
<td>Turn on the STF signal to start forward rotation and turn it off to stop. If the STF and STR signals are turned on simultaneously, the stop command is given.</td>
<td></td>
</tr>
<tr>
<td>STR</td>
<td>Reverse rotation start</td>
<td>Turn on the STR signal to start reverse rotation and turn it off to stop.</td>
<td></td>
</tr>
<tr>
<td>STOP</td>
<td>Start self-holding selection</td>
<td>Turn on the STOP signal to self-hold the start signal.</td>
<td></td>
</tr>
<tr>
<td>RH, RM, RL</td>
<td>Multi-speed selection</td>
<td>Multi-speed can be selected according to the combination of RH, RM and RL signals.</td>
<td></td>
</tr>
<tr>
<td>JOG</td>
<td>Pulse train input</td>
<td>JOG terminal can be used as pulse train input terminal. To use as pulse train input terminal, the Pr.291 setting needs to be changed. (maximum input pulse: 100/1000/10000).</td>
<td></td>
</tr>
<tr>
<td>RT</td>
<td>Second function selection</td>
<td>Turn on the RT signal to select second function selection. When the second function such as “Second torque boost” and “Second V/F (base frequency)” are set, turning on the RT signal selects these functions.</td>
<td></td>
</tr>
<tr>
<td>MRS</td>
<td>Output stop</td>
<td>Turn on the MRS signal (2ms or more) to stop the inverter output. Use to shut off the inverter output when stopping the motor by electromagnetic brake.</td>
<td></td>
</tr>
<tr>
<td>MRS (X10)*</td>
<td>Output stop (Inverter operation enable)</td>
<td>Connect to the terminal MDA of the converter unit (FR-C22). When the RDA signal is turned OFF, the inverter output is shut off. The X10 signal (NC contact) is assigned to the terminal MRS in the initial setting. Use Pr.599 to change the specification to NO contact.</td>
<td></td>
</tr>
<tr>
<td>RES</td>
<td>Reset</td>
<td>Used to reset alarm output provided when protective circuit is activated. Turn on the RES signal for more than 0.1s, then turn it off. Recover about 1s after reset is cancelled.</td>
<td></td>
</tr>
<tr>
<td>AU</td>
<td>Terminal 4 input selection</td>
<td>Terminal 4 is made valid only when the AU signal is turned on. Turning the AU signal on makes terminal 2 invalid.</td>
<td></td>
</tr>
<tr>
<td>CS</td>
<td>Selection of automatic restart after instantaneous power failure</td>
<td>When the CS signal is left on, the inverter restarts automatically at power restoration. Note that restart setting is necessary for this operation. In the initial setting, a restart is disabled.</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>Contact input common (sink)*</td>
<td>Common terminal for the contact input terminal (sink logic) and terminal FM. Connect to the terminal RDA of the converter unit (FR-C22). When the RDA signal is turned OFF, the inverter output is shut off. The X10 signal (NC contact) is assigned to the terminal MRS in the initial setting. Use Pr.599 to change the specification to NO contact.</td>
<td></td>
</tr>
<tr>
<td>External transistor common (source)*</td>
<td>Common terminal for the 24 VDC power supply (terminal PC, terminal +24) and terminal FM. Connect to the terminal RDA of the converter unit (FR-C22). When the RDA signal is turned OFF, the inverter output is shut off. The X10 signal (NC contact) is assigned to the terminal MRS in the initial setting. Use Pr.599 to change the specification to NO contact.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>Contact input common (source)*</td>
<td>Common terminal for contact input terminal (source logic).</td>
<td></td>
</tr>
<tr>
<td>24 VDC power supply</td>
<td></td>
<td>Can be used as 24 VDC 0.1 A power supply.</td>
<td></td>
</tr>
</tbody>
</table>

### Frequency Setting

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10E</td>
<td>Frequency setting power supply</td>
<td>When connecting a frequency setting potentiometer at an initial status, connect it to terminal 10E. Change the input specifications of terminal 2 when connecting it to terminal 10E.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Frequency setting (voltage)</td>
<td>Inputting 0 to 5 VDC (or 0 to 10 V, 4 to 20 mA) provides the maximum output frequency at 5 V (10 V, 20 mA) and makes input and output proportional. Use Pr.73 to switch from among input 0 to 5 VDC (initial setting), 0 to 10 VDC, and 4 to 20 mA. Set the voltage/current input switch in the ON position to select current input (0 to 20 mA).</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Frequency setting (current)</td>
<td>Inputting 4 to 20 mA/DC (or 0 to 5 V, 0 to 10 V) provides the maximum output frequency at 20 mA and makes input and output proportional. This input signal is valid only when the AU signal is valid. (terminal 2 input is invalid). Use Pr.267 to switch from among input 0 to 20 mA (initial setting), 0 to 5 VDC, and 0 to 10 VDC. Set the voltage/current input switch in the OFF position to select voltage input (0 to 5 V to 10 V). Use Pr.858 to switch to terminal 2 settings.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Frequency setting auxiliary</td>
<td>Inputting 0 to ±5 VDC or 0 to ±10 VDC adds this signal to terminal 2 or 4 frequency setting signal. Use Pr.73 to switch between input 0 to ±5 VDC and 0 to ±10 VDC (initial setting) input.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Frequency setting common</td>
<td>Common terminal for frequency setting signal (terminal 2, 1 or 4) and analog output terminal AM, CA. Do not earth (ground).</td>
<td></td>
</tr>
</tbody>
</table>

### PTC Thermistor Input

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>PTC thermistor input</td>
<td>For receiving PTC thermistor outputs. When PTC thermistor is valid (Pr.561 = “9999”), the terminal 2 is not available for frequency setting.</td>
<td></td>
</tr>
</tbody>
</table>

**Indicates that terminal functions can be selected from Pr.178 to Pr.196 (V/O terminal function selection).**

Terminal names and terminal functions are those of the factory set.
### Drive Product

**Series**

**Outline Drawing**

**Examples**

**Specifications**

**FREQROL-A800 Series**

**Type**  | **Terminal Symbol**  | **Terminal Name**  | **Description**
---|---|---|---
Power supply | +24 | 24 V external power supply input | For connecting 24 V external power supply. If the 24 V external power supply is connected, power is supplied to the control circuit while the main power circuit is OFF.

**Relay**

| . | A1, B1, C1 | Relay output 1 (alarm output) | 1 changeover contact output indicates that the inverter protective function has activated and the output stopped. Alarm: discontinuity across B-C (continuity across A-C), Normal: continuity across B-C (discontinuity across A-C)
| . | A2, B2, C2 | Relay output 2 | 1 changeover contact output

**RUN**

Inverter running

**SU**

Up to frequency

**OL**

Overload alarm

**IPF**

Instantaneous power failure

**FU**

Frequency detection

**SE**

Open collector output common

**FM**

For meter

**AM**

Analog voltage output

**CA**

Analog current output

**TXD+**

Inverter transmission terminal

**RXD+**

Inverter reception terminal

**GND (SIG)**

Earth (Ground)

**PU connector**

With the PU connector, communication can be made through RS-485. Conforming standard: EIA-485 (RS-485) Transmission format: Multi-drop link Communication speed: 4800 to 115200bps Wiring length: 500 m

**USB A connector**

A connector (receptacle). A USB memory device enables parameter copies and the trace function. Interface: Conforms to USB1.1 (USB2.0 full-speed compatible). Transmission speed: 12 Mbps

**USB B connector**

Mini B connector (receptacle). Connected to a personal computer via USB to enable setting, monitoring, test operations of the inverter by FR Configurator2

**S1**

Safety stop input (Channel 1)

**S2**

Safety stop input (Channel 2)

**SIC**

Safety stop input terminal common

**SO**

Safety monitor output (open collector output)

**SOC**

Safety stop input terminal common

---

Note:

- *1: Terminals R/L1, S/L2, T/L3, PR, P3, P1, and PX are not provided in the separated converter type.
- *2: Terminals R/L11, S/L12, PR, P3, and PX are not provided for the ISPS compatible model.
- *4: The sink logic is initially set for the FM-type inverter.
- *5: The source logic is initially set for the CA-type inverter.
- *6: Terminal FM is provided in the FM-type inverter.
- *7: Terminal CA is provided in the CA-type inverter.
- *8: Function and name of the separated converter type.
### Major difference from and comparison with the FR-A700 series

<table>
<thead>
<tr>
<th>Item</th>
<th>FR-A700</th>
<th>FR-A800</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control method</strong></td>
<td>V/F control</td>
<td>Advanced magnetic flux vector control</td>
</tr>
<tr>
<td></td>
<td>Advanced magnetic flux vector control</td>
<td>Real sensorless vector control</td>
</tr>
<tr>
<td></td>
<td>Real sensorless vector control</td>
<td>Vector control (with plug-in option/terminal option)</td>
</tr>
<tr>
<td></td>
<td>Vector control (with plug-in option/control terminal option)</td>
<td>PM sensorless vector control (IPM motor/SPM motor)</td>
</tr>
<tr>
<td><strong>Added functions</strong></td>
<td>–</td>
<td>USB host function</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>Safety stop function</td>
</tr>
<tr>
<td></td>
<td>–</td>
<td>PLC function</td>
</tr>
<tr>
<td><strong>Brake transistor</strong></td>
<td>Built in for the FR-A720-0.4K to 22K</td>
<td>Built in for the FR-A820-00046(0.4K) to 01250(22K)</td>
</tr>
<tr>
<td><strong>(brake resistor usable)</strong></td>
<td>Built in for the FR-A740-0.4K to 22K</td>
<td>Built in for the FR-A840-00023(0.4K) to 01800(55K)</td>
</tr>
<tr>
<td><strong>Maximum output frequency</strong></td>
<td>400 Hz</td>
<td>590 Hz</td>
</tr>
<tr>
<td></td>
<td>Advanced magnetic flux vector control</td>
<td>120 Hz</td>
</tr>
<tr>
<td></td>
<td>Real sensorless vector control</td>
<td>120 Hz</td>
</tr>
<tr>
<td></td>
<td>PM sensorless vector control</td>
<td>300 Hz</td>
</tr>
<tr>
<td><strong>PID control</strong></td>
<td>Turn the X14 signal ON to enable PID control.</td>
<td>When the X14 signal is not assigned, just set a value other than “0” in Pr.128 to enable PID control. When the X14 signal is assigned, turn the X14 signal ON while Pr.128 ≠ “0” to enable PID control. The PID pre-charge function and dancer control are added.</td>
</tr>
<tr>
<td><strong>Automatic restart after instantaneous power failure</strong></td>
<td>Turn the CS signal ON to enable restart.</td>
<td>CS signal assignment not required. (Restart is enabled with the Pr.57 setting only.)</td>
</tr>
<tr>
<td><strong>Number of motor poles</strong></td>
<td>The V/F switching signal (X18) is valid when Pr.81 = “12 to 20 (2 to 10 poles)”.</td>
<td>Pr.81 = “12 (12 poles)” X18 is valid regardless of the Pr.81 setting. (The Pr.81 settings “14 to 20” are not available.)</td>
</tr>
<tr>
<td><strong>PTC thermistor input</strong></td>
<td>Input from the terminal AU (The function of the terminal AU is switched by a switch.)</td>
<td>Input from the terminal 2. (The function of the terminal 2 is switched by the Pr.561 setting.)</td>
</tr>
<tr>
<td><strong>USB connector</strong></td>
<td>B connector</td>
<td>Mini B connector</td>
</tr>
<tr>
<td><strong>Control circuit terminal block</strong></td>
<td>Removable terminal block (screw type)</td>
<td>Removable terminal block (spring clamp type)</td>
</tr>
<tr>
<td><strong>Terminal response level</strong></td>
<td>The FR-A800's I/O terminals have better response level than the FR-A700's terminals. By setting Pr.286 inverter output terminal filter and Pr.699 input terminal filter, the terminal response level can be compatible with that of FR-A700. Set to approximately 5 to 8 ms and adjust the setting according to the system.</td>
<td></td>
</tr>
<tr>
<td><strong>PU</strong></td>
<td>FR-DU07 (4-digit LED) FR-PU07</td>
<td>FR-DU08 (5-digit LED) FR-LU08 (LCD operation panel)</td>
</tr>
<tr>
<td></td>
<td>(Some functions, such as parameter copy, are unavailable.)</td>
<td>FR-DU07 is not supported.</td>
</tr>
<tr>
<td><strong>Plug-in option</strong></td>
<td>Connected to the connector 3</td>
<td>Connected to the connector 1</td>
</tr>
<tr>
<td><strong>Communication option</strong></td>
<td>Dedicated plug-in options (not interchangeable)</td>
<td>Connected to the connector 3</td>
</tr>
<tr>
<td><strong>Installation size</strong></td>
<td>For standard models, installation size is compatible for all capacities. (Replacement between the same capacities does not require new mounting holes.) For separated converter types, installation size is not compatible. (New mounting holes are required.)</td>
<td>Connected to the connector 3</td>
</tr>
<tr>
<td><strong>Converter</strong></td>
<td>Built-in for all capacities</td>
<td>An optional converter unit (FR-CC2) is required for separated converter types.</td>
</tr>
<tr>
<td><strong>DC reactor</strong></td>
<td>The 75K or higher comes with a DC reactor (FR-HEL).</td>
<td>For the FR-A820-03800(75K) or higher, the FR-A840-02160(75K) or higher, and when a 75 kW or higher motor is used, select a DC reactor suitable for the applicable motor capacity. (A DC reactor is not included.) Separated converter types (converter unit FR-CC2) and IP55 compatible models have a built-in DC reactor.</td>
</tr>
<tr>
<td><strong>Brake unit (75 kW or higher)</strong></td>
<td>FR-BU2, MT-BU5</td>
<td>FR-BU2</td>
</tr>
</tbody>
</table>
Inverter FREQROL-A800 Plus Series for CRANES

The optimum functions for cranes are added.

Suited for various cranes to achieve fast, robust, and smooth operations

Reduction in tact time

Anti-sway control

By using the Mitsubishi’s original anti-sway control technology, the swinging of an object moved by a crane is suppressed at the time of stopping, even without operator’s input adjustment.

This control cuts down the tact time and facilitates efficient operation.

Load torque high-speed frequency control (mode 2)

When there is a light-load (when light loads are moved up or down by a crane), the speed will automatically be increased.

This reduces the tact time and facilitates efficient operation.

The possible operation speed is set automatically according to the load.

After starting the inverter, the inverter runs at high speed with a light load.

Shortest-time torque startup function

The time from the start command to when the brake opens is shortened.

This will contributes to reduction in tact time.

- **Shortest-time torque startup function**

  The optimum distribution of the excitation current and torque current enables rapid startup of the torque.

- **Magnetic flux command during pre-excitation**

  Decreasing the pre-excitation current during a motor stop reduces power consumption during standby, and enables rapid startup of the torque.

Example of FR-A820-90K-1-60CRN and SF-THY (90 kW)
Load slippage prevention

Brake sequence function
The highly scalable brake sequence function enables the output of a brake opening signal for the optimum brake operation calculated from the load torque or the speed.
The function enables setting of the brake opening level individually for forward rotation and reverse rotation.

Falling detection
Slippage during the start of a lift can be checked.
When the commanded direction differs from the actual motor rotation direction, the falling detection signal is output.

Low-speed range speed control P gain
When an inverter is connected to a lift, the inverter has a load immediately after the lift brake is released. Adjusting the speed control P gain in the low-speed range improves the response at low speed, and shortens the time from startup to brake opening.

Dedicated monitoring functions

Overload detection function
By outputting an overload detection signal when too much load (overload) is applied to a crane, this information can be transmitted to the superordinate controller.
During constant speed operation, when the motor torque is equal to or higher than the torque setting for the time setting or longer, the overload detection signal is turned ON.

Start count monitor
The inverter starting times can be counted.
Confirming the starting times can be used to determine the timing of the maintenance, or can be used as a reference for system inspection or parts replacement.

Wide range applications

Compliance with ship classification standards
Using the recommended noise filter in combination with the inverter supports compliance with various countries ship classifications, such as NK, LR, DNV, ABS, BV, CCS, and KR.
The FR-A800-CRN can be used for electric deck cranes on ship.
## Lineup

### Standard model

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure/function</th>
<th>Capacity</th>
<th>Description</th>
<th>Symbol</th>
<th>Type</th>
<th>Circuit board coating</th>
<th>Rated output</th>
<th>Symbol</th>
<th>Dedicated function</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200 V class</td>
<td>0</td>
<td>00023 to 06830</td>
<td>Inverter SLD rated current (A)</td>
<td>-1</td>
<td>FM</td>
<td>60</td>
<td>With</td>
<td>CRN</td>
<td>Dedicated to crane</td>
</tr>
<tr>
<td>4</td>
<td>400 V class</td>
<td>0</td>
<td>0.4K to 2880K</td>
<td>Inverter ND rated capacity (kW)</td>
<td>-2</td>
<td>CA</td>
<td>06</td>
<td>With</td>
<td>CRN</td>
<td>Dedicated to crane</td>
</tr>
</tbody>
</table>

### Separated converter type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure/function</th>
<th>Capacity</th>
<th>Description</th>
<th>Symbol</th>
<th>Type</th>
<th>Circuit board coating</th>
<th>Rated output</th>
<th>Symbol</th>
<th>Dedicated function</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>400 V class</td>
<td>2</td>
<td>07700 to 12120</td>
<td>Inverter SLD rated current (A)</td>
<td>-1</td>
<td>FM</td>
<td>60</td>
<td>With</td>
<td>CRN</td>
<td>Dedicated to crane</td>
</tr>
<tr>
<td>4</td>
<td>400 V class</td>
<td>2</td>
<td>315K to 500K</td>
<td>Inverter ND rated capacity (kW)</td>
<td>-2</td>
<td>CA</td>
<td>06</td>
<td>Without</td>
<td>CRN</td>
<td>Dedicated to crane</td>
</tr>
</tbody>
</table>

### Specifications

- **FM**: Terminal FM (pulse train output) - OFF
- **CA**: Terminal CA (analog voltage output (0 to 10 VDC)) - ON

### Other Information

- **Type**: FM, CA
- **Rated output**: 60 Hz (same as the power supply voltage), 50 Hz (95% of the power supply voltage)

---

*1 Models can be alternatively indicated with the inverter rated current (SLD rating).

*2 Specification differs by the type as follows.

*3 Available for the 5.5K or higher.

*4 For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.
# Standard specifications

## Rating (Standard model)

200 V class

<table>
<thead>
<tr>
<th>Model FR-AB20-□ CRN</th>
<th>0.4K</th>
<th>0.75K</th>
<th>1.5K</th>
<th>2.2K</th>
<th>3.7K</th>
<th>5.5K</th>
<th>7.5K</th>
<th>11K</th>
<th>15K</th>
<th>18.5K</th>
<th>22K</th>
<th>30K</th>
<th>37K</th>
<th>45K</th>
<th>55K</th>
<th>75K</th>
<th>90K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)*1</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
<td>132</td>
</tr>
<tr>
<td>LD</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
<td>110</td>
</tr>
<tr>
<td>HD</td>
<td>0.2*2</td>
<td>0.27</td>
<td>0.45</td>
<td>0.75</td>
<td>1.2</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
</tr>
<tr>
<td>Rated capacity (kVA)*3</td>
<td>1.8</td>
<td>2.9</td>
<td>4</td>
<td>6.4</td>
<td>10</td>
<td>13</td>
<td>19</td>
<td>24</td>
<td>29</td>
<td>35</td>
<td>48</td>
<td>59</td>
<td>71</td>
<td>89</td>
<td>120</td>
<td>145</td>
<td>181</td>
</tr>
<tr>
<td>LD</td>
<td>1.6</td>
<td>2.7</td>
<td>3.7</td>
<td>5.8</td>
<td>8.8</td>
<td>12</td>
<td>17</td>
<td>22</td>
<td>27</td>
<td>32</td>
<td>43</td>
<td>53</td>
<td>65</td>
<td>81</td>
<td>110</td>
<td>132</td>
<td>165</td>
</tr>
<tr>
<td>HD</td>
<td>1.1</td>
<td>1.9</td>
<td>3</td>
<td>4.2</td>
<td>6.7</td>
<td>9.1</td>
<td>13</td>
<td>18</td>
<td>23</td>
<td>29</td>
<td>34</td>
<td>44</td>
<td>55</td>
<td>67</td>
<td>82</td>
<td>110</td>
<td>132</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>4.6</td>
<td>7</td>
<td>9.6</td>
<td>15.2</td>
<td>23</td>
<td>34</td>
<td>49</td>
<td>63</td>
<td>77</td>
<td>93</td>
<td>125</td>
<td>154</td>
<td>187</td>
<td>233</td>
<td>316</td>
<td>380</td>
<td>475</td>
</tr>
<tr>
<td>LD</td>
<td>4.2</td>
<td>7</td>
<td>9.6</td>
<td>15.2</td>
<td>23</td>
<td>34</td>
<td>49</td>
<td>63</td>
<td>77</td>
<td>93</td>
<td>125</td>
<td>154</td>
<td>187</td>
<td>233</td>
<td>316</td>
<td>380</td>
<td>475</td>
</tr>
<tr>
<td>HD</td>
<td>3</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>17.5</td>
<td>24</td>
<td>33</td>
<td>46</td>
<td>61</td>
<td>76</td>
<td>90</td>
<td>115</td>
<td>145</td>
<td>175</td>
<td>215</td>
<td>288</td>
<td>346</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload current rating*6</td>
<td>110%</td>
<td>60 s</td>
<td>120%</td>
<td>3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>120%</td>
<td>60 s</td>
<td>150%</td>
<td>3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td>200%</td>
<td>60 s</td>
<td>250%</td>
<td>3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage*5</td>
<td>150%</td>
<td>60 s</td>
<td>200%</td>
<td>3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 200 to 240 V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>170 to 264 V, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*9</td>
<td>2</td>
<td>3.4</td>
<td>5</td>
<td>7.5</td>
<td>12</td>
<td>17</td>
<td>24</td>
<td>31</td>
<td>37</td>
<td>44</td>
<td>58</td>
<td>70</td>
<td>84</td>
<td>103</td>
<td>120</td>
<td>145</td>
<td>181</td>
</tr>
<tr>
<td>LD</td>
<td>5</td>
<td>8.3</td>
<td>12.2</td>
<td>18.3</td>
<td>28.5</td>
<td>41.6</td>
<td>58.2</td>
<td>74.8</td>
<td>90.9</td>
<td>106</td>
<td>139</td>
<td>178</td>
<td>207</td>
<td>255</td>
<td>288</td>
<td>346</td>
<td>432</td>
</tr>
<tr>
<td>HD</td>
<td>3.9</td>
<td>6.3</td>
<td>10.6</td>
<td>14.1</td>
<td>22.5</td>
<td>33.4</td>
<td>44.2</td>
<td>50.9</td>
<td>60.3</td>
<td>73</td>
<td>100</td>
<td>150</td>
<td>181</td>
<td>216</td>
<td>266</td>
<td>298</td>
<td>346</td>
</tr>
<tr>
<td>Protective structure (IEC 60529)*10</td>
<td>Enclosed type (IP20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

*2 0.2 kW motors can be used only under V/F control.

*3 The rated output capacity indicated assumes that the output voltage is 220 V.

*4 The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

*5 The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 1/2.

*6 With the built-in brake resistor

*7 ND rating reference value

*8 The rated input current is the value when at the rated input current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

*9 The power supply capacity is the value when at the rated input current. The impedance at the power supply side (including those of the input reactor and cables) affects the power supply capacity.
Inverter FREQROL-A800 Plus Series for CRANES

### Specifications/Features/Connectivity

**Drive Product Outline**

- **Series**
  - FREQROL-D700
  - FREQROL-F700PJ
  - FREQROL-E700
  - FREQROL-F800
  - FREQROL-A800

**Examples**

- *12
- *5
- *11
- *9
- *8
- *7
- *4
- *3
- *2
- *1

---

#### 400 V class

<table>
<thead>
<tr>
<th>Model FR-A840-C</th>
<th>CRN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Applicable motor capacity (kW)**

<table>
<thead>
<tr>
<th>Applicable motor capacity (kW)</th>
<th>SLD</th>
<th>ND</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD (initial setting)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rated capacity (kVA)**

<table>
<thead>
<tr>
<th>Rated capacity (kVA)</th>
<th>SLD</th>
<th>ND</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rated current (A)**

<table>
<thead>
<tr>
<th>Rated current (A)</th>
<th>SLD</th>
<th>ND</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Output Overload current rating**

<table>
<thead>
<tr>
<th>Output Overload current rating</th>
<th>SLD</th>
<th>ND</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Rated voltage**

<table>
<thead>
<tr>
<th>Rated voltage</th>
<th>SLD</th>
<th>ND</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Regenerative braking**

<table>
<thead>
<tr>
<th>Regenerative braking</th>
<th>Built-in</th>
<th>FR-BU2 (option)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum brake torque</td>
<td>100% torque/10%ED</td>
<td>100% torque/6%ED</td>
</tr>
<tr>
<td>LD</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>ND</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>HD</td>
<td>2.3</td>
<td>2.3</td>
</tr>
</tbody>
</table>

**Permissible AC voltage fluctuation**

<table>
<thead>
<tr>
<th>Permissible AC voltage fluctuation</th>
<th>±5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td></td>
</tr>
<tr>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
</tr>
</tbody>
</table>

**Protective structure (IEC 60529)**

<table>
<thead>
<tr>
<th>Protective structure (IEC 60529)</th>
<th>Enclosed type (IP20)</th>
<th>Open type (IP00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>ND</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>HD</td>
<td>2.3</td>
<td>2.3</td>
</tr>
</tbody>
</table>

---

1. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
2. 0.2 kW motors can be used only under V/F control.
3. The rated output capacity indicated assumes that the output voltage is 440 V.
4. The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
5. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about ±25%.
6. With the built-in brake resistor
7. ND rating reference value
8. The rated input current is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.
9. The power supply capacity is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the power supply capacity.
10. FR-DU08: IP40 (except for the PU connector)
11. For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.
12. A commercial brake resistor can be used to improve the braking capability of the inverter built-in brake. Please contact your sales representative for details.
### 400 V class

#### Inverter

<table>
<thead>
<tr>
<th>Model</th>
<th>FR-A842-□ CRN</th>
<th>07700</th>
<th>08660</th>
<th>09620</th>
<th>10940</th>
<th>12120</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>315K</td>
<td>355K</td>
<td>400K</td>
<td>450K</td>
<td>500K</td>
</tr>
<tr>
<td></td>
<td>Applicable motor capacity (kW)**</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td>SLD</td>
<td></td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
</tr>
<tr>
<td>LD</td>
<td></td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>280</td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td>587</td>
<td>650</td>
<td>733</td>
<td>834</td>
<td>924</td>
</tr>
<tr>
<td>SLD</td>
<td></td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
</tr>
<tr>
<td>LD</td>
<td></td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>417</td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td></td>
</tr>
<tr>
<td>HD</td>
<td></td>
<td>547</td>
<td>610</td>
<td>683</td>
<td>770</td>
<td>866</td>
</tr>
</tbody>
</table>

#### Output

<table>
<thead>
<tr>
<th>Power supply voltage</th>
<th>430 to 780 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control power supply auxiliary input</td>
<td>Single-phase 380 to 500 V, 50 Hz/60 Hz*3</td>
</tr>
</tbody>
</table>

#### Overload current rating**

| SLD | 110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C |
| LD  | 120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C |
| HD  | 150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C |

#### Rated voltage**

<table>
<thead>
<tr>
<th>Three-phase 380 to 500 V</th>
</tr>
</thead>
</table>

#### Regenerative braking torque**

| Maximum brake torque | 10% torque/continuous |

#### Power supply

<table>
<thead>
<tr>
<th>Power supply capacity (kVA)**</th>
<th>465 521 587 660 733 833 924</th>
</tr>
</thead>
</table>

#### Cooling system

<table>
<thead>
<tr>
<th>Approx. mass (kg)</th>
<th>163 163 243 243 243 243</th>
</tr>
</thead>
</table>

### Converter unit (FR-CC2)

<table>
<thead>
<tr>
<th>Model</th>
<th>FR-CC2-H</th>
<th>315K</th>
<th>355K</th>
<th>400K</th>
<th>450K</th>
<th>500K</th>
<th>560K</th>
<th>630K</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td>Overload current rating**</td>
<td>200% 60 s, 250% 3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage**</td>
<td>430 to 780 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 380 to 500 V, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>Three-phase 323 to 550 V, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input current (A)</td>
<td>610 683 770 866 962 1094 1212</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)**</td>
<td>465 521 587 660 733 833 924</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Protective structure (IEC 60529)**

<table>
<thead>
<tr>
<th>Open type (IP00)</th>
</tr>
</thead>
</table>

#### Cooling system

<table>
<thead>
<tr>
<th>Forced air cooling</th>
</tr>
</thead>
</table>

#### DC Reactor

<table>
<thead>
<tr>
<th>Approx. mass (kg)</th>
<th>210 213 282 288 293 294</th>
</tr>
</thead>
</table>

### Notes

1. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
2. The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
3. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 2.
4. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 2.
5. ND rating reference value
6. FR-DU08: IP40 (except for the PU connector)
7. For the power supply exceeding 480 V, set Pr.977 Input voltage mode selection.
8. The permissible voltage imbalance ratio is 3% or less. (Imbalance ratio = (highest voltage between lines - average voltage between three lines) / average voltage between three lines × 100)
Inverter FREQROL-A800 Plus Series for CRANES

Common specifications

- Soft-PWM control, high carrier frequency PWM control (selectable among V/f control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, vector control, and PM sensorless vector control.

- Frequency setting resolution: Analog Input 0.015 Hz/60 Hz (0 to 10 V/12 bits for terminals 2 and 4), 0.03 Hz/60 Hz (0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits for terminals 2 and 4, 0 to ±10 V/12 bits for terminal 1), 0.06 Hz/60 Hz (0 to ±5 V/11 bits for terminal 1).

- Frequency accuracy: Analog Input ±0.2% of the max. output frequency (25°C/10°C).

- Voltage/frequency characteristics: Base frequency can be set from 0 to 590 Hz. Constant-torque/variable-torque pattern or adjustable 5 points V/f can be selected.

- Starting torque:
  - SLD rating: 120%/0.3 Hz, LD rating: 150%/0.3 Hz, HD rating: 200%/0.3 Hz, HD rating: 250%/0.3 Hz (under Real sensorless vector control or vector control).
  - Under Real sensorless vector control or vector control.

- Torque boost:
  - Maximal torque boost.

- Acceleration/deceleration time setting:
  - 0 to 3800 s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode, backlash countermeasures acceleration/deceleration can be selected.

- Stall prevention operation level:
  - Activation range of stall prevention operation (SLD rating: 0 to 120%, LD rating: 0 to 150%, HD rating: 0 to 220%, HD rating: 0 to 280%). Whether to use the stall prevention or not can be selected (V/f control, Advanced magnetic flux vector control).

- Torque limit level:
  - Torque limit value can be set (0 to 4400% variable).

- Frequency setting signal:
  - Analog Input Terminals 2 and 4: 0 to 5 V, 4 to 20 mA (0 to 20 mA) are available. Terminal 1: -10 to 10 V, 5 to ±5 V are available.

- Input signals (twelve terminals):
  - Analogue Input Terminals 2 and 4: 0 to 10 V, 0 to 5 V, 4 to 20 mA (0 to 20 mA) are available.
  - 0 to ±10 V, ±5 to ±5 V are available.
  - Digital input Input using the setting dial of the operation panel or parameter unit.
  - Four-digit BCD or 16-bit binary (when used with option FR-ABAX).

- Start signal:
  - Forward/reverse reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.

- Input signals (twelve terminals):
  - Forward/reverse reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.

- Pulse train input:
  - 100 kpps.

- Max. 2.4 kHz: one terminal (output frequency).

- Current input (CA type):
  - Max. 20 mA: one terminal (output frequency).

- Voltage output:
  - Max. 10 VDC: one terminal (output frequency).

- Operating status:
  - Output frequency, Output current, Output voltage, Frequency setting value.

- Fault record:
  - Fault record is displayed when a protective function is activated. Past 8 fault records and output voltage/current/frequency/ cumulative energization time/year/month/day/hour immediately before the protective function is activated are stored.

- Protective/warning function:
  - Overcurrent trip during acceleration, Overcurrent trip during constant speed, Overcurrent trip during deceleration or stop, Regenerative overvoltages trip during acceleration, Regenerative overcurrent trip during constant speed, Regenerative overvoltage trip during deceleration or stop, Inverter overload trip, Motor overload trip, Heatsink overheat, Instantaneous power failure, Undervoltage, Input phase loss, Stall prevention stop, Loss of synchronism detection, Encoder brake alarm detection, Output side earth (ground) fault detection, Output short circuit, Output phase loss, External thermal relay operation, PTC thermistor operation, Option fault, Communication option fault, Parameter storage device fault, PU disconnect, Retry count excess, Parameter storage device fault, CPU fault, Operation panel power supply short circuit/RS-485 terminals power supply short circuit, 24 VDC power fault, Abnormal output current detection, Inrush current limit fault detection, Communication fault (inverter), Analog input fault, USB communication fault, Safety circuit fault, Overspeed occurrence, Speed deviation excess detection, Signal loss detection, Excessive position fault, Encoder sequence error, Brake sequence fault, Encoder phase fault, 4 mA input fault, Pre-charge fault, PID signal fault, Option fault, Opposite rotation deceleration fault, Inverter heat detection, Internal circuit fault, Magnetic pole position unknown.

- Warning function:
  - Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Regenerative brake pre-alarm, Electronic thermal relay pre-alarm, PU stop, Speed limit indication, Parameter copy, Safety stop, Maintenance signal output, USB host error, Home position return setting error, Home position return parameter uncompleted, Home position return parameter setting error, Operation panel lock, Password locked, Parameter write error, Copy operation error, 24 V external power supply operation.

- Surrounding air temperature:
  - -10°C to +50°C (non-freezing) (LD, ND, and HD ratings).
  - -10°C to +40°C (non-freezing) (SLD rating).

- Surrounding air humidity:
  - 95% RH or less (non-condensing) (With circuit board coating (IEC60721-3-3 3C2/3S2 compatible).
  - 80% RH or less (non-condensing) (Without circuit board coating).

- Storage temperature:
  - -20°C to +65°C.

- Environment:
  - Atmosphere Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.).

- Altitude/air pressure:
  - Maximum 1000 m above sea level1: 5.9 m/s or less2 at 10 to 55 Hz (directions of X, Y, Z axes).

---

1. The vector control is available only if a vector control compatible option is installed.
2. For the installation in an altitude above 1000 m (up to 2500 m), derate the rated current 3% per 500 m.
3. Available only for the standard model.
4. The vector control is available only when a vector control compatible option is installed.
5. Available only for the standard model.
6. The vector control is available only when a vector control compatible option is installed.
7. The vector control is available only when a vector control compatible option is installed.

---
#### Outline Dimension Drawings

**FR-A820-00046(0.4K) to 04750(90K)**  
**FR-A840-00023(0.4K) to 03610(132K)**  

<table>
<thead>
<tr>
<th>Inverter model</th>
<th>W</th>
<th>W1</th>
<th>H</th>
<th>H1</th>
<th>D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-00046(0.4K)</td>
<td>110</td>
<td>95</td>
<td>260</td>
<td>245</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00077(0.75K)</td>
<td>150</td>
<td>125</td>
<td>260</td>
<td>245</td>
<td>140</td>
<td>6</td>
</tr>
<tr>
<td>FR-A820-00167(2.2K)</td>
<td>220</td>
<td>195</td>
<td>300</td>
<td>285</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00490(7.5K)</td>
<td>250</td>
<td>230</td>
<td>400</td>
<td>380</td>
<td>190</td>
<td>10</td>
</tr>
<tr>
<td>FR-A820-00630(11K)</td>
<td>325</td>
<td>270</td>
<td>550</td>
<td>530</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00870(37K)</td>
<td>435</td>
<td>380</td>
<td>525</td>
<td>250</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>FR-A820-01160(45K)</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inverter model</th>
<th>W</th>
<th>W1</th>
<th>H</th>
<th>H1</th>
<th>D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-00038(0.75K)</td>
<td>150</td>
<td>125</td>
<td>260</td>
<td>245</td>
<td>140</td>
<td>6</td>
</tr>
<tr>
<td>FR-A820-00052(1.5K)</td>
<td>220</td>
<td>195</td>
<td>300</td>
<td>285</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00083(2.2K)</td>
<td>250</td>
<td>230</td>
<td>400</td>
<td>380</td>
<td>190</td>
<td>10</td>
</tr>
<tr>
<td>FR-A820-00126(3.7K)</td>
<td>325</td>
<td>270</td>
<td>550</td>
<td>530</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00170(5.5K)</td>
<td>435</td>
<td>380</td>
<td>525</td>
<td>250</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00250(7.5K)</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

### 200 V class

### 400 V class
Separated converter type

Outline Dimension Drawings

FR-A842-07700(315K), 08660(355K)

FR-A842-09620(400K), 10940(450K), 12120(500K)
In roll to roll applications, control is necessary for machining of elongated products such as paper, film, and thread. Processing types include printing, slitting, coating, and twisting. High productivity can be achieved by stable tension control. The FR-A800-R2R inverter can be used in a wide variety of systems with various dedicated functions.

**Features**

- **Roll to roll dedicated model with functions optimum for winding/unwinding**
  - **System simplification**
    - Stable winding/unwinding can be achieved by the inverter alone.
  - **Wide range of applications**
    - The FR-A800-R2R inverter enables the use in various system applications such as winding/unwinding in the wire drawing machines and printers.
  - **Easy startup and adjustment**
    - Parameters can be used for mechanical adjustment according to applications.

**Winding/unwinding shaft**

Tension control (speed control / torque control) is enabled by inputting the dancer roll position or the feedback from the tension sensor. Stable control can be achieved by winding diameter calculation, even with a large difference between the maximum and minimum diameters.

**Intermediate shaft**

The line speed is controlled by driving the intermediate shafts such as a reference shaft with a constant winding diameter or the feeding shaft.
System simplification

The FR-A800-R2R inverter has various dedicated functions such as winding diameter calculation, providing stable winding/unwinding control independently.

Winding diameter calculation

The present winding diameter for the winding/unwinding shaft is calculated from the actual line speed or the actual motor speed.

Line speed command input selection / actual line speed input selection

The line speed command and actual line speed required for calculating the winding diameter can be input through the analog input terminal or plug-in option.

Winding diameter calculation function selection

The winding diameter calculation method can be selected in order to improve the tension control performance.

- **Actual line speed calculation method**

  The winding diameter is calculated from the line speed and the main speed (actual motor speed).

  \[
  D = \frac{V}{\pi \times n \times Z}
  \]

- **Thickness calculation method**

  The material thickness is added up to find the overall winding diameter.

  \[
  D = \text{Initial diameter} \pm 2 \times d \times N \times Z
  \]

Initial winding diameter calculation

When the winding diameter changes after the material change or others, the present winding diameter is calculated in the following two ways.

- **The present winding diameter is calculated based on the dancer roll movement at a start from the lower limit position to the target position.**

- **The present winding diameter is calculated from the line speed and the actual motor speed. (The system must be started at low speed.)**

Winding diameter / winding length storage

The present value of winding diameter and winding/unwinding length can be stored. The winding diameter and winding length values are stored in the inverter even during power-OFF.
**Dancer feedback speed control / Tension sensor feedback speed control**

PID control is performed using feedback of the detected dancer roll position or feedback from the tension sensor. Stable control can be achieved in combination with the winding diameter calculation.

**Speed control proportional gain compensation**

By adjusting the speed control proportional gain according to the winding diameter, the response level can be kept constant.

**Tension PI gain tuning**

By automatically adjusting the tension PI gain for PID control, time required for adjustment is significantly cut down. Anyone can start the system easily.

**Dancer roll malposition detection**

When material rupture (break) occurs and the sensor feedback value (dancer/tension feedback) is held at the upper/lower limit for a certain period of time, the break detection signal is output.

---

**Tension sensorless torque control / Tension sensor feedback torque control**

The output torque of a motor is controlled so that the tension applied to a material is constant by calculating the winding diameter of a roll.

**Mechanical loss compensation function**

The tension applied to the material is maintained constant by raising a commanded torque to compensate mechanical loss caused by factors such as friction on the dancer roll or winding/unwinding shaft.

**Inertia compensation function**

During acceleration/deceleration, the tension applied to the material is maintained constant by adjusting the variable tension on the winding and unwinding sides.

**Taper function**

By adjusting the tension on the workpiece, it is possible to avoid imperfections such as wrinkles or deformation caused by the increase in diameter.

---

**Tension command cushion time**

The cushion time is set for the tension command to avoid sudden change in tension.
Wide range of applications

The FR-A800-R2R inverter offers four types of control functions which enable the use in various system applications such as winding/unwinding in the wire drawing machines and printers.

| Dancer feedback speed control | Tension sensor feedback speed control | Tension sensorless torque control | Tension sensor feedback torque control |

- **Dancer feedback speed control**
  - Speed is controlled for keeping a constant tension on the workpiece (winding/unwinding shaft) by using the dancer roll position and line speed data.
  - Further stable speed control is possible by performing PID control and winding diameter calculation in the inverter.
  - Tension sensor feedback speed control is a control function to keep the tension constant using feedback from the tension sensor, instead of the dancer roll position.

- **Tension sensor feedback speed control**
  - Speed is controlled for keeping a constant tension on the workpiece (winding/unwinding shaft) by using the dancer roll position and line speed data.
  - Further stable speed control is possible by performing PID control and winding diameter calculation in the inverter.
  - Tension sensor feedback speed control is a control function to keep the tension constant using feedback from the tension sensor, instead of the dancer roll position.

- **Tension sensorless torque control**
  - Torque is controlled for keeping a constant tension on the workpiece (winding/unwinding shaft) by using the tension sensor and line speed information.
  - Further stable torque control is possible by changing the torque command according to the acceleration/deceleration torque calculation at a speed change (inertia compensation) and the mechanical loss torque compensation, as well as the compensation determined by the winding diameter calculation.
  - Tension sensor feedback torque control can be used when the PLC function is enabled.

Example of dancer feedback speed control

Example of tension sensorless torque control
**Easy startup and adjustment**

Parameters can be used for mechanical adjustment according to applications, useful for the startup and adjustment work of the system.

*Before*

Setting and adjusting multiple devices including controllers were required for dancer control, and it took much time to start up the system.

*After*

○ Complex position control of the dancer roll can be achieved by the inverter alone by setting parameters.
○ By setting mechanical specifications, optimum control can be performed according to the system and the application.
○ Analog/pulse signal input method is selectable at the discretion of the customer. Input via communication is also available.
○ PID control enables and simplifies complex control using only the inverter.
○ Automatic tension PI gain adjustment enables easy startup. (Tension PI gain tuning)
Example of startup procedure

The following procedure shows the parameter setting example for the dancer feedback speed control.

**STEP 1**
Basic setting of the inverter

Perform setting according to the motor type and the control method.

**STEP 2**
Basic setting of mechanical specifications

Set the mechanical specifications.

**STEP 3**
Analog/pulse input method selection

Select the input method and the input terminal function for the line speed command.

**STEP 4**
PID control adjustment
(Dancer roll target position, tension PI gain tuning)

Set parameters to control the dancer roll and adjust the tension PI gain.

---

**Mechanical specifications setting**

Set the mechanical specifications according to application.

<table>
<thead>
<tr>
<th>Pr. Item</th>
<th>Name</th>
<th>Method</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1235</td>
<td>Maximum winding diameter 1</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1236</td>
<td>Minimum winding diameter 1</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1237</td>
<td>Winding/winding selection</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>645</td>
<td>Winding diameter range selection</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1247</td>
<td>Winding diameter change increment amount limit</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1243</td>
<td>Gear ratio numerator (follower side)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1244</td>
<td>Gear ratio denominator (driver side)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>7</td>
<td>Acceleration time</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>Deceleration time</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>394</td>
<td>First acceleration time for line speed command</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>395</td>
<td>First deceleration time for line speed command</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>101</td>
<td>Second deceleration time for line speed command</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>393</td>
<td>Line speed command acceleration/deserialization reference</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1231</td>
<td>Material thickness d1</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1252</td>
<td>Dancer lower limit position</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1255</td>
<td>Accumulated amount</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

---

**Control accuracy improvement by the winding diameter calculation**

By calculating the winding diameter of the winding/unwinding shaft, the tension is always optimized even if it changes along with the winding diameter change.

---

**Input method selection for the line speed command, dancer signal, and actual line speed**

The line speed command input method can be selected from the following: analog input through a terminal (2, 4, 1, 6, etc.), single-phase pulse train input, encoder pulse input, and input via communication (CC-Link IE Field Network communication, DeviceNet™, PROFIBUS-DP V0, etc.).

---

**Dancer roll target position setting**

Set the target position, upper limit, and lower limit values for the dancer roll.

<table>
<thead>
<tr>
<th>Item</th>
<th>Pr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set point</td>
<td>133</td>
</tr>
<tr>
<td>Upper limit</td>
<td>131</td>
</tr>
<tr>
<td>Lower limit</td>
<td>132</td>
</tr>
<tr>
<td>PID action selection</td>
<td>128</td>
</tr>
</tbody>
</table>

---

**PI gain automatic adjustment**

The PI gain is automatically adjusted by tension PI gain tuning. The time required for gain adjustment can be reduced.

---

**TEST RUN**

Turn ON the X114 signal for using dancer feedback speed control and the winding diameter calculation function.
Inverter FREQROL-A800 Plus Series for Roll to Roll

### Lineup

#### Standard model

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure/function</th>
<th>Capacity**</th>
<th>Description</th>
<th>Symbol</th>
<th>Type**</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
<th>Symbol</th>
<th>Dedicated function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>0.4K to 280K</td>
<td>Inverter SLD rated current (A)</td>
<td>-1</td>
<td>FM</td>
<td>None</td>
<td>Without</td>
<td>60</td>
<td>R2R Roll to roll dedicated model</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>0.4K to 280K</td>
<td>Inverter ND rated capacity (kW)</td>
<td>-2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>06*</td>
<td></td>
</tr>
</tbody>
</table>

#### Separated converter type

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure/function</th>
<th>Capacity**</th>
<th>Description</th>
<th>Symbol</th>
<th>Type**</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
<th>Symbol</th>
<th>Dedicated function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
<td>2</td>
<td>0770 to 12120</td>
<td>Inverter SLD rated current (A)</td>
<td>-1</td>
<td>FM</td>
<td>None</td>
<td>Without</td>
<td>60</td>
<td>R2R Roll to roll dedicated model</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>315K to 500K</td>
<td>Inverter ND rated capacity (kW)</td>
<td>-2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>06*</td>
<td></td>
</tr>
</tbody>
</table>

*1 Models can be alternatively indicated with the inverter rated current (SLD rating).

*2 Specification differs by the type as follows.

*3 Available for the 5.5K or higher.

*4 For the 75K or higher inverter, or whenever a 75 kW or higher motor is used, always connect a DC reactor (FR-HEL), which is available as an option.

<table>
<thead>
<tr>
<th>Type</th>
<th>Motor output</th>
<th>Built-in EMC filter</th>
<th>Control logic</th>
<th>Rated frequency</th>
<th>Pr19 Base frequency voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>Terminal FM: pulse train output</td>
<td>OFF</td>
<td>Sink logic</td>
<td>60 Hz</td>
<td>9999 (same as the power supply voltage)</td>
</tr>
<tr>
<td>CA</td>
<td>Terminal CA: analog current output (0 to 20mA DC)</td>
<td>ON</td>
<td>Source logic</td>
<td>50 Hz</td>
<td>8888 (95% of the power supply voltage)</td>
</tr>
</tbody>
</table>
### Standard Specifications  
#### Rating (Standard model)  
200 V class

<table>
<thead>
<tr>
<th>Model FR-AB20□R2R</th>
<th>20046</th>
<th>0077</th>
<th>0105</th>
<th>0167</th>
<th>0205</th>
<th>0246</th>
<th>0468</th>
<th>0030</th>
<th>0070</th>
<th>0120</th>
<th>0154</th>
<th>0187</th>
<th>0230</th>
<th>0316</th>
<th>0380</th>
<th>0470</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4K</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>0.75K</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>22</td>
<td>30</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
<td>110</td>
</tr>
<tr>
<td>1.5K</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
<td>110</td>
<td>132</td>
</tr>
<tr>
<td>2.2K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>45</td>
<td>55</td>
<td>55</td>
<td>75</td>
</tr>
<tr>
<td>3.7K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>5.5K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>7.5K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>11K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>15K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>18.5K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>22K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>37K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>55K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>75K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
<tr>
<td>90K</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>37</td>
<td>55</td>
</tr>
</tbody>
</table>

#### Applicable Motor Capacity (kW)*
- SLD
- LD
- ND (initial setting)
- HD

#### Rated Capacity (kW)*
- SLD
- LD
- ND (initial setting)
- HD

#### Rated Current (A)*
- SLD
- LD
- ND (initial setting)
- HD

#### Overload current rating*
- SLD
- LD
- ND (initial setting)
- HD

#### Output Permissible AC voltage fluctuation
- 170 to 264 V, 50/60 Hz

#### Power supply capacity (kVA)*
- SLD
- LD
- ND (initial setting)
- HD

#### Protective structure (IEC 60529)*
- Enclosed type (IP20)
- Open type (IP00)

#### Cooling system
- Self-cooling
- Forced air cooling

---

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

*2 For the ND rating, the carrier frequency is always 2 kHz.

*3 The 0.2 kW motor capacity is applicable under V/F control only.

*4 The rated output capacity indicated assumes that the output voltage is 220 V for 200 V class.

*5 The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

*6 The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about √2.

*7 Value for the built-in brake resistor

*8 Value for the ND rating

*9 The rated input current indicates a value at a rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

*10 The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).

*11 FR-DJ08: IP40 (except for the PJ connector section)
### Inverter FREQROL-A800 Plus Series for Roll to Roll

**400 V class**

<table>
<thead>
<tr>
<th>Model</th>
<th>FR-A840-□□ R2R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)**</td>
<td>SLD 0.75, 1, 1.5, 2.2, 3, 4</td>
</tr>
<tr>
<td>LD 0.75, 1, 1.5, 2.2, 3, 4</td>
<td>7.5</td>
</tr>
<tr>
<td>ND 0.75, 1, 1.5, 2.2, 3, 4</td>
<td>7.5</td>
</tr>
<tr>
<td>SNDC (initial setting)</td>
<td>0.4</td>
</tr>
<tr>
<td>HD 0.4</td>
<td>0.75</td>
</tr>
<tr>
<td>Rated capacity (kVA)</td>
<td>SLD 1.8, 2.9, 4</td>
</tr>
<tr>
<td>LD 1.8, 2.9, 4</td>
<td>6</td>
</tr>
<tr>
<td>ND 1.8, 2.9, 4</td>
<td>6</td>
</tr>
<tr>
<td>SNDC (initial setting)</td>
<td>1.1</td>
</tr>
<tr>
<td>HD 0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>SLD 2.3, 3.8, 5.2</td>
</tr>
<tr>
<td>LD 2.3, 3.8, 5.2</td>
<td>8.3</td>
</tr>
<tr>
<td>ND 2.3, 3.8, 5.2</td>
<td>8.3</td>
</tr>
<tr>
<td>SNDC (initial setting)</td>
<td>1.5</td>
</tr>
<tr>
<td>HD 0.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Overload current rating (%)</td>
<td>SLD 110%, 60%, 120%, 3 s (inverse-time characteristics)</td>
</tr>
<tr>
<td>LD 120%, 60%, 150%, 3 s (inverse-time characteristics)</td>
<td>120%</td>
</tr>
<tr>
<td>ND (initial setting)</td>
<td>150%, 60%, 200%, 3 s (inverse-time characteristics)</td>
</tr>
<tr>
<td>HD 200%, 60%, 250%, 3 s (inverse-time characteristics)</td>
<td>200%</td>
</tr>
<tr>
<td>Rated voltage (V)</td>
<td>Three-phase 380 to 500 V</td>
</tr>
<tr>
<td>Regenerative braking</td>
<td>Maximum brake torque**</td>
</tr>
<tr>
<td></td>
<td>20% torque/continuous</td>
</tr>
<tr>
<td></td>
<td>100% torque/10%ED when the option is used</td>
</tr>
<tr>
<td>Power supply</td>
<td>Three-phase 380 to 500 V, 50 Hz/60 Hz**</td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>323 to 550 V, 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Permissible frequency fluctuation (s%)</td>
<td>3.2, 4.9, 7.3</td>
</tr>
<tr>
<td>Rated input current (A)**</td>
<td>3.2, 4.9, 7.3</td>
</tr>
<tr>
<td>Power supply capacity (kVA)**</td>
<td>3.2, 4.9, 7.3</td>
</tr>
<tr>
<td>Protective structure (IEC 60529)**</td>
<td>Enclosed type (IP25)</td>
</tr>
</tbody>
</table>

### Cooling system

- **Self-cooling**
- **Forced air cooling**

### Protection system

- **IEC 60529**

### Specifications

- **Drive Product**
- **Outline**
- **Examples**

---

**1** The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

**2** For the SNDC rating, the carrier frequency is always 2 kHz.

**3** The 0.2 kW motor capacity is applicable under V/F control only.

**4** The rated output capacity indicated assumes that the rated output current is 440 V or 400 V class.

**6** The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 2. √2.

**7** Value for the built-in brake resistor

**8** Value for the HD rating

**9** The rated input current indicates a value at a rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

**10** The power supply voltage is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).

**11** For the power voltage exceeding 480 V, set Pr. 577 Input voltage mode selection.

**12** The braking capability of the inverter built-in brake can be improved with a commercial brake resistor. For the details, please contact your sales representative.

---

<table>
<thead>
<tr>
<th>Drive Product</th>
<th>Outline</th>
<th>Examples</th>
<th>404</th>
<th>Inverter FREQROL-A800 Plus Series for Roll to Roll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
<tr>
<td>Drive Product</td>
<td>Outline</td>
<td>Examples</td>
<td>404</td>
<td>Inverter FREQROL-A800 Plus Series for Roll to Roll</td>
</tr>
</tbody>
</table>
## Rating (Separated converter type)
### 400 V class
#### Inverter

<table>
<thead>
<tr>
<th>Model FR-A842-C2-R2R</th>
<th>07700 (SLD)</th>
<th>08660 (LD)</th>
<th>09620 (SND)</th>
<th>10940 (ND)</th>
<th>12120 (HD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)**1</td>
<td>315K</td>
<td>355K</td>
<td>400K</td>
<td>450K</td>
<td>500K</td>
</tr>
<tr>
<td></td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td></td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
</tr>
<tr>
<td></td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>280</td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
<td>924</td>
</tr>
<tr>
<td></td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
</tr>
<tr>
<td></td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
</tr>
<tr>
<td></td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1034</td>
<td>1212</td>
</tr>
<tr>
<td></td>
<td>583</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1034</td>
</tr>
<tr>
<td></td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
</tr>
<tr>
<td></td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>465</td>
<td>521</td>
<td>587</td>
<td>660</td>
</tr>
<tr>
<td></td>
<td>610</td>
<td>683</td>
<td>770</td>
<td>866</td>
<td>962</td>
</tr>
<tr>
<td></td>
<td>547</td>
<td>610</td>
<td>683</td>
<td>770</td>
<td>866</td>
</tr>
</tbody>
</table>

#### Output

<table>
<thead>
<tr>
<th>Overload current rating*3</th>
<th>SLD</th>
<th>110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LD</td>
<td>120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
<tr>
<td></td>
<td>SND*3</td>
<td>150% 60 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
<tr>
<td></td>
<td>ND (initial setting)</td>
<td>150% 60 s, 200% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
<tr>
<td></td>
<td>HD</td>
<td>200% 60 s, 250% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
</tr>
</tbody>
</table>

#### Rated voltage*4

| Regenerative braking torque*5 (When the converter unit (FR-CC2) is used) | Maximum brake torque | 10% torque/continuous |

#### Input Power

<table>
<thead>
<tr>
<th>DC power supply voltage</th>
<th>430 to 780 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control power supply auxiliary input</td>
<td>Single phase 380 to 500 V, 50 Hz/60 Hz*5</td>
</tr>
<tr>
<td>Permissible control power supply auxiliary input fluctuation</td>
<td>Frequency ±5%, voltage ±10%</td>
</tr>
</tbody>
</table>

#### Protective structure (IEC 60529)*6

| Open type (IP00) |

#### Cooling system

| Forced air cooling |

#### Approx. mass (kg)

| 163 | 163 | 243 | 243 | 243 |

---

**1** The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

**2** For the SND rating, the carrier frequency is always 2 kHz.

**3** The rated output capacity indicated assumes that the output voltage is 440 V.

**4** For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

**5** The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about 2.

**6** The carrier unit output voltage varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by about 2.

**7** For the power supply exceeding 480 V, set Pr.977 Input voltage mode selection.

---

#### Converter unit (FR-CC2)

<table>
<thead>
<tr>
<th>Model FR-CC2-H2</th>
<th>315K</th>
<th>355K</th>
<th>400K</th>
<th>450K</th>
<th>500K</th>
<th>560K</th>
<th>630K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)</td>
<td>315</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td>Overload current rating*1</td>
<td>200% 60 s, 250% 3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage*2</td>
<td>430 to 780 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 380 to 500 V, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>Three-phase 323 to 550 V, 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input current (A)</td>
<td>610</td>
<td>683</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1094</td>
<td>1212</td>
</tr>
<tr>
<td>Power supply capacity (kVA)**3</td>
<td>460</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>833</td>
<td>924</td>
</tr>
<tr>
<td>Protective structure (IEC 60529)*1</td>
<td>Open type (IP00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### DC reactor

| Built-in |

#### Approx. mass (kg)

| 210 | 213 | 282 | 285 | 288 | 293 | 294 |

---

**1** The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the converter unit and the inverter to return to or below the temperatures under 100% load.

**2** The converter unit output voltage varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by about 2.

**3** The power supply capacity is the value when at the rated output current. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

**4** The permissible voltage imbalance ratio is 3% or less. (Imbalance ratio = (highest voltage between lines - average voltage between three lines) / average voltage between three lines × 100)
### Common specifications

| Control method | Soft-PWM control, high carrier frequency PWM control (selectable among V/f control, Advanced magnetic flux vector control, Real sensorless vector control), Optimum excitation control, and vector control*1 |
| Output frequency range | 0.2 to 500 Hz (The upper-limit frequency is 400 Hz (200 Hz for the SLD rating) under Advanced magnetic flux vector control, Real sensorless vector control, and vector control*2) |
| Frequency setting resolution | Analog Input: 0.015 Hz/60 Hz (0 to 10 V/2 bits for terminals 2 and 4) – 0.03 Hz/60 Hz (0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits for terminals 2 and 4, 0 to ±10 V/12 bits for terminal 1) – 0.06 Hz/60 Hz (0 to ±5 V/11 bits for terminal 1) | Digital input: 0.01 Hz |
| Frequency accuracy | Analog Input | Within ±0.2% of the max. output frequency (25°C ± 10°C) |
| | Digital input | Within 0.01% of the set output frequency |
| Voltage/frequency characteristics | Base frequency can be set from 0 to 500 Hz. Constant-torque/variable-torque pattern or adjustable 5 points V/f can be selected. |
| Starting torque | SLD Rating: 120% 0.3 Hz, LD Rating: 150% 0.3 Hz, SLD Rating: 150% 0.3 Hz, ND Rating: 200% 0.3 Hz*, HD Rating: 250% 0.3 Hz* |
| Torque boost | Manual torque boost |
| Acceleration/deceleration time setting | DC injection brake (induction motor) | Operation frequency (0 to 120 Hz), operation time (0 to 10 s), operation voltage (0 to 30%) variable |
| Stall prevention operation level | Activation range of stall prevention operation (SLD rating: 0 to 120%, LD rating: 0 to 150%, SLD rating: 0 to 220%, HD rating: 0 to 280%). Whether to use the stall prevention or not can be selected. (V/f control, Advanced magnetic flux vector control) |
| Torque limit level | Torque limit value can be set (0 to 400% variable). (Real sensorless vector control, vector control*3) |
| Frequency setting signal | Analog Input | Terminal 1 - 10 to ±10 V. -5 to ±5 V are available. |
| | Digital input | Input using the setting dial of the operation panel or parameter unit |
| Start signal | Low-speed operation command, Middle-speed operation command, High-speed operation command, Second function selection, Terminal 4 input selection, Jog operation selection, Selection of automatic restart after instantaneous power failure, Flying start, Output stop, Start self-holding selection, Forward reverse rotation, Reverse rotation, Inverter reset |
| Input signals (twelve terminals) | The input signal can be changed using Pr.178 to Pr.189 (input terminal function selection). |
| Pulse train input | 1000 pulses |
| Open collector output (five terminals) | Inverter running, Up to frequency, Instantaneous power failure/undervoltage*4, Overload warning, Output frequency detection, Fault. The output signal can be changed using Pr.190 to Pr.196 (output terminal function selection). Fault codes of the inverter can be output (4 bits) from the open collector. |
| Pulse train output (FM type) | 50 bits |
| For meter | Pulse train output (FM type) | Max. 2.4 kHz: one terminal (output frequency) The monitored item can be changed using Pr.54 FM/CA terminal function selection. |
| | Current output | Max. 20 mA/DC: one terminal (output current) The monitored item can be changed using Pr.54 FM/CA terminal function selection. |
| | Voltage output | Max. 10 VDC: one terminal (output voltage) The monitored item can be changed using Pr.158 AM terminal function selection. |
| Operation panel (FR-QL08) | Operating status Output frequency, Output current, Output voltage, Frequency setting value The monitored item can be changed using Pr.52 Operation panel main monitor selection. |
| Pulse train output (FM type) | Fault record A fault record is displayed when a fault occurs. If the same fault occurs within 5 minutes, the fault record is displayed. |}

### Operational functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driver feedback speed control</td>
<td>Tension sensor feedback speed control, Tension sensor feedback torque control, winding diameter with initial winding diameter calculation, line speed detection, reduction ratio setting, winding size in winding diameter setting, winding diameter/length in line speed setting, acceleration/deceleration pattern, water-proof sensor, speed sensor, speed control proportional gain compensation function, real change function, tapper function, inertia compensation function, mechanical loss compensation function, maximum and minimum frequency setting, multi-speed operation, acceleration/deceleration pattern, thermal protection, DC injection brake, starting frequency, Jog operation, operation stop (MRS), stall prevention, regeneration avoidance, DC bias frequency*5, frequency jump, rotation display, automatic restart after instantaneous power failure, retry function, carrier frequency selection, fast-responses current limit, forward/reverse rotation prevention, operation mode selection, slip compensation, droop control, speed smoothing control, auto-tuning, applied motor selection, gain tuning, RS-485 communication, encoder control, cooling fan operation selection, stop selection (deceleration stop/coasting), power-failure deceleration stop function, PLC function, life diagnosis, maintenance timer, current average monitor, multiple rating, speed control, pre-excitation, torque limit, test run, 24 V power supply input for control circuit, safety stop function</td>
</tr>
</tbody>
</table>

### Protective/Warning function

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overcurrent trip during acceleration, Overcurrent trip during constant speed, Overcurrent trip during deceleration or stop, Regenerative overvoltage trip during acceleration, Regenerative overvoltage trip during constant speed, Regenerative overvoltage trip during deceleration or stop, Inverter overload trip (electronic thermal relay function), Motor overload trip (electronic thermal relay function), Heat sink overheat, Instantaneous power failure<em>4, Undervoltage</em>4, Input phase loss<em>3, Stall prevention stop, Brake transistor alarm detection</em>2, Output side earth (ground) fault overcurrent, Short circuit, Phase output short, External thermal relay operation<em>3, PTC thermostat operation</em>4, Option fault, Communication option fault, Parameter storage device fault, PU disconnection, Retry count excess<em>3, Parameter storage device fault, CPU fault, Operation panel power supply short circuit/ HS-485 terminals power supply short circuit, 24 VDC power fault, Abnormal output current detection</em>4, Inrush current limit circuit fault<em>4, Communication fault (inverter), Analog input fault, USB communication fault, Safety circuit fault, Overload trip, Speed deviation excess detection</em>4, Signal loss detection<em>4, Encoder phase fault</em>4, 4 mA input fault<em>4, PID signal fault</em>4, Option fault, Output overcurrent detection (gain*3), Internal circuit fault, Encoder pulse number setting error, Overload trip</td>
<td></td>
</tr>
</tbody>
</table>

### Protective/Warning function

<table>
<thead>
<tr>
<th>Warning function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overvoltage trip (electronic thermal relay function pre-alarm, PU, Speed limit indication<em>4, Parameter copy, Safety stop, Maintenance signal output</em>4, USB host error, Operation panel lock<em>4, Password locked</em>4, Parameter write error, Copy operation error, 24 V external power supply operation</td>
<td></td>
</tr>
</tbody>
</table>

### Environmental specifications

<table>
<thead>
<tr>
<th>Environment</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surrounding air temperature</td>
<td>–10°C to +50°C (non-freezing) (SLD, SND, ND, HD ratings) –10°C to +40°C (Freezing) (SLD rating)</td>
</tr>
<tr>
<td>Surrounding air humidity</td>
<td>95% RH or less (non-condensing) (With circuit board coating (conforming to IEC60721-3-3 3C2/3S2) 90% RH or less (non-condensing) (Without circuit board coating)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>–20°C to +65°C</td>
</tr>
</tbody>
</table>

*1 Available only when a vector control compatible option is included.
*2 In the initial setting of the FR-A800-00340(5.5K) or higher and the FR-A840-00170(5.5K) or higher, it is limited to 150% by the torque limit level.
*3 This protective function is not available in the initial status.
*4 Only available for standard models.
*5 Parameter applicable to a short time, e.g. in transit.
*6 For the installation at an altitude above 1,000 m up to 2,500 m, derate the rated current 3% per 500 m.
*7 2.3m/s2 or less for the FR-A840-04320(160K) or higher.
### Outline Dimension Drawings

#### FR-A820-00046(0.4K) to 04750(90K)-R2R

#### FR-A840-00023(0.4K) to 03610(132K)-R2R

#### FR-A840-04320(160K) to 06830(280K)-R2R

#### 200 V class

<table>
<thead>
<tr>
<th>Inverter model</th>
<th>W</th>
<th>W1</th>
<th>H</th>
<th>H1</th>
<th>D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A820-00046(0.4K)-R2R</td>
<td>110</td>
<td>95</td>
<td>260</td>
<td>245</td>
<td>110</td>
<td>6</td>
</tr>
<tr>
<td>FR-A820-00077(0.75K)-R2R</td>
<td>150</td>
<td>125</td>
<td>245</td>
<td>140</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00167(2.2K)-R2R</td>
<td>220</td>
<td>195</td>
<td>300</td>
<td>285</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>FR-A820-00250(3.7K)-R2R</td>
<td>250</td>
<td>230</td>
<td>400</td>
<td>380</td>
<td>190</td>
<td>10</td>
</tr>
<tr>
<td>FR-A820-01540(30K)-R2R</td>
<td>325</td>
<td>270</td>
<td>550</td>
<td>530</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>FR-A820-01870(37K)-R2R</td>
<td>435</td>
<td>380</td>
<td>525</td>
<td>250</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>FR-A820-03800(75K)-R2R</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

#### 400 V class

<table>
<thead>
<tr>
<th>Inverter model</th>
<th>W</th>
<th>W1</th>
<th>H</th>
<th>H1</th>
<th>D</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A840-00023(0.4K)-R2R</td>
<td>150</td>
<td>125</td>
<td>260</td>
<td>245</td>
<td>140</td>
<td>6</td>
</tr>
<tr>
<td>FR-A840-00038(0.75K)-R2R</td>
<td>220</td>
<td>195</td>
<td>300</td>
<td>285</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>FR-A840-00052(1.5K)-R2R</td>
<td>250</td>
<td>230</td>
<td>400</td>
<td>380</td>
<td>190</td>
<td>10</td>
</tr>
<tr>
<td>FR-A840-00126(3.7K)-R2R</td>
<td>325</td>
<td>270</td>
<td>550</td>
<td>530</td>
<td>195</td>
<td></td>
</tr>
<tr>
<td>FR-A840-00170(5.5K)-R2R</td>
<td>435</td>
<td>380</td>
<td>525</td>
<td>250</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>FR-A840-00380(11K)-R2R</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>360</td>
<td></td>
</tr>
</tbody>
</table>

(Unit: mm)
Inverter FREQROL-A800 Plus Series for Roll to Roll

Seperated converter type

Outline Dimension Drawings

- FR-A842-07700(315K), 08660(355K)-R2R

(Unit: mm)

- FR-A842-09620(400K), 10940(450K), 12120(500K)-R2R

(Unit: mm)
Drive Product

Series
FREQROL-A800
FREQROL-F800
FREQROL-E700
FREQROL-F700PJ
FREQROL-D700

Specifications/Outline Drawing
Examples
Supporting Documents
Order

AC Servo
P.268
Inverter
P.436
Energy Saving with Inverters

The consumed power of a variable-torque load, such as fans, pumps, and blowers, is proportional to the cube of its rotation speed.
Adjusting the air volume by the inverter rotation speed control can lead to energy savings.

**Utilizing the motor capability to the full**

- Optimum excitation control continuously adjusts the excitation current to an optimum level to provide the highest motor efficiency. With a small load torque, a substantial energy saving can be achieved.
  - For example, at 4% motor load torque for a general-purpose motor, the motor efficiency under Optimum excitation control is about 30% higher than the motor efficiency under V/F control.

**Advanced optimum excitation control**

- Advanced optimum excitation control, which has been newly developed, provides a large starting torque while maintaining the motor efficiency under the conventional Optimum excitation control.
- Without the need of troublesome adjustment of parameters (acceleration/ deceleration time, torque boost, etc.), acceleration is done in a short time.
- Also, energy saving operation with the utmost improved motor efficiency is performed during constant-speed operation.

**Supporting operations of various motors**

- Offline auto tuning

The offline auto tuning function to measure circuit constants of the motor enables optimal operation of motors even when motor constants vary, when a motor of other manufacturers is used, or when the wiring distance is long.

As well as Mitsubishi general-purpose motors, Mitsubishi PM motors (MM-EFS, MM-THE4), sensorless operation can be performed for other manufacturers’ general-purpose motors*2 and other manufacturers’ permanent magnet (PM) motors*2.

The tuning function enables the Advanced optimum excitation control of other manufacturers’ general-purpose motors*2, which increases the use in the energy saving applications.

---

*2 Depending on the motor characteristics, tuning may not be available.
Energy Saving with High-Efficiency IPM Motor

In the international context of global warming prevention, many countries in the world have started to introduce laws and regulations to mandate manufacturing and sales of high-efficiency motors. With the use of high-efficiency motors, further energy saving is achieved.

- **IE code**
  As an international standard of the efficiency, IEC60034-30 (energy-efficiency classes for single-speed, three-phase, cage-induction motors) was formulated in October 2008. The efficiency is classified into four classes from IE1 to IE4. The larger number means the higher efficiency.

Further energy saving with the premium high-efficiency IPM motor

- The IPM motor, with permanent magnets embedded in the rotor, achieves even higher efficiency as compared to the general-purpose motor (SF-PR/SF-THE3).
- The IM driving setting can be switched to IPM driving setting by only one setting. (**12** (MM-EFS/MM-THE4) in the parameter (IPM)).

Why is an IPM motor more efficient?

- No current flows to the rotor (secondary side), and no secondary copper loss is generated.
- Magnetic flux is generated with permanent magnets, and less motor current is required.
- Embedded magnets provide reluctance torque,** and the reluctance torque can be applied.

**4:** Reluctance torque occurs due to magnetic imbalance on the rotor.

Energy-Saving Functions Suitable for Various Systems

Standby power reduction

- With the 24 VDC external power supply, the input MC signal can be turned OFF after the motor is stopped, and turned ON before activating the motor. The inverter enables self power management to reduce standby power.
- The inverter cooling fan can be controlled depending on the temperature of the inverter heatsink. Also, signals can be output in accordance with the inverter cooling fan operation. When the fan is installed on the enclosure, the enclosure fan can be synchronized with the inverter cooling fan.
- Extra power consumption when the motor is stopped can be reduced.

Energy saving at a glance

- **Energy saving monitor / Pulse train output of output power**
  Energy saving monitor is available. The energy saving effect can be checked using an operation panel, output terminal, or network.
  The output power amount measured by the inverter can be output in pulses.
  The cumulative power amount can be easily checked.

Effective use of the regenerative energy

- **FR-CV / FR-HC2**
  Multiple inverters can be connected to the power regeneration common converter (FR-CV) or the high power factor converter (FR-HC2) through a common PN bus. The regenerated energy is used by another inverter, and if there is still an excess, it is returned to the power supply, saving on the energy consumption. The 355K or higher models are inverter-converter separated types, which are suitable for power regeneration.
## Optimum Inverter Capacity Selection

**Multiple rating**

The rating can be selected between the two types (LD (light duty) or SLD (superlight duty)) depending on the load of the fan/pump to be used. The optimum inverter capacity can be selected suitable for the motor to be used. For the 200 V class 90K or higher and the 400 V class 75K or higher, a motor with one-rank higher capacity can be combined.

<table>
<thead>
<tr>
<th>Load</th>
<th>Rating</th>
<th>Overload current rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superlight</td>
<td>SLD rating</td>
<td>110% 60 s, 120% 3 s (inverse-time characteristics)</td>
</tr>
<tr>
<td>Light duty</td>
<td>LD rating</td>
<td>120% 60 s, 150% 3 s (inverse-time characteristics)</td>
</tr>
<tr>
<td></td>
<td>at surrounding air temperature of 40˚C</td>
<td>at surrounding air temperature of 50˚C</td>
</tr>
</tbody>
</table>

## Further Enhanced PID Control

### System cost reduction [PID multiple loops (two loops)]

Two PID operation units are available in the inverter. The inverter can perform PID control of the motor operation and control the external equipment at the same time. The system cost can be reduced because no external PID controller is required for controlling the external equipment.

### Direct setting of the PID set point

The PID set point can be set directly from the operation panel. The setting can be easily changed at hand.

### Visibility improvement

With the optional LCD operation panel (FR-LU08), the unit can be changed from % to other easy-to-see units. Maintenance and adjustment is facilitated by using a familiar unit of air volume, temperature, etc. for indication.

## Water volume control with multiple pumps

### Multi-pump function

By controlling the pumps connected in parallel (up to four pumps) by the PID control by one inverter, water volume, etc. can be adjusted.

One of the connected pumps is driven by the inverter. Other pumps are driven by commercial power supply. The number of pumps to be driven by commercial power supply is automatically adjusted according to the water volume.

## Avoidance of rapid acceleration/deceleration using PID action

### PID pre-charge function

Before PID action, the water flow to the pipe is controlled by operating the motor at a constant speed until the measured value (pressure, etc.) reaches the set level. This function is used to avoid rapid acceleration/deceleration caused by starting the PID action while the pipe is empty, and prevent a water hammer action, etc.

## Pump water volume control

### PID input pressure control

In order to prevent air intake and cavitation inside the pump, the pump inlet pressure can be controlled so that there is no water shortage.
Operating Status Monitoring

Detection of mechanical faults

- Load characteristics measurement function
  - The speed/torque relationship is stored while no fault occurs. By comparing the present load status with the stored load characteristics, out-of-range warnings can be output if applicable. Mechanical faults such as clogging of the filter or breakage of the belt can be easily detected, and maintenance is facilitated.

Cleaning of fans and pumps

- Cleaning function
  - Foreign matter on the impellers or fans of pumps can be removed by repeating forward/reverse rotation and stopping of the motor. (Use this function when a back flush does not pose a problem.) This function can also be automatically started when the result of load characteristics measurement is out of range (overload).

Smooth Restart

- Automatic restart after instantaneous power failure / flying start function
  - After an instantaneous power failure, the operation is restartable from the coasting motor speed. With the advanced flying start function, the operation can be smoothly started from low speed.

Keep Running during Flying Start Operation

- Regeneration avoidance function
  - The operation frequency is automatically increased to prevent the regenerative overvoltage fault from occurring. This function is useful when a load is forcibly rotated by another fan in the duct.

PLC Control with an Inverter

- PLC function in the inverter
  - Parameters and setting frequency can be changed at the program. Control programs can be created in sequence ladders using the inverter setup software (FR Configurator2).
  - Inverter control such as inverter operations triggered by input signals, signal output based on inverter operation status, and monitor output can be freely customized based on the machine specifications.
  - All machines can be controlled by the inverter alone, and control can also be dispersed.
  - Time-based operation is possible by using in combination with the real-time clock function (when using an optional LCD operation panel (FR-LU08)).

Compatibility with Various Systems

Compatibility with various networks

- It supports BACnet® MS/TP as standard, as well as Mitsubishi inverter protocol and MODBUS®RTU (binary) protocol.
- Communication options are also available for the major network protocols such as CC-Link, CC-Link IE Field, LONWORKS® (to be supported soon), FL-net remote I/O (to be supported soon), PROFiBUS-DP/V0, and DeviceNet™.

Simplified external equipment

- The CA-type inverters are available. For the CA type, the monitor output terminal FM/CA operates as terminal CA (analog current output 0 to 20 mA), not as terminal FM (pulse train output). An external converter is not required.
  - (The factory setting is different for the CA type and the FM type.)

Mechanical Resonance Suppression

- Speed smoothing control
  - Vibration caused by mechanical resonance can be reduced. (Available with general-purpose motors)

Extended Functions

- Support for up to three types of options
  - Three types of plug-in options can be attached. The functions of the inverter can be extended through network. For example, additional I/O terminals can be used.
**Security & Safety**

---

**Improved System Safety**

**Safety standards compliance**

Controls with safety functions can be easily performed. Pld and SIL2 are supported as standard. (STO)

- EN ISO 13849-1 Pld / Cat.3
- EN 61508, EN61800-5-2 SIL2

![Diagram of safety function](image)

- Safety function is equipped. Magnetic contactor (MC), Emergency stop wire.
- Before: 2 MCs were required.
- High cost
- High maintenance (maintenance for two)
- Large installation space

**Reliable and Secure Maintenance**

**Standard 24 VDC power supply for the control circuit**

In addition to the existing power supply input terminals (R1 and S1) of the control circuit, 24 VDC input is equipped as standard. The 24 VDC power supplied from outside can be fed to the control circuit locally.

- The parameter setting and communication operation can be done without turning ON the main power.

![Diagram of 24 VDC power supply](image)

**Prevention of trouble with temperature monitoring**

The inverter is equipped with an internal temperature sensor, which outputs a signal when the internal temperature is high. This facilitates the detection of rises in temperature inside the inverter following cooling fan malfunction, or rises in the surrounding air temperature due to inverter operating conditions.

---

**Quick Reaction to Troubles**

**Easy fault diagnosis**

- The operating status (output frequency, etc.) immediately before the protection function activates can be stored in the inverter built-in RAM with the trace function. Stored data (trace data) can be copied to a USB memory device, facilitating easy trouble analysis at a separate location by reading into FR Configurator2.

- Trace data stored in the built-in RAM is deleted when the power is turned OFF or the inverter is reset.

**Clock setting is now available in addition to the already-available**

- The time and date at a protective function activation are easily identified.
  - The clock is reset at power-OFF. The date and time are also saved with the trace data, making the fault analysis easier.

- By using the real-time clock function with the optional LCD operation panel (FR-LU08) (when using battery), the time is not reset even when the power supply is turned OFF.

---

Graph function

(FR Configurator2)
Protection of Critical Parameter Settings

Misoperation prevention by setting a password

- Setting a 4-digit password can restrict parameter reading/writing.

Long Life Components and Life Check Function

Long life components

- The service life of the cooling fans is now 10 years\(^1\). The service life can be further extended by ON/OFF control of the cooling fan.
- Capacitors with a design life of 10 years\(^{1,2}\) are adapted.
- Life indication of life components

<table>
<thead>
<tr>
<th>Component</th>
<th>Estimated Service Life FR-F800*</th>
<th>Guideline of JEMA*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooling fan</td>
<td>10 years*</td>
<td>2 to 3 years</td>
</tr>
<tr>
<td>Main circuit smoothing capacitor</td>
<td>10 years*</td>
<td>5 years</td>
</tr>
<tr>
<td>Printed board smoothing capacitor</td>
<td>10 years*</td>
<td>5 years</td>
</tr>
</tbody>
</table>

\(^1\): Surrounding air temperature: Annual average of 40°C (free from corrosive gas, flammable gas, oil mist, dust and dirt).
\(^2\): Output current: 80% of the inverter rating

Enhanced life check function NEW

- An internal thermal sensor is equipped to all inverters as standard, which enables monitoring of the installation environment. Use this function as a guide for the life diagnosis.
- Maintenance timers are available for up to three peripheral devices, such as a motor and bearings.

Renewal Assurance

Compatibility with existing models

- The inverter installation method is the same as that for the FR-F700(P) series, eliminating any concerns over replacement (except for some capacity models).
- Furthermore, the FR-F700(P) series control circuit terminal blocks can be installed with the use of an option (FR-A8TAT).

- The terminal response adjustment function allows a user to adjust the response speed in accordance with the existing facility. (The response time is shorter for the FR-F800 series.)
- In addition to the FR-F700(P) series' parameter settings, the FR-F500 series parameter settings (to be supported soon) can be easily copied to the FR-F800 series by using the conversion function of FR Configurator2. NEW

Cooling fan
Main circuit smoothing capacitor
Printed board smoothing capacitor

- Estimated lifespan of the FR-F800
- 2 to 3 years
- 5 years
- 5 years

Guideline of JEMA *3*1
FR-F700 (P) Personal computer
FR-F800

*1: Surrounding air temperature: Annual average of 40°C (free from corrosive gas, flammable gas, oil mist, dust and dirt).
The design life is a calculated value from the LD rating and is not a guaranteed product life.

*2: Output current: 80% of the inverter rating

*3: Excerpt from "Periodic check of the transistorized inverter" of JEMA (Japan Electrical Manufacturer’s Association).
Harmonic current may adversely affect the power supply. To suppress such harmonic current, the power-factor-improving compact AC reactor (FR-HAL) and the DC reactor (FR-HEL) are available. (For the 75K or higher inverter, always connect a DC reactor. Select a DC reactor according to the applied motor capacity.)

- By attaching the EMC filter connector to the ON or OFF position, the built-in EMC filter can be set enabled/disabled\(^{*1}\). When it is enabled, the inverter conforms to the EMC Directive (EN61800-3/2nd Environment Category C3\(^{*3}\)) by itself.

\(^{*1}\): Enabling the EMC filter increases leakage current.
\(^{*2}\): The input side common mode choke, which is built in the 55K or lower inverter, is always enabled regardless of the EMC filter ON/OFF connector setting.
\(^{*3}\): Refer to the EMC Installation Guidelines for the required specifications.

<table>
<thead>
<tr>
<th>Capacitive filter</th>
<th>Common mode choke</th>
<th>DC reactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>55K or lower</td>
<td>Standard (built-in)</td>
<td>Option (sold separately)</td>
</tr>
<tr>
<td>75K or higher</td>
<td>Standard (built-in)</td>
<td>Option (sold separately)</td>
</tr>
</tbody>
</table>

The F800 series inverters are equipped with built-in capacitive filters (capacitors) and common mode chokes (55K or lower). By installing a DC reactor (FR-HEL), which is available as an option, they can conform to the Architectural Standard Specifications (Electric Installation) and the Architectural Standard Specifications (Machinery Installation) (2013 revision) supervised by the Ministry of Land, Infrastructure, Transport and Tourism of Japan.

- With a high power factor converter (FR-HC2), the inverter is equivalent to a self-excitation three-phase bridge circuit in the "Harmonic Suppression Guidelines for Specific Consumers" in Japan, and realizes the equivalent capacity conversion coefficient K5=0. For the 355K or higher, the converter is separated. Therefore, installation space can be saved when connecting the FR-HC2.

Compliance with UL, cUL, and EC Directives (CE marking), and the Radio Waves Act (South Korea) (KC marking).

Being RoHS compliant, the FR-F800 inverters are friendly to people and the environment.
Streamlining the Startup Process

**Parameter copy with a USB memory device**

A USB host connector (A type), which allows external device connections, has been added. Parameters can be copied to commercial USB memory devices.

![USB 2.0 supported (full speed)](image)

**Easy setup with FR Configurator2**

- With the sense of unity with other Mitsubishi FA products with common MELSOFT design and operability, the software is easy to use.
- Easy plug-and-play connection is available to the USB terminal equipped as standard.

![FR Configurator2](image)

- A free trial version, which contains start-up functions, is available. It can be downloaded at Mitsubishi Electric FA Global Website.

Easy wiring to the control circuit

Spring clamp terminals have been adopted for control circuit terminals. Wires can be protected against loosening under vibrations during transportation of the inverter. Ten additional terminals are used as compared to the FR-F700(P) series. Round crimping terminals can also be used by employing a control terminal option (FR-A8TR).

![Easy wiring](image)

**Easy-to-follow Display Improves the Operability**

**Easy operation with GOT**

- Automatic communication is possible without specifying any parameter settings simply by connecting to the GOT2000 series.
- The PLC function device monitor can be displayed at the GOT2000 series. Batch control of multiple inverter device monitors is possible with a single GOT unit.
- The sample screen data for the FR-F800 can be found in the screen design software of the GOT2000 series. For the latest version of the screen design software, please contact your local sales office.

Easy-to-follow parameter configuration

With the parameter setting mode selection of the operation panel, the group parameter mode can be selected to provide intuitive and simple parameter settings. (The conventional parameter setting mode is selected by default.)

([Table of parameters](image))

**Easy-to-read operation panel**

AS-digt, 12-segment display has been adopted for the operation panel (FR-DU08) for a more natural character display. Furthermore, an optional operation panel (FR-LU08) adopting an LCD panel capable of displaying text and menus is also available.

![Operation panel](image)

To Aid with Maintenance

**Reduced wiring check time**

Split-type covers are adapted for all capacity models. Maintenance is now easy because all an operator has to do is to remove the cover for the target wiring area.

**Maintenance and control of multiple inverters**

Serial number reading is possible using the optional LCD operation panel (FR-LU08) or the inverter setup software (FR Configurator2). Administration of different inverters has become much more simple.
### Drive Product

**Drive Product**

**Inverter FREQROL-F800 Series**

**Lineup/Functions**

**Connectivity**

**Examples**

### Features/Others

- **FREQROL-A800 Series**
- **FREQROL-F800 Series**
- **FREQROL-E700 Series**
- **FREQROL-F700PJ Series**
- **FREQROL-D700 Series**

## Specifications/Outline

**Converter unit**

- **FM** (terminal FM equipped model)
- **CA** (terminal CA equipped model)

### Terminal FM (pulse train output)

- Terminal AM (analog voltage output (0 to ±10 VDC))

### Terminal CA (analog current output (0 to 20 mADC))

- Terminal AM (analog voltage output (0 to ±10 VDC))

### Sink logic

- **60 Hz**

### Source logic

- **50 Hz**

### OFF

- **9999** (same as the power supply voltage)

### ON

- **8888** (95% of the power supply voltage)

### Type Motor output

- **LD rated inverter capacity (kW)**

### Initial setting

- **Control logic**

- **Rated frequency**

- **Pr. 19 Base frequency voltage**

- **Pr. 575 Multiple rating setting**

### Circuit board coating

- **(IEC60721-3-3 3C2/3S2 compatible)**

### Plated conductor

### Symbol Description

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Structure, functionality</th>
<th>Symbol</th>
<th>Type</th>
<th>Description</th>
<th>Symbol</th>
<th>Type</th>
<th>Symbol</th>
<th>Circuit board coating</th>
<th>Plated conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200 V class</td>
<td>Standard model</td>
<td>1</td>
<td>FM</td>
<td>0.75K to 315K</td>
<td>2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>Without</td>
</tr>
<tr>
<td>4</td>
<td>400 V class</td>
<td></td>
<td>1</td>
<td>FM</td>
<td>355K to 560K</td>
<td>2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>Without</td>
</tr>
<tr>
<td>0</td>
<td>150 V class</td>
<td></td>
<td>1</td>
<td>FM</td>
<td>355K to 630K</td>
<td>2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>Without</td>
</tr>
<tr>
<td>0</td>
<td>120 V class</td>
<td></td>
<td>1</td>
<td>FM</td>
<td>355K to 630K</td>
<td>2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>Without</td>
</tr>
<tr>
<td>355K</td>
<td>400 K</td>
<td>Separated converter type</td>
<td>1</td>
<td>FM</td>
<td>355K to 630K</td>
<td>2</td>
<td>CA</td>
<td>None</td>
<td>Without</td>
<td>Without</td>
</tr>
</tbody>
</table>

#### Notes

- *1: Models can be alternatively indicated with the inverter rated current (SLD rating).
- *2: Specification differs by the type as follows.
- *3: Available for the 7.5K or higher.
- *4: For the 75K or higher inverter, always connect a DC reactor (FR-HEL), which is available as an option. Select a DC reactor according to the applied motor capacity.
- *5: Always install the converter unit (FR-CC2). (Not required when a high power factor converter (FR-HC2) is used)
• Connection example for standard models

Three-phase AC power supply
Must be within the permissible power supply specifications of the inverter.

Moulded case circuit breaker (MCCB) or earth leakage current breaker (ELB), fuse
Must be selected carefully since an inrush current flows in the inverter at power ON.

Magnetic contactor (MC)
Install this to ensure safety. Do not use this to start and stop the inverter. Doing so will shorten the life of the inverter.

AC reactor (FR-HAL)
DC reactor (FR-HEL)

Line noise filter (FR-BLF)
The FR-F020-0230X(5K) or higher, or the FR-F040-01800(75K) or higher, always connect a DC reactor. (The converter unit (FR-CC2) is equipped with the DC reactor.)

For the FR-F530-03160(75K) or higher, the FR-F840-01800(75K) or higher, always connect a DC reactor. (The converter unit (FR-CC2) is equipped with the DC reactor.)

USB connector
USB host (A connector)
Communication status indicator (LED) (USB host)
USB device (Mini B connector)

Personal computer (FR Configurator2)

Induction motor
Earth (Ground)

EMC filter (ferrite core)
(FR-BSF01, FR-BLF)

No-fuse switch (DSN type)
Connect this for an application where a PM motor is driven by the load even while the inverter power is OFF. Do not open or close the contactor while the inverter is running (outputting).

Power regeneration converter (MT-RC)
Power regeneration common converter (FR-CV)
Power regeneration converter (MT-RC)

Resistor unit (FR-BR, MT-BR5)
Moulded case circuit breaker (MCCB) or earth leakage current breaker (ELB), fuse

Connecting example

Install these options as required.

Connection Example

Controller Setting/Communications Drawings

Drive Product

Features/Specifications

Examples

AC Servo

P.268

Inverter

P.436
200 V class

<table>
<thead>
<tr>
<th>Model FR-F820-□</th>
<th>0.75K</th>
<th>1.5K</th>
<th>2.2K</th>
<th>3.7K</th>
<th>5.5K</th>
<th>7.5K</th>
<th>11K</th>
<th>15K</th>
<th>18.5K</th>
<th>22K</th>
<th>30K</th>
<th>37K</th>
<th>45K</th>
<th>55K</th>
<th>75K</th>
<th>90K</th>
<th>110K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)**</td>
<td>SLD</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
</tr>
<tr>
<td>LD</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
<td>90/110</td>
</tr>
<tr>
<td>Rated capacity (kVA)**</td>
<td>SLD</td>
<td>1.8</td>
<td>2.9</td>
<td>4</td>
<td>6.4</td>
<td>10</td>
<td>13</td>
<td>19</td>
<td>24</td>
<td>29</td>
<td>35</td>
<td>48</td>
<td>59</td>
<td>71</td>
<td>89</td>
<td>120</td>
<td>145</td>
</tr>
<tr>
<td>LD</td>
<td>1.6</td>
<td>2.7</td>
<td>3.7</td>
<td>5.8</td>
<td>8.8</td>
<td>12</td>
<td>17</td>
<td>22</td>
<td>27</td>
<td>32</td>
<td>43</td>
<td>53</td>
<td>65</td>
<td>81</td>
<td>110</td>
<td>132</td>
<td>165</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>SLD</td>
<td>4.6</td>
<td>7.7</td>
<td>10.5</td>
<td>16.7</td>
<td>25</td>
<td>34</td>
<td>49</td>
<td>63</td>
<td>77</td>
<td>93</td>
<td>125</td>
<td>154</td>
<td>187</td>
<td>233</td>
<td>316</td>
<td>380</td>
</tr>
<tr>
<td>LD</td>
<td>4.2</td>
<td>7</td>
<td>9.6</td>
<td>15.2</td>
<td>23</td>
<td>31</td>
<td>45</td>
<td>58</td>
<td>70.5</td>
<td>85</td>
<td>114</td>
<td>140</td>
<td>170</td>
<td>212</td>
<td>288</td>
<td>346</td>
<td>432</td>
</tr>
</tbody>
</table>

Overload rating

| Model FR-F820-□ | SLD | 110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C | LD | 120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C |

| Voltage rating | ✚ | Three-phase 200 to 240 V |

400 V class

<table>
<thead>
<tr>
<th>Model FR-F840-□</th>
<th>0.75K</th>
<th>1.5K</th>
<th>2.2K</th>
<th>3.7K</th>
<th>5.5K</th>
<th>7.5K</th>
<th>11K</th>
<th>15K</th>
<th>18.5K</th>
<th>22K</th>
<th>30K</th>
<th>37K</th>
<th>45K</th>
<th>55K</th>
<th>75K</th>
<th>90K</th>
<th>110K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)**</td>
<td>SLD</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
</tr>
<tr>
<td>LD</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
<td>18.5</td>
<td>22</td>
<td>30</td>
<td>37</td>
<td>45</td>
<td>55</td>
<td>75</td>
<td>90</td>
<td>110</td>
</tr>
<tr>
<td>Rated capacity (kVA)**</td>
<td>SLD</td>
<td>1.8</td>
<td>2.9</td>
<td>4</td>
<td>6.4</td>
<td>10</td>
<td>13</td>
<td>19</td>
<td>24</td>
<td>29</td>
<td>35</td>
<td>48</td>
<td>59</td>
<td>71</td>
<td>89</td>
<td>120</td>
<td>145</td>
</tr>
<tr>
<td>LD</td>
<td>1.6</td>
<td>2.7</td>
<td>3.7</td>
<td>5.8</td>
<td>8.8</td>
<td>12</td>
<td>17</td>
<td>22</td>
<td>27</td>
<td>32</td>
<td>43</td>
<td>53</td>
<td>65</td>
<td>81</td>
<td>110</td>
<td>132</td>
<td>165</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>SLD</td>
<td>4.6</td>
<td>7.7</td>
<td>10.5</td>
<td>16.7</td>
<td>25</td>
<td>34</td>
<td>49</td>
<td>63</td>
<td>77</td>
<td>93</td>
<td>125</td>
<td>154</td>
<td>187</td>
<td>233</td>
<td>316</td>
<td>380</td>
</tr>
<tr>
<td>LD</td>
<td>4.2</td>
<td>7</td>
<td>9.6</td>
<td>15.2</td>
<td>23</td>
<td>31</td>
<td>45</td>
<td>58</td>
<td>70.5</td>
<td>85</td>
<td>114</td>
<td>140</td>
<td>170</td>
<td>212</td>
<td>288</td>
<td>346</td>
<td>432</td>
</tr>
</tbody>
</table>

Overload rating

| Model FR-F840-□ | SLD | 110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C | LD | 120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C |

| Voltage rating | ✚ | Three-phase 380 to 500 V |

4. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by \( \sqrt{2} \).

5. The rated input current indicates a value at a rated output voltage. The impedance at the power supply side (including those of the input reactor and cables) affects the rated input current.

6. The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).

7. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

8. The rated output capacity indicated assumes that the output voltage is 440 V for 400 V class.
### Rating (separated converter type)  
400 V class

#### Inverter

<table>
<thead>
<tr>
<th>Applicable motor capacity (kW)</th>
<th>Model FR-F842-□D</th>
<th>355K</th>
<th>400K</th>
<th>450K</th>
<th>500K</th>
<th>560K</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLD</td>
<td>07700</td>
<td>08660</td>
<td>09620</td>
<td>10940</td>
<td>12120</td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td>Rated capacity (kVA)</td>
<td>SLD</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
<td>924</td>
</tr>
<tr>
<td>LD</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>834</td>
<td>924</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>SLD</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1094</td>
<td>1212</td>
</tr>
<tr>
<td>LD</td>
<td>683</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1094</td>
<td>1212</td>
</tr>
<tr>
<td>Overload current rating</td>
<td>SLD</td>
<td>110% 60 s, 120% 3 s (inverse-time characteristics) at surrounding air temperature of 40°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>120% 60 s, 150% 3 s (inverse-time characteristics) at surrounding air temperature of 50°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque</td>
<td></td>
<td>Maximum brake torque 10% torque/continuous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC power supply voltage</td>
<td></td>
<td>430 to 780 VDC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control power supply auxiliary input</td>
<td>Single phase 380 to 500 V 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible control power supply auxiliary input fluctuation</td>
<td>Frequency ±5%, voltage ±10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protective structure (IEC 60529)</td>
<td>Open type (IP00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td></td>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approx. mass (kg)</td>
<td></td>
<td>163</td>
<td>163</td>
<td>243</td>
<td>243</td>
<td>243</td>
</tr>
</tbody>
</table>

1: The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
2: The rated output capacity indicated assumes that the output voltage is 440 V.
3: The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
4: The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the maximum point of the voltage waveform at the inverter output side is the power supply voltage multiplied by about \( \sqrt{2} \).
5: LD rating reference value
6: FR-DU08: IP40 (except for the PU connector section)
7: For the power voltage exceeding 480 V, set Pr.977 Input voltage mode selection.

#### Converter unit (FR-CC2)

<table>
<thead>
<tr>
<th>Applicable motor capacity (kW)</th>
<th>Model FR-CC2-H□L</th>
<th>355K</th>
<th>400K</th>
<th>450K</th>
<th>500K</th>
<th>560K</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLD</td>
<td>355</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>560</td>
<td>630</td>
</tr>
<tr>
<td>Rated capacity (kVA)</td>
<td>SLD</td>
<td>200% 60 s, 250% 3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LD</td>
<td>150% 60 s, 200% 3 s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>Three-phase 380 to 500 V 50 Hz/60 Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)</td>
<td>SLD</td>
<td>683</td>
<td>770</td>
<td>866</td>
<td>962</td>
<td>1094</td>
</tr>
<tr>
<td>LD</td>
<td>521</td>
<td>587</td>
<td>660</td>
<td>733</td>
<td>833</td>
<td>924</td>
</tr>
<tr>
<td>Protective structure (IEC 60529)</td>
<td>Open type (IP00)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td></td>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC reactor</td>
<td>Built-in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approx. mass (kg)</td>
<td></td>
<td>213</td>
<td>282</td>
<td>285</td>
<td>288</td>
<td>293</td>
</tr>
</tbody>
</table>

1: The % value of the overload current rating indicated is the ratio of the overload current to the converter unit’s rated output current. For repeated duty, allow time for the converter unit and the inverter to return to or below the temperatures under 100% load.
2: The converter unit output voltage varies according to the input power supply voltage and the load. The maximum point of the voltage waveform at the converter unit output side is approximately the power supply voltage multiplied by \( \sqrt{2} \).
3: The power supply capacity is the value when at the rated output current. It varies by the impedance at the power supply side (including those of the input reactor and cables).
4: The permissible voltage imbalance ratio is 3% or less. (Imbalance ratio = (highest voltage between lines - average voltage between three lines) / average voltage between three lines × 100)
### Common specifications

<table>
<thead>
<tr>
<th>Control method</th>
<th>Soft-PWM control, high carrier frequency PWM control (selectable among V/F control (Optimum excitation control), Advanced magnetic flux vector control (Advanced optimum excitation control) and PM motor control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output frequency range</td>
<td>0.2 to 590 Hz ([The lower-limit frequency is 400 Hz under Advanced magnetic flux vector control, and PM motor control.])</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequency setting resolution</th>
<th>Analog input</th>
<th>0.015 Hz/60 Hz (terminal 2, 4: 0 to 10 V/12 bits)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Analog input</td>
<td>0.003 Hz/60 Hz (0 to 5 V/11 bits or 0 to 20 mA/approx. 11 bits for terminals 2 and 4, 0 to ±10 V/12 bits for terminal 1)</td>
</tr>
<tr>
<td>Digital input</td>
<td>0.01 Hz</td>
<td></td>
</tr>
<tr>
<td>Frequency accuracy</td>
<td>Analog input</td>
<td>Within ±0.2% of the max. output frequency (25°C ± 10°C)</td>
</tr>
<tr>
<td>Digital input</td>
<td>Within 0.01% of the set output frequency</td>
<td></td>
</tr>
<tr>
<td>Voltage/frequency characteristics</td>
<td>Base frequency can be set from 0 to 590 Hz. Constant-torque/variable-torque pattern or adjustable 5 points V/F can be selected.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Starting torque</th>
<th>Induction motor</th>
<th>120% 0.5 Hz (Advanced magnetic flux vector control)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPM motor</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

### Torque boost
- Manual torque boost

### Acceleration/deceleration time setting
- 0 to 3600 s (acceleration and deceleration can be set individually), or 5-pattern acceleration/deceleration mode: backlash countermeasures (acceleration/deceleration can be selected). |

### DC injection brake (induction motor)
- Operation frequency (0 to 120 Hz), operation time (0 to 10 s), operation voltage (0 to 30%) variable

### Stall prevention operation level
- Activation range of stall prevention operation (SLD rating: 0 to 120%, LD rating: 0 to 150%). Whether to use the stall prevention or not can be selected. (V/F control, Advanced magnetic flux vector control)

### Frequency setting signal
- Analog input
| Terminals 2 and 4: 0 to 10 V, 0 to 5 V, 4 to 20 mA (0 to 20 mA) are available. |
| Terminal 1: -10 to +10 V, -5 to 5 V are available. |
- Digital input
| Input using the setting dial of the operation panel or the parameter unit |

### Start signal
- Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected.

### Input signals (twelve terminals)
- Low-speed operation command, Middle-speed operation command, High-speed operation command, Second function selection, Terminal 4 input selection, Jog operation selection, Output stop, Start self-holding selection, Forward rotation command, Reverse rotation command, Inverter reset

### Pulse train input
- 100 kpps

### Operational functions
- Maximum and minimum frequency settings, multi-speed operation, acceleration/deceleration pattern, thermal protection, DC injection brake, starting frequency, Jog operation, output stop (MRS), stall prevention, regeneration avoidance, increased magnetic excitation deceleration, DC feeding, frequency jump, rotation display, automatic restart after instantaneous power failure, electronic bypass sequence, remote setting, relay function, carrier frequency selection, fast response current limit, forward/reverse rotation protection, operation mode selection, slip compensation, speed smoothing control, traverse, auto tuning, applied motor selection, RS-485 communication, PID control, PID pre-charge function, cooling fan operation selection, stop selection (deceleration stop/coasting), power-failure deceleration stop function, PLC function, life diagnosis, maintenance timer, current average monitor, multiple rating, test run, 24 V power supply input for control circuit, safety stop function, self power management, BACnet communication, PID gain tuning, cleaning, load characteristics storage, emergency drive

### Indication
- Pulse train output (five terminals)
| Max. 2.4 kHz: one terminal (output frequency) |
| The monitored item can be changed using Pr.54 FM/CA terminal function selection. |
- Current output (CA type)
| Max. 20 mADC: one terminal (output current) |
| The monitored item can be changed using Pr.54 FM/CA terminal function selection. |
- Voltage output
| Max. 10 VDC: one terminal (output voltage) |
| The monitored item can be changed using Pr.158 AM terminal function selection. |
- Operation panel (FR-DU08)
| Operating status |
| Output frequency, output current, output voltage, frequency setting value |
| The monitored item can be changed using Pr.52 Operation panel main monitor selection. |
- Fault record
| Fault record is displayed when a fault occurs. Past 8 fault records and the conditions immediately before the fault are saved (output voltage/current/frequency/cumulative energization time/year/month/date/time) are saved. |

### Protective/warning function
- Overcurrent trip during acceleration, Overcurrent trip during constant speed, Overcurrent trip during deceleration or stop, Regenerative voltage trip during acceleration, Regenerative overvoltage trip during constant speed, Regenerative overvoltage trip during deceleration or stop, Inverter overload trip (electronic thermal relay function), Motor overload trip (electronic thermal relay function), Heatsink overheat, Instantaneous power failure, Undervoltage, Input phase loss, Stall prevention stop, Loss of synchronism detection, Upper limit fault detection, Lower limit fault detection, Output side earth (ground) fault overcurrent, Output short circuit, Output phase loss, External thermal relay operation, PTC thermistor operation, Option fault, Communication option fault, Parameter protection device fault, PU disconnection, Retry count excess, CPU fault, Operation panel power supply short circuit/RS-485 terminals power supply short circuit, 24 VDC power fault, Abnormal output current detection, Inrush current limit fault, Communication fault (inverter), Analog input fault, USB communication fault, Safety circuit fault, Overvoltage fault, Overcurrent fault, 4 mA input fault, Pre-charging fault, PID signal fault, Internal circuit fault, User definition error in the PLC function

### Warning function
- Fan alarm, Stall prevention (overcurrent), Stall prevention (overvoltage), Electronic thermal relay function pre-alarm, PU stop, Parameter copy, Safety stop, Maintenance timer 1 to 3*, USB host error, Operation panel lock*, Password locked*, Parameter write error, Copy order error, 24 V external power supply operation, Load fault warning, Emergency drive in operation

### Environment
- Surrounding air temperature
| -10°C to +50°C (non-freezing) (LD rating) |
| -10°C to +40°C (non-freezing) (SLD rating) |

| Surrounding air humidity |
| With circuit board coating (conforming to IEC60721-3-3 3C2/3S2): 95% RH or less (non-condensing) |
| Without circuit board coating: 90% RH or less (non-condensing) |

| Storage temperature |
| -20°C to +65°C |

| Atmophere |
| Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.) |

| Altitude/ vibration |
| Maximum 1000 m above sea level*1, 5.9 m/s² or less*2, at 10 to 55 Hz (directions of X, Y, Z axes) |

*1: Available only for the standard model.
*2: This protective function is not available in the initial status.
*3: Temperature applicable for a short time, e.g. in transit.
*4: For the installation at an altitude above 1,000 m (up to 2,500 m), derate the rated current 3% per 500 m.
*5: For the installation at an altitude above 1,000 m (up to 2,500 m), derate the rated current 3% per 500 m.
*6: 2.9 m/s² or less for the FR-F840-04320(185K) or higher.
**PLC function specifications**

<table>
<thead>
<tr>
<th>Item</th>
<th>F800 PLC function specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control method</td>
<td>Repeated operation (by stored program)</td>
</tr>
<tr>
<td>I/O control mode</td>
<td>Refresh</td>
</tr>
<tr>
<td>Programming language</td>
<td>Relay symbolic language (ladder)</td>
</tr>
<tr>
<td>Functional block</td>
<td>Function block</td>
</tr>
<tr>
<td>No. of instructions</td>
<td></td>
</tr>
<tr>
<td>Sequence instructions</td>
<td>25</td>
</tr>
<tr>
<td>Basic instructions</td>
<td>84</td>
</tr>
<tr>
<td>Application instructions</td>
<td>37</td>
</tr>
<tr>
<td>Processing speed</td>
<td>Sequence instructions 1.9 μs to 12 μs/step*1</td>
</tr>
<tr>
<td>Number of I/O device points</td>
<td></td>
</tr>
<tr>
<td>128 (input: 64 points, output: 64 points)</td>
<td></td>
</tr>
<tr>
<td>19 points built-in (input: 12 points, output: 7 points)*2</td>
<td></td>
</tr>
<tr>
<td>FR-ABAX (input: 16 points)</td>
<td></td>
</tr>
<tr>
<td>FR-ABAY (output: 7 points)</td>
<td></td>
</tr>
<tr>
<td>FR-ABAR (output: 3 points)</td>
<td></td>
</tr>
<tr>
<td>Number of analog I/O points</td>
<td></td>
</tr>
<tr>
<td>3 input points built-in (Terminals 1, 2, and 4)</td>
<td></td>
</tr>
<tr>
<td>2 output points built-in (Terminals FM/CA and AM), FR-ABAY: 2 output points (AM0 and AM1)</td>
<td></td>
</tr>
<tr>
<td>Pulse train I/O</td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>Terminal JOG maximum input pulse: 100k pulses/s*3</td>
</tr>
<tr>
<td>Output</td>
<td>Terminal FM maximum output pulse: 50k pulses/s*3</td>
</tr>
<tr>
<td>Watchdog timer</td>
<td>10 to 2000 ms</td>
</tr>
<tr>
<td>Program capacity</td>
<td>6K steps (24k bytes) (0 to 6144 steps can be set)</td>
</tr>
<tr>
<td>Contained in one program</td>
<td></td>
</tr>
<tr>
<td>Internal relay (M)</td>
<td>128 (M0 to M127)</td>
</tr>
<tr>
<td>Latch relay (L)</td>
<td>Not used (Can be set with parameters but will not latch)*4</td>
</tr>
<tr>
<td>Timer (T)</td>
<td></td>
</tr>
<tr>
<td>Number of points</td>
<td>16 (T0 to T15)</td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
</tr>
<tr>
<td>100 ms timer: 0.1 to 3276.7 s can be set</td>
<td></td>
</tr>
<tr>
<td>10 ms timer: 0.01 to 3276.7 s can be set</td>
<td></td>
</tr>
<tr>
<td>100 ms retime timer: 0.1 to 3276.7 s can be set</td>
<td></td>
</tr>
<tr>
<td>Counter (C)</td>
<td></td>
</tr>
<tr>
<td>Number of points</td>
<td>16 (C0 to C15)</td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
</tr>
<tr>
<td>Normal counter: Setting range 1 to 32767</td>
<td></td>
</tr>
<tr>
<td>Interrupt program counter: Not used</td>
<td></td>
</tr>
<tr>
<td>Data register (D)</td>
<td></td>
</tr>
<tr>
<td>Number of points</td>
<td>256 (D0 to D255)</td>
</tr>
<tr>
<td>Specifications</td>
<td></td>
</tr>
<tr>
<td>Special relay (SM)</td>
<td>2048 (SM0 to SM2047) with limited functions</td>
</tr>
<tr>
<td>Special register (SD)</td>
<td>2048 (SD0 to SD2047) with limited functions</td>
</tr>
</tbody>
</table>

*1: The scan time is approximately 40 ms for 1K steps as inverter control is also performed in actual operations.
*2: One point is always required for a sequence start (RUN/STOP).
*3: There is no device latch function for power failures.
*4: Use the Pr.1150 to Pr.1199 PLC function user parameters 1 to 50 (D206 to D255) to store device values in the EEPROM.

**NOTE**
- There is no buffer memory.
Inverter FREQROL-F800 Series

Outline Dimension Drawings

- FR-F820-00046(0.75K), FR-F820-00077(1.5K)

- FR-F840-00023(0.75K), 00038(1.5K), 00052(2.2K), 00083(3.7K), 00126(5.5K)

- FR-F840-00023(0.75K) to 00052(2.2K) are not provided with a cooling fan.

(Unit: mm)
Outline Dimension Drawings

- FR-F820-00340(7.5K), 00490(11K), 00630(15K)
- FR-F840-00170(7.5K), 00250(11K), 00310(15K), 00380(18.5K)

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>H</th>
<th>H1</th>
<th>H2</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F820-00340(7.5K), 00490(11K)</td>
<td>260</td>
<td>245</td>
<td>1.5</td>
<td>170</td>
<td>84</td>
</tr>
<tr>
<td>FR-F840-00170(7.5K), 00250(11K)</td>
<td>260</td>
<td>245</td>
<td>1.5</td>
<td>170</td>
<td>84</td>
</tr>
<tr>
<td>FR-F820-00630(15K)</td>
<td>300</td>
<td>285</td>
<td>3</td>
<td>190</td>
<td>101.5</td>
</tr>
<tr>
<td>FR-F840-00310(15K), 00380(18.5K)</td>
<td>300</td>
<td>285</td>
<td>3</td>
<td>190</td>
<td>101.5</td>
</tr>
</tbody>
</table>

(Unit: mm)

- FR-F820-00770(18.5K), 00930(22K), 01250(30K)
- FR-F840-00470(22K), 00620(30K)
Drive Product

Inverter FREQROL-F800 Series

Outline Dimension Drawings

- FR-F820-01540(37K)
- FR-F840-00770(37K)

![Outline Dimension Drawings](image)

- FR-F820-01870(45K), 02330(55K), 03160(75K), 03800(90K), 04750(110K)
- FR-F840-00930(45K), 01160(55K), 01800(75K), 02160(90K), 02600(110K), 03250(132K), 03610(160K)

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W</th>
<th>W1</th>
<th>H</th>
<th>H1</th>
<th>H2</th>
<th>d</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F820-01870(45K), 02330(55K)</td>
<td>435</td>
<td>380</td>
<td>525</td>
<td>514</td>
<td>25</td>
<td>250</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>FR-F840-00930(45K), 01160(55K), 01800(75K)*2</td>
<td>465</td>
<td>410</td>
<td>700</td>
<td>675</td>
<td>664</td>
<td>25</td>
<td>250</td>
<td>22</td>
</tr>
<tr>
<td>FR-F820-03160(75K)*2</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>704</td>
<td>24</td>
<td>360</td>
<td>22</td>
</tr>
<tr>
<td>FR-F840-02160(90K)*3, 02600(110K)*3</td>
<td>465</td>
<td>400</td>
<td>620</td>
<td>595</td>
<td>584</td>
<td>24</td>
<td>300</td>
<td>22</td>
</tr>
<tr>
<td>FR-F840-03250(132K)*4, 03610(160K)*4</td>
<td>465</td>
<td>400</td>
<td>740</td>
<td>715</td>
<td>704</td>
<td>25</td>
<td>360</td>
<td>22</td>
</tr>
</tbody>
</table>

*2: Always connect a DC reactor (FR-HEL), which is available as an option.
Always connect a DC reactor (FR-HEL), which is available as an option.

(Unit: mm)
Separate converter type

Outline Dimension Drawings

*Inverter

- FR-F842-07700(355K), 08660(400K)
- FR-F842-09620(450K), 10940(500K), 12120(560K)

(Fr-F842-09620(450K), 10940(500K), 12120(560K))

- FR-F842-09620(450K), 10940(500K), 12120(560K)

(Unit: mm)
FR-CC2-H355K

- Equipped with a DC reactor.

FR-CC2-H400K, H450K, H500K, H560K, H630K

- Equipped with a DC reactor.

*1: Do not remove the cover on the side of the converter unit.
Drive Product

Inverter FREQROL-F800 Series

Operation panel (FR-DU08, FR-LU08)

Outline Dimension Drawings

Outline dimensions

Enclosure cut dimensions

*1: Denotes the space required to connect an optional operation panel connection cable (FR-CB2). When using another cable, leave the space required for the cable specification.

(Unit: mm)
Protruding the heatsink through the panel
When encasing the inverter or the converter unit in an enclosure, the heat generated in the enclosure can be greatly reduced by protruding the heatsink of the inverter or the converter unit. When installing the inverter in a compact enclosure, etc., this installation method is recommended. For the FR-F840-04320(185K) or higher, a heatsink can be protruded outside the enclosure without using an attachment.

When using a panel through attachment (FR-A8CN)
For the FR-F820-00105(2.2K) to FR-F820-04750(110K) and FR-F840-00023(0.75K) to FR-F840-03610(160K), a heatsink can be protruded outside the enclosure using a panel through attachment (FR-A8CN). Refer to the instruction manual of the panel through attachment (FR-A8CN) for details.

Drawing after attachment installation (when used with the FR-A8CN)

Enclosure cut dimensions (when used with the FR-A8CN)
Heatsink protrusion through the panel for the FR-F840-04320(185K) or higher

- Enclosure cutting
  Cut an enclosure according to the capacity of the inverter or the converter unit.

| Unit: mm |
|------------------|------------------|------------------|------------------|
| 484              | 603              | 300              | 300              |
| 300              | 662              | 300              | 300              |
| 200              | 200              | 15               | 15               |
| 6-M10 screw      | 6-M10 screw      | 6-M10 screw      | 6-M10 screw      |

- FR-F840-04320(185K)  
  FR-F840-04810(220K)
- FR-F840-05470(250K)  
  FR-F840-06100(280K)  
  FR-F840-06830(315K)
- FR-F842-07700(355K)  
  FR-F842-08660(400K)  
  FR-F842-10940(500K)  
  FR-F842-12120(560K)

- FR-CC2-H355K
  FR-CC2-H400K
  FR-CC2-H450K
  FR-CC2-H500K
  FR-CC2-H560K
  FR-CC2-H630K

(Unit: mm)
• Shift and removal of a rear side installation frame
  For the FR-F840-04320(185K) to FR-F840-06830(315K)

  One installation frame is attached to each of the upper and lower parts of the inverter. Change the position of the rear side installation frame on the upper and lower sides of the inverter to the front side as shown below. When changing the installation frames, make sure that the installation orientation is correct.

  ![Diagram of installation frame shift](image)

  ![Diagram of installation frame removal](image)

  For the FR-F842-07700(355K) to FR-F842-12120(560K), FR-CC2-H355K to FR-CC2-H630K

  Two installation frames are attached to each of the upper and lower parts of the inverter or the converter unit. Remove the rear side installation frame on the upper and lower sides of the inverter or the converter unit as shown below.

• Installation of the inverter or the converter unit
  Push the inverter heatsink portion outside the enclosure and fix the enclosure and the inverter or the converter unit with upper and lower installation frame.

  ![Diagram of inverter installation](image)

  – Cooling
    - There are finger guards behind the enclosure. Therefore, the thickness of the panel should be less than 10 mm (*) and also do not place anything around finger guards to avoid contact with the finger guards.

  - Dimension of the outside of the enclosure
    - 185mm
    - 140mm
    - 6mm

  - Enclosure
    - Inside the enclosure
    - Exhausted air

  – Installation frame
    - 10mm*

[NOTE]
- Having a cooling fan, the cooling section which comes out of the enclosure cannot be used in the environment of water drops, oil, mist, dust, etc.
- Be careful not to drop screws, dust etc. into the inverter or the converter unit and the cooling fan section.
- The FR-A7CN panel through attachment cannot be installed on the FR-F800 series.
No function is assigned in the initial status. Assign the function using Pr.186 CS terminal function selection.

Not required when calibrating the scale with the operation panel.

The terminal F/C (FM) can be used to output pulse trains as open collector output by setting Pr.291 (Pr.190 to Pr.194).

The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).

Do not connect the DC power supply (under DC feeding mode) to terminal P3.

It is recommended to use 2 W 1 kΩ potentiometer.

To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal.

Terminal input specifications can be changed by analog input specification switch (Pr.73, Pr.267) to choose JOG or pulse.

When a DC reactor is connected to the FR-F820-02330(55K) or lower or the FR-F840-01160(55K) or lower, if a jumper is installed across the terminals P1 and P/+, remove the jumper before installing the DC reactor. (To select a DC reactor and select one according to the applicable motor capacity.)

For the FR-F820-03160(75K) or higher, the FR-F840-01800(75K) or higher, always connect a DC reactor (FR-HEL), which is available as an option.

*1: For the FR-F820-03160(75K) or higher, the FR-F940-01800(75K) or higher, always connect a DC reactor (FR-HEL), which is available as an option. (To select a DC reactor and select one according to the applicable motor capacity.)

When a DC reactor is connected to the FR-F820-02330(55K) or lower or the FR-F940-01160(55K) or lower, if a jumper is installed across the terminals P1 and P/+, remove the jumper before installing the DC reactor.

*2: When using separate power supply for the control circuit, remove the jumper between R1/L1 and S1/L1.

*3: The function of these terminals can be changed with the input terminal assignment (Pr.178 to Pr.183).

*4: Terminal JOG is also used as the pulse train input terminal. Use Pr.291 to change JOG as pulse.

*5: Terminal input specifications can be changed by analog input specification switch (Pr.73, Pr.267). To input a voltage, set the voltage/current input switch OFF.

*6: To input a current, set the voltage/current input switch ON. Terminals 10 and 2 are also used as a PTC input terminal. (Pr.561)

*7: It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.

*8: Do not use terminals PR and PX. The jumper may or may not be attached depending on the inverter. (Refer to the Instruction Manual (Startup).)

*9: Do not connect the DC power supply (under DC feeding mode) to terminal P3.

*10: The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).

*11: The function of these terminals can be changed with the output terminal assignment (Pr.195 to Pr.196).

*12: The terminal FC (FM) can be used to output pulse trains as open collector output by setting Pr.291.

*13: Not required when calibrating the scale with the operation panel.

*14: No function is assigned in the initial status. Assign the function using Pr.186 CS terminal function selection.
For the CA type

The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).

Do not connect the DC power supply (under DC feeding mode) to terminal P3.

Do not use terminals PR and PX. The jumper may or may not be attached depending on the inverter. (Refer to the Instruction Manual (Startup).)

It is recommended to use 2 W 1 kΩ. Terminals 10 and 2 are also used as a PTC input terminal. (Pr.561)

To input a voltage, set the voltage/current input switch OFF. To input a current, set the voltage/current input switch ON. Terminal input specifications can be changed by analog input specification switchover (Pr.73, Pr.267).

Terminal JOG is also used as the pulse train input terminal. Use to choose JOG or pulse. (Pr.291)

The function of these terminals can be changed with the input terminal assignment (Pr.178 to Pr.189).

When using separate power supply for the control circuit, remove the jumper between R1/L11 and S1/L21.

When a DC reactor is connected to the FR-F820-02330(55K) or lower or the FR-F840-01160(55K) or lower, if a jumper is installed across the terminals P1 and P/+, remove the jumper before installing the DC reactor. For the FR-F820-03160(75K) or higher, the FR-F840-01800(75K) or higher, always connect a DC reactor (FR-HEL), which is available as an option.

No function is assigned in the initial status. Assign the function using Pr.186 CS terminal function selection.

Examples

1. For the FR-F820-03160(75K) or higher, the FR-F840-01800(75K) or higher: always connect a DC reactor (FR-HEL), which is available as an option.

2. When a DC reactor is connected to the FR-F820-03160(75K) or higher, always connect a DC reactor (FR-HEL), which is available as an option.

3. When using separate power supply for the control circuit, remove the jumper between R1/L11 and S1/L21.

4. Terminal JOG is also used as the pulse train input terminal. Use to choose JOG or pulse. (Pr.291)

5. Terminal input specifications can be changed by analog input specification switchover (Pr.73, Pr.267).

6. It is recommended to use 2 W 1 kΩ when the frequency setting signal is changed frequently.

7. Do not use terminals PR and PX. The jumper may or may not be attached depending on the inverter. (Refer to the Instruction Manual (Startup).)

8. Do not connect the DC power supply (under DC feeding mode) to terminal P3.

9. The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).

10. The function of these terminals can be changed with the output terminal assignment (Pr.195, Pr.196).

11. No function is assigned in the initial status. Assign the function using Pr.186 CS terminal function selection.
Separated converter type

Inverter (FM type)

Drive Product

Specifications/Features/Connectivity

Outline Drawing

Examples

Inverter FREQROL-F800 Series

Separated converter type

Inverter (FM type)

Drive Product

Specifications/Features/Connectivity

Outline Drawing

Examples

Inverter FREQROL-F800 Series

Separated converter type

Inverter (FM type)
Converter unit (FR-CC2)

- When the sink logic is selected

*1: When using separate power supply for the control circuit, remove the jumpers from R1/L11 and S1/L21.

*2: The function of these terminals can be changed with the input terminal assignment (Pr.176, Pr.187, Pr.189).

*3: The function of these terminals can be changed with the output terminal assignment (Pr.195).

*4: The function of these terminals can be changed with the output terminal assignment (Pr.190 to Pr.194).

*5: The connector is for manufacturer setting. Do not use.

*6: Plug-in options cannot be used.

*7: For manufacturer setting. Do not use.

*8: For the FR-CC2-H400K to H630K, two EMC filter ON/OFF connectors are provided.
### Standard models, and separated converter type

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC power input</td>
<td>RL1, SL2, TL3</td>
<td>Connect to the commercial power supply.</td>
<td></td>
</tr>
<tr>
<td>U, V, W</td>
<td>Power supply for control circuit</td>
<td>Connected to the AC power supply terminals RL1 and SL2. To retain alarm display and alarm output, apply external power to this terminal.</td>
<td></td>
</tr>
<tr>
<td>P1+, N1-</td>
<td>Brake unit connection</td>
<td>Connect the brake unit (FR-BU2), power regeneration common converter (FR-CV), power regeneration converter (MR-TC), high power factor converter (FR-HC2), or DC power supply (under DC feeding mode). Do not connect the DC power supply between terminals P3 and N1-. Use terminals P1+ and N1- for DC feeding. Connect the separated converter type to the terminals P1+ and N1- of the converter unit.</td>
<td></td>
</tr>
<tr>
<td>P3+, N3-</td>
<td>DC reactor connection</td>
<td>Remove the jumper across terminals P3+ and P1+ and connect a DC reactor. For the FR-F820-03160 (75K) or higher, the FR-F840-01800 (75K) or higher, always connect a DC reactor, which is available as an option.</td>
<td></td>
</tr>
<tr>
<td>PR, PX</td>
<td>Do not use terminals PX and PR. The terminal PX is equipped in the FR-F820-00490(11K) or lower and the FR-F840-00250(11K) or lower. The terminal PR is equipped in the FR-F820-01250(30K) or lower or the FR-F840-01800(75K) or lower.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Main circuit

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STF</td>
<td>Forward rotation start. Turn ON the STF signal to start forward rotation and turn it OFF to stop.</td>
</tr>
<tr>
<td>STR</td>
<td>Reverse rotation start. Turn ON the STR signal to start reverse rotation and turn it OFF to stop.</td>
</tr>
<tr>
<td>STP (STOP)</td>
<td>Start self-holding selection. Turn ON the STOP signal to self-hold the start signal.</td>
</tr>
<tr>
<td>RH, RM, RL</td>
<td>Multi-speed selection. Multi-speed can be selected according to the combination of RH, RM and RL signals.</td>
</tr>
<tr>
<td>JOG</td>
<td>Pulse train input. JOG terminal can be used as pulse train input terminal. To use as pulse train input terminal, the Pr.291 setting needs to be changed. (maximum voltage input: 100k pulses/s)</td>
</tr>
<tr>
<td>RT</td>
<td>Second function selection. When the second function such as “Second torque boost” and “Second V/F (base frequency)” are set, turn ON the RT signal selects these functions.</td>
</tr>
<tr>
<td>MRS</td>
<td>Output stop. Turn ON the MRS signal (2 ms or more) to stop the inverter output. Use to shut OFF the inverter output when stopping the motor by electromagnetic brake.</td>
</tr>
<tr>
<td>MRS (X10)</td>
<td>Output stop (Inverter-operation enable). Connect to the terminal RDA of the converter unit (FR-C2). When the RDA signal is turned ON, the inverter output is shut off. The X10 signal (NC contact) is assigned to the terminal MRS in the initial setting. Use Pr.599 to change the specification to NO contact.</td>
</tr>
<tr>
<td>RES</td>
<td>Reset. Used to reset alarm output provided when protective circuit is activated. Turn ON the RES signal for more than 0.1 s, then turn it OFF. Recover about 1 s after reset is canceled.</td>
</tr>
<tr>
<td>AU</td>
<td>Terminal 4 input selection. Terminal 4 is made valid only when the AU signal is turned ON. Turning the AU signal makes terminal 2 invalid.</td>
</tr>
<tr>
<td>CS</td>
<td>No function. Use Pr.186 CS terminal function selection for function assignment.</td>
</tr>
<tr>
<td>SD</td>
<td>Contact input common (sink)*2. Common terminal for the contact input terminal (sink logic) and terminal PM.</td>
</tr>
<tr>
<td>PC</td>
<td>接触输入公共 (source)*2. Connect terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction by undesired current.</td>
</tr>
<tr>
<td>24 VDC power supply common</td>
<td>Common output terminal for the 24 VDC 0.1 A power supply (terminal PC). Isolated from terminals 5 and SE.</td>
</tr>
<tr>
<td>EX</td>
<td>External transistor common (source)*2. Connect this terminal to the power supply common terminal of a power supply common terminal (open collector output) device, such as a programmable controller, in the sink logic to avoid malfunction by undesired currents.</td>
</tr>
<tr>
<td>EX</td>
<td>Contact input common (source)*2. Common terminal for contact input terminal (source logic).</td>
</tr>
</tbody>
</table>

### Control circuit/input signal

<table>
<thead>
<tr>
<th>Terminal 10E</th>
<th>Frequency setting power supply. When connecting a frequency setting potentiometer at an initial status, connect it to terminal 10E. Change the input specifications of terminal 2 when connecting it to terminal 10E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Frequency setting (voltage). Inputting 0 to 5 VDC (or 0 to 10 V, 4 to 20 mA) provides the maximum output voltage at 5 V (10 V, 20 mA) and makes input and output proportional. Use Pr.73 to switch from among input 0 to 5 VDC (initial setting), 0 to 10 VDC, and 4 to 20 mA. Set the voltage/current input switch in the ON position to select current input (0 to 20 mA).</td>
</tr>
<tr>
<td>4</td>
<td>Frequency setting (current). Inputting 4 to 20 mA (or 0 to 5 to 10 V, 0 to 10 V) provides the maximum output voltage at 20 mA and makes input and output proportional. The input voltage is valid only when the AU signal is on (terminal 2 input is invalid). Use Pr.369 to switch from among input 0 to 5 VDC (initial setting), 0 to 5 VDC, and 0 to 10 VDC. Set the voltage/current input switch in the OFF position to select voltage input (0 to 5 V to 10 V). Use Pr.858 to switch current functions.</td>
</tr>
<tr>
<td>1</td>
<td>Frequency setting auxiliary. Inputting 0 to ±5 VDC provides the sensitivity to terminal 2 or 4. Set the frequency setting signal. Use Pr.73 to switch between input 0 to ±5 VDC and 0 to ±10 VDC (initial setting) input.</td>
</tr>
<tr>
<td>5</td>
<td>Frequency setting common. Common terminal for frequency setting signal (terminal 2, 1 or 4) and analog output terminal AM, CA. Do not earth (ground).</td>
</tr>
<tr>
<td>10</td>
<td>PTC thermistor input. For receiving PTC thermistor outputs. When PTC thermistor is valid (Pr.561 = “9999”), the terminal 2 is not available for frequency setting.</td>
</tr>
<tr>
<td>2</td>
<td>PTC thermistor specification Overheat detection resistance:500 Ω to 30 kΩ (Set by Pr.561).</td>
</tr>
</tbody>
</table>

### Terminal names and terminal functions are those of the factory set.
<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay</td>
<td>A1, B1, C1</td>
<td>Relay output 1 (alarm output)</td>
<td>1 changeover contact output indicates that the inverter protective function has activated and the output stopped. Alarm: continuity across B-C (continuity across A-C). Normal: continuity across B-C (discontinuity across A-C).</td>
</tr>
<tr>
<td></td>
<td>A2, B2, C2</td>
<td>Relay output 2</td>
<td>1 changeover contact output</td>
</tr>
<tr>
<td>RUN</td>
<td>Inverter running</td>
<td>Switched low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5Hz). Switched high during stop or DC injection brake operation.</td>
<td></td>
</tr>
<tr>
<td>SU</td>
<td>Up to frequency</td>
<td>Switched low when the output frequency reaches within the range of ±10% (initial value) of the set frequency. Switched high during acceleration/deceleration and at a stop.</td>
<td></td>
</tr>
<tr>
<td>OL</td>
<td>Overload alarm</td>
<td>Switched low when stall prevention is activated by the stall prevention function. Switched high when stall prevention is cancelled.</td>
<td></td>
</tr>
<tr>
<td>IPF</td>
<td>Instantaneous power failure</td>
<td>Switched low when an instantaneous power failure and under voltage protections are activated.</td>
<td></td>
</tr>
<tr>
<td>IPP**</td>
<td>Open collector output</td>
<td>No function is assigned in the initial setting. The function can be assigned setting Pr.192.</td>
<td></td>
</tr>
<tr>
<td>FU</td>
<td>Frequency detection</td>
<td>Switched low when the inverter output frequency is equal to or higher than the preset detected frequency and high when less than the preset detected frequency.</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>Open collector common</td>
<td>Common terminal for terminals RUN, SU, OL, IPF, FU</td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>FM**</td>
<td>For meter</td>
<td>Select one e.g. output frequency from monitor items. (The signal is not output during an inverter reset.) The output signal is proportional to the magnitude of the corresponding monitoring item.</td>
</tr>
<tr>
<td></td>
<td>NPN open collector output</td>
<td></td>
<td>Output item: output frequency (initial setting), permissible load current 2 mA, For full scale 1440 pulses/s</td>
</tr>
<tr>
<td>Analog</td>
<td>AM</td>
<td>Analog voltage output</td>
<td>The output signal is proportional to the magnitude of the corresponding monitoring item.Use Pr.35, Pr.56, and Pr.866 to set full scales for the monitored output frequency, output current, and torque.</td>
</tr>
<tr>
<td></td>
<td>CA**</td>
<td>Analog current output</td>
<td>Output item: output frequency (initial setting), output signal 0 to ±10 VDC, permissible load current 1 mA (load impedance 10 kΩ or more), resolution 8 bit</td>
</tr>
<tr>
<td></td>
<td>RXD+</td>
<td>Inverter transmission terminal</td>
<td>With the RS-485 terminals, communication can be made through RS-485.</td>
</tr>
<tr>
<td></td>
<td>RXD-</td>
<td>Inverter reception terminal</td>
<td>Conforming standard: EIA-485 (RS-485)</td>
</tr>
<tr>
<td></td>
<td>GND (SG)</td>
<td>Earth (Ground)</td>
<td>Communication speed: 4800 to 115200 bps, Wiring length: 500 m</td>
</tr>
<tr>
<td>Safety stop signal</td>
<td>S1</td>
<td>Safety stop input (Channel 1)</td>
<td>The terminals S1 and S2 are used for the safety stop input signal for the safety relay module. The terminals S1 and S2 are used at the same time (dual channel). Inverter output is shutoff by shortening/opening between terminals S1 and SIC, or between S2 and SIC.</td>
</tr>
<tr>
<td></td>
<td>S2</td>
<td>Safety stop input (Channel 2)</td>
<td>The terminals S1 and S2 are used at the same time (dual channel). Inverter output is shutoff by shortening/opening between terminals S1 and SIC, or between S2 and SIC.</td>
</tr>
<tr>
<td></td>
<td>SIC</td>
<td>Safety stop input terminal common</td>
<td>Indicates the safety stop input signal status. Switched to LOW when the status is other than the internal safety circuit failure. Switched to HIGH during the internal safety circuit failure status. LOW is when the open collector output transistor is ON (conducted). HIGH is when the transistor is OFF (not conducted.) Refer to the Safety stop function instruction manual (BCN-A23228-001) when the signal is switched to HIGH while both terminals S1 and S2 are open.</td>
</tr>
<tr>
<td></td>
<td>SO</td>
<td>Safety monitor output (open collector output)</td>
<td>Common terminal for terminals S1 and S2.</td>
</tr>
<tr>
<td></td>
<td>SOC</td>
<td>Safety stop input terminal common</td>
<td>Common terminal for terminal SO.</td>
</tr>
</tbody>
</table>

1: Terminals R/L1, S/L2, T/L3, PR, P3, P1, and PX are not provided in the separated converter type.
2: The terminal P3 is equipped in the FR-VC20-00770(18.5K) to 01250(30K) and the FR-FRA0-00470(22K) to 01800(75K).
3: Sink logic is initially set for the FM-type inverter.
4: Source logic is initially set for the CA-type inverter.
5: Terminal CA is provided in the CA-type inverter.
6: Terminal CA is provided in the CA-type inverter.
7: Function and name of the separated converter type.
Converter unit (FR-CC2)

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL/L1, SL/L2, TL/L3</td>
<td>AC power input</td>
<td>Connect these terminals to the commercial power supply.</td>
<td></td>
</tr>
<tr>
<td>R/L1,1, S/L1,21</td>
<td>Power supply for the control circuit</td>
<td>Connected to the AC power supply terminals R/L1 and S/L2. To retain the fault display and fault output, remove the jumpers across terminals R/L1 and R/L1,1 and across S/L2 and S/L1,21 and supply external power to these terminals.</td>
<td></td>
</tr>
<tr>
<td>Pi, Ni</td>
<td>Inverter connection</td>
<td>Connect to terminals Pi+ and Ni- of the inverter.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Earth (ground)</td>
<td>For earthing (grounding) the converter unit chassis. This must be earthed (grounded).</td>
<td></td>
</tr>
</tbody>
</table>

| RES | Reset | The function can be assigned by setting Pr.178. |
| OH  | External thermal relay input | The external thermal relay input (OH) signal is used when using an external thermal relay or a thermal protector built into the motor to protect the motor from overheating. When the thermal relay is activated, the inverter trips by the external thermal relay operation (E.OHT). |
| RDI | Contact input common (sink) (Initial setting) | Common terminal for contact input terminal (sink logic). |
| SD  | External transistor common (source) | Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction due to undesirable current. |
|    | 24 VDC power supply common | Common terminal for the 24 VDC power supply (terminal PC, terminal +24) isolated from terminal SE. |
| PC  | External transistor common (source) (Initial setting) | Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction due to undesirable current. |
|    | Contact input common (source) | Common terminal for contact input terminal (source logic). |
|    | 24 VDC power supply common | Can be used as a 24 VDC 0.1 A power supply. |

| Relay | A1, B1, C1 | 1 changeover contact output that indicates that the protective function of the converter unit has been activated and the outputs are stopped. Fault: discontinuity across B and C (continuity across A and C); Normal: continuity across Band C (discontinuity across A and C). |
|       | 88R, 88S | For manufacturer setting. Do not use. |

| Open Collector | RDA | Inverter operation enable (NO contact) | Switched to LOW when the converter unit operation is ready. Assign the signal to the terminal MRS (X10) of the inverter. The inverter can be started when the RDA status is LOW. |
|               | RDB | Inverter operation enable (NC contact) | Switched to LOW when a converter unit fault occurs or the converter is reset. The inverter can be started when the RDB status is HIGH. |
|               | RSO | Inverter reset | Switched to LOW when the converter is reset (RES=ON). Assign the signal to the terminal RSO of the inverter. The inverter is reset when it is connected with the RSO status LOW. |
|               | IPF | Instantaneous power failure | Switched to LOW when an instantaneous power failure is detected. |
|               | FAN | Cooling fan fault | Switched to LOW when a cooling fan fault occurs. |
| SE            | Open collector output common | Common terminal for terminals RDA, RDB, RSO, IPF, FAN. |

| Communication | — | PU connector | With the PU connector, communication can be made through RS-485. (For connection on a 1:1 basis only) |
|              | — | Converter unit transmission terminal | The RS-485 terminals enable the communication by RS-485. |

| RS-485 terminals | TXD+ | Converter unit transmission terminal | The RS-485 terminals enable the communication by RS-485. |
|                 | TXD- |                                           |                                           |
|                 | RXD+ |                                           |                                           |
|                 | RXD- |                                           |                                           |
|                 | GND | Earthing (grounding) | For connecting a 24 V external power supply. |

* indicates that terminal functions can be selected from Pr.178, Pr.187, Pr.189 to Pr.195 (IO terminal function selection). Terminal names and terminal functions are those of the factory set.
Inverter FREQROL-E700 Series

Compact body with easy use and High-class drive performance

Top Level of Driving Performance in Compact Body

High Torque 200%/0.5Hz is Realized by Advanced Magnetic Flux Vector Control (3.7K or less)

By the advancement of General-purpose magnetic flux vector control to Advanced magnetic flux vector control, top level of driving performance becomes possible.

Since V/F control and General-purpose magnetic flux vector control operations are available, operation after replacement of the conventional model (FR-E500 series) is ensured.

For the 5.5K to 15K, 150%/0.5Hz torque is realized.

- Speed/torque characteristics example

- Advanced auto tuning

Many kinds of three phase induction motors can be optimally controlled with Mitsubishi’s original "non-rotation" auto tuning function. High precision tuning is enabled even when a test operation of a machine cannot be performed at parameter adjustment.

- Short Time Overload Capacity is Increased (200% 3s)

Short time overload capacity is increased to 200% 3s (200% 0.5s for the conventional model). Overcurrent trip is less likely to occur.

- Improved Regeneration Capability

A brake transistor is built-in to the 0.4K to 15K. Connecting an optional brake resistor increases regeneration capability.

- Improved Torque Limit/Current Limit Function

Improved torque limit/current limit function provides a machine protection, load limit, and stop-on-contact operation.

- Advanced magnetic flux vector control is ideal for a lift in an automated-storage system which requires high torque at low speed.

- When a bogie runs over a bump, the impact can be beared by this function.

- Using the torque limit function, machine breakage from overload can be avoided. For example, edge chipping of a tool can be avoided.
Enhanced Operability

Usability was thoroughly pursued.

With a Provided USB Connector, Setting is Easily Done from a Personal Computer Using FR Configurator

An USB connector (mini-B connector) is provided as standard. The inverter can be easily connected without a USB-RS-485 converter. Wizard (interactive) function of FR Configurator (inverter setup software) provides setting support. In addition, a high-speed graph function with USB enables high speed sampling display.

Enclosure Surface Operation Panel FR-PA07 (Option)

Optional enclosure surface operation panel (FR-PA07) can be connected.

In addition, an operation panel for conventional model (FR-E500 series) can be connected.

The operation panel of the inverter cannot be removed.

A parameter unit connection cable (FR-CB20) is separately required.

Parameter Unit FR-PU07/FR-PU07BB(-L) (Option)

The FR-PU07/FR-PU07BB(-L), an optional parameter unit, can be connected as well.

A parameter unit connection cable (FR-CB20) is separately required. (Parameter unit connection cable FR-CB203 (3m) is enclosed with FR-PU07BB(-L).)

- Setting such as direct input method with a numeric keypad, operation status indication, and help function are useful.
- The display language can be selected from 8 languages.
- Parameter settings of maximum of three inverters can be stored.
- A battery pack type (FR-PU07BB(-L)) allows parameter setting and parameter copy without powering on the inverter.

To use a parameter unit with battery pack (FR-PU07BB) outside of Japan, order a “FR-PU07BB-L” (parameter unit type indicated on the package has L at the end).
Enhanced Expandability

Mitsubishi inverters offer the expandability that answers to every need

A Variety of Plug-in Options are Mountable

Plug-in options supporting digital input, analog output extension, and a variety of communications provide extended functions which is almost equivalent to the FR-A700 series. (One type of plug-in option can be mounted.)

[For the FR-E700 series, use the "FR-A7 □□□ E kit" which is a set of optional board and dedicated front cover.]

These plug-in options are supported by the standard control circuit terminal model.

<table>
<thead>
<tr>
<th>Compatible Plug-in Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-A7AX E kit ...16-bit digital input</td>
</tr>
<tr>
<td>FR-A7AY E kit ...Digital output</td>
</tr>
<tr>
<td>Extension analog output</td>
</tr>
<tr>
<td>FFR-A7AR E kit ...Relay output</td>
</tr>
<tr>
<td>FR-A7NC E kit ...CC-Link</td>
</tr>
<tr>
<td>FR-A7ND E kit ...DeviceNet</td>
</tr>
<tr>
<td>FR-A7NP E kit ...PROFIBUS-DP</td>
</tr>
<tr>
<td>FR-A7NL E kit ...LonWorks</td>
</tr>
</tbody>
</table>

Enhanced Expandability

Spring clamp terminals are adopted as control circuit terminals. Spring clamp terminals are highly reliable and can be easily wired.

The FR-E700-SC series is compliant to the EU Machinery Directive without the addition of previously required external devices.

Operation of an external emergency stop device results in a highly reliable immediate shutoff of the D700’s output to the motor. This safety stop function conforms to the following standards.

EN ISO 13849-1 Category 3 / PLd
EN62061 / IEC61508 SIL2

Safety Stop Function (FR-E700-SC)

Control Terminals are Selectable According to Applications

Terminal cards other than standard terminal such as analog, plus train (available soon), two port RS-485 terminal are available as options. A crimp ring terminal type is also available (to be released).

A terminal card is removable and can be easily replaced from a standard terminal card.

Various Kinds of Networks are Supported

- EIA-485 (RS-485), ModbusRTU (equipped as standard), CC-Link, PROFIBUS-DP, DeviceNet®, LonWorks® (option)

LonWorks® is a registered trademark of Echelon Corporation, DeviceNet® is of ODVA, and PROFIBUS is of PROFIBUS User Organization. Other company and product names herein are the trademarks of their respective owners.

Compact and Space Saving

Compact design expands flexibility of enclosure design.

Compact Body with High Performance Function

Space can be saved by side by side no clearance installation.

Side by Side Installation Saves Space

Installation size is the same as the conventional model (FR-E500 series) in consideration of intercompatibility. (7.5K or less)

Peripheral device

- Mitsubishi magnetic contactors
- Offer a selection of small frames
- Offer a line-up of safety contactors
- Support with low-level load (auxiliary contact)
- Support many international regulations as a standard model
Ensured Maintenance

700 series are the pioneer of long life and high reliability.

Long-life Design

- The design life of the cooling fan has been extended to 10 years*1. The life of the fan can be further extended utilizing the it's ON/OFF control.
- The design life of the capacitors has been extended to 10 years by adopting a capacitor that endures 5000 hours at 105°C surrounding air temperature*2. *3
- The life indication of life components

<table>
<thead>
<tr>
<th>Components</th>
<th>Guideline of the FR-E700 Life</th>
<th>Guideline of JEMA*4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main circuit smoothing capacitor</td>
<td>10 years</td>
<td>5 years</td>
</tr>
<tr>
<td>Printed board smoothing capacitor</td>
<td>10 years</td>
<td>5 years</td>
</tr>
</tbody>
</table>

*1: Surrounding air temperature : annual average 40°C (free from corrosive gas, flammable gas, oil mist, dust and dirt). Since the design life is a calculated value, it is not a guaranteed value.
*2: Output current : 80% of the inverter rated current
*3: Excerpts from “Periodic check of the transistorized inverter” of JEMA (Japan Electrical Manufacturer’s Association)
*4: Any one of main circuit capacitor, control circuit capacitor, inrush current limit circuit or cooling fan

Easy Replacement of Cooling Fan

- A cooling fan is provided on top of the inverter for all capacities requiring a cooling fan*5. A cooling fan can be easily replaced without disconnecting main circuit wires.

Combed Shaped Wiring Cover

- Since a wiring cover can be installed after wiring, wiring work is easily done.

Removable Control Terminal Block

- Wiring of the control circuit when replacing the same series inverter can be done by changing the terminal block.

Environment-Friendly

Human and environment-friendly inverter

Compliance with the EU Restriction of Hazardous Substances (RoHS)

- The inverter is human and environment-friendly by being compliance with the RoHS Directive.

Filter Options

- The inverter with filterpack FR-BFP2 (a package of power factor improving DC reactor, common mode choke and capacitive filter) conforms to the Japanese harmonic suppression guideline.
- Noise filter option which is compatible with EMC Directive (EN61800-3 2nd Environment Category C3) is available.

Full of Useful Functions

Enhanced functions for all sorts of applications

- Automatic restart after instantaneous power failure function with frequency search
- Power-failure deceleration stop function/operation continuation at instantaneous power failure function
  - The motor can be decelerated to a stop when a power failure or undervoltage occurs to prevent the motor from coasting. This function is useful to stop a motor at power failure as a fail safe of machine tool, etc.
  - With the new operation continuation function at instantaneous power failure, the motor continues running without coasting even if an instantaneous power failure occurs during operation.
  - The inverter may trip and the motor may coast depending on the load condition.

- Brake sequence mode is useful for mechanical brake control of a lift.
- Regeneration avoidance function prevents regenerative overvoltage in a pressing machine.
- Optimum excitation control can save more energy with the maximum motor efficiency control.
- Main circuit power supply DC input can be connected to DC power supply.
- Enhanced I/O terminal function supports switchover of analog input (voltage / current).
- Password function is effective for parameter setting protection.

Energy saving design for fan/pump use

- Applicable load selection (Pr.14)
  - Selecting the best output characteristics (V/F characteristics) according to use and load characteristics is possible.
- Optimum excitation control (Pr.60)
  - Save more energy with control that maximizes motor efficiency.
## Inverter FREQROL-E700 Series

### Lineup

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage</th>
<th>Number of Power Phases</th>
<th>Inverter Capacity</th>
<th>Control circuit terminal specification</th>
<th>Protective Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100V class</td>
<td>None</td>
<td>0.1K</td>
<td>None</td>
<td>Enclosed-type structure IP20</td>
</tr>
<tr>
<td>2</td>
<td>200V class</td>
<td>Three-phase input</td>
<td>0.1K to 15K</td>
<td>Standard control circuit terminal model (screw type)</td>
<td>Totally enclosed structure IP40</td>
</tr>
<tr>
<td>4</td>
<td>400V class</td>
<td>Single-phase input</td>
<td>15K</td>
<td>SC</td>
<td>Enclosed-type structure IP20</td>
</tr>
</tbody>
</table>

### Inverter Model

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>Inverter capacity</th>
<th>Symbol</th>
<th>Voltage</th>
<th>Protective Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-phase 200V</td>
<td>FR-E720</td>
<td>None</td>
<td>100V class</td>
<td>Enclosed-type structure IP20</td>
</tr>
<tr>
<td>Single-phase 200V</td>
<td>FR-E720S</td>
<td>S</td>
<td>200V class</td>
<td>Totally enclosed structure IP40</td>
</tr>
<tr>
<td>Three-phase 400V</td>
<td>FR-E740</td>
<td>W</td>
<td>400V class</td>
<td>Enclosed-type structure IP20</td>
</tr>
<tr>
<td>Single-phase 200V</td>
<td>FR-E740S</td>
<td>S</td>
<td>200V class</td>
<td>Totally enclosed structure IP40</td>
</tr>
</tbody>
</table>

### Inverter Type

<table>
<thead>
<tr>
<th>Inverter Type</th>
<th>Inverter Capacity</th>
<th>Symbol</th>
<th>Protective Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-phase 200V class</td>
<td>FR-E720</td>
<td>NF/NC</td>
<td>Enclosed-type structure IP20</td>
</tr>
<tr>
<td>3-phase 400V class</td>
<td>FR-E740</td>
<td>NF/NC</td>
<td>Enclosed-type structure IP20</td>
</tr>
</tbody>
</table>

### Specifications

- **Inverter Model**
  - FR-E720: Available models
  - FR-E720S: Available models
  - FR-E740: Available models
  - FR-E740S: Available models

- **Inverter Type**
  - FR-E720: Available models
  - FR-E740: Available models

###符号

- **电压**
  - 100V class
  - 200V class
  - 400V class

###保护结构

- Enclosed-type structure (IP20)
- Totally enclosed structure (IP40)

###控制电路端子规格

- FL远程通信兼容模型
- CC-Link通信兼容模型

- Complies with UL, cUL, EC Directives (CE marking) as a standard model

- Single-phase 100V power input specification models are not in compliance with the EMC Directive.

- Our inverters comply with RoHS Directive and are eco-friendly to people and the environment.
Installation Example

AC power supply
Use within the permissible power supply specifications of the inverter. To ensure safety, use a moulded case circuit breaker, earth leakage circuit breaker or magnetic contactor to switch power ON/OFF.

Moulded case circuit breaker (MCCB) or earth leakage current breaker (ELB), fuse
The breaker must be selected carefully since an in-rush current flows in the inverter at power on.

Magnetic contactor (MC)
Install the magnetic contactor to ensure safety. Do not use this magnetic contactor to start and stop the inverter. Doing so will cause the inverter life to be shortened.

Reactor (FR-HAL, FR-HEL option)
Install reactors to suppress harmonics and to improve the power factor. A reactor (option) is required when installing the inverter near a large power supply system (500kVA or more). The inverter may be damaged if you do not use reactors. Select the reactor according to the model. Remove the jumpers across terminals P/+ - P1 to connect the DC reactor.

EMC filter (ferrite core)*
Install a noise filter to reduce the electromagnetic noise generated from the inverter. Effective in the range from about 1MHz to 10MHz. When more wires are passed through, a more effective result can be obtained. A wire should be wound four turns or more.

*Filterpack (FR-BFP2), which contains DC reactor and noise filter in one package, is also available.

AC reactor (FR-HAL)
DC reactor (FR-HEL)*
EMC filter (ferrite core)* (FR-BSF01, FR-BLF) Install a noise filter to reduce the electromagnetic noise generated from the inverter. Effective in the range from about 1MHz to 10MHz. When more wires are passed through, a more effective result can be obtained. A wire should be wound four turns or more.

Brake unit (FR-BU2)
Brake resistor (FR-ABR, MRS, MYS)
Braking capability can be improved. (0.4K or more) Always install a thermal relay when using a brake resistor whose capacity is 11K or more.

Power regeneration common converter (FR-CV)
High power factor converter (FR-HC)
Power supply harmonics can be greatly suppressed. Install this as required.*

Register unit (FR-BR)
Discharging resistor (GZG, GRZG)
The regenerative braking capability of the inverter can be exhibited fully. Install this as required.*

Devices connected to the output
Do not install a power factor correction capacitor, surge suppressor or radio noise filter on the output side of the inverter. When installing a moulded case circuit breaker on the output side of the inverter, contact each manufacturer for selection of the moulded case circuit breaker.

Earth (Ground)
To prevent an electric shock, always earth (ground) the motor and inverter. For reduction of induction noise from the power line of the inverter, it is recommended to wire the earth (ground) cable by returning it to the earth (ground) terminal of the inverter.

*2 Can be used only with standard control circuit terminal specification models and safety-stop function models.
### Standard specifications

#### Drive Product

#### FEATURES

- Connectivity

#### EXAMPLES

- Outline Drawing

### Inverter FREQROL-E700 Series

#### Three-phase 200V power supply

<table>
<thead>
<tr>
<th>Model FREQROL-E700 Series</th>
<th>0.1</th>
<th>0.2</th>
<th>0.4</th>
<th>0.75</th>
<th>1.5</th>
<th>2.2</th>
<th>3.7</th>
<th>5.5</th>
<th>7.5</th>
<th>11</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)*1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.3</td>
<td>0.6</td>
<td>1.2</td>
<td>2.0</td>
<td>3.2</td>
<td>4.4</td>
<td>7.0</td>
<td>9.5</td>
<td>13.1</td>
<td>18.7</td>
<td>23.9</td>
</tr>
<tr>
<td>Rated current (A)*3</td>
<td>0.8</td>
<td>1.3</td>
<td>2.0</td>
<td>3.0</td>
<td>5.0</td>
<td>8.0</td>
<td>11</td>
<td>17.5</td>
<td>24</td>
<td>33</td>
<td>47</td>
</tr>
<tr>
<td>Overload current rating*4</td>
<td>150%</td>
<td>60s, 200% 3s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage*5</td>
<td>Three-phase 200 to 240V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*6</td>
<td>150%</td>
<td>100%</td>
<td>50%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC (DC) voltage/ frequency</td>
<td>Three-phase 200 to 240V 50Hz/60Hz (283 to 339VDC)*7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC (DC) voltage fluctuation</td>
<td>170 to 264V 50Hz/60Hz (240 to 373VDC)*8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*9</td>
<td>0.4</td>
<td>0.8</td>
<td>1.5</td>
<td>2.5</td>
<td>4.5</td>
<td>5.5</td>
<td>9</td>
<td>12</td>
<td>17</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>Protective structure (JEM1030)</td>
<td>Enclosed type (IP20), IP40 for totally enclosed structure series.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>0.5</td>
<td>0.5</td>
<td>0.7</td>
<td>1.0</td>
<td>1.4</td>
<td>1.4</td>
<td>1.7</td>
<td>4.3</td>
<td>4.3</td>
<td>6.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

---

### Three-phase 400V power supply

<table>
<thead>
<tr>
<th>Model FREQROL-E700 Series</th>
<th>0.4</th>
<th>0.75</th>
<th>1.5</th>
<th>2.2</th>
<th>3.7</th>
<th>5.5</th>
<th>7.5</th>
<th>11</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)*1</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>1.2</td>
<td>2.0</td>
<td>3.0</td>
<td>4.6</td>
<td>7.2</td>
<td>9.1</td>
<td>13.0</td>
<td>17.5</td>
<td>23.0</td>
</tr>
<tr>
<td>Rated current (A)*3</td>
<td>1.6</td>
<td>2.6</td>
<td>4.0</td>
<td>6.0</td>
<td>9.5</td>
<td>12</td>
<td>17</td>
<td>23</td>
<td>30</td>
</tr>
<tr>
<td>Overload current rating*4</td>
<td>150%</td>
<td>60s, 200% 3s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage*5</td>
<td>Three-phase 380 to 480V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*6</td>
<td>100%</td>
<td>50%</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input voltage/frequency</td>
<td>Three-phase 380 to 480V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>325 to 528V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*9</td>
<td>1.5</td>
<td>2.5</td>
<td>4.5</td>
<td>5.5</td>
<td>9.5</td>
<td>12</td>
<td>17</td>
<td>20</td>
<td>28</td>
</tr>
<tr>
<td>Protective structure (JEM1030)</td>
<td>Enclosed type (IP20), IP40 for totally enclosed structure series.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>1.4</td>
<td>1.4</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>3.2</td>
<td>3.2</td>
<td>6.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

---

1. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
2. The rated output capacity indicated assumes that the output voltage is 230V for three-phase 200V class and 440V for three-phase 400V class.
3. The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
4. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about ±5% of the power supply.
5. The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regeneration energy is large. A brake unit (FR-BU2) may also be used. (Option brake resistor cannot be used for 0.1K and 0.2K.
6. The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
7. Setting 2kHz or more in Pr. 72 PWM frequency selection to perform low acoustic noise operation in the surrounding air temperature exceeding 40°C (totally enclosed structure is 30°C), the rated output current is the value in parenthesis.
8. Connect DC power supply to terminal P/+ and N/-. Connect the plus side of the power supply to terminal P/+ and minus side to terminal N/-. Since the voltage between P/+ and N/- may increase due to the regeneration energy from the motor and exceeds 415V temporarily, select the DC power supply which can withstand the voltage/energy during regeneration.
9. Connect DC power supply to terminal P/+ and N/-. Connect the plus side of the power supply to terminal P/+ and minus side to terminal N/-. Since the voltage between P/+ and N/- may increase due to the regeneration energy from the motor and exceeds 415V temporarily, select the DC power supply which can withstand the voltage/energy during regeneration.
10. Setting 2kHz or more in Pr. 72 PWM frequency selection to perform low acoustic noise operation in the surrounding air temperature exceeding 40°C (totally enclosed structure is 30°C), the rated output current is the value in parenthesis.
11. Connect DC power supply to terminal P/+ and N/-. Connect the plus side of the power supply to terminal P/+ and minus side to terminal N/-. Since the voltage between P/+ and N/- may increase due to the regeneration energy from the motor and exceeds 415V temporarily, select the DC power supply which can withstand the voltage/energy during regeneration.
12. The safety stop function model is indicated with SC.
13. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
14. The rated output capacity indicated assumes that the output voltage is 230V for three-phase 200V class and 440V for three-phase 400V class.
15. The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
16. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about ±5% of the power supply.
17. The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regeneration energy is large. A brake unit (FR-BU2) may also be used. (Option brake resistor cannot be used for 0.1K and 0.2K.
18. The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
19. Setting 2kHz or more in Pr. 72 PWM frequency selection to perform low acoustic noise operation in the surrounding air temperature exceeding 40°C (totally enclosed structure is 30°C), the rated output current is the value in parenthesis.
20. Connect DC power supply to terminal P/+ and N/-. Connect the plus side of the power supply to terminal P/+ and minus side to terminal N/-. Since the voltage between P/+ and N/- may increase due to the regeneration energy from the motor and exceeds 415V temporarily, select the DC power supply which can withstand the voltage/energy during regeneration.
21. Connect DC power supply to terminal P/+ and N/-. Connect the plus side of the power supply to terminal P/+ and minus side to terminal N/-. Since the voltage between P/+ and N/- may increase due to the regeneration energy from the motor and exceeds 415V temporarily, select the DC power supply which can withstand the voltage/energy during regeneration.
22. The safety stop function model is indicated with SC.
23. The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
24. The rated output capacity indicated assumes that the output voltage is 230V for three-phase 200V class and 440V for three-phase 400V class.
25. The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
26. The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about ±5% of the power supply.
27. The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regeneration energy is large. A brake unit (FR-BU2) may also be used. (Option brake resistor cannot be used for 0.1K and 0.2K.
28. The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
### Single-phase 200V power supply

<table>
<thead>
<tr>
<th>Model FR-E720S-□□K(SC)*10</th>
<th>0.1</th>
<th>0.2</th>
<th>0.4</th>
<th>0.75</th>
<th>1.5</th>
<th>2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)*1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.3</td>
<td>0.6</td>
<td>1.2</td>
<td>2.0</td>
<td>3.2</td>
<td>4.4</td>
</tr>
<tr>
<td>Rated current (A)*7</td>
<td>0.8</td>
<td>1.5</td>
<td>3.0</td>
<td>5.0</td>
<td>8.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Overload current rating*3</td>
<td>150% 60s, 200% 3s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output voltage*4</td>
<td>Three-phase 200 to 240V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*5</td>
<td>150%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Single-phase 200 to 240V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>170 to 264V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>Within ±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.5</td>
<td>0.9</td>
<td>1.5</td>
<td>2.5</td>
<td>4.0</td>
<td>5.2</td>
</tr>
<tr>
<td>Protective structure (JEM1030)</td>
<td>Enclosed type (IP20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>0.6</td>
<td>0.6</td>
<td>0.9</td>
<td>1.4</td>
<td>1.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

### Single-phase 100V power supply

<table>
<thead>
<tr>
<th>Model FR-E710W-□□K</th>
<th>0.1</th>
<th>0.2</th>
<th>0.4</th>
<th>0.75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable motor capacity (kW)*1</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.75</td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.3</td>
<td>0.6</td>
<td>1.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Rated current (A)*7</td>
<td>0.8</td>
<td>1.5</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Overload current rating*3</td>
<td>150% 60s, 200% 3s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated output voltage*4</td>
<td>Three-phase 200 to 230V*8, *9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*5</td>
<td>150%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Single-phase 100 to 115V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>90 to 132V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>Within ±5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.5</td>
<td>0.9</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Protective structure (JEM1030)</td>
<td>Enclosed type (IP20)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>0.6</td>
<td>0.7</td>
<td>0.9</td>
<td>1.5</td>
</tr>
</tbody>
</table>

---

*1 The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

*2 The rated output capacity indicated assumes that the output voltage is 200V.

*3 The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load. If the automatic restart after instantaneous power failure function (Pr. 57) or power failure stop function (Pr. 261) is set and power supply voltage is low while load becomes bigger, the bus voltage decreases to power failure detection level and load of 100% or more may not be available.

*4 The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about 7 times that of the power supply.

*5 The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous-regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regenerative energy is large. A brake unit (FR-BU2) may also be used. (Option brake resistor cannot be used for 0.1K and 0.2K.)

*6 The braking resistor capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).

*7 Setting 2kHz or more in Pr. 72 PWM frequency selection to perform low acoustic noise operation with the surrounding air temperature exceeding 40°C, the rated output current is the value in parenthesis.

*8 The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).

*9 In a single-phase 100V power input model, the output voltage may fall down when the load is heavy, and larger output current may flow compared to a three-phase input model. Use the motor with less load so that the output current is within the rated motor current range.

*10 The safety stop function model is indicated with SC.

---

**Notes:**

- The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.
- The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load. If the automatic restart after instantaneous power failure function (Pr. 57) or power failure stop function (Pr. 261) is set and power supply voltage is low while load becomes bigger, the bus voltage decreases to power failure detection level and load of 100% or more may not be available.
- The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about 7 times that of the power supply.
- The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous-regenerative torque. When the motor is decelerated from the frequency higher than the base frequency, the average deceleration torque will reduce. Since the inverter does not contain a brake resistor, use the optional brake resistor when regenerative energy is large. A brake unit (FR-BU2) may also be used. (Option brake resistor cannot be used for 0.1K and 0.2K.)
- The braking resistor capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- Setting 2kHz or more in Pr. 72 PWM frequency selection to perform low acoustic noise operation with the surrounding air temperature exceeding 40°C, the rated output current is the value in parenthesis.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- In a single-phase 100V power input model, the output voltage may fall down when the load is heavy, and larger output current may flow compared to a three-phase input model. Use the motor with less load so that the output current is within the rated motor current range.
- The safety stop function model is indicated with SC.
### Common specifications

<table>
<thead>
<tr>
<th>Control method</th>
<th>Inverter FREQROL-E700 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output frequency range</td>
<td>0.2 to 400Hz</td>
</tr>
<tr>
<td>Frequency setting resolution</td>
<td>Analog input: 0.06Hz/80Hz (terminal2: 4 to 0V/10V±5%), 0.12Hz/80Hz (terminal2: 4 to 5V/96bit), 0.06Hz/80Hz (terminal4: 0 to 20mA/10bit)</td>
</tr>
<tr>
<td>Digital input</td>
<td>0.01Hz</td>
</tr>
<tr>
<td>Voltage/frequency characteristics</td>
<td>Base frequency can be set from 0 to 400Hz, Constant-torque/variable torque pattern can be selected</td>
</tr>
<tr>
<td>Starting torque</td>
<td>200% or more (at 0Hz) when Advanced magnetic flux vector control is set (3.7kW or less)</td>
</tr>
<tr>
<td>Torque boost</td>
<td>Manual torque boost</td>
</tr>
<tr>
<td>Acceleration/deceleration time setting</td>
<td>0.01 to 360s, 0.1 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration modes are available.</td>
</tr>
<tr>
<td>DC injection brake</td>
<td>Operation frequency (0 to 120Hz), operation time (0 to 10s), operation voltage (0 to 30%) can be changed.</td>
</tr>
<tr>
<td>Stall prevention operation level</td>
<td>Operation current level can be set (0 to 200% adjustable), whether to use the function or not can be selected</td>
</tr>
</tbody>
</table>

#### Frequency setting signal

<table>
<thead>
<tr>
<th>Input</th>
<th>Standard control circuit terminal model: Seven terminals Safety stop function model: Six terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog input</td>
<td>Two terminals: Terminal 2: 0 to 10V, 0 to 5V can be selected, Terminal 4: 0 to 10V, 0 to 5V, 4 to 20mA can be selected, Digital input: The signal is entered from the operation panel or parameter unit. Frequecy setting increment can be set, 4 digit BCD or 16bit binary data (when the option FR-A7AX E kit is used)</td>
</tr>
</tbody>
</table>

#### Operational functions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating status</td>
<td>The following signals can be assigned to Pr. 178 to Pr. 184 (input terminal function selection): multi-speed selection, remote setting, stop-on contact selection, second function selection, terminal 4 input selection, JOG operation selection, PID control valid terminal, brake opening completion signal, external thermal input, PU/External operation switcher, V/F switcher, output stop, start self-holding selection, forward rotation, reverse rotation command, inverter reset, PU-NET operation switcher, External-NET operation switcher, command source switcher, inverter operation enable signal, and PU operation external interlock.</td>
</tr>
<tr>
<td>Pulse train output (Max. 2.4kHz, one terminal)</td>
<td>The following signals can be assigned to Pr. 54 FM terminal function selection: output frequency, motor current (steady), output voltage, frequency setting, motor torque, converter output voltage, regenerative brake duty, electronic thermal relay function load factor, output current peak value, converter output voltage peak value, reference voltage output, motor load factor, PID set point, PID measured value, output power Pulse train output (1440 pulses/s/full scale)</td>
</tr>
<tr>
<td>Operation panel Parameter unit (FR-PU07)</td>
<td>Operating status: The following operating status can be displayed: output frequency, motor current (steady), output voltage, frequency setting, cumulative energization time, actual operation time, motor torque, converter output voltage, regenerative brake duty, electronic thermal relay function load factor, output current peak value, converter output voltage peak value, reference voltage output, motor load factor, PID set point, PID measured value, output power Pulse train output (1440 pulses/s/full scale)</td>
</tr>
</tbody>
</table>

#### Protective/warning function

| Protective functions | Overcurrent during acceleration, overcurrent during constant speed, overcurrent during deceleration, overvoltage during acceleration, overvoltage during constant speed, overvoltage during deceleration, inverter protection thermal operation, motor protection thermal operation, heat sink overheated, input phase failure, output side earth ground) fault overcurrent at start, output phase failure, external thermal relay operation, option fault, parameter error, internal board fault, PU disconnection, retry count excess, CPU fault, brake transistor alarm, inrush resistance overheat, communication error, analog input error, USB communication error, brake sequence error 4 to 7, safety circuit fault  |
| Warning functions | Fan alarm, overcurrent stall prevention, overvoltage stall prevention, PU stop, parameter write error, regenerative brake prealarm, electronic thermal relay function prealarm, maintenance output, undervoltage, operation panel lock, password locked, inverter reset, safety stop  |

#### Operation specifications

<table>
<thead>
<tr>
<th>Input signal</th>
<th>Start signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start signal</td>
<td>Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected</td>
</tr>
</tbody>
</table>

#### Protective function

<table>
<thead>
<tr>
<th>Protective function</th>
<th>Temperature applicable for a short time, e.g. in transit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective function</td>
<td>As the FR-E720-0.1K(SC) to 0.75K(SC), FR-E740-0.4K(SC) and 0.75K(SC), FR-E720S-0.1K(SC) to 0.4K(SC), FR-E710W-0.1K to 0.75K are not provided with the cooling fan, this alarm does not function.</td>
</tr>
<tr>
<td>Protective function</td>
<td>Temperatures applicable for a short time, e.g. in transit.</td>
</tr>
</tbody>
</table>

#### Operation specifications

<table>
<thead>
<tr>
<th>Input signal</th>
<th>Start signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start signal</td>
<td>Forward and reverse rotation or start signal automatic self-holding input (3-wire input) can be selected</td>
</tr>
</tbody>
</table>

#### Protective function

<table>
<thead>
<tr>
<th>Protective function</th>
<th>Temperature applicable for a short time, e.g. in transit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective function</td>
<td>As the FR-E720-0.1K(SC) to 0.75K(SC), FR-E740-0.4K(SC) and 0.75K(SC), FR-E720S-0.1K(SC) to 0.4K(SC), FR-E710W-0.1K to 0.75K are not provided with the cooling fan, this alarm does not function.</td>
</tr>
<tr>
<td>Protective function</td>
<td>Temperatures applicable for a short time, e.g. in transit.</td>
</tr>
</tbody>
</table>
### Standard Model

**Outline Dimension Drawings**

- FR-E720-0.1K(SC) to 0.75K(SC)
- FR-E720S-0.1K(SC) to 0.4K(SC)
- FR-E710W-0.1K to 0.4K

---

**Capacity plate**

![Capacity plate diagram](image)

---

**When used with the plug-in option**

![Plug-in option diagram](image)

---

**Inverter Model**

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>D</th>
<th>D1</th>
<th>D2*</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-E720-0.1K, 0.2K</td>
<td>80.5</td>
<td>10</td>
<td>95.6</td>
</tr>
<tr>
<td>FR-E720S-0.1K, 0.2K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-E710W-0.1K</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-E720-0.1KSC, 0.2KSC</td>
<td>86.5</td>
<td>108.1</td>
<td></td>
</tr>
<tr>
<td>FR-E720S-0.1KSC, 0.2KSC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-E710W-0.2K</td>
<td>110.5</td>
<td>10</td>
<td>125.6</td>
</tr>
<tr>
<td>FR-E720-0.4K</td>
<td>112.5</td>
<td>42</td>
<td>127.6</td>
</tr>
<tr>
<td>FR-E720-0.4KSC</td>
<td>118.5</td>
<td>140.1</td>
<td></td>
</tr>
<tr>
<td>FR-E720-0.75K</td>
<td>132.5</td>
<td>62</td>
<td>147.6</td>
</tr>
<tr>
<td>FR-E720-0.75KSC</td>
<td>138.5</td>
<td>160.1</td>
<td></td>
</tr>
<tr>
<td>FR-E720S-0.4K</td>
<td>142.5</td>
<td>42</td>
<td>157.6</td>
</tr>
<tr>
<td>FR-E710W-0.4K</td>
<td>148.5</td>
<td>170.1</td>
<td></td>
</tr>
</tbody>
</table>

*When the FR-A7NC E kit is mounted, a terminal block protrudes making the depth approx. 2mm greater.

(Unit: mm)
Outline Dimension Drawings

- FR-E720-1.5K(SC), 2.2K(SC)
- FR-E720S-0.75K(SC), 1.5K(SC)
- FR-E710W-0.75K

When used with the plug-in option

FR-E720-3.7K(SC)

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>D</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-E720-1.5K, 2.2K</td>
<td>135.5</td>
<td>60</td>
<td>163.1</td>
</tr>
<tr>
<td>FR-E720S-0.75K</td>
<td>141.5</td>
<td>176.1</td>
<td></td>
</tr>
<tr>
<td>FR-E720S-1.5KSC, 2.2KSC</td>
<td>167</td>
<td>188.6</td>
<td></td>
</tr>
<tr>
<td>FR-E720S-0.75KSC</td>
<td>155</td>
<td>170.1</td>
<td></td>
</tr>
</tbody>
</table>

*1 When used with the plug-in option

FR-E720S-0.75K are not provided with the cooling fan.

*2 When the FR-A7NC E kit is mounted, a terminal block protrudes making the depth approx. 2mm greater.

Inverter Model | D  | D1 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-E720-3.7K</td>
<td>142.5</td>
<td>157.6</td>
</tr>
<tr>
<td>FR-E720-3.7KSC</td>
<td>148.5</td>
<td>170.1</td>
</tr>
</tbody>
</table>

* When the FR-A7NC E kit is mounted, a terminal block protrudes making the depth approx. 2mm greater.

(Unit: mm)
### Outline Dimension Drawings

#### FR-E720-5.5K(SC) to 15K(SC)

When used with the plug-in option

#### FR-E740-0.4K(SC) to 3.7K(SC)

* FR-E740-0.4K, 0.75K are not provided with the cooling fan.

#### Inverter Model

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W</th>
<th>W1</th>
<th>W2</th>
<th>D</th>
<th>D1*</th>
<th>D2</th>
<th>D3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-E720-5.5K, 7.5K</td>
<td>180</td>
<td>164</td>
<td>180</td>
<td>165</td>
<td>180.1</td>
<td>71.5</td>
<td>10</td>
</tr>
<tr>
<td>FR-E720-11K, 15K</td>
<td>220</td>
<td>195</td>
<td>211</td>
<td>190</td>
<td>205.1</td>
<td>84.5</td>
<td>10.5</td>
</tr>
</tbody>
</table>

* When the FR-A7NC E kit is mounted, a terminal block protrudes making the depth approx. 2mm greater.

---

(Unit: mm)
Outline Dimension Drawings

FR-E740-5.5K(SC), 7.5K(SC)

When used with the plug-in option

Inverter Model | D  | D1*  
|----------------|----|------
| FR-E740-5.5K, 7.5K | 147 | 162.1  
| FR-E740-5.5KSC, 7.5KSC | 153 | 174.6  

* When the FR-A7NC E kit is mounted, a terminal block protrudes making the depth approx. 2mm greater.

FR-E740-11K(SC), 15K(SC)

When used with the plug-in option

Inverter Model | D  | D1*  
|----------------|----|------
| FR-E740-11K, 15K | 190 | 205.1  
| FR-E740-11KSC, 15KSC | 196 | 217.6  

* When the FR-A7NC E kit is mounted, a terminal block protrudes making the depth approx. 2mm greater.
Terminal Connection Diagram

(1) Standard control circuit terminal model

Control input signals (No voltage input allowed)

- Terminal functions vary with the input terminal assignment (Pr. 178 to Pr. 184)
- Frequency setting signals (Analog)
  - 3 Terminal input specifications can be changed by analog input specifications switchover (Pr. 73).
  - 4 It is recommended to use 2W1kΩ when the frequency setting signal is changed frequently.
- 5 Terminal input specifications can be changed by analog input specifications switchover (Pr. 287). Set the voltage/current input switch in the "V" position to select voltage input (0 to 5V or 0 to 10V) and "I" (initial value) to select current input (4 to 20mA).
- 6 Terminal P1 is not available for single-phase 100V power input model.
- 7 A brake transistor is not built-in to the 0.1K and 0.2K.
- 8 Brake resistor (FR-ABR, MRS, MYS type) Install a thermal relay to prevent an overheat and burnout of the brake resistor. (The brake resistor cannot be connected to the 0.1K and 0.2K.)

NOTE

- To prevent a malfunction caused by noise, separate the signal cables more than 10cm from the power cables. Also separate the main circuit wire of the input side and the output side.
- After wiring, wire offcuts must be left in the inverter. Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.
- The output of the single-phase power input model is three-phase 200V.
NOTE

• To prevent a malfunction caused by noise, separate the signal cables more than 10cm from the power cables. Also separate the main circuit wire of the input side and the output side.

• Wire cut ends must not be left in the inverter. Wire cut ends can cause an alarm, failure or malfunction. Always keep the inverter clean.

• The output of the single-phase power input model is three-phase 200V.
(3) FL remote communication compatible model (NF)

- To prevent a malfunction caused by noise, separate the signal cables more than 10cm from the power cables. Also separate the main circuit wire of the input side and the output side.
- After wiring, wire offcuts must not be left in the inverter. Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.

(4) CC-Link communication compatible model (NC)

- To prevent a malfunction caused by noise, separate the signal cables more than 10cm from the power cables. Also separate the main circuit wire of the input side and the output side.
- After wiring, wire offcuts must not be left in the inverter. Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When drilling mounting holes in an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.
### Terminal Specification Explanation

#### (1) Standard control circuit terminal specification model and safety-stop model (SC)

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main circuit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RH, RM, RL</td>
<td></td>
<td>Multi-speed selection</td>
<td>Multi-speed can be selected according to the combination of RH, RM and RL signals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency setting (multi-speed selection)</td>
<td>This terminal is used for frequency setting (multi-speed selection) of the inverter.</td>
</tr>
<tr>
<td></td>
<td>S1/S2</td>
<td>Frequency setting (speed setting)</td>
<td>Permissible maximum voltage 20VDC. When using the multi-speed setting, the input voltage is set to 0 to 5VDC (initial setting) and 0 to 10VDC.</td>
</tr>
<tr>
<td></td>
<td>S1/S2</td>
<td>Input resistance</td>
<td>20mA. Permissible maximum voltage 20VDC.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Frequency setting (current)</td>
<td>Permissible maximum voltage 20VDC. When using the multi-speed setting, the input voltage is set to 0 to 5VDC (initial setting) and 0 to 10VDC.</td>
</tr>
</tbody>
</table>

#### Safety stop

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RH, RM, RL</td>
<td>S1/S2</td>
<td>Safe stop input (Channel 1)</td>
<td>24VDC permissible maximum voltage 20VDC.</td>
</tr>
<tr>
<td></td>
<td>S1/S2</td>
<td>Safe stop input (Channel 2)</td>
<td>24VDC permissible maximum voltage 20VDC.</td>
</tr>
</tbody>
</table>

#### Specifications

- **Permissible maximum voltage**: 20VDC
- **Input resistance**: 10kΩ
- **Permissible maximum current**: 10mA
### Control circuit/output signal

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay</td>
<td>A, B, C</td>
<td>Relay output (fault output)</td>
<td>1 changeover contact output indicates that the inverter fault occurs. Fault: discontinuity across B-C (continuity across A-C), Normal: continuity across B-C (discontinuity across A-C) Contact capacity 230VAC 0.3A (power factor = 0.4) 30VDC 0.3A</td>
</tr>
<tr>
<td>Open collector</td>
<td>RUN</td>
<td>Inverter running</td>
<td>Switched low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5Hz). Switched high during stop or DC injection brake operation.*</td>
</tr>
<tr>
<td></td>
<td>FU</td>
<td>Frequency detection</td>
<td>Switched low when the inverter output frequency is equal to or higher than the preset detected frequency and high when less than the preset detected frequency.*</td>
</tr>
<tr>
<td></td>
<td>SE</td>
<td>Open collector output common</td>
<td>Common terminal of terminal RUN and FU.</td>
</tr>
<tr>
<td>Pulse</td>
<td>FM</td>
<td>Select one e.g. output frequency</td>
<td>Select one e.g. output frequency from monitor items. (Not output during inverter reset.) The output signal is proportional to the magnitude of the corresponding monitoring item.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>from monitor items.</td>
<td></td>
</tr>
</tbody>
</table>

* Low is when the open collector output transistor is on (conducts). High is when the transistor is off (does not conduct).

<table>
<thead>
<tr>
<th>Communication</th>
<th>PU connector</th>
<th>With the PU connector, RS-485 communication can be made.</th>
<th>Conforming standard: EIA-485 (RS-485)</th>
<th>Transmission format: Multi-drop link</th>
<th>Communication speed: 4800 to 38400bps</th>
<th>Overall extension: 500m</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USB connector</td>
<td>The FR Configurator can be operated by connecting the inverter to the personal computer through USB.</td>
<td>Interface: conforms to USB1.1</td>
<td>Transmission Speed: 12Mbps</td>
<td>Connector: USB mini B connector (receptacle mini B type)</td>
<td></td>
</tr>
</tbody>
</table>

[Note]
- Set Pr. 267 and a voltage/current input switch correctly, then input an analog signal in accordance with the setting. Applying a voltage with voltage/current input switch in "I" position (current input is selected) or a current with switch in "V" position (voltage input is selected) could cause component damage of the inverter or analog circuit of output devices.
- The inverter will be damaged if power is applied to the inverter output terminals (U, V, W). Never perform such wiring.
- Indicates that terminal functions can be selected using Pr. 178 to Pr. 192 (I/O terminal function selection).
- Terminal names and terminal functions are those of the factory set.
- When connecting the DC power supply, be sure to connect the plus side of the power supply to terminal P+ and minus side to terminal N-. Opposite polarity will damage the inverter.
### Drive Product

#### Inverter FREQROL-E700 Series

**Lineup/Functions**

- **Connectivity**
  - Examples

- **Features/Outline**
  - Specifications/Outline Drawing

---

### Models compatible with FL remote communication (NF) and CC-Link communication (NC)

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal symbol</th>
<th>Terminal name</th>
<th>Descriptions of terminal functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main circuit</td>
<td>R/L1, S/L2, TA/3</td>
<td>Alternating current power input</td>
<td>Connects with commercial power supply.</td>
</tr>
<tr>
<td></td>
<td>U, V, W</td>
<td>Inverter output</td>
<td>Connects with 3-phase squirrel-cage motor.</td>
</tr>
<tr>
<td></td>
<td>P+/+, PR</td>
<td>Brake resistor connection</td>
<td>Connects with optional brake resistor (MRS and MYS types, FR-ABR) between terminal P+/+ and PR. (Cannot be connected with 0.1K and 0.2K.)</td>
</tr>
<tr>
<td></td>
<td>P/+, N-</td>
<td>Brake unit connection</td>
<td>Connects with a brake unit (FR-BU2).</td>
</tr>
<tr>
<td></td>
<td>P/+, P1</td>
<td>DC reactor connection</td>
<td>Remove the short-circuit piece between terminals P/+, P1, and connect the DC reactor.</td>
</tr>
</tbody>
</table>

| Control circuit | Ground | For inverter chassis; make earth ground connection. |

### 24V external power supply

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal symbol</th>
<th>Terminal name</th>
<th>Descriptions of terminal functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main circuit</td>
<td>+24</td>
<td>Alternating current power input</td>
<td>The 24V power input from an external source enables ongoing communication even when the main circuit power is OFF.</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>24V external power supply terminals common</td>
<td>Common terminal for positive terminal 24</td>
</tr>
</tbody>
</table>

### Safety stop

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal symbol</th>
<th>Terminal name</th>
<th>Descriptions of terminal functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control circuit</td>
<td>S1</td>
<td>Safety stop input (system 1)</td>
<td>Terminals S1 and S2 are safety stop input signals and are used for the safety relay unit. Terminals S1 and S2 are used simultaneously (dual-channel).</td>
</tr>
<tr>
<td></td>
<td>S2</td>
<td>Safety stop input (system 2)</td>
<td>Short circuit release between S1 - PC and S2 - PC will shut off the inverter output. In initial state, terminals S1 and S2 are short-circuited with terminal PC with short-circuit wires. When using the safety stop function, remove the short-circuit wires and connect to the safety relay unit.</td>
</tr>
<tr>
<td></td>
<td>PC</td>
<td>Safety stop input terminal common</td>
<td>Common terminals for safety stop input terminals S1 and S2.</td>
</tr>
</tbody>
</table>

### Communication

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal symbol</th>
<th>Terminal name</th>
<th>Descriptions of terminal functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL-net</td>
<td>FL remote communication connector</td>
<td>The FL remote communication connector enables FL remote communication.</td>
<td></td>
</tr>
</tbody>
</table>

### FL-Net

- **FL remote communication connector**
  - The FL remote communication connector enables FL remote communication.

### CC-Link

- **CC-Link communication connector (2 ports)**
  - Manufacturer: Mitsubishi Electric Corporation
  - Manufacturer: Sumitomo 3M Limited

### Pin layout

<table>
<thead>
<tr>
<th>Pin number</th>
<th>Signal name</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>SLD</td>
</tr>
<tr>
<td>4</td>
<td>NC</td>
</tr>
<tr>
<td>3</td>
<td>DG</td>
</tr>
<tr>
<td>2</td>
<td>DB</td>
</tr>
<tr>
<td>1</td>
<td>DA</td>
</tr>
</tbody>
</table>

---

**Note**

- The inverter will be damaged if power is applied to the inverter output terminals (U, V, W). Never perform such wiring.
- When connecting the DC power supply, be sure to connect the plus side of the power supply to terminal P/+ and minus side to terminal N/-. Opposite polarity will damage the inverter.
### Main Differences and Compatibilities with the FR-E500 series

<table>
<thead>
<tr>
<th>Item</th>
<th>FR-E500</th>
<th>FR-E700</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control method</strong></td>
<td>V/F control</td>
<td>V/F control</td>
</tr>
<tr>
<td></td>
<td>General-purpose magnetic flux vector control</td>
<td>Optimum excitation control</td>
</tr>
<tr>
<td><strong>Torque boost</strong> (Pr. 0)</td>
<td>Initial value</td>
<td>FR-E520-1.5K to 2.2K: 6%</td>
</tr>
<tr>
<td></td>
<td>FR-E540-1.5K to 2.7K: 6%</td>
<td>FR-E540-1.5K(SC) to 3.7K(SC): 4%</td>
</tr>
<tr>
<td></td>
<td>FR-E540-5.5K, 7.5K: 6%</td>
<td>FR-E740-1.5K(SC) to 3.7K(SC): 3%</td>
</tr>
<tr>
<td><strong>DC injection brake operation voltage</strong> (Pr. 12)</td>
<td>Initial value</td>
<td>0.4K: 0.75K: 4%</td>
</tr>
<tr>
<td></td>
<td>0.4K to 7.5K: 6%</td>
<td>0.4K: 0.75K: 4%</td>
</tr>
<tr>
<td><strong>Frequency at 5V (10V) input</strong> (Pr. 38)</td>
<td></td>
<td>Parameter number change</td>
</tr>
<tr>
<td></td>
<td>Frequency at 20mA input frequency (Pr. 39)</td>
<td>(Pr. 125 Terminal 2 frequency setting gain frequency)</td>
</tr>
<tr>
<td></td>
<td>Second electronic thermal O/L relay (Pr. 48)</td>
<td>(Pr. 126 Terminal 4 frequency setting gain frequency)</td>
</tr>
<tr>
<td></td>
<td>Shortest acceleration/deceleration mode (Pr. 60)</td>
<td>(Pr. 51 Second electronic thermal O/L relay)</td>
</tr>
<tr>
<td></td>
<td>Reverse rotation from the inverter operation panel</td>
<td>(Pr. 60 Energy saving control selection)</td>
</tr>
<tr>
<td></td>
<td>Press [REV]</td>
<td>(Pr. 292 Automatic acceleration/deceleration)</td>
</tr>
</tbody>
</table>

**Changed/cleared functions**

<table>
<thead>
<tr>
<th>Item</th>
<th>FR-E500</th>
<th>FR-E700</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Provided for the 200V class 2.2K or more and 400V class</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provided for the all capacity</td>
</tr>
<tr>
<td><strong>Input terminal function selection</strong> (Pr. 54)</td>
<td>Setting</td>
<td>Initial value 0: External operation mode is selected at power ON</td>
</tr>
<tr>
<td></td>
<td>0: Output frequency (initial value),</td>
<td>Setting 0, 11 are deleted)</td>
</tr>
<tr>
<td></td>
<td>1: Output current,</td>
<td>1: Output frequency (initial value),</td>
</tr>
<tr>
<td></td>
<td>2: Output voltage</td>
<td>2: Output current,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3: Output voltage</td>
</tr>
<tr>
<td><strong>Second applied motor</strong></td>
<td>Pr. 71 = 100 to 123</td>
<td>Pr. 450 Second applied motor</td>
</tr>
<tr>
<td><strong>Terminal 2 to 5V, 0 to 10V selection</strong> (Pr. 73)</td>
<td>Setting</td>
<td>Initial value 0: External operation mode is selected at power ON</td>
</tr>
<tr>
<td></td>
<td>0: 0 to 5V (initial value),</td>
<td>Setting 8: deleted (X16 signal is used instead)</td>
</tr>
<tr>
<td></td>
<td>1: to 10V</td>
<td></td>
</tr>
<tr>
<td><strong>Operation mode selection</strong> (Pr. 79)</td>
<td>Initial value</td>
<td>Initial value 0: External operation mode is selected at power ON</td>
</tr>
<tr>
<td></td>
<td>1: PU operation mode</td>
<td>Setting 8: deleted (X16 signal is used instead)</td>
</tr>
<tr>
<td>Setting 9: Operation mode switching by external signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Setting General-purpose magnetic flux vector</strong></td>
<td>Pr. 80 ≠ 9999</td>
<td>Pr. 80 ≠ 9999, Pr. 81 ≠ 9999, Pr. 800 = 30</td>
</tr>
<tr>
<td><strong>User group</strong></td>
<td>User group 1 (16), user group 2 (16)</td>
<td>User group 1 (16) only, setting methods were partially changed</td>
</tr>
<tr>
<td><strong>Input terminal function selection</strong> (Pr. 130 to Pr. 133)</td>
<td>Setting</td>
<td>Setting 0, 11 are deleted)</td>
</tr>
<tr>
<td>Setting 5: STOP signal (start self-holding selection)</td>
<td></td>
<td>Setting 0, 11 are deleted)</td>
</tr>
<tr>
<td>Setting 6: MRS signal (output stop)</td>
<td></td>
<td>Setting 0, 11 are deleted)</td>
</tr>
<tr>
<td><strong>Long wiring mode</strong></td>
<td>Pr. 240 setting 10, 11</td>
<td>Setting is unnecessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Pr. 240 setting 0, 11 are deleted)</td>
</tr>
<tr>
<td><strong>Cooling fan operation selection</strong> (Pr. 244)</td>
<td>Initial setting</td>
<td>Setting is unnecessary</td>
</tr>
<tr>
<td></td>
<td>0: Cooling fan operates in power-on status.</td>
<td>(Pr. 240 setting 0, 11 are deleted)</td>
</tr>
<tr>
<td></td>
<td>11: Cooling fan on/off control valid</td>
<td>Setting is unnecessary</td>
</tr>
<tr>
<td><strong>Stop selection</strong> (Pr. 250)</td>
<td>Setting increments</td>
<td>Setting is unnecessary</td>
</tr>
<tr>
<td></td>
<td>1s</td>
<td>(Pr. 240 setting 0, 11 are deleted)</td>
</tr>
<tr>
<td><strong>RS-485 communication control source from the PU connector</strong></td>
<td>Network operation mode (PU operation mode as FR-E500 when Pr. 551 = 2)</td>
<td>Network operation mode (PU operation mode as FR-E500 when Pr. 551 = 2)</td>
</tr>
<tr>
<td><strong>Earth (ground) fault detection</strong></td>
<td>400V class: Detects only at a start</td>
<td>Earth (ground) fault detection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>400V class: Detects only at a start</td>
</tr>
</tbody>
</table>

**Inrush current limit circuit**

<table>
<thead>
<tr>
<th>Item</th>
<th>FR-E500</th>
<th>FR-E700</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Provided for the all capacity</td>
</tr>
<tr>
<td><strong>Control terminal block</strong></td>
<td>Fixed terminal block (can not be removed)</td>
<td>Removable terminal block</td>
</tr>
<tr>
<td></td>
<td>Screw type terminal block (Phillips screw M2.5)</td>
<td>Standard control circuit terminal model:</td>
</tr>
<tr>
<td></td>
<td>Length of recommended bar terminal is 7mm.</td>
<td>Screw type terminal block (Flathead screw M2 (M3 for terminal A, B, and C))</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of recommended blade terminal is 5mm (6mm for terminal A, B and C).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety stop function model: Spring clamp terminal block (Fixes a wire with a pressure of inside spring)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length of recommended blade terminal is 10mm</td>
</tr>
<tr>
<td><strong>Operation panel</strong></td>
<td>Removable operation panel (PA02)</td>
<td>Integrated operation panel (can not be removed)</td>
</tr>
<tr>
<td><strong>Parameter unit</strong></td>
<td>FR-PU04</td>
<td>FR-PU07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FR-PU04 (some functions, such as parameter copy, are unavailable.)</td>
</tr>
<tr>
<td><strong>Plug-in option</strong></td>
<td>for 400V class only</td>
<td>Dedicated plug-in option (installation is incompatible)</td>
</tr>
<tr>
<td></td>
<td>FR-E5NC : CC-Link communication</td>
<td>FR-A7NC E kit : CC-Link communication</td>
</tr>
<tr>
<td></td>
<td>FR-E5ND : DeviceNet communication</td>
<td>FR-A7ND E kit : DeviceNet communication</td>
</tr>
<tr>
<td></td>
<td>FR-E5NL : LonWorks communication</td>
<td>FR-A7NL E kit : LonWorks communication</td>
</tr>
<tr>
<td><strong>Installation size</strong></td>
<td>FR-E720-0.1K(SC) to 7.5K(SC), FR-E740-0.4K(SC) to 7.5K(SC), FR-E720S-0.1K(SC) to 0.75K(SC), FR-E710W-0.1K to 0.75K(SC) are compatible in mounting dimensions</td>
<td></td>
</tr>
</tbody>
</table>
Suitable for Both The General-Purpose Motor (Three-Phase Induction Motor) and The IPM Motor

The F700PJ Series for Both a General-Purpose Motor (IM) and an IPM Motor (IPM)

- The IM drive setting can be switched to IPM drive setting by only one setting “12” (MM-EFS) in the parameter P101.
- Never drive an IPM motor in the IM drive setting.
- One spare F700PJ inverter is enough for the two types of motors (IM and IPM); the number of required spare inverters is reduced by half.
- A push on the setting dial in the monitor mode brings up the control setting (IM, IPM).

Simple and Reliable Transition from IM to IPM

- There is no need to replace the whole system at once; replace the inverters first, then replace the motors.
- When the budget is limited, equipment investment can be made over several stages.

What is an IPM Motor?

An IPM motor is a synchronous motor with strong permanent magnets embedded in its rotor.

Why is an IPM motor more efficient?

- No current flows to the rotor (secondary side), and no secondary copper loss is generated.
- Magnetic flux is generated with permanent magnets, and less motor current is required.
- Embedded magnets provide reluctance torque*, which can be used for driving.

* Reluctance torque occurs due to magnetic imbalance in the rotor.
**Inverter Control for Energy Saving**

### Energy Saving with Speed Control
- The consumed power of a variable-torque load, such as fans, pumps, and blowers, is proportional to the cube of its rotation speed. This means that controlling the rotation speed to adjust the air volume can lead to energy saving.

### Energy Saving with Optimum Excitation Control (General-Purpose Motors)
- The optimum excitation control achieves the highest motor efficiency. Further energy saving can be achieved for applications such as fans and pumps with variable load torque.

#### To Save More Energy – the IPM Motor Control (MM-EFS Series) is Now Available

**High efficiency achieved with IPM motors**
- The IPM motors that have permanent magnets embedded in their rotors are even more efficient than the high-performance energy-saving motors.

**IE4-equivalent efficiency level**
- The premium high-efficiency IPM motor "MM-EFS series" provides efficiency that is equivalent to IE4 (super premium efficiency), the highest efficiency class*2.

*2: As of October 2012

- The consumed power of a variable-torque load, such as fans, pumps, and blowers, is proportional to the cube of its rotation speed. This means that controlling the rotation speed to adjust the air volume can lead to energy saving.

#### Check the Energy Saving Effect at a Glance

- Energy saving monitor is available. The energy saving effect can be checked using an operation panel, output terminal (terminal FM), or network.

**List of monitored items for energy saving**
- Power saving monitor (kW)
- Power saving rate average value (%)
- Power saving rate (%)
- Power saving amount (kWh)
- Power saving amount (kW)
- Power saving average value (kW)

- The output power amount measured by the inverter can be output in pulses. The cumulative power amount can be easily checked.*4

*4: This function cannot be used as a meter to certify billings.
Wire and Space Saving

A Lineup of Filterpack Models Available

- The power factor improving DC reactor, common mode choke (line noise filter), and capacitive filter (radio noise filter) are all essential for air conditioning applications, and all of these are included in a Filterpack. The Filterpack inverter models (FR-F7PJ-□F) are also available. The option wiring, which was necessary in the past, is no longer required.

- A Filterpack allows flexible installation and various layouts in the enclosure. Smaller space is required for installation.

- Less wiring and smaller space also enable compliance with the Harmonic Suppression Guidelines, the Architectural Standard Specifications (Electrical Installation), and the Architectural Standard Specifications (Machinery Installation) (2013 revisions) in Japan.

Space Saving by Side-by-Side Installation

- Side-by-side installation is possible*2 and requires less space. A DIN rail installation attachment (FR-UDA□□) option can be installed.

- Keep the surrounding air temperature of the inverter at 40°C maximum.

- Side-by-side installation is not available for Filterpacks.

Easy Operation and Maintenance

Quick Setting Using the Setting Dial

- The adaptable scroll speed setting dial allows for quick jumps or precise increments based on turning speed.

- The non-slip treatment was applied to the setting dial for easier turning.

Automatic Parameter Setting for Specific Applications

- Simple parameter setting (Pr.79 Operation mode selection)

- Communication setting for Mitsubishi HMI (GOT)

- Rated frequency change (60Hz→50Hz)

Spring Clamp Terminals (Control Circuit Terminals)

- Spring clamp terminals*1 are adopted as control circuit terminals. Spring clamp terminals are highly reliable and can be easily wired.

- The control circuit terminals are screw terminals.

- Offers a selection of small frames

- Offers a line-up of safety contactors

- Supports small loads (auxiliary contact)

- Supports many international regulations as standard

Longer Life Parts

- The service life of the cooling fans is now 10 years*2. The service life can be further extended by ON/OFF control of the cooling fan.

- Capacitors with a design life of 10 years*2*3 are adapted. (Surrounding air temperature of 105°C for 5000 hours). With these capacitors, the service life of the inverter is further extended.

- The degree of deterioration of the main circuit capacitor, control circuit capacitor, and inrush current limit circuit can be diagnosed on the monitor.

- Using the self-diagnosis function, the part life warning*4 can be output. With these warnings, the self-diagnosis function prevents troubles from occurring.

- The Mitsubishi inverter protocol and Modbus-RTU are selectable.

- The speed of RS-485 communication has been improved. (Communication at 38.4kbps is available.)
Optimum for Fan and Pump Applications

Enhanced PID Control

- To save energy in low-speed operation: PID output shutoff (sleep) function
- To shorten the start-up time of PID control: PID automatic switchover function
- For air conditioning applications: Forward/reverse rotation switching by external signals
- To use various types of detectors: PID set point and measured value outputs in voltage (0 to 5V / 0 to 10V) and current (4 to 20mA)

(Example: Water-cooling pump for a showcase)

Regeneration Avoidance Function

- The operation frequency is automatically increased to prevent the regenerative overvoltage fault from occurring. This function is useful when a load is forcibly rotated by another fan in the duct.

Automatic Restart After Instantaneous Power Failure / Flying Start Function

- After an instantaneous power failure, the operation is re-startable from the coasting motor speed. Even if the rotation direction has been forcibly reversed, the operation can be smoothly restarted in the original direction.

The fan is rotated by the external force.

We need smooth start-up of the motor.
Use the flying start function.

The motor can be started smoothly even after the motor was rotated by the external force (coasting). This function can be set enabled by changing Pr.57 setting.

We need continuous operations without being interrupted by the overvoltage protective function E.OV.
Use the regeneration avoidance function.

When the external force accelerates rotation of the running motor (regeneration), the motor may trip due to the overvoltage. The regeneration avoidance function is available to increase the frequency and avoid the regenerative condition. This function can be set enabled by changing Pr.822 setting.

Parameters to adjust the acceleration time at a restart (Pr.511), to detect the fan rotation direction (Pr.299), etc. are also available.

Parameters to start the regeneration avoidance operation (Pr.883) and to adjust the response level (Pr.886) are also available.
**Drive Product**

**Inverter FREQROL-F700PJ Series**

**Lineup/Functions**

- Connectivity
- Examples
- Features/Outline
- Specifications/Outline Drawing

**FREQROL-A800 Series**

**FREQROL-F800 Series**

**FREQROL-E700 Series**

**FREQROL-F700PJ Series**

**FREQROL-D700 Series**

---

**Application Example**

Great energy saving effect obtained in medium airow

(When the electricity cost is 14 yen/kWh, and the CO2 emission is [1,000 kWh 0.555 ton - CO2 emission])

**Water-cooling pump for a showcase**

- **Units to drive**
  - Water-cooling pump
    - 3.7 kW × 1 unit
  - Fans for the cooling tower
    - 1.5 kW × 1 unit
    - 11 kW × 3 unit
    - 5.5 kW × 2 unit
    - 3.7 kW × 1 unit
    - 3.0 kW × 1 unit

**Air conditioning in a Mitsubishi plant**

- **Units to drive**
  - Ventilator
    - 0.75 kW × 3 unit
    - 2.2 kW × 3 unit
    - Air conditioner
      - 15 kW × 1 unit
      - 18.5 kW × 1 unit
      - 30 kW × 2 unit

**Air conditioning in a building**

- **Units to drive**
  - Fans for air conditioning
    - 5.5 kW × 10 unit
    - 7.5 kW × 10 unit
    - 3.7 kW × 100 unit

**Condition**

- Commercial power supply (valve) + Inverter
- General-purpose motor (SF-JR)

**Operation patterns**

- With commercial power supply
  - Approx. 0.15 million kWh
  - Approx. 2.17 million yen
- With inverter
  - Approx. 0.14 million kWh
  - Approx. 1.9 million yen

**Annual energy saving effect**

- Approx. 0.27 million yen
- 10.7 tons

**Annual CO2 emission reduction**

- Approx. 0.019 million kWh
- 10.7 tons

---

**Your best assistant — Mitsubishi inverter software**

**IPM energy savings simulation file**

The IPM energy savings simulation file calculates the energy saving effect and CO2 reduction rate achieved by replacing commercial power supply (damper/valve control) operation with IPM motor operation by inverter. This file requires inputs of motor capacity, quantity, air volume, operating time, etc.

**FR Configurator (FR-SW3-SETUP-WE) (Option)**

Support tool for the inverter operations from start-up to maintenance.
### Lineup

#### Inverter

<table>
<thead>
<tr>
<th>Power supply specification</th>
<th>Inverter model</th>
<th>Symbol</th>
<th>Inverter capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three-phase 200 V</td>
<td>FR-F720PJ-CKF</td>
<td>0.4</td>
<td>0.4K to 15K</td>
</tr>
<tr>
<td></td>
<td>FR-F720PJ-CKF</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Three-phase 400 V</td>
<td>FR-F720PJ-CKF</td>
<td>0.4</td>
<td>0.4K to 15K</td>
</tr>
<tr>
<td></td>
<td>FR-F720PJ-CKF</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FR-F740PJ-CKF</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

#### Symbol Filterpack

- None
- No
- F
- Yes

#### Specifications/

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Voltage class</th>
<th>Inverter capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200 V class</td>
<td>Represents the capacity (kW).</td>
</tr>
<tr>
<td>4</td>
<td>400 V class</td>
<td></td>
</tr>
</tbody>
</table>

#### Precautions

- Never drive an IPM motor in the IM drive setting.
- Use the same IPM motor capacity as the inverter capacity.
- For IPM motor, use an MM-EFS or MM-EF series motor.
- Please contact us regarding a combination with other manufacturer's IPM motor.

#### Premium high-efficiency IPM motor

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Output</th>
<th>Symbol</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0.75kW</td>
<td>55</td>
<td>5.5kW</td>
</tr>
<tr>
<td>15</td>
<td>1.5kW</td>
<td>75</td>
<td>7.5kW</td>
</tr>
<tr>
<td>22</td>
<td>2.2kW</td>
<td>11K</td>
<td>11kW</td>
</tr>
<tr>
<td>37</td>
<td>3.7kW</td>
<td>15K</td>
<td>15kW</td>
</tr>
</tbody>
</table>

#### Symbol Specification

- Q: Class B
- P1: Outdoor-type

#### Symbol Specification

- Also applicable to an application with the rated speed of 1800r/min.
- The outdoor-type and class B are semi-standard models.
- For IPM motor, use an MM-EFS or MM-EF series motor.
- Please contact your sales representative for a special specification such as the long-axis type, flange shape, and salt-proof type.

#### Precautions

- MM-EFS series IPM motors cannot be driven with commercial power supply.
- The total wiring length for an IPM motor should be 100 m or less.
- Only one IPM motor can be connected to an inverter.
Installation Example

AC power supply
Use within the permissible power supply specifications of the inverter. To ensure safety, use a moulded case circuit breaker, earth leakage circuit breaker or magnetic contactor to switch power ON/OFF.

Molded case circuit breaker (MCCB), earth leakage circuit breaker (ELB), or fuse
The breaker must be selected carefully since an inrush current flows in the inverter at power on.

Magnetic contactor (MC)
Install the magnetic contactor to ensure safety. Do not use this magnetic contactor to start and stop the inverter. Doing so will cause the inverter life to be shortened.

Drive Product

Inverter FREQROL-F700PJ Series

(Refer to chapter 1 of the Instruction Manual (Applied))

In this case, install the FR-BIF optional EMC filter (capacitor) (for use in the input side only) or FR-BSF01 or FR-BLF noise filter (ferrite core) to minimize interference.

Do not install a power factor correction capacitor, surge suppressor or noise filter (capacitor) on the output side of the inverter. When installing a molded case circuit breaker on the output side of the inverter, contact each manufacturer for selection of the molded case circuit breaker.

Earth (Ground)
To prevent an electric shock, always earth (ground) the motor and inverter. For reduction of induction noise from the power line of the inverter, it is recommended to wire the earth (ground) cable by returning it to the earth (ground) terminal of the inverter.

*: Install these options as required.

[NOTE]
- The life of the inverter is influenced by surrounding air temperature. Use the product within the permissible surrounding air temperature. This must be noted especially when the inverter is installed in an enclosure.
- Wrong wiring might lead to damage of the inverter. The control signal lines must be kept fully away from the main circuit to protect them from noise.
- Do not install a power factor correction capacitor, surge suppressor or noise filter (capacitor) on the output side of the inverter. This will cause the inverter to trip or the capacitor and surge suppressor to be damaged.
- Installation Example

Electromagnetic wave interference
The input/output (main circuit) of the inverter includes high frequency components, which may interfere with the communication devices (such as AM radios) used near the inverter.

In this case, install the FR-BIF optional EMC filter (capacitor) (for use in the input side only) or FR-BSF01 or FR-BLF noise filter (ferrite core) to minimize interference.

- Refer to the Instruction Manual of each option and peripheral devices for details of peripheral devices.
- An IPM motor cannot be driven by the commercial power supply.
- An IPM motor is a motor with permanent magnets embedded inside. High voltage is generated at the motor terminals while the motor is running.
- Before closing the contactor at the output side, make sure that the inverter power is ON and the motor is stopped.

RS-232C - RS-485 converter is required when connecting to PC with RS-232C interface.
### Standard Specifications

#### Inverter

<table>
<thead>
<tr>
<th>Model FR-F720PJ-CJK</th>
<th>0.4</th>
<th>0.75</th>
<th>1.5</th>
<th>2.2</th>
<th>3.7</th>
<th>5.5</th>
<th>7.5</th>
<th>11</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable general-purpose motor capacity (kW)**</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Rated capacity (kVA)**</td>
<td>1.0</td>
<td>1.6</td>
<td>2.7</td>
<td>3.8</td>
<td>6.3</td>
<td>9.1</td>
<td>12.1</td>
<td>17.1</td>
<td>22.1</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>2.5</td>
<td>4.2</td>
<td>7.0</td>
<td>10.0</td>
<td>16.5</td>
<td>23.8</td>
<td>31.8</td>
<td>45</td>
<td>58</td>
</tr>
<tr>
<td>Overload current rating**</td>
<td>120% 60s, 150% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage**</td>
<td>Three-phase 200 to 240V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 200 to 240V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>170 to 264V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)</td>
<td>Without Filterpack</td>
<td>1.2</td>
<td>2.1</td>
<td>4.0</td>
<td>5.0</td>
<td>8.8</td>
<td>12.0</td>
<td>17.0</td>
<td>20.0</td>
</tr>
<tr>
<td>With Filterpack</td>
<td>0.8</td>
<td>1.2</td>
<td>2.6</td>
<td>3.4</td>
<td>5.5</td>
<td>8.4</td>
<td>11.0</td>
<td>16.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Protective structure (JEM 1030)</td>
<td>Enclosed type (IP20)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>0.8</td>
<td>1.0</td>
<td>1.4</td>
<td>1.4</td>
<td>1.8</td>
<td>3.6</td>
<td>3.6</td>
<td>6.5</td>
<td>6.5</td>
</tr>
</tbody>
</table>

#### Filterpack

<table>
<thead>
<tr>
<th>Model FR-BFP2-CJK</th>
<th>0.4</th>
<th>0.75</th>
<th>1.5</th>
<th>2.2</th>
<th>3.7</th>
<th>5.5</th>
<th>7.5</th>
<th>11</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable general-purpose motor capacity (kW)**</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Rated capacity (kVA)**</td>
<td>0.9</td>
<td>1.7</td>
<td>2.8</td>
<td>3.8</td>
<td>6.2</td>
<td>9.1</td>
<td>12.4</td>
<td>17.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>1.2</td>
<td>2.2</td>
<td>3.7</td>
<td>5.0</td>
<td>8.1</td>
<td>12.0</td>
<td>16.3</td>
<td>23.0</td>
<td>29.5</td>
</tr>
<tr>
<td>Overload current rating**</td>
<td>120%60s, 150% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage**</td>
<td>Three-phase 380 to 480V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 380 to 480V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>325 to 528V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)**</td>
<td>Without Filterpack</td>
<td>1.1</td>
<td>2.2</td>
<td>4.2</td>
<td>4.8</td>
<td>8.6</td>
<td>12.0</td>
<td>17.0</td>
<td>20.0</td>
</tr>
<tr>
<td>With Filterpack</td>
<td>0.7</td>
<td>1.3</td>
<td>2.7</td>
<td>3.3</td>
<td>5.4</td>
<td>8.5</td>
<td>11.0</td>
<td>16.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Protective structure (JEM 1030)</td>
<td>Enclosed type (IP20)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>1.3</td>
<td>1.3</td>
<td>1.4</td>
<td>1.5</td>
<td>1.5</td>
<td>3.3</td>
<td>3.3</td>
<td>6.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

#### Filterpack-H

<table>
<thead>
<tr>
<th>Model FR-BFP2-H-CJK</th>
<th>0.4</th>
<th>0.75</th>
<th>1.5</th>
<th>2.2</th>
<th>3.7</th>
<th>5.5</th>
<th>7.5</th>
<th>11</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable general-purpose motor capacity (kW)**</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td>3.7</td>
<td>5.5</td>
<td>7.5</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Rated capacity (kVA)**</td>
<td>0.9</td>
<td>1.7</td>
<td>2.8</td>
<td>3.8</td>
<td>6.2</td>
<td>9.1</td>
<td>12.4</td>
<td>17.5</td>
<td>22.5</td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>1.2</td>
<td>2.2</td>
<td>3.7</td>
<td>5.0</td>
<td>8.1</td>
<td>12.0</td>
<td>16.3</td>
<td>23.0</td>
<td>29.5</td>
</tr>
<tr>
<td>Overload current rating**</td>
<td>120%60s, 150% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage**</td>
<td>Three-phase 380 to 480V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 380 to 480V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>325 to 528V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)**</td>
<td>Without Filterpack</td>
<td>1.1</td>
<td>2.2</td>
<td>4.2</td>
<td>4.8</td>
<td>8.6</td>
<td>12.0</td>
<td>17.0</td>
<td>20.0</td>
</tr>
<tr>
<td>With Filterpack</td>
<td>0.7</td>
<td>1.3</td>
<td>2.7</td>
<td>3.3</td>
<td>5.4</td>
<td>8.5</td>
<td>11.0</td>
<td>16.0</td>
<td>19.0</td>
</tr>
<tr>
<td>Protective structure (JEM 1030)</td>
<td>Enclosed type (IP20)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooling system</td>
<td>Self-cooling</td>
<td>Forced air cooling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>1.6</td>
<td>1.7</td>
<td>1.9</td>
<td>2.3</td>
<td>2.6</td>
<td>4.5</td>
<td>5.0</td>
<td>7.0</td>
<td>8.2</td>
</tr>
</tbody>
</table>

#### Notes:

* The applicable motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor. To use a dedicated IPM motor.

** The rated capacity assumes the following output voltages: 220V for the three-phase 200V and 440V for the three-phase 400V class.

*** The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

**** The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about \( \sqrt{2} \) that of the power supply.

***** The power supply side capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).

****** Open type (IP20) for Filterpack.

******* The values in parentheses are calculated with 1 fundamental frequency power factor according to the Year 2013 Standard specification for public constructions (electric installation works), published by the Ministry of Land, Infrastructure, Transport and Tourism in Japan.

******** The indicated leakage current is equivalent to one-phase of the three-phase three wire line connection cable.
### Control Specifications

<table>
<thead>
<tr>
<th>Control method</th>
<th>High carrier frequency PWM control (V/F control)/Optimum excitation control/General-purpose magnetic flux vector control/IPM motor control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output frequency range</td>
<td>0.2 to 400Hz</td>
</tr>
<tr>
<td>Frequency setting resolution</td>
<td></td>
</tr>
<tr>
<td>Analog input</td>
<td>0.06Hz/60Hz (terminals 2 and 4: 0 to 10V/10-bit)</td>
</tr>
<tr>
<td>Digital input</td>
<td>0.01Hz</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
</tr>
<tr>
<td>Analog input</td>
<td>Within ±1% of the max. output frequency (25°C ± 10°C)</td>
</tr>
<tr>
<td>Digital input</td>
<td>Within 0.01% of the set output frequency</td>
</tr>
<tr>
<td>Speed control range</td>
<td>V/F control 1:10, General-purpose magnetic flux vector control (during power driving) 1:60, IPM motor control 1:10</td>
</tr>
<tr>
<td>Voltage/frequency characteristics</td>
<td></td>
</tr>
<tr>
<td>Base frequency</td>
<td>Can be set from 0 to 400Hz. Constant-torque-variable-torque pattern can be selected.</td>
</tr>
<tr>
<td>Starting torque</td>
<td>General-purpose motor control (General-purpose magnetic flux vector control or slip compensation): 120% (at 1Hz)</td>
</tr>
<tr>
<td>Torque boost</td>
<td>IPM motor control: 50%</td>
</tr>
<tr>
<td>Acceleration/deceleration time setting</td>
<td>0.1 to 3600s (acceleration and deceleration can be set individually), linear and S-pattern acceleration/deceleration modes are available.</td>
</tr>
<tr>
<td>Regenerative braking torque</td>
<td>General-purpose motor control: 15%</td>
</tr>
<tr>
<td>IPM motor control</td>
<td>IPM motor control: 5% (10% for 1.5kW or less)</td>
</tr>
<tr>
<td>DC injection brake</td>
<td>General-purpose motor control: Operation frequency (0 to 120Hz), operation time (0 to 10s), operation voltage (0 to 30%) can be changed.</td>
</tr>
<tr>
<td>Stall prevention operation level</td>
<td>Operation current level can be set (0 to 150% variable). Whether to use the function or not can be set.</td>
</tr>
<tr>
<td>Frequency setting signal</td>
<td></td>
</tr>
<tr>
<td>Analog input</td>
<td>Two terminals</td>
</tr>
<tr>
<td>Terminal 2: 0 to 10V and 0 to 5V are available</td>
<td></td>
</tr>
<tr>
<td>Digital input</td>
<td>Terminal 4: 0 to 10V, 0 to 5V, and 4 to 20mA are available</td>
</tr>
<tr>
<td>Start signal</td>
<td></td>
</tr>
<tr>
<td>Forward and reverse rotation or start automatic self-holding input (3-wire input) can be selected.</td>
<td></td>
</tr>
<tr>
<td>Input signal (five terminals)</td>
<td></td>
</tr>
<tr>
<td>Relay output (one terminal)</td>
<td></td>
</tr>
<tr>
<td>Open collector output (one terminal)</td>
<td></td>
</tr>
<tr>
<td>For meter</td>
<td></td>
</tr>
<tr>
<td>Pulse train output</td>
<td></td>
</tr>
<tr>
<td>(MAX 2.4kHz: one terminal)</td>
<td></td>
</tr>
<tr>
<td>Operational functions</td>
<td>Maximum/morning frequency setting, frequency jump operation, internal thermal relay input selection, automatic restart after instantaneous power failure operation, forward/reverse rotation prevention, remote setting, second function, multi-speed operation, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, PID control, computer link operation (RS-485), Optimum excitation control, power failure stop, speed smoothing control, MODBUS RTU</td>
</tr>
<tr>
<td>Output signal</td>
<td></td>
</tr>
<tr>
<td>Operation status</td>
<td></td>
</tr>
<tr>
<td>Operating status</td>
<td></td>
</tr>
<tr>
<td>Signal level</td>
<td></td>
</tr>
<tr>
<td>Operating status</td>
<td></td>
</tr>
<tr>
<td>For meter</td>
<td></td>
</tr>
<tr>
<td>Pulse train output</td>
<td></td>
</tr>
<tr>
<td>(MAX 2.4kHz: one terminal)</td>
<td></td>
</tr>
<tr>
<td>Operation panel lock</td>
<td></td>
</tr>
<tr>
<td>Function (help) for operation guide</td>
<td></td>
</tr>
<tr>
<td>Protective/warning function</td>
<td>Overcurrent during acceleration, overcurrent during constant speed, overcurrent during deceleration, overvoltage during acceleration, overvoltage during constant speed, overvoltage during deceleration, inverter protection thermal operation, motor protection thermal operation, heatsink overheat, undervoltage, input phase loss, output phase (ground) fault, output overcurrent at start, output short circuit, output phase loss, external thermal relay operation, PTC thermistor operation, parameter error, PU disconnection, retry count excess, CPU fault, brake transistor alarm, inrush resistance overheat, analog input error, overspeed occurrence, PID signal fault, stall prevention operation, output current detection value exceeded, loss of synchronism detection, thermal relay function prealarm, output stop, parameter write error, regenerative brake prealarm, electronic thermal relay function prealarm, maintenance output, undervoltage, operation panel lock, password locked, inverter reset</td>
</tr>
<tr>
<td>Warning function</td>
<td>Fan alarm, overcurrent stall prevention, overvoltage stall prevention, parameter write error, regenerative brake prealarm, electronic thermal relay function prealarm, maintenance output, undervoltage, operation panel lock, password locked, inverter reset</td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>Surrounding air temperature</td>
<td>-10°C to +50°C (non-freezing)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>90% RH or less (non-condensing)</td>
</tr>
<tr>
<td>Altitude</td>
<td>Maximum 1000m above sea level, 5.9m/s or less at 10 to 55Hz (directions of X, Y, Z axes)</td>
</tr>
<tr>
<td>Atmosphere</td>
<td>Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)</td>
</tr>
</tbody>
</table>

1. The regenerative braking torque indicates the average short-time torque (which varies by the motor loss) that is generated when a motor decelerates in the shortest time by itself from the rated speed. It is not the continuous regenerative torque. When a motor decelerates from a speed higher than the rated speed, the average deceleration torque decreases. When the regenerative power is large, use an option brake unit.
2. As the 0.75K or lower are not provided with the cooling fan, this alarm does not function.
3. This function is available only when an IPM motor is connected.
4. This operation guide is only available with option parameter unit (FR-PU07).
5. This protective function is not available in the initial status.
6. When using the inverters at the surrounding air temperature of 40°C or less, the inverters can be installed closely attached (form clearances).
7. Temperature applicable for a short time, i.e. in transit.
8. When installing Filterpack of 11K or 15K on the rear side of an inverter, do not install to a moving object or place where vibrates (exceeding 1.96m/s²).
Standard Model (Without a Filterpack)

Outline Dimension Drawings

- FR-F720PJ-0.4K, 0.75K
- FR-F740PJ-0.4K to 3.7K
- FR-F740PJ-0.4K to 3.7K

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>D (mm)</th>
<th>D1 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F720PJ-0.4K</td>
<td>112.5</td>
<td>42</td>
</tr>
<tr>
<td>FR-F720PJ-0.75K</td>
<td>132.5</td>
<td>62</td>
</tr>
</tbody>
</table>

- FR-F720PJ-1.5K to 3.7K
- FR-F720PJ-5.5K, 7.5K
- FR-F740PJ-5.5K, 7.5K

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W (mm)</th>
<th>W1 (mm)</th>
<th>D (mm)</th>
<th>D1 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F720PJ-1.5K</td>
<td>135.5</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-F720PJ-2.2K</td>
<td>108</td>
<td>96</td>
<td>129.5</td>
<td>54</td>
</tr>
<tr>
<td>FR-F720PJ-3.7K</td>
<td>155.5</td>
<td>60</td>
<td>165.5</td>
<td>66.5</td>
</tr>
<tr>
<td>FR-F720PJ-3.7K</td>
<td>170</td>
<td>158</td>
<td>142.5</td>
<td>66.5</td>
</tr>
</tbody>
</table>

- FR-F740PJ-0.4K and 0.75K are not provided with the cooling fan.

- FR-F740PJ-11K, 15K
- FR-F740PJ-11K, 15K

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W (mm)</th>
<th>W1 (mm)</th>
<th>D (mm)</th>
<th>D1 (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F720PJ-11K</td>
<td>195</td>
<td>220</td>
<td>190</td>
<td>10.5</td>
</tr>
<tr>
<td>FR-F720PJ-15K</td>
<td>244</td>
<td>260</td>
<td>190</td>
<td>84.5</td>
</tr>
</tbody>
</table>

* FR-F740PJ-0.4K and 0.75K are not provided with the cooling fan.
Standard Model (With a Filterpack) A Filterpack can be installed on the side or rear panel of the inverter. This is a sample outline dimension drawing. The shape differs by the model.

Outline Dimension Drawings

Filterpack installed on the rear panel

Filterpack installed on the side panel

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W</th>
<th>H</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F720PJ-0.4KF</td>
<td>68</td>
<td>218</td>
<td>172.5</td>
</tr>
<tr>
<td>FR-F720PJ-0.75KF</td>
<td>68</td>
<td>218</td>
<td>192.5</td>
</tr>
<tr>
<td>FR-F720PJ-1.5KF, 2.2KF</td>
<td>108</td>
<td>188</td>
<td>215.5</td>
</tr>
<tr>
<td>FR-F720PJ-3.7KF</td>
<td>170</td>
<td>188</td>
<td>207.5</td>
</tr>
<tr>
<td>FR-F720PJ-5.5KF, 7.5KF</td>
<td>220</td>
<td>210</td>
<td>230</td>
</tr>
<tr>
<td>FR-F720PJ-11KF, 15KF</td>
<td>220</td>
<td>320</td>
<td>275</td>
</tr>
<tr>
<td>FR-F740PJ-0.4KF, 0.75KF</td>
<td>108</td>
<td>188</td>
<td>184.5</td>
</tr>
<tr>
<td>FR-F740PJ-1.5KF</td>
<td>108</td>
<td>188</td>
<td>215.5</td>
</tr>
<tr>
<td>FR-F740PJ-2.2KF</td>
<td>108</td>
<td>188</td>
<td>235.5</td>
</tr>
<tr>
<td>FR-F740PJ-3.7KF</td>
<td>108</td>
<td>188</td>
<td>245.5</td>
</tr>
<tr>
<td>FR-F740PJ-5.5KF, 7.5KF</td>
<td>220</td>
<td>210</td>
<td>230</td>
</tr>
<tr>
<td>FR-F740PJ-11KF, 15KF</td>
<td>220</td>
<td>320</td>
<td>275</td>
</tr>
</tbody>
</table>

*(Unit: mm)*

Filterpack installed on the side panel

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W</th>
<th>H</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-F720PJ-0.4KF</td>
<td>138</td>
<td>218</td>
<td>112.5</td>
</tr>
<tr>
<td>FR-F720PJ-0.75KF</td>
<td>138</td>
<td>218</td>
<td>132.5</td>
</tr>
<tr>
<td>FR-F720PJ-1.5KF, 2.2KF</td>
<td>198</td>
<td>188</td>
<td>135.5</td>
</tr>
<tr>
<td>FR-F720PJ-3.7KF</td>
<td>245</td>
<td>188</td>
<td>170</td>
</tr>
<tr>
<td>FR-F720PJ-5.5KF, 7.5KF</td>
<td>305</td>
<td>210</td>
<td>195</td>
</tr>
<tr>
<td>FR-F720PJ-11KF, 15KF</td>
<td>315</td>
<td>320</td>
<td>195</td>
</tr>
<tr>
<td>FR-F740PJ-0.4KF, 0.75KF</td>
<td>173</td>
<td>188</td>
<td>129.5</td>
</tr>
<tr>
<td>FR-F740PJ-1.5KF</td>
<td>198</td>
<td>188</td>
<td>135.5</td>
</tr>
<tr>
<td>FR-F740PJ-2.2KF</td>
<td>198</td>
<td>188</td>
<td>155.5</td>
</tr>
<tr>
<td>FR-F740PJ-3.7KF</td>
<td>198</td>
<td>188</td>
<td>165.5</td>
</tr>
<tr>
<td>FR-F740PJ-5.5KF, 7.5KF</td>
<td>305</td>
<td>210</td>
<td>195</td>
</tr>
<tr>
<td>FR-F740PJ-11KF, 15KF</td>
<td>315</td>
<td>320</td>
<td>195</td>
</tr>
</tbody>
</table>

*(Unit: mm)*

*The clearance between the inverter and the filter is 10mm.*
Terminal Connection Diagram

Control input signals (No voltage input allowed)

- The function of these terminals can be changed to the reset signal, etc., with the input terminal assignment (Pr. 178 to Pr. 182).

Control circuit terminal
- Brake unit (Option)  
  *7 Brake resistor (FR-ABR, MRS type, MYS type)  
  Install a thermal relay to prevent an overheating and burnout of the brake resistor. Always install a thermal relay when using a brake resistor whose capacity is 11K or higher.

Main circuit
- Terminal functions vary by Pr. 192 A,B,C terminal function selection
- Terminal functions vary by Pr. 190 RUN terminal function selection

Frequency setting signals (Analog)
- Terminal input specifications can be changed by analog input specifications switcher (Pr. 73). Terminal 10 and terminal 2 are used as PCT input terminal (Pr. 56).

- It is recommended to use 2W1kΩ when the frequency setting signal is changed frequently.

- Terminal input specifications can be changed by analog input specifications switcher (Pr. 267). Set the voltage/current input switch in the "I" position to select voltage input (0 to 5V/0 to 10V) and "V" (initial value) to select current input (4 to 20mA). To use terminal 4 (initial setting is current input), set "I" in any of Pr.178 to Pr.182 (input terminal function selection) to assign the function, and turn ON AU signal.

Additional Notes:
- To prevent a malfunction caused by noise, separate the signal cables more than 10cm from the power cables. Also separate the main circuit wire of the input side and the output side.
- When connecting a DC reactor, remove the jumper across P1 and P+.  
  *2 DC reactor (FR-HRL).  
  Always install a thermal relay when using a brake resistor whose capacity is 11K or higher.
- After wiring, leave offcuts more than 10cm.
- Wire offcuts can cause an alarm, failure or malfunction. Always keep the inverter clean. When driling mounting holes in an enclosure etc., take care not to allow chips and other foreign matter to enter the inverter.
- The terminals S1, S2, SC, and SO are for manufacturer setting. Do not remove the shortening wires across the terminals S1 and SC and the terminals S2 and SC.

Drive Product
## Terminal Specification Explanation

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Terminal Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverter</td>
<td>R/L1, S/L2, T/L3</td>
<td>AC power input</td>
<td>Connect to the commercial power supply. Do not connect anything to these terminals when using the high power factor converter (FR-HC2) or power regeneration common converter (FR-CV). To use Filterpack, connect the R, S, and T cables of Filterpack.</td>
</tr>
<tr>
<td></td>
<td>U, V, W</td>
<td>Inverter output</td>
<td>Connect a three-phase squirrel-cage motor or a dedicated IPM motor.</td>
</tr>
<tr>
<td></td>
<td>P/+P, N/-</td>
<td>Brake resistor connection</td>
<td>Connect a brake resistor (FR-ABR, MRS type, MYS type) across terminals P/+ and P.</td>
</tr>
<tr>
<td></td>
<td>P/+P, N/-</td>
<td>Brake unit connection</td>
<td>Connect the brake unit (FR-BU2), power regeneration common converter (FR-CV) or high power factor converter (FR-HC2).</td>
</tr>
<tr>
<td></td>
<td>P/+P, P1</td>
<td>DC reactor (Filterpack) connection</td>
<td>Remove the jumper across terminals P/+ and P1 and connect a DC reactor. To use Filterpack, remove the jumper across the terminals P/+ and P1, then connect the P and P1 cables of Filterpack.</td>
</tr>
<tr>
<td></td>
<td>R0, S0, T0</td>
<td>Commercial power supply input</td>
<td>Connect to the commercial power supply.</td>
</tr>
<tr>
<td>Filterpack</td>
<td>R, S, T</td>
<td>Earth (Ground)</td>
<td>For earthing (grounding) the inverter chassis. Must be earthed (grounded).</td>
</tr>
<tr>
<td></td>
<td>P, P1</td>
<td>DC reactor terminal</td>
<td>Remove the jumper across terminals P/+ and P1, and connect to the terminals P/+ and P1 of the inverter.</td>
</tr>
<tr>
<td></td>
<td>GND</td>
<td>Inverter earth (ground) connection</td>
<td>Connect to the earth (ground) terminal of the inverter.</td>
</tr>
<tr>
<td></td>
<td>AU</td>
<td>Terminal 4 input selection</td>
<td>The terminal 4 function is available only when the AU signal is ON. (The operation with the frequency setting signal of 4 to 20mA DC is available) Turning ON the AU signal disables the terminal 2 (voltage input) function.</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>Contact input common (sink) (initial setting)</td>
<td>Common terminal for contact input terminal (sink logic) and terminal FM.</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>External transistor common (source)</td>
<td>Connect this terminal to the power supply common terminal of a transistor output (open collector output) device, such as a programmable controller, in the source logic to avoid malfunction by undesirable current.</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>24VDC power supply common</td>
<td>Common output terminal for 24VDC 0.1A power supply (PC terminal), isolated from terminals 5 and SE.</td>
</tr>
<tr>
<td></td>
<td>PC</td>
<td>Contact input common (source)</td>
<td>Common terminal for contact input terminal (source logic).</td>
</tr>
<tr>
<td></td>
<td>PC</td>
<td>24VDC power supply</td>
<td>Can be used as 24VDC 0.1A power supply.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Frequency setting power supply</td>
<td>Used as power supply when connecting potentiometer for frequency setting (speed setting) from outside of the inverter. SVDC permissible load current 10mA</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Frequency setting (voltage)</td>
<td>Inputting 0 to 5VDC (or 0 to 10V) provides the maximum output frequency at 5V (10V) and makes input and output proportional. Use Pr. 73 to switch between input 0 to 5VDC initial (setting) and 0 to 10VDC. Input resistance 10kΩ ± 10% Permissible maximum voltage 20VDC</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Frequency setting (current)</td>
<td>Inputting 4 to 20mADC (or 0 to 5V, 0 to 10V) provides the maximum output frequency at 20mA and makes input and output proportional. The input signal to terminal 4 is valid only when the AU signal is ON (terminal 2 input is invalid). Use Pr. 267 to switch from input 4 to 20mA (initial setting), 0 to 5VDC and 0 to 10VDC. Set the voltage/current input switch in the “V” position to select voltage input (0 to 5V/0 to 10V). Current input: Input resistance 24Ω ± 5% Maximum permissible current 30mA Voltage input: Input resistance 10Ω ± 10% Permissible maximum voltage 20VDC</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Frequency setting common</td>
<td>Frequency setting signal (terminal 2 or 4) common terminal. Do not earth (ground).</td>
</tr>
<tr>
<td>Thermistor</td>
<td>10</td>
<td>PTC thermistor input</td>
<td>For connecting PTC thermistor output. When PTC thermistor protection is valid (Pr. 561 • &quot;9999&quot;) terminal 2 is not available for frequency setting. Adaptive PTC thermistor specification Heat detection resistance: 50Ω to 30Ω (Set by Pr. 561)</td>
</tr>
</tbody>
</table>
### Relay
- **A, B, C**: Relay output (fault output)
  - Fault: discontinuity across B-C (continuity across A-C).
  - Normal: continuity across B-C (discontinuity across A-C).
  - Contact capacity: 230VAC 0.3A (power factor = 0.4), 30VDC 0.3A.
- **Switched Low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5Hz).**
- **Switched High during stop or DC injection brake operation.**
  - (Low is when the open collector output transistor is ON (conducts). High is when the transistor is OFF (does not conduct).)
- **Permissible load**: 24VDC (maximum 27VDC) 0.1A (a voltage drop is 3.4V maximum when the signal is ON).

### Open collection
- **RUN**: Inverter running
  - **Switched Low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5Hz).**
  - **Switched High during stop or DC injection brake operation.**
  - **Permissible load**: 1mA, 1440 pulses/s at full scale.

### Communication
- **SE**: Open collector output common
  - **Common terminal of terminal RUN.**
- **FM**: For meter
  - **Selected one e.g. output frequency from monitored items.**
  - **Not output during inverter reset.**
  - **The output signal is proportional to the magnitude of the corresponding monitored item.**
  - **Permissible load current**: 1mA, 1440 pulses/s at full scale.
- **PU connector**: With the PU connector, communication can be established through RS-485.
  - **Conforming standard**: EIA-485 (RS-485)
  - **Transmission format**: Multidrop link
  - **Communication speed**: 4800 to 38400bps
  - **Overall length**: 500m

### [NOTE]
- To change the input specification for terminal 4, set Pr. 267 and the voltage/current input switch correctly, then input the analog signal relevant to the setting. Applying a voltage with voltage/current input switch in “I” position (current input is selected) or a current with switch in “V” position (voltage input is selected) could cause component damage of the inverter or analog circuit of output devices.
- Connecting the power supply to the inverter output terminals (U, V, W) will damage the inverter. Do not perform such wiring.
- Indicates that terminal functions can be selected using Pr. 178 to Pr. 182, Pr. 190 and Pr. 192 (I/O terminal function selection).
- The terminal names and functions shown here are the initial settings.
- The terminals S1, S2, SC, and SO are for manufacturer setting. Do not connect anything to these.
- Removing either shortening wire disables the inverter operation.
INVERTER FREQROL-D700 Series
Simple and compact; the Mitsubishi standard

Mitsubishi Inverter Sets a New Standard —— with More Reliability!!

Spring Clamp Terminal (Control Circuit Terminal)

- Easy wiring
  Wiring is completed only by inserting wires treated with blade terminal (max. diameter 1.5mm)
  Capable of wiring without a blade terminal.

- High reliability
  Spring structure in terminal contact section inside prevents contact fault by vibration.

- Maintenance is unnecessary
  Screw retightening is unnecessary.

Safety Stop Function

The FR-D700 series is compliant to the EU Machinery Directive without the addition of previously required external devices.
Operation of an external Emergency Stop device results in a highly reliable immediate shutoff of the D700’s output to the motor.
This safety stop function conforms to the following standards.

- EN ISO 13849-1 Category 3 / PLd
- EN62061 / IEC61508 SIL2

Password Function

Registering 4-digit password can limit parameter read/write.

- It is effective for parameter setting protection.
Equipped with High-Class Performance (as of April 2008)

150%/1Hz High Starting Torque by General-Purpose Magnetic Flux Vector Control

General-purpose magnetic flux vector control and auto tuning function are available. It ensures operation that requires high starting torque, such as transfer machine including conveyer, hoist, lift, etc., washing machine, and agitators.

- High torque of 150%/1Hz and 200%/3Hz (3.7K or less) is realized (when the slip compensation function is valid).
- Auto tuning
  Many kinds of motors can be optimally controlled with Mitsubishi original "non-rotation" auto tuning function. (R1 constants tuning)

Simple & Easy Operation

Quick Setup with the Setting Dial

Setting dial is the feature of Mitsubishi inverters.

- Displayed numbers can be jumped by turning the setting dial quickly, and numbers can be changed one by one by turning it slowly, enabling speedy parameter setting.
- The nonslip setting dial is easier to turn.

Easy Setting from a Personal Computer Using the FR Configurator (Option)

Connecting a personal computer and the inverter via RS-485 communication enables setting with wizard (interactive) function of the FR Configurator (inverter setup software).

In addition, a parameter setting can be converted from the FR-S500 series to the FR-D700 series by "Convert" function.

"Graph" function displays monitor data in waveform.

Optional enclosure surface operation panel (FR-PA07) can be connected. In addition, an operation panel for the FR-E500 series can be connected.

The operation panel of the inverter can not be removed.

A parameter unit connection cable (FR-CB20) is separately necessary.

An optional parameter unit (FR-PU07) can be connected as well.

A parameter unit connection cable (FR-CB20) is separately necessary.

- Setting such as direct input method with a numeric keypad, operation status indication, and help function are usable.
- Eight languages can be displayed.
- Parameter setting values of maximum of three inverters can be stored.
### Compact and Space Saving

#### Easily Replaceable Compact Body
Installation size is the same as that of the FR-S500 series which is the smallest model of the Mitsubishi inverter.

#### Side by Side Installation Saves Space
Space can be saved by side by side no clearance installation*.

* Use the inverter at the surrounding air temperature of 40°C or less.

---

### Long-Life and Easy Maintenance

#### Long-Life Design
- The design life of the cooling fan has been extended to 10 years*1. The life of the fan can be further extended utilizing the it’s ON/OFF control.
- The design life of the capacitors has been extended to 10 years by the adoption of a capacitor endures 5000 hours at 105°C surrounding air temperature*1, *2.

*1: Surrounding air temperature : annual average 40°C (free from corrosive gas, flammable gas, oil mist, dust and dirt) Since the design life is a calculated value, it is not a guaranteed value.

*2: Output current : 80% of the inverter rated current

- Degrees of deterioration of main circuit capacitor, control circuit capacitor, and inrush current limit circuit can be monitored.
- Trouble can be avoided with the self-diagnostic alarm*4 that is output when the life span is near.

*4: If any one of main circuit capacitor, control circuit capacitor, inrush current restriction circuit or cooling fan reaches the output level, an alarm is output. Capacity of the main circuit capacitor can be measured by setting parameter at a stop and turning the power from off to on. Measuring the capacity enables alarm to be output.

#### Environment Consciousness in Global Standards

#### RoHS Directive Compliant

RoHS Directive requires member nations to guarantee that new electrical and electronic equipment sold in the market after July 1, 2006 do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

<Do> mark indicating RoHS Directive compliance is printed on the package.

#### EMC Directive Compliant Noise Filter
Compliance to the EMC Directive of European Norm is easier.

Noise filter option which is compatible with EMC Directive ( EN61800-3 2nd Environment Category C3) is available.

---

#### Connectivity Examples

#### Examples

#### Specifications

#### Outline Drawing

---

#### Combed Shaped Wiring Cover
Since a cover can be fitted after wiring, wiring work is easily done.
Enhanced Functions

Built for Various Applications
Equipped with many useful functions for various applications

<table>
<thead>
<tr>
<th>Fan and pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy saving</td>
</tr>
<tr>
<td>● Applicable load selection (Pr.14) Select the best output features (V/F features) according to use and load characteristics.</td>
</tr>
<tr>
<td>● Optimum excitation control (Pr.60) This control maximizes motor efficiency, saving more energy especially during use of reduced load torque such as fan and pump applications.</td>
</tr>
<tr>
<td>● Regeneration avoidance function This function automatically increases the frequency level during regeneration, for example, a dragging fan, to restrain tripping.</td>
</tr>
<tr>
<td>● Deceleration and stop function upon power failure/continuous operation function upon instantaneous power failure</td>
</tr>
<tr>
<td>● PID control</td>
</tr>
<tr>
<td>● Auto-restart upon instantaneous power failure/drag retraction</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conveyor and food machineries</th>
</tr>
</thead>
<tbody>
<tr>
<td>● General-purpose magnetic flux vector control</td>
</tr>
<tr>
<td>● S-shaped acceleration and deceleration</td>
</tr>
<tr>
<td>● Multi-speed function (up to 15 speed)</td>
</tr>
<tr>
<td>● Brake resistor connection</td>
</tr>
</tbody>
</table>

| (i.e. conveyor) (i.e. meat slicer) |

| (i.e. A/C fan) (i.e. pump) |

<table>
<thead>
<tr>
<th>Environmental and consumer-related machineries</th>
</tr>
</thead>
<tbody>
<tr>
<td>● General-purpose magnetic flux vector control</td>
</tr>
<tr>
<td>● Brake resistor connection</td>
</tr>
</tbody>
</table>

| (i.e. Industrial washing machine) (i.e. Car wash machine) |

<table>
<thead>
<tr>
<th>Amusement machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Packaging machinery</td>
</tr>
<tr>
<td>● Textile machinery</td>
</tr>
<tr>
<td>● Printing machinery</td>
</tr>
<tr>
<td>● etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Machine tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>● General-purpose magnetic flux vector control</td>
</tr>
<tr>
<td>● Deceleration and stop function upon power failure In the event of a power failure or an undervoltage, the motor decelerates and stops to prevent a free-run state. This function is useful to prevent risks associated with machine tools, such as when stopping a motor upon power failure.</td>
</tr>
</tbody>
</table>

| (i.e. Spindle) |

<table>
<thead>
<tr>
<th>Enhanced Communication Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Mitsubishi inverter protocol and Modbus-RTU Faster communication speed with RS-485 models (enables 38.4kbps communication).</td>
</tr>
<tr>
<td>Added the &quot;Multi-Command Mode&quot; to the Mitsubishi inverter protocol (reduces inverter data process time by 1/3 - 1/4) Compatible with Modbus-RTU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brake Resistor Connection Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-in brake transistor for 0.4K and above. Regenerative capacity can be increased by connecting the optional brake resistor. The above function can also be used to reduce deceleration time of fans and other machineries with a large inertia as well as lifts.</td>
</tr>
</tbody>
</table>

Introducing the Mitsubishi magnetic contactor |

| ● Offers a selection of small frames |
| ● Offers a line-up of safety contactors |
| ● Supports small loads (auxiliary contact) |
| ● Supports many international regulations as standard |
The lineup of three phase 200V/400V class goes to 15K.

- For a use in harsh environment, special unit with board coating is also available. Please contact our sales representative.
- For the FR-D700 series, North American (NA), EU (EC), and Chinese (CHT) specifications also are supported.

* This catalog explains based on the Japanese specifications. Consult our sales office for specifications of each country.

The lineup of three phase 200V/400V class goes to 15K.

For a use in harsh environment, special unit with board coating is also available. Please contact our sales representative.

For the FR-D700 series, North American (NA), EU (EC), and Chinese (CHT) specifications also are supported.

* This catalog explains based on the Japanese specifications. Consult our sales office for specifications of each country.

The lineup of three phase 200V/400V class goes to 15K.

For a use in harsh environment, special unit with board coating is also available. Please contact our sales representative.

For the FR-D700 series, North American (NA), EU (EC), and Chinese (CHT) specifications also are supported.

* This catalog explains based on the Japanese specifications. Consult our sales office for specifications of each country.

The lineup of three phase 200V/400V class goes to 15K.

For a use in harsh environment, special unit with board coating is also available. Please contact our sales representative.

For the FR-D700 series, North American (NA), EU (EC), and Chinese (CHT) specifications also are supported.

* This catalog explains based on the Japanese specifications. Consult our sales office for specifications of each country.
Installation Example

AC power supply
Use within the permissible power supply specifications of the inverter. To ensure safety, use a moulded case circuit breaker, earth leakage circuit breaker or magnetic contactor to switch power ON/OFF.

Moulded case circuit breaker (MCCB) or earth leakage current breaker (ELB), fuse
The breaker must be selected carefully since an in-rush current flows in the inverter at power on.

Magnetic contactor (MC)
Install the magnetic contactor to ensure safety. Do not use this magnetic contactor to start and stop the inverter. Doing so will cause the inverter life to be shortened.

Reactor (FR-HAL, FR-HEL option)
Install reactors to suppress harmonics and to improve the power factor. A reactor (option) is required when installing the inverter near a large power supply system (500kVA or more). The inverter may be damaged if you do not use reactors. Select the reactor according to the model. Remove the jumpers across terminals P/+ - P1 to connect the DC reactor.

EMC filter (ferrite core)* (FR-BSF01, FR-BLF)
Install a noise filter to reduce the electromagnetic noise generated from the inverter. Effective in the range from about 1MHz to 10MHz. When more wires are passed through, a more effective result can be obtained. A wire should be wound four turns or more.

Brake resistor (FR-ABR, MRS, MYS)
Braking capability can be improved. (0.4K or more) Always install a thermal relay when using a brake resistor whose capacity is 11K or more.

Devices connected to the output
Do not install a power factor correction capacitor, surge suppressor or radio noise filter on the output side of the inverter. When installing a moulded case circuit breaker on the output side of the inverter, contact each manufacturer for selection of the moulded case circuit breaker.

Earth (Ground)
To prevent an electric shock, always earth (ground) the motor and inverter. For reduction of induction noise from the power line of the inverter, it is recommended to wire the earth (ground) cable by returning it to the earth (ground) terminal of the inverter.

*2 Can be used only with standard control circuit terminal specification products and safety stop compatible models.
# Inverter FREQROL-D700 Series

## Standard Specifications

### Three-phase 200V power supply

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.3</td>
<td>0.6</td>
<td>1.0</td>
<td>1.7</td>
<td>2.5</td>
<td>4.2</td>
<td>7.0</td>
</tr>
<tr>
<td>Voltage</td>
<td>Three-phase 200 to 240V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*5</td>
<td>150% 60s, 200% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 380 to 480V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>170 to 264V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.4</td>
<td>0.7</td>
<td>1.2</td>
<td>2.1</td>
<td>4.0</td>
<td>5.5</td>
<td>9.0</td>
</tr>
<tr>
<td>Maximum output voltage</td>
<td>Does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload current rating*1</td>
<td>150% 60s, 200% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>0.8</td>
<td>1.4</td>
<td>2.5</td>
<td>4.2</td>
<td>7.0</td>
<td>10.0</td>
<td>16.5</td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.3</td>
<td>0.6</td>
<td>1.0</td>
<td>1.7</td>
<td>2.8</td>
<td>4.0</td>
<td>6.6</td>
</tr>
<tr>
<td>Rated capacity (A)</td>
<td>0.8</td>
<td>1.4</td>
<td>2.5</td>
<td>4.2</td>
<td>7.0</td>
<td>10.0</td>
<td>16.5</td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>0.5</td>
<td>0.8</td>
<td>1.2</td>
<td>2.1</td>
<td>4.0</td>
<td>5.5</td>
<td>9.0</td>
</tr>
</tbody>
</table>

### Three-phase 400V power supply

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.3</td>
<td>0.6</td>
<td>1.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Voltage</td>
<td>Three-phase 380 to 480V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*5</td>
<td>150%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Three-phase 380 to 480V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>325 to 528V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>1.5</td>
<td>2.5</td>
<td>4.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Maximum output voltage</td>
<td>Does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload current rating*1</td>
<td>150% 60s, 200% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>1.2</td>
<td>2.5</td>
<td>4.5</td>
<td>6.0</td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.9</td>
<td>1.7</td>
<td>2.7</td>
<td>3.8</td>
</tr>
<tr>
<td>Rated capacity (A)</td>
<td>1.2</td>
<td>2.2</td>
<td>3.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>1.3</td>
<td>2.5</td>
<td>4.5</td>
<td>6.0</td>
</tr>
</tbody>
</table>

### Single-phase 200V power supply

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.75</td>
<td>1.5</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Three-phase 200 to 240V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*5</td>
<td>150%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Single-phase 200 to 240V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>170 to 264V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.5</td>
<td>0.9</td>
<td>1.5</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum output voltage</td>
<td>Does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload current rating*1</td>
<td>150% 60s, 200% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>0.8</td>
<td>1.5</td>
<td>2.5</td>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.6</td>
<td>1.2</td>
<td>2.0</td>
<td>3.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated capacity (A)</td>
<td>0.8</td>
<td>1.5</td>
<td>2.5</td>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>1.3</td>
<td>2.5</td>
<td>4.5</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Single-phase 100V power supply

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.1</td>
<td>0.2</td>
<td>0.4</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Three-phase 200 to 230V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regenerative braking torque*5</td>
<td>150%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated input AC voltage/frequency</td>
<td>Single-phase 100 to 115V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible AC voltage fluctuation</td>
<td>90 to 123V 50Hz/60Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permissible frequency fluctuation</td>
<td>±5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply capacity (kVA)*6</td>
<td>0.5</td>
<td>0.9</td>
<td>1.5</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum output voltage</td>
<td>Does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overload current rating*1</td>
<td>150% 60s, 200% 0.5s (inverse-time characteristics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated current (A)</td>
<td>0.8</td>
<td>1.5</td>
<td>2.5</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated capacity (kVA)*2</td>
<td>0.6</td>
<td>1.2</td>
<td>2.0</td>
<td>3.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated capacity (A)</td>
<td>0.8</td>
<td>1.5</td>
<td>2.5</td>
<td>4.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approximate mass (kg)</td>
<td>1.3</td>
<td>2.5</td>
<td>4.5</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Power supply capacity

- **Approximate mass (kg)**: 0.5, 0.8, 1.2, 2.1, 4.0, 5.5, 9.0, 12.0, 17.0, 20.0, 27.0
- **Cooling system**: Self-cooling, Forced air cooling
- **Protective structure (JEM1030)**: Enclosed type (IP20)

### Specifications

- The braking torque indicated is a short-duration average torque (which varies with motor loss) when the motor alone is decelerated from 60Hz in the shortest time and is not a continuous regenerative torque.
- The rated output capacity indicated assumes that the output voltage is 230V. For three-phase 200V class and 440V for three-phase 400V class.
- The % value of the overload current rating indicated is the ratio of the overload current to the inverter’s rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.
- The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).

### Features

- A brake unit (FR-BU2) may also be used.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- A brake unit (FR-BU2) may also be used.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- A brake unit (FR-BU2) may also be used.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- A brake unit (FR-BU2) may also be used.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- A brake unit (FR-BU2) may also be used.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- A brake unit (FR-BU2) may also be used.
- The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).
- A brake unit (FR-BU2) may also be used.

### Protective structure (JEM1030)

- Enclosed type (IP20)

### Protective structure (JEM1030)

- Enclosed type (IP20)
### Common Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control method</td>
<td>Soft-PWM control/high carrier frequency PWM control (V/F control, General-purpose magnetic flux vector control, and Optimum excitation control are applicable)</td>
</tr>
<tr>
<td>Output frequency range</td>
<td>0.2 to 400Hz</td>
</tr>
<tr>
<td>Frequency setting resolution</td>
<td>Analog input: 0.06Hz/60Hz (terminal2: 4 to 10V/10bit)</td>
</tr>
<tr>
<td></td>
<td>0.12Hz/60Hz (terminal2: 4 to 5V/10bit)</td>
</tr>
<tr>
<td></td>
<td>0.06Hz/60Hz (terminal4: 0 to 20mA/10bit)</td>
</tr>
<tr>
<td>Frequency accuracy</td>
<td>0.01Hz</td>
</tr>
<tr>
<td>Analog input</td>
<td>Within ±1% of the max. output frequency (25°C ±10°C)</td>
</tr>
<tr>
<td>Digital input</td>
<td>Within 0.01% of the set output frequency</td>
</tr>
<tr>
<td>Voltage/frequency characteristics</td>
<td>Base frequency can be set from 0 to 400Hz. Constant-torque/variable torque pattern can be selected</td>
</tr>
<tr>
<td>Starting torque</td>
<td>150% or more (at 1Hz)... when General-purpose magnetic flux vector control and slip compensation is set</td>
</tr>
<tr>
<td>Torque boost</td>
<td>Manual torque boost</td>
</tr>
<tr>
<td>Acceleration/deceleration time setting</td>
<td>0.1 to 3600s (acceleration and deceleration can be set individually)</td>
</tr>
<tr>
<td>DC injection brake</td>
<td>Operation frequency (0 to 120Hz), operation time (0 to 10s), and operation voltage (0 to 30%) can be changed</td>
</tr>
<tr>
<td>Stall prevention operation level</td>
<td>Operation current level (0 to 200%), and whether to use the function or not can be selected</td>
</tr>
<tr>
<td>Frequency setting signal</td>
<td>Analog input: Two terminals 2: 0 to 10V and 0 to 5V are available</td>
</tr>
<tr>
<td></td>
<td>Terminal 4: 0 to 10V, 0 to 5V, and 4 to 20mA are available</td>
</tr>
<tr>
<td>Input signal (five terminals)</td>
<td>The signal is entered from the operation panel or parameter unit. Frequency setting increment can be set</td>
</tr>
<tr>
<td>Operational functions</td>
<td>Maximum/minimum frequency setting, frequency jump operation, external thermal relay input selection, automatic restart after instantaneous power failure operation, forward/reverse rotation prevention, remote setting, second function, multi-speed operation, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, PID control, computer link operation (RS-485), Optimum excitation control, power failure stop, speed smoothing control, Modbus-RTU</td>
</tr>
<tr>
<td>Output signal</td>
<td>The following signals can be assigned to Pr.178 to Pr.182 (input terminal function selection): multi-speed selection, remote setting, second function selection, terminal 4 input selection, JOG operation selection, PID control, valid terminal, external thermal input, PU-External operation switchover, V/F switchover, output stop, start self-holding selection, forward, reverse rotation, reverse rotation command, inverter reset, PU-NET operation switchover, External-NET operation switchover, command source switchover, inverter operation enable signal, and PU operation external interlock.</td>
</tr>
<tr>
<td>Open collector output (two terminals)</td>
<td>The following signals can be assigned to Pr.190, Pr.192 and Pr.197 (output terminal function selection): inverter operation, up-to-frequency, overload alarm, output frequency detection, regenerative brake prealarm, electronic thermal relay function prealarm, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward/reverse rotation output, fan alarm 1, heatsink overheat pre-alarm, deceleration, load factor, and an instantaneous power failure. PID control activated, PID output interruption, safety monitor output, safety monitor output 2, during retry, life alarm, current average value monitor, remote output, alarm output, fault output, fault output 3, and maintenance timer alarm.</td>
</tr>
<tr>
<td>Output signal (one terminal)</td>
<td>The following signals can be assigned to Pr.54 FM terminal function selection: output frequency, output current (steady), output voltage, frequency setting, converter output voltage, regenerative brake duty, electronic thermal relay function load factor, output current peak value, converter output voltage peak value, reference voltage output, motor load factor, PID set point, PID measured value, output power, PID deviation, motor thermal load factor, and inverter thermal load factor. Pulse train output (1440 pulses/full scale)</td>
</tr>
<tr>
<td>Operation panel Parameter unit (FR-PU07)</td>
<td>Maximum/minimum frequency setting, frequency jump operation, external thermal relay input selection, automatic restart after instantaneous power failure operation, forward/reverse rotation prevention, remote setting, second function, multi-speed operation, regeneration avoidance, slip compensation, operation mode selection, offline auto tuning function, PID control, computer link operation (RS-485), Optimum excitation control, power failure stop, speed smoothing control, Modbus-RTU</td>
</tr>
<tr>
<td>Indication function</td>
<td>Function (help) for operation guide</td>
</tr>
<tr>
<td>Protective function</td>
<td>Overcurrent during acceleration, overcurrent during constant speed, overcurrent during deceleration, overvoltage during acceleration, overvoltage during constant speed, overvoltage during deceleration, inverter protection thermal operation, motor protection thermal operation, heatsink overheat, input phase loss<em>2, output side earth (ground) fault, overcurrent at start</em>2, output phase loss, external thermal relay operation<em>2, PTC thermistor operation</em>2, parameter error, PU disconnection, retry count excess<em>2, CPU fault, brake transistor alarm, inrush resistance overheating, analog input error, stall prevention operation, output current detection value exceeded</em>2, safety circuit fault</td>
</tr>
<tr>
<td>Warning function</td>
<td>Overcurrent, stall prevention, overvoltage stall prevention, PU stop, parameter write error, regenerative brake prealarm<em>2, electronic thermal relay function operation, electronic thermal relay function output, and maintenance timer alarm</em>2, undervoltage, operation panel lock, password locked, inverter reset, safety stop</td>
</tr>
<tr>
<td>Surrounding air temperature</td>
<td>-10°C to +50°C maximum (non-freezing)*3</td>
</tr>
<tr>
<td>Ambient humidity</td>
<td>90%RH or less (non-condensing)</td>
</tr>
<tr>
<td>Storage temperature*3</td>
<td>-20°C to +65°C</td>
</tr>
<tr>
<td>Atmosphere*4</td>
<td>Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt etc.)</td>
</tr>
<tr>
<td>Altitude/temperature</td>
<td>Maximum 1000m above sea level, 5.9m/s² or less at 10 to 55Hz (directions of X, Y, Z axes)</td>
</tr>
</tbody>
</table>

*1 As the 0.75K or less are not provided with the cooling fan, this alarm does not function.  
*2 This operation guide is only available with option parameter unit (FR-PU07).  
*3 This protective function does not function in the initial status.  
*4 This protective function is available with the three-phase power input specification model only.  
*5 When using the inverters at the surrounding air temperature of 40°C or less, the inverters can be installed closely attached (20mm clearance).  
*6 Temperatures applicable for a short time, e.g. in transit.
Inverter FREQROL-D700 Series

Outline Dimension Drawings

- FR-D720-0.1K to 0.75K
- FR-D720S-0.1K to 0.75K
- FR-D710W-0.1K to 0.4K

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-D720-0.1K, 0.2K</td>
<td>80.5</td>
<td>10</td>
</tr>
<tr>
<td>FR-D720S-0.1K, 0.2K</td>
<td>110.5</td>
<td>10</td>
</tr>
<tr>
<td>FR-D710W-0.1K</td>
<td>112.5</td>
<td>42</td>
</tr>
<tr>
<td>FR-D720-0.75K</td>
<td>132.5</td>
<td>62</td>
</tr>
<tr>
<td>FR-D720S-0.4K</td>
<td>142.5</td>
<td>62</td>
</tr>
<tr>
<td>FR-D710W-0.4K</td>
<td>162.5</td>
<td>62</td>
</tr>
</tbody>
</table>

(Unit: mm)

- FR-D720-1.5K to 3.7K
- FR-D740-0.4K to 3.7K
- FR-D720S-1.5K
- FR-D710W-0.75K

<table>
<thead>
<tr>
<th>Inverter Model</th>
<th>W</th>
<th>W1</th>
<th>D</th>
<th>D1</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR-D720-1.5K, 2.2K</td>
<td>135.5</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-D740-1.5K</td>
<td>129.5</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-D740-0.4K, 0.75K</td>
<td>155.5</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-D720S-1.5K</td>
<td>165.5</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-D740-3.7K</td>
<td>149.5</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-D710W-0.75K</td>
<td>170</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR-D720S-3.7K</td>
<td>170</td>
<td>158</td>
<td>142.5</td>
<td>66.5</td>
</tr>
</tbody>
</table>

(Unit: mm)

* FR-D740-0.4K, 0.75K, FR-D710W-0.75K are not provided with the cooling fan.