Changes for the Better

MITSUBISHI ELECTRIC

# LINEAR SERVO AMPLIFIERS & MOTORS FOR MELSERVO-J3 SERIES

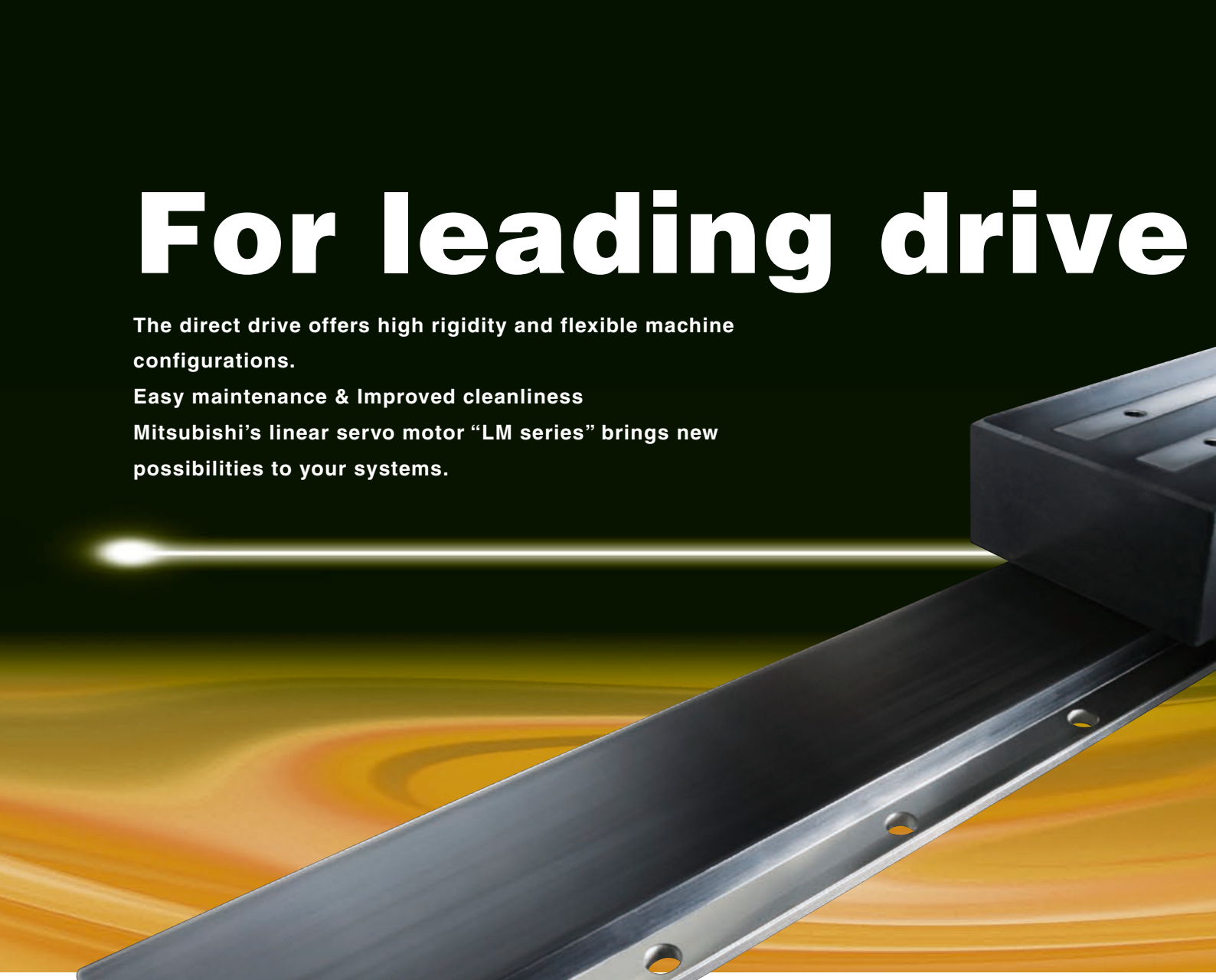
Always Ahead of the Scene, Seize the Future

# LINEAR SERVO

## LM Series

# For leading drive

**The direct drive offers high rigidity and flexible machine configurations.**
**Easy maintenance & Improved cleanliness**
**Mitsubishi's linear servo motor "LM series" brings new possibilities to your systems.**



## Linear servo motor for advanced control and usability

**For higher machine performance**

- ◎ Speeds up to 2m/s improve productivity
- ◎ High-accuracy positioning by fully closed loop control system

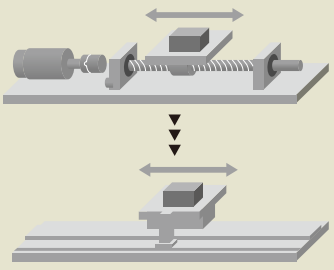
**For easier use**

- ◎ No transmission mechanism - smooth and quiet operations
- ◎ No grease splashing - suitable for clean systems

**For flexible machine configurations**

- ◎ Simple and compact machine by using direct drive system
- ◎ No thrust transmission mechanism increases machine rigidity
- ◎ Multi-head and tandem systems can be easily configured
- ◎ Suitable for long-stroke applications

**Offers more advantage than conventional ball screw driving systems**



# LINEAR SERVO MOTOR

# control

## The perfect solution, Mitsubishi's linear servo motor

- Sophisticated performance
- Four series for a variety of applications
- High performance and accuracy control systems
- Useful engineering tools

by MITSUBISHI

## INDEX


| | PAGE |
|---|---|
| **Features** | **3** |
| **Model designation** | |
| · Linear servo motor | **7** |
| · Servo amplifier | **11** |
| **Combinations of linear servo motor and servo amplifier** | **12** |
| **Linear servo motor specifications** | |
| · LM-H2 series | **13** |
| · LM-F series | **14** |
| · LM-K2 series | **15** |
| · LM-U2 series | **16** |
| **Linear servo motor dimensions** | **17** |
| **Servo amplifier specifications** | |
| · MR-J3-B-RJ004 | **25** |
| · MR-J3W-B | **26** |
| **Standard wiring diagram** | **27** |
| **Compatible linear encoders** | **31** |
| **Options (for MR-J3-B-RJ004)** | |
| · Cables and connectors | **32** |
| · Dynamic brake | **34** |
| · Optional regeneration unit | **35** |
| **Options (for MR-J3W-B)** | |
| · Cables and connectors | **38** |
| · Optional regeneration unit | **42** |
| **Peripheral equipment** | |
| · Electrical wires, circuit breakers and magnetic contactors | **43** |
| **Servo amplifier dimensions** | **44** |
| **Product list** | **48** |
| **List of compatible software versions** | **51** |
| **List of compatible servo amplifier software versions** | **51** |
| **Selecting linear servo motor** | **53** |
| **Cautions concerning use** | **55** |
| **Warranty** | **57** |
| **Global FA centers** | **58** |

# Linear servo motor for semiconductors, LCDs and material handlings.

## Sophisticated performance

### ◎ High speed and high thrust

Max. speed: 2m/s
Max. thrust range: 150N to 18000N
Small size and high thrust are realized by increasing the winding density and by optimizing core and magnet geometries using electromagnetic field analysis.

### ◎ A variety of product lines

LM-K2 series, core type with magnetic attraction counter-force, is newly introduced in addition to the conventional core, coreless and liquid-cooling core types.

### ◎ Create high performance systems

High performance systems such as high accuracy tandem synchronous control are achieved by using a motion controller and the SSCNET Ⅲ compatible linear servo amplifier.

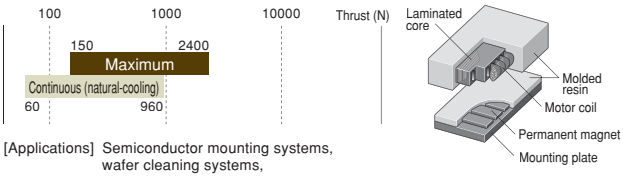
### ◎ Compatible with a variety of linear encoders

The linear servo motors are compatible with a variety of serial interface linear encoders, which have a minimum resolution of 0.005μm. A/B/Z-phase differential output type linear encoders are also offered.

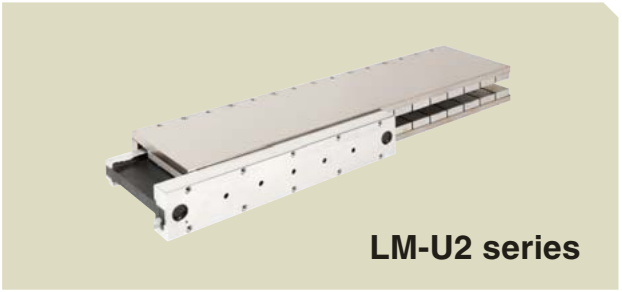
## Four series for a variety of applications

**LM-H2 series**

Core type suitable for space-saving
The magnetic attraction force contributes to high rigidity.

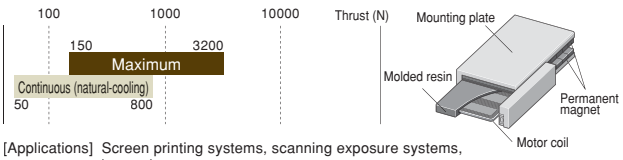



[Applications] Semiconductor mounting systems, wafer cleaning systems, LCD assembly systems (multi-head use)

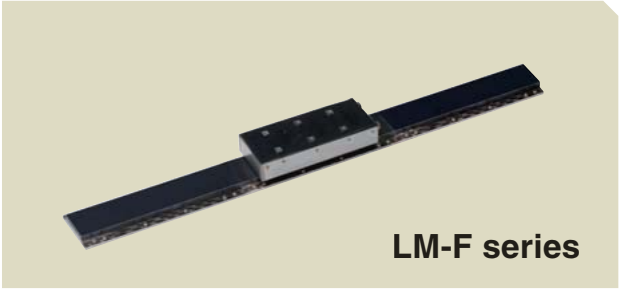


**LM-U2 series**

Coreless type without cogging resulting in small speed fluctuation
The structure with no magnetic attraction force extends life of the linear guides.

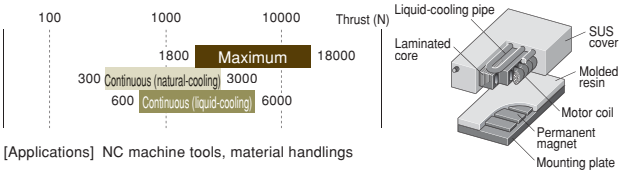



[Applications] Screen printing systems, scanning exposure systems, inspection systems

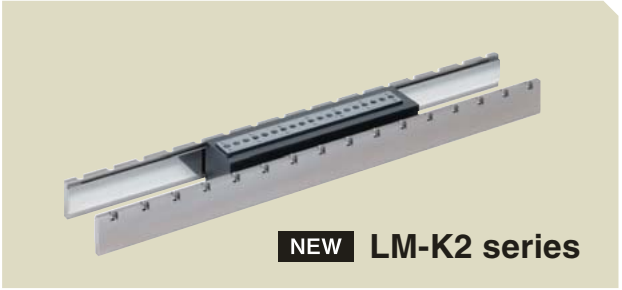


**LM-F series**

Core type compact linear servo motor
The integrated liquid-cooling system doubles the continuous thrust. The magnetic attraction force contributes to high rigidity.

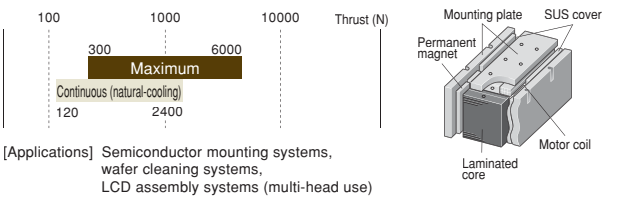



[Applications] NC machine tools, material handlings



**NEW LM-K2 series**

Core type with magnetic attraction counter-force
The magnetic attraction counter-force structure extends life of the linear guides and contributes to lowering audible noise.

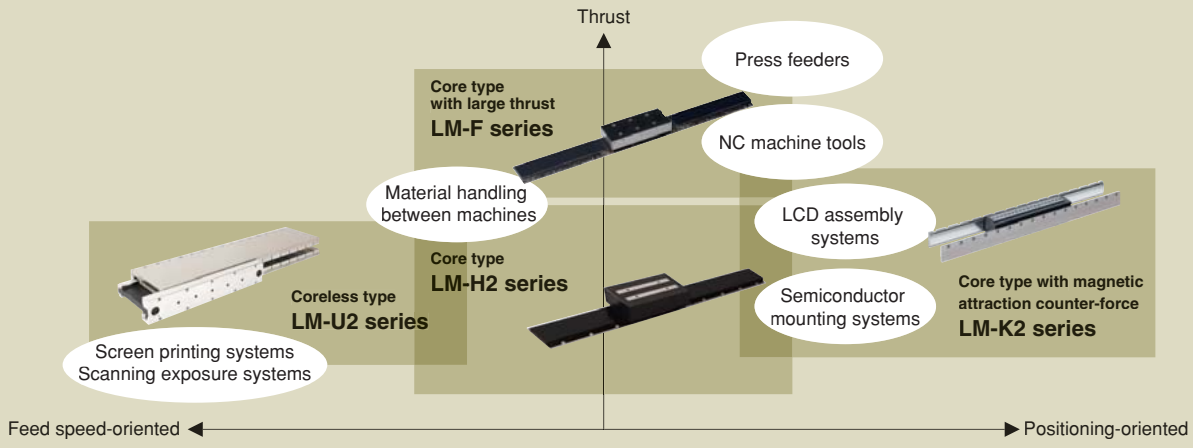



[Applications] Semiconductor mounting systems, wafer cleaning systems, LCD assembly systems (multi-head use)

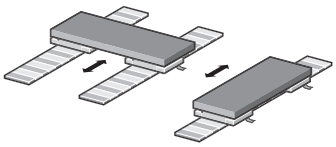
# Extensive product lines for your applications.

LINEAR SERVO by MITSUBISHI

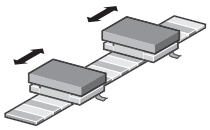
## Application chart




## Linear servo motor application examples

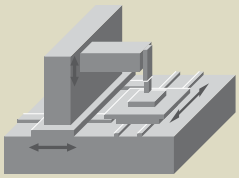


**Tandem configuration**
The linear servo motors can be configured in tandem especially for large systems that require highly accurate synchronous operation between two axes.

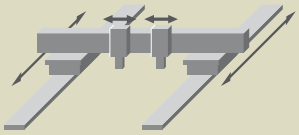


**Multi-head configuration**
Multi-head systems enable control of two motor coils independently, thereby simplifying machine mechanisms. This system is suitable for machines that require short tact time.

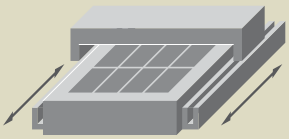
- Machine tools
- XYZ stage



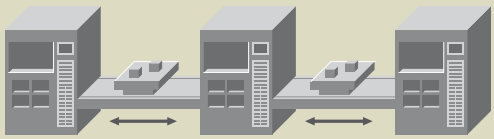
- Semiconductor/LCD manufacturing systems
- Electrical parts assembling/ manufacturing systems



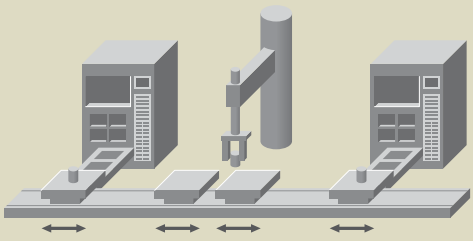
- Screen printing systems
- Large LCD coaters



- Material handling systems



- Multi-head material handling between machines



# Mitsubishi supports total systems from controllers to servo

## High performance and accuracy control system

By configuring Mitsubishi motion controller and SSCNETⅢ servo amplifier, high accuracy synchronous operation and multiple operations are realized. The fully closed control system offers high accuracy control.

Industry leading control performance

**SSCNETⅢ compatible servo amplifier**

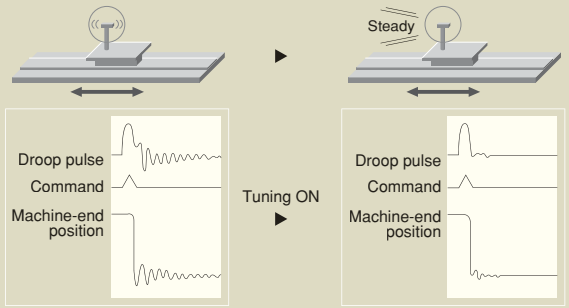
### 【MR-J3-B-RJ004】

◎ Gains are adjusted easily using “real time auto-tuning”.
◎ Resonances and vibrations are suppressed using “advanced vibration suppression control” and “adaptive filterⅡ”.
◎ “Robust disturbance compensation” function suppresses uneven speeds caused by disturbance.

**Automatically suppresses low frequency vibration**

**Advanced vibration suppression control**

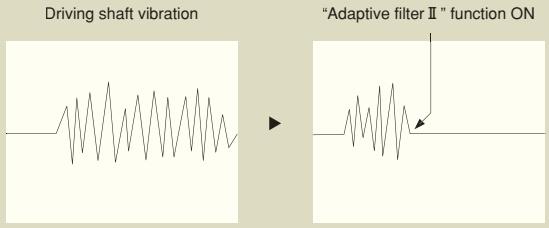
◎ This function suppresses 100Hz or lower frequency vibration that occurs when a driving part stops.




**Automatically suppresses resonance**

**Adaptive filterⅡ**

◎ Resonance on the driving mechanism, such as a ball screw, can be suppressed automatically using this filter.



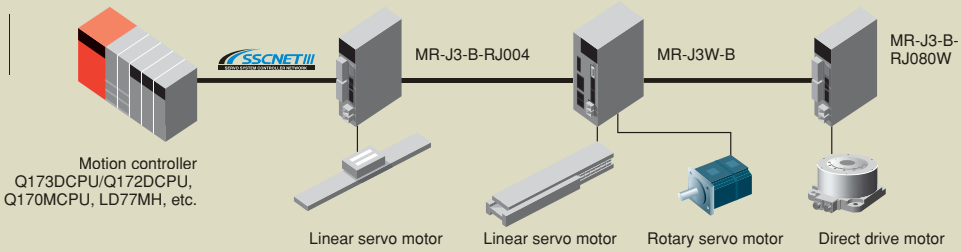

Drives 2 axes by one unit

**2-axis servo amplifier**

### 【MR-J3W series】

◎ Same level of functionality and performance as MR-J3.
◎ Reduced wiring and space-savings in a cabinet.
◎ Combinable with a rotary servo motor as well.

System configuration examples




SSCNETⅢ
SERVO SYSTEM CONTROLLER NETWORK

Servo system network enabling high speed and accuracy by optical fiber

| | |
|---|---|
| Achieves full duplex baud rate up to 50Mbps and high-speed serial communication with cycle times as fast as 0.44ms | Improves noise immunity by using optical fiber cables |
| Enables synchronous control with rotary and linear servo motors | Enables long distance wiring up to 800m per system |

## Useful engineering tools

**Servo setup software**

# 【MR Configurator2】

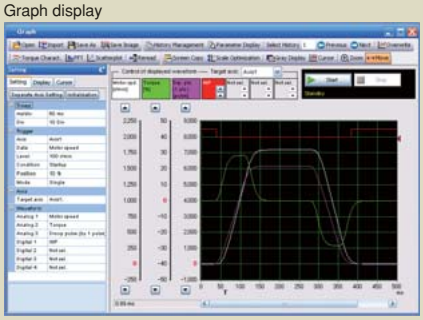
MR Configurator2 supports servo systems from setup to maintenance. With this software, monitor display, diagnostics, reading/writing parameters and test operations are performed easily. Setup of the servo amplifier can be completed just by following guidance displays of the servo assistant function.

**A variety of monitor functions**
Graph display function is equipped to display servo motor status such as command pulses, droop pulses and speeds by a trigger of input signals.

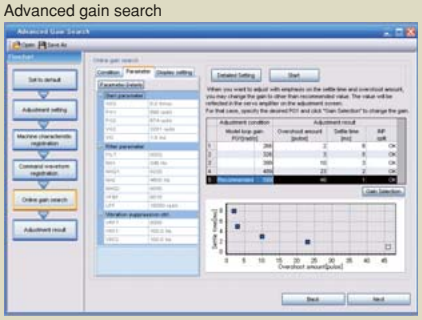
**Machine analyzer operation function**
This function automatically inputs random torque to the servo motor and analyzes frequency characteristics. Machine resonance suppression filter can be set easily based on the result.

**Advanced gain search function**
While changing gains automatically, this function sets an optimal gain that achieves shortest settling time with low overshoot and vibration.

Graph display



Advanced gain search



**Find out optimal system configurations**

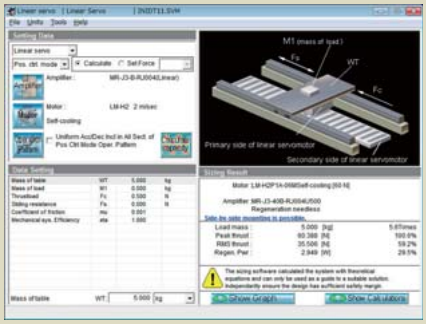
# 【Capacity selection software】

Optimal servo amplifier, linear servo motor and optional regeneration unit can be selected just by entering constants and operation pattern.

Features
(1) Feedrate and thrust can be displayed in graph format during the selection process.
(2) Calculation process can be displayed.

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

Linear servo



## Model designation for linear servo motor

### ●LM-H2 Series

**LM-H2P2B-24M-□ (Primary side: Coil)**

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| A | 128 |
| B | 224 |
| C | 320 |
| D | 416 |

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| 1 | 50 |
| 2 | 70 |
| 3 | 110 |

| Symbol | Maximum speed (m/s) |
|---|---|
| M | 2 |

| Symbol | Rated thrust (N) |
|---|---|
| 06 | 60 |
| 12 | 120 |
| 24 | 240 |
| 36 | 360 |
| 48 | 480 |
| 72 | 720 |
| 96 | 960 |

| Symbol | Motor model |
|---|---|
| 4SS0 | LM-H2P1A-06M |
| 1SS0 | LM-H2P2A-12M |
| | LM-H2P2B-24M |
| | LM-H2P2C-36M |
| | LM-H2P2D-48M |
| | LM-H2P3A-24M |
| | LM-H2P3B-48M |
| | LM-H2P3C-72M |
| | LM-H2P3D-96M |

**LM-H2S20-288-□ (Secondary side: Magnet)**

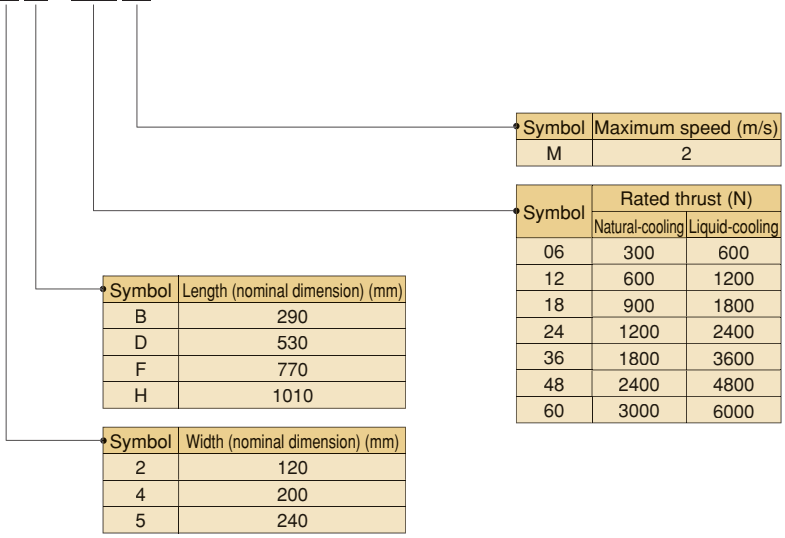
| Symbol | Width (nominal dimension) (mm) |
|---|---|
| 1 | 42 |
| 2 | 65 |
| 3 | 105 |

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| 288 | 288 |
| 384 | 384 |
| 480 | 480 |
| 768 | 768 |

| Symbol | Motor model |
|---|---|
| 4SS0 | LM-H2S10-288 |
| | LM-H2S10-384 |
| | LM-H2S10-480 |
| | LM-H2S10-768 |
| 1SS0 | LM-H2S20-288 |
| | LM-H2S20-384 |
| | LM-H2S20-480 |
| | LM-H2S20-768 |
| | LM-H2S30-288 |
| | LM-H2S30-384 |
| | LM-H2S30-480 |
| | LM-H2S30-768 |

## ●LM-F Series

### LM-FP2B-06M-1SS0 (Primary side: Coil)



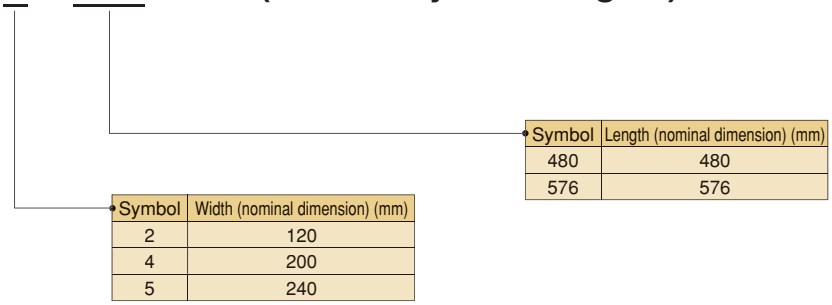
| Symbol | Maximum speed (m/s) |
|---|---|
| M | 2 |

| Symbol | Rated thrust (N) | |
|---|---|---|
| | Natural-cooling | Liquid-cooling |
| 06 | 300 | 600 |
| 12 | 600 | 1200 |
| 18 | 900 | 1800 |
| 24 | 1200 | 2400 |
| 36 | 1800 | 3600 |
| 48 | 2400 | 4800 |
| 60 | 3000 | 6000 |

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| B | 290 |
| D | 530 |
| F | 770 |
| H | 1010 |

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| 2 | 120 |
| 4 | 200 |
| 5 | 240 |

### LM-FS20-480-1SS0 (Secondary side: Magnet)



| Symbol | Length (nominal dimension) (mm) |
|---|---|
| 480 | 480 |
| 576 | 576 |

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| 2 | 120 |
| 4 | 200 |
| 5 | 240 |

# Model designation for linear servo motor

## ●LM-K2 Series

### LM-K2P1A-01M-□ (Primary side: Coil)

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| A | 138 |
| C | 330 |
| E | 522 |

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| 1 | 54 |
| 2 | 74.5 |
| 3 | 114.5 |

| Symbol | Maximum speed (m/s) |
|---|---|
| M | 2 |

| Symbol | Rated thrust (N) |
|---|---|
| 01 | 120 |
| 02 | 240 |
| 03 | 360 |
| 07 | 720 |
| 12 | 1200 |
| 14 | 1440 |
| 24 | 2400 |

| Symbol | Motor model |
|---|---|
| 2SS1 | LM-K2P1A-01M |
| | LM-K2P1C-03M |
| 1SS1 | LM-K2P2A-02M |
| | LM-K2P2C-07M |
| | LM-K2P2E-12M |
| | LM-K2P3C-14M |
| | LM-K2P3E-24M |

### LM-K2S10-288-□ (Secondary side: Magnet)

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| 1 | 46 |
| 2 | 61 |
| 3 | 101 |

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| 288 | 288 |
| 384 | 384 |
| 480 | 480 |
| 768 | 768 |

| Symbol | Motor model |
|---|---|
| 2SS1 | LM-K2S10-288 |
| | LM-K2S10-384 |
| | LM-K2S10-480 |
| | LM-K2S10-768 |
| 1SS1 | LM-K2S20-288 |
| | LM-K2S20-384 |
| | LM-K2S20-480 |
| | LM-K2S20-768 |
| | LM-K2S30-288 |
| | LM-K2S30-384 |
| | LM-K2S30-480 |
| | LM-K2S30-768 |

## ●LM-U2 (medium thrust) Series

### LM-U2PAB-05M-□ (Primary side: Coil)

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| B | 130 |
| D | 250 |
| F | 370 |

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| A | 66.5 |
| B | 86.5 |

| Symbol | Maximum speed (m/s) |
|---|---|
| M | 2 |

| Symbol | Rated thrust (N) |
|---|---|
| 05 | 50 |
| 07 | 75 |
| 10 | 100 |
| 15 | 150 |
| 22 | 225 |

| Symbol | Motor model |
|---|---|
| 0SS0 | LM-U2PAB-05M |
| | LM-U2PAD-10M |
| | LM-U2PAF-15M |
| 1SS0 | LM-U2PBB-07M |
| | LM-U2PBD-15M |
| | LM-U2PBF-22M |

### LM-U2SA0-240-□ (Secondary side: Magnet)

| Symbol | Width (nominal dimension) (mm) |
|---|---|
| A | 62 |
| B | 82 |

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| 240 | 240 |
| 300 | 300 |
| 420 | 420 |

| Symbol | Motor model |
|---|---|
| 0SS0 | LM-U2SA0-240 |
| | LM-U2SA0-300 |
| | LM-U2SA0-420 |
| 1SS0 | LM-U2SB0-240 |
| | LM-U2SB0-300 |
| | LM-U2SB0-420 |

## ●LM-U2 (large thrust) Series

### LM-U2P2B-40M-□ (Primary side: Coil)

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| B | 286 |
| C | 406 |
| D | 526 |

| Symbol | Maximum speed (m/s) |
|---|---|
| M | 2 |

| Symbol | Rated thrust (N) |
|---|---|
| 40 | 400 |
| 60 | 600 |
| 80 | 800 |

| Symbol | Motor model |
|---|---|
| 2SS0 | LM-U2P2B-40M |
| | LM-U2P2C-60M |
| | LM-U2P2D-80M |

### LM-U2S20-480-□ (Secondary side: Magnet)

| Symbol | Length (nominal dimension) (mm) |
|---|---|
| 300 | 300 |
| 480 | 480 |

| Symbol | Motor model |
|---|---|
| 2SS0 | LM-U2S20-300 |
| | LM-U2S20-480 |

# Model designation for servo amplifier

**MR-J3-□□□-RJ004(U□)**

Mitsubishi general-purpose AC servo amplifier MELSERVO-J3 Series

Compatible with linear servo motor

| Symbol | Compatible linear servo motor |
|---|---|
| None | LM-H2 series (Note 1)<br>LM-K2 series<br>LM-U2 series (Note 1) |
| U□ | LM-F series<br>✻ "U□" is necessary. |

Notes: 1. MR-J3-□B-RJ004U□ is also available for LM-H2 and LM-U2 series. Refer to "Combination of linear servo motor and servo amplifier" in the following page for more details.

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

B(N): SSCNETⅢ compatible

| Symbol |
|---|
| 20 |
| 40 |
| 60 |
| 70 |
| 200 |
| 350 |
| 500 |
| 700 |
| 11K |
| 15K |
| 22K (Note 1) |

Notes: 1. Only 22K is compatible with 3-phase 400VAC.

**MR-J3W-□B**

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

SSCNETⅢ compatible

| Symbol |
|---|
| 22 |
| 44 |
| 77 |
| 1010 |

# Combinations of linear servo motor and servo amplifier

| Linear servo motor | | | Servo amplifier |
|---|---|---|---|
| Primary side (coil) | | Secondary side (magnet) | |
| LM-H2 series | LM-H2P1A-06M-4SS0 | LM-H2S10-288-4SS0, LM-H2S10-384-4SS0, LM-H2S10-480-4SS0, LM-H2S10-768-4SS0 | MR-J3-40B-RJ004 (U500) (Note 3), MR-J3W-44B, MR-J3W-77B (Note 2), MR-J3W-1010B (Note 2) |
| | LM-H2P2A-12M-1SS0 | LM-H2S20-288-1SS0, LM-H2S20-384-1SS0, LM-H2S20-480-1SS0, LM-H2S20-768-1SS0 | MR-J3-40B-RJ004 (U501) (Note 3), MR-J3W-44B, MR-J3W-77B (Note 2), MR-J3W-1010B (Note 2) |
| | LM-H2P2B-24M-1SS0 | | MR-J3-70B-RJ004 (U502) (Note 3), MR-J3W-77B, MR-J3W-1010B |
| | LM-H2P2C-36M-1SS0 | | MR-J3-200BN-RJ004 (U503) (Note 3) |
| | LM-H2P2D-48M-1SS0 | | MR-J3-200BN-RJ004 (U504) (Note 3) |
| | LM-H2P3A-24M-1SS0 | LM-H2S30-288-1SS0, LM-H2S30-384-1SS0, LM-H2S30-480-1SS0, LM-H2S30-768-1SS0 | MR-J3-70B-RJ004 (U505) (Note 3), MR-J3W-77B, MR-J3W-1010B |
| | LM-H2P3B-48M-1SS0 | | MR-J3-200BN-RJ004 (U506) (Note 3) |
| | LM-H2P3C-72M-1SS0 | | MR-J3-350B-RJ004 (U507) (Note 3) |
| | LM-H2P3D-96M-1SS0 | | MR-J3-500B-RJ004 (U508) (Note 3) |
| LM-F series | LM-FP2B-06M-1SS0 | LM-FS20-480-1SS0, LM-FS20-576-1SS0 | MR-J3-200BN-RJ004U518 (for natural-cooling)<br>MR-J3-200BN-RJ004U519 (for liquid-cooling) |
| | LM-FP2D-12M-1SS0 | | MR-J3-500B-RJ004U520 (for natural-cooling)<br>MR-J3-500B-RJ004U521 (for liquid-cooling) |
| | LM-FP2F-18M-1SS0 | | MR-J3-700B-RJ004U522 (for natural-cooling)<br>MR-J3-700B-RJ004U523 (for liquid-cooling) |
| | LM-FP4B-12M-1SS0 | LM-FS40-480-1SS0, LM-FS40-576-1SS0 | MR-J3-500B-RJ004U524 (for natural-cooling)<br>MR-J3-500B-RJ004U525 (for liquid-cooling) |
| | LM-FP4D-24M-1SS0 | | MR-J3-700B-RJ004U526 (for natural-cooling)<br>MR-J3-700B-RJ004U527 (for liquid-cooling) |
| | LM-FP4F-36M-1SS0 | | MR-J3-11KB-RJ004U528 (for natural-cooling)<br>MR-J3-11KB-RJ004U529 (for liquid-cooling) |
| | LM-FP4H-48M-1SS0 | | MR-J3-15KB-RJ004U530 (for natural-cooling)<br>MR-J3-15KB-RJ004U531 (for liquid-cooling) |
| | LM-FP5H-60M-1SS0 | LM-FS50-480-1SS0, LM-FS50-576-1SS0 | MR-J3-22KB4-RJ004U532 (for natural-cooling) (Note 4)<br>MR-J3-22KB4-RJ004U533 (for liquid-cooling) (Note 4) |
| LM-K2 series | LM-K2P1A-01M-2SS1 | LM-K2S10-288-2SS1, LM-K2S10-384-2SS1, LM-K2S10-480-2SS1, LM-K2S10-768-2SS1 | MR-J3-40B-RJ004, MR-J3W-44B (Note 1), MR-J3W-77B (Note 1, 2), MR-J3W-1010B (Note 1, 2) |
| | LM-K2P1C-03M-2SS1 | | MR-J3-200BN-RJ004 |
| | LM-K2P2A-02M-1SS1 | LM-K2S20-288-1SS1, LM-K2S20-384-1SS1, LM-K2S20-480-1SS1, LM-K2S20-768-1SS1 | MR-J3-70B-RJ004, MR-J3W-77B (Note 1), MR-J3W-1010B (Note 1) |
| | LM-K2P2C-07M-1SS1 | | MR-J3-350B-RJ004 |
| | LM-K2P2E-12M-1SS1 | | MR-J3-500B-RJ004 |
| | LM-K2P3C-14M-1SS1 | LM-K2S30-288-1SS1, LM-K2S30-384-1SS1, LM-K2S30-480-1SS1, LM-K2S30-768-1SS1 | MR-J3-350B-RJ004 |
| | LM-K2P3E-24M-1SS1 | | MR-J3-500B-RJ004 |
| LM-U2 series | LM-U2PAB-05M-0SS0 | LM-U2SA0-240-0SS0, LM-U2SA0-300-0SS0, LM-U2SA0-420-0SS0 | MR-J3-20B-RJ004 (U512) (Note 3), MR-J3W-22B, MR-J3W-44B |
| | LM-U2PAD-10M-0SS0 | | MR-J3-40B-RJ004 (U513) (Note 3), MR-J3W-44B, MR-J3W-77B (Note 2), MR-J3W-1010B (Note 2) |
| | LM-U2PAF-15M-0SS0 | | MR-J3-40B-RJ004 (U514) (Note 3), MR-J3W-44B, MR-J3W-77B (Note 2), MR-J3W-1010B (Note 2) |
| | LM-U2PBB-07M-1SS0 | LM-U2SB0-240-1SS0, LM-U2SB0-300-1SS0, LM-U2SB0-420-1SS0 | MR-J3-20B-RJ004 (U515) (Note 3), MR-J3W-22B, MR-J3W-44B |
| | LM-U2PBD-15M-1SS0 | | MR-J3-60B-RJ004 (U516) (Note 3), MR-J3W-77B, MR-J3W-1010B |
| | LM-U2PBF-22M-1SS0 | | MR-J3-70B-RJ004 (U517) (Note 3), MR-J3W-77B, MR-J3W-1010B |
| | LM-U2P2B-40M-2SS0 | LM-U2S20-300-2SS0, LM-U2S20-480-2SS0 | MR-J3-200BN-RJ004 (U509) (Note 3) |
| | LM-U2P2C-60M-2SS0 | | MR-J3-350B-RJ004 (U510) (Note 3) |
| | LM-U2P2D-80M-2SS0 | | MR-J3-500B-RJ004 (U511) (Note 3) |

Notes: 1. The servo amplifier with software version B2 or above is compatible.
2. When using this servo amplifier with software version B2 or below, it is required to set parameter No. Po04 to "□□1□". For the servo amplifier with software version B3 or above, setting the parameter is not required.
3. Servo amplifier model that is compatible with LM-H2 and LM-U2 series is MR-J3-□B-RJ004. However, MR-J3-□B-RJ004U□ is also available as before.
4. This servo amplifier is rated 400VAC. 200VAC class is not available.

# Linear servo motor specifications

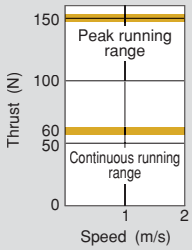
## ●LM-H2 series

| Linear servo motor model | LM-H2 | P1A-06M-4SS0 | P2A-12M-1SS0 | P2B-24M-1SS0 | P2C-36M-1SS0 | P2D-48M-1SS0 | P3A-24M-1SS0 | P3B-48M-1SS0 | P3C-72M-1SS0 | P3D-96M-1SS0 |
|---|---|---|---|---|---|---|---|---|---|---|
| Compatible servo amplifier model | MR-J3- (Note1) | 40B-RJ004(U500) | 40B-RJ004(U501) | 70B-RJ004(U502) | 200BN-RJ004(U503) | 200BN-RJ004(U504) | 70B-RJ004(U505) | 200BN-RJ004(U506) | 350B-RJ004(U507) | 500B-RJ004(U508) |
| | MR-J3W- | 44B/77B (Note 2) / 1010B (Note 2) | 44B/77B (Note 2) / 1010B (Note 2) | 77B/1010B | — | — | 77B/1010B | — | — | — |
| Power supply capacity (kVA) | | 0.9 | 0.9 | 1.3 | 3.5 | 3.5 | 1.3 | 3.5 | 5.5 | 7.5 |
| Cooling method | | Natural-cooling | | | | | | | | |
| Thrust | Continuous (N) | 60 | 120 | 240 | 360 | 480 | 240 | 480 | 720 | 960 |
| | Maximum (N) | 150 | 300 | 600 | 900 | 1200 | 600 | 1200 | 1800 | 2400 |
| Maximum speed (Note 3) (m/s) | | 2.0 | | | | | | | | |
| Magnetic attraction force (N) | | 500 | 1000 | 1900 | 2700 | 3500 | 2000 | 3700 | 5300 | 7000 |
| Rated current (A) | | 2.2 | 2.2 | 4.3 | 6.4 | 8.6 | 4.6 | 9.3 | 14.0 | 17.7 |
| Maximum current (A) | | 7.1 | 6.4 | 12.7 | 19.0 | 25.2 | 12.8 | 26.3 | 38.0 | 50.3 |
| Mass (kg [lb]) | Primary side (coil) | 0.9 (2.0) | 1.4 (3.1) | 2.5 (5.6) | 3.6 (8.0) | 4.7 (11) | 2.4 (5.3) | 4.3 (9.5) | 6.2 (14) | 8.1 (18) |
| | Secondary side (magnet) | 288mm/piece: 0.6 (1.4) | 288mm/piece: 1.1 (2.5) | | | | 288mm/piece: 3.2 (7.1) | | | |
| | | 384mm/piece: 0.8 (1.8) | 384mm/piece: 1.4 (3.1) | | | | 384mm/piece: 4.3 (9.5) | | | |
| | | 480mm/piece: 1.0 (2.2) | 480mm/piece: 1.8 (4.0) | | | | 480mm/piece: 5.3 (12) | | | |
| | | 768mm/piece: 1.6 (3.6) | 768mm/piece: 2.9 (6.4) | | | | 768mm/piece: 8.5 (19) | | | |
| Secondary side model LM-H2 | | S10-□-4SS0 | S20-□-1SS0 | | | | S30-□-1SS0 | | | |
| Recommended load to motor mass ratio | | Maximum of 30 times the mass of the linear servo motor's primary side | | | | | | | | |
| Structure | | Open (IP rating: IP00) | | | | | | | | |
| Environment | Ambient temperature | 0 to 40°C (32 to 104°F) (non freezing), storage: -15 to 70°C (5 to 158°F) (non freezing) | | | | | | | | |
| | Ambient humidity | 80% RH maximum (non condensing), storage: 90% RH maximum (non condensing) | | | | | | | | |
| | Atmosphere | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust | | | | | | | | |
| | Vibration | 49m/s$^2$ maximum | | | | | | | | |
| | Elevation | 1000m or less above sea level | | | | | | | | |

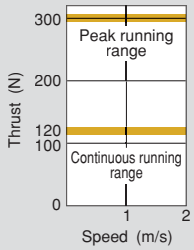
Notes: 1. Servo amplifier model that is compatible with LM-H2 series is MR-J3-□B-RJ004. However, MR-J3-□B-RJ004U□ is also available as before.
2. When using this servo amplifier with software version B2 or below, it is required to set parameter No. Po04 to "□□1□". For the servo amplifier with software version B3 or above, setting the parameter is not required.
3. The linear servo motor's maximum speed or the linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.

## ●LM-H2 series thrust characteristics

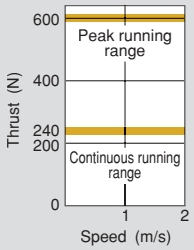
**■LM-H2P1A-06M-4SS0**(Note 1)



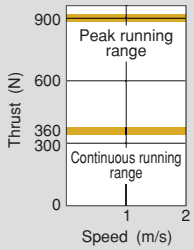

**■LM-H2P2A-12M-1SSO**(Note 1)



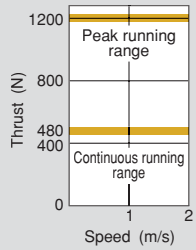

**■LM-H2P2B-24M-1SSO**(Note 1)



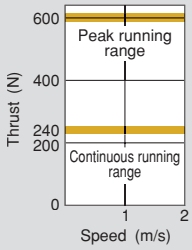

**■LM-H2P2C-36M-1SSO**(Note 2)



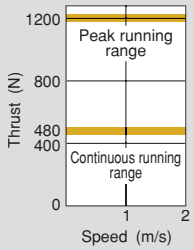

**■LM-H2P2D-48M-1SSO**(Note 2)



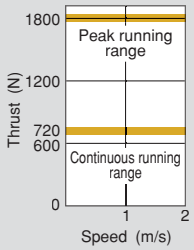

**■LM-H2P3A-24M-1SSO**(Note 1)



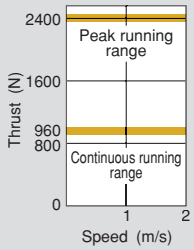

**■LM-H2P3B-48M-1SSO**(Note 2)




**■LM-H2P3C-72M-1SSO**(Note 2)




**■LM-H2P3D-96M-1SSO**(Note 2)




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

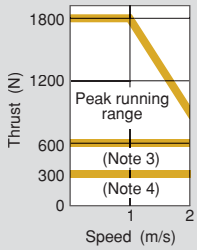
## ●LM-F series

| Linear servo motor model | | LM-F | P2B-06M-1SS0 | P2D-12M-1SS0 | P2F-18M-1SS0 | P4B-12M-1SS0 | P4D-24M-1SS0 | P4F-36M-1SS0 | P4H-48M-1SS0 | P5H-60M-1SS0 (Note 2) |
|---|---|---|---|---|---|---|---|---|---|---|
| Compatible servo amplifier model MR-J3- | Natural-cooling | | 200BN-RJ004U518 | 500B-RJ004U520 | 700B-RJ004U522 | 500B-RJ004U524 | 700B-RJ004U526 | 11KB-RJ004U528 | 15KB-RJ004U530 | 22KB4-RJ004U532 |
| | Liquid-cooling | | 200BN-RJ004U519 | 500B-RJ004U521 | 700B-RJ004U523 | 500B-RJ004U525 | 700B-RJ004U527 | 11KB-RJ004U529 | 15KB-RJ004U531 | 22KB4-RJ004U533 |
| Power supply capacity (kVA) | | | 3.5 | 5.5 | 10 | 7.5 | 18 | 18 | 18 | 22 |
| Cooling method | | | Natural-cooling or liquid-cooling | | | | | | | |
| Thrust | Continuous (Natural-cooling) (N) | | 300 | 600 | 900 | 600 | 1200 | 1800 | 2400 | 3000 |
| | Continuous (Liquid-cooling) (N) | | 600 | 1200 | 1800 | 1200 | 2400 | 3600 | 4800 | 6000 |
| | Maximum (N) | | 1800 | 3600 | 5400 | 3600 | 7200 | 10800 | 14400 | 18000 |
| Maximum speed (Note 1) (m/s) | | | 2.0 | | | | | | | |
| Magnetic attraction force (N) | | | 4500 | 9000 | 13500 | 9000 | 18000 | 27000 | 36000 | 45000 |
| Rated current (A) | Natural-cooling | | 4.0 | 7.8 | 12 | 7.8 | 15 | 21 | 28 | 22 |
| | Liquid-cooling | | 7.8 | 16 | 23 | 17 | 31 | 44 | 59 | 45 |
| Maximum current (A) | | | 30 | 58 | 87 | 57 | 109 | 159 | 212 | 157 |
| Mass (kg [lb]) | Primary side (coil) | | 9.0 (20) | 18 (40) | 27 (60) | 14 (31) | 28 (62) | 42 (93) | 56 (125) | 67 (150) |
| | Secondary side (magnet) | | 480mm/piece: 7.0 (16)<br>576mm/piece: 9.0 (20) | | | 480mm/piece: 12 (27)<br>576mm/piece: 15 (33) | | | | 480mm/piece: 20 (44)<br>576mm/piece: 24 (53) |
| Secondary side model | | LM-F | S20-□-1SS0 | | | S40-□-1SS0 | | | | S50-□-1SS0 |
| Recommended load to motor mass ratio | | | Maximum of 15 times the mass of the linear servo motor's primary side | | | | | | | |
| Structure | | | Open (IP rating: IP00) | | | | | | | |
| Environment | Ambient temperature | | 0 to 40°C (32 to 104°F) (non freezing), storage: -15 to 70°C (5 to 158°F) (non freezing) | | | | | | | |
| | Ambient humidity | | 80% RH maximum (non condensing), storage: 90% RH maximum (non condensing) | | | | | | | |
| | Atmosphere | | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust | | | | | | | |
| | Vibration | | 49m/s$^2$ maximum | | | | | | | |
| | Elevation | | 1000m or less above sea level | | | | | | | |

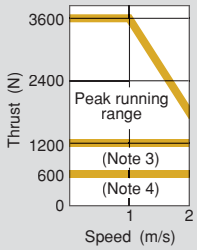
Notes: 1. The linear servo motor's maximum speed or the linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.
2. Use 400VAC rated servo amplifier.

## ●LM-F series thrust characteristics

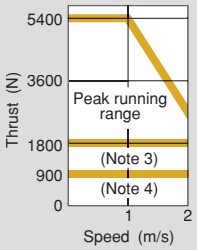
**■LM-FP2B-06M-1SS0**(Note 1)



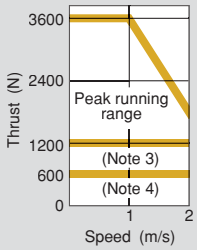

**■LM-FP2D-12M-1SS0**(Note 1)



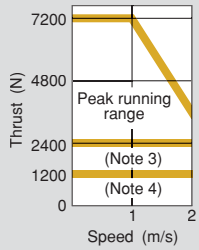

**■LM-FP2F-18M-1SS0**(Note 1)



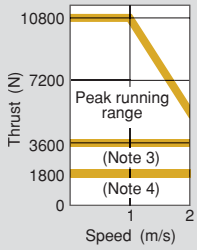

**■LM-FP4B-12M-1SS0**(Note 1)



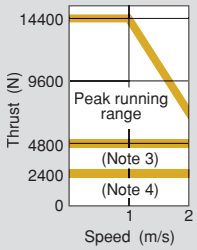

**■LM-FP4D-24M-1SS0**(Note 1)



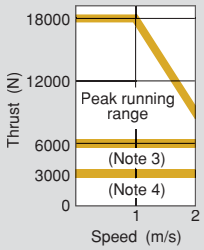

**■LM-FP4F-36M-1SS0**(Note 1)




**■LM-FP4H-48M-1SS0**(Note 1)




**■LM-FP5H-60M-1SS0**(Note 2)




Notes:
1. For 3-phase 200VAC.
2. For 3-phase 400VAC.
3. For continuous running range (liquid-cooling).
4. For continuous running range (natural-cooling).

# Linear servo motor specifications

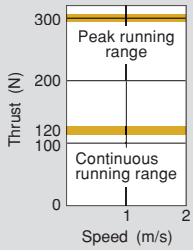
## ●LM-K2 series

| Linear servo motor model | | LM-K2 | P1A-01M-2SS1 | P1C-03M-2SS1 | P2A-02M-1SS1 | P2C-07M-1SS1 | P2E-12M-1SS1 | P3C-14M-1SS1 | P3E-24M-1SS1 |
|---|---|---|---|---|---|---|---|---|---|
| Compatible servo amplifier model | | MR-J3- | 40B-RJ004 | 200BN-RJ004 | 70B-RJ004 | 350B-RJ004 | 500B-RJ004 | 350B-RJ004 | 500B-RJ004 |
| | | MR-J3W- | 44B (Note 1)/ 77B (Note 1, 2)/ 1010B (Note 1, 2) | — | 77B (Note 1)/ 1010B (Note 1) | — | — | — | — |
| Power supply capacity (kVA) | | | 0.9 | 3.5 | 1.3 | 5.5 | 7.5 | 5.5 | 7.5 |
| Cooling method | | | Natural-cooling | | | | | | |
| Thrust | Continuous (N) | | 120 | 360 | 240 | 720 | 1200 | 1440 | 2400 |
| | Maximum (N) | | 300 | 900 | 600 | 1800 | 3000 | 3600 | 6000 |
| Maximum speed (Note 3) (m/s) | | | 2.0 | | | | | | |
| Magnetic attraction force (N) | | | 0 | | | | | | |
| Rated current (A) | | | 2.3 | 6.8 | 3.7 | 12 | 19 | 15 | 25 |
| Maximum current (A) | | | 7.6 | 23 | 13 | 39 | 65 | 47 | 79 |
| Mass (kg [lb]) | Primary side (coil) | | 2.5 (5.6) | 6.5 (15) | 4.0 (8.9) | 10 (22) | 16 (36) | 18 (40) | 27 (60) |
| | Secondary side (magnet) | | 288mm/piece: 1.5 (3.4) | | 288mm/piece: 1.9 (4.2) | | | 288mm/piece: 5.5 (13) | |
| | | | 384mm/piece: 2.0 (4.4) | | 384mm/piece: 2.5 (5.6) | | | 384mm/piece: 7.3 (16) | |
| | | | 480mm/piece: 2.5 (5.6) | | 480mm/piece: 3.2 (7.1) | | | 480mm/piece: 9.2 (21) | |
| | | | 768mm/piece: 3.9 (8.6) | | 768mm/piece: 5.0 (11) | | | 768mm/piece: 14.6 (33) | |
| Secondary side model LM-K2 | | | S10-□-2SS1 | | S20-□-1SS1 | | | S30-□-1SS1 | |
| Recommended load to motor mass ratio | | | Maximum of 30 times the mass of the linear servo motor's primary side | | | | | | |
| Structure | | | Open (IP rating: IP00) | | | | | | |
| Environment | Ambient temperature | | 0 to 40°C (32 to 104°F) (non freezing), storage: -15 to 70°C (5 to 158°F) (non freezing) | | | | | | |
| | Ambient humidity | | 80% RH maximum (non condensing), storage: 90% RH maximum (non condensing) | | | | | | |
| | Atmosphere | | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust | | | | | | |
| | Vibration | | 49m/s$^2$ maximum | | | | | | |
| | Elevation | | 1000m or less above sea level | | | | | | |

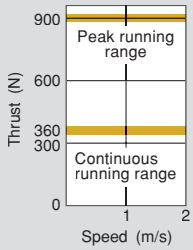
Notes: 1. The servo amplifier with software version B2 or above is compatible.
2. When using this servo amplifier with software version B2 or below, it is required to set parameter No. Po04 to "□□1□". For the servo amplifier with software version B3 or above, setting the parameter is not required.
3. The linear servo motor's maximum speed or the linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.

## ●LM-K2 series thrust characteristics

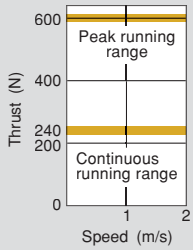
**■LM-K2P1A-01M-2SS1** (Note 1)



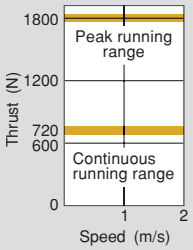

**■LM-K2P1C-03M-2SS1** (Note 2)



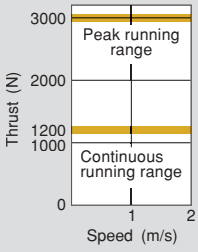

**■LM-K2P2A-02M-1SS1** (Note 1)



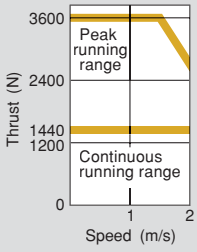

**■LM-K2P2C-07M-1SS1** (Note 2)



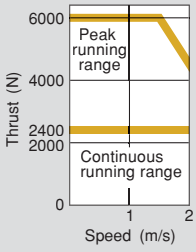

**■LM-K2P2E-12M-1SS1** (Note 2)




**■LM-K2P3C-14M-1SS1** (Note 2)




**■LM-K2P3E-24M-1SS1** (Note 2)




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

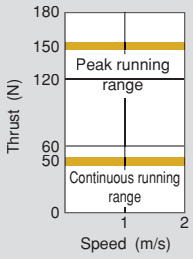
## ●LM-U2 series

| Linear servo motor model | | LM-U2 | PAB-05M-0SS0 | PAD-10M-0SS0 | PAF-15M-0SS0 | PBB-07M-1SS0 | PBD-15M-1SS0 | PBF-22M-1SS0 | P2B-40M-2SS0 | P2C-60M-2SS0 | P2D-80M-2SS0 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Compatible servo amplifier model | MR-J3- (Note1) | | 20B-RJ004(U512) | 40B-RJ004(U513) | 40B-RJ004(U514) | 20B-RJ004(U515) | 60B-RJ004(U516) | 70B-RJ004(U517) | 200BN-RJ004(U509) | 350B-RJ004(U510) | 500B-RJ004(U511) |
| | MR-J3W- | | 22B/44B | 44B/77B (Note2)/ 1010B (Note2) | 44B/77B (Note2)/ 1010B (Note2) | 22B/44B | 77B/1010B | 77B/1010B | — | — | — |
| Power supply capacity (kVA) | | | 0.5 | 0.9 | 0.9 | 0.5 | 1.0 | 1.3 | 3.5 | 5.5 | 7.5 |
| Cooling method | | | Natural-cooling | | | | | | | | |
| Thrust | Continuous (N) | | 50 | 100 | 150 | 75 | 150 | 225 | 400 | 600 | 800 |
| | Maximum (N) | | 150 | 300 | 450 | 225 | 450 | 675 | 1600 | 2400 | 3200 |
| Maximum speed (Note 3) (m/s) | | | 2.0 | | | | | | | | |
| Magnetic attraction force (N) | | | 0 | | | | | | | | |
| Rated current (A) | | | 0.9 | 1.9 | 2.7 | 1.5 | 3.0 | 4.6 | 6.6 | 9.8 | 13.1 |
| Maximum current (A) | | | 2.7 | 5.5 | 8.3 | 4.5 | 8.9 | 13.7 | 26.7 | 40.3 | 53.7 |
| Mass (kg [lb]) | Primary side (coil) | | 0.3 (0.67) | 0.6 (1.4) | 0.8 (1.8) | 0.4 (0.89) | 0.8 (1.8) | 1.1 (2.5) | 2.9 (6.4) | 4.2 (9.3) | 5.5 (13) |
| | Secondary side (magnet) | | 240mm/piece: 2.0 (4.4)<br>300mm/piece: 2.5 (5.6)<br>420mm/piece: 3.5 (7.8) | | | 240mm/piece: 2.6 (5.8)<br>300mm/piece: 3.2 (7.1)<br>420mm/piece: 4.5 (10) | | | 300mm/piece: 9.6 (22)<br>480mm/piece: 15.3 (34) | | |
| Secondary side model LM-U2 | | | SA0-□-0SS0 | | | SB0-□-1SS0 | | | S20-□-2SS0 | | |
| Recommended load to motor mass ratio | | | Maximum of 30 times the mass of the linear servo motor's primary side | | | | | | | | |
| Structure | | | Open (IP rating: IP00) | | | | | | | | |
| Environment | Ambient temperature | | 0 to 40°C (32 to 104°F) (non freezing), storage: -15 to 70°C (5 to 158°F) (non freezing) | | | | | | | | |
| | Ambient humidity | | 80% RH maximum (non condensing), storage: 90% RH maximum (non condensing) | | | | | | | | |
| | Atmosphere | | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust | | | | | | | | |
| | Vibration | | 49m/s$^2$ maximum | | | | | | | | |
| | Elevation | | 1000m or less above sea level | | | | | | | | |

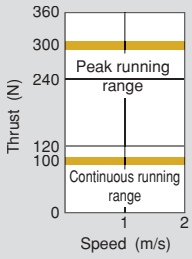
Notes: 1. Servo amplifier model that is compatible with LM-U2 series is MR-J3-□B-RJ004. However, MR-J3-□B-RJ004U□ is also available as before.
2. When using this servo amplifier with software version B2 or below, it is required to set parameter No. Po04 to "□□1□". For the servo amplifier with software version B3 or above, setting the parameter is not required.
3. The linear servo motor's maximum speed or the linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.

## ●LM-U2 series thrust characteristics

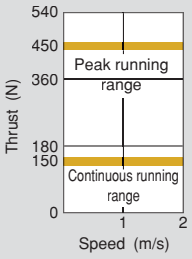
**■LM-U2PAB-05M-0SS0**(Note 1)




**■LM-U2PAD-10M-0SS0**(Note 1)



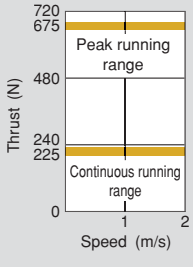

**■LM-U2PAF-15M-0SS0**(Note 1)



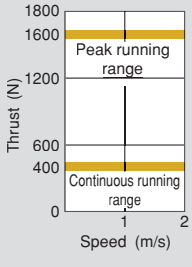

**■LM-U2PBB-07M-1SS0**(Note 1)


**■LM-U2PBD-15M-1SS0**(Note 1)

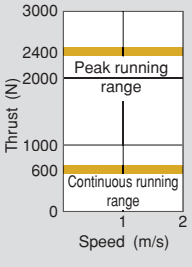

**■LM-U2PBF-22M-1SS0**(Note 1)



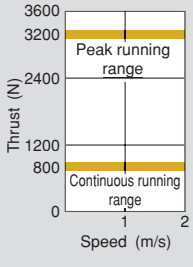

**■LM-U2P2B-40M-2SS0**(Note 2)




**■LM-U2P2C-60M-2SS0**(Note 2)




**■LM-U2P2D-80M-2SS0**(Note 2)



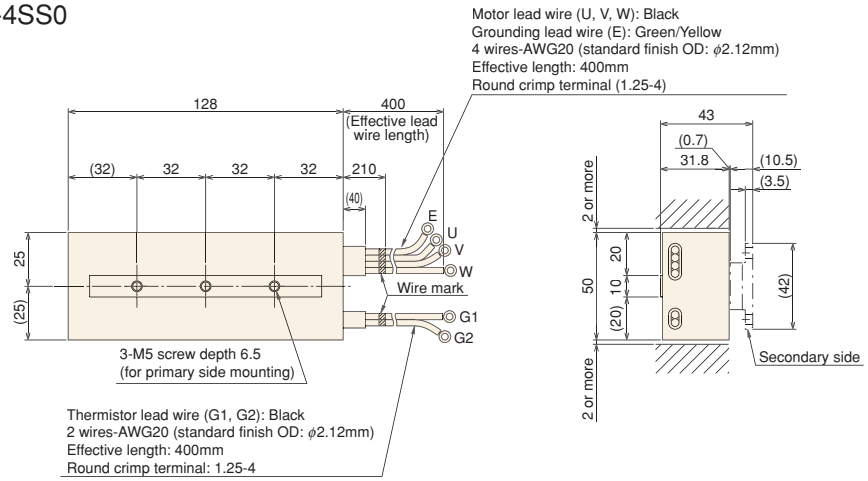

Notes:
1. For 3-phase 200VAC or 1-phase 200VAC.
2. For 3-phase 200VAC.

# Linear servo motor dimensions

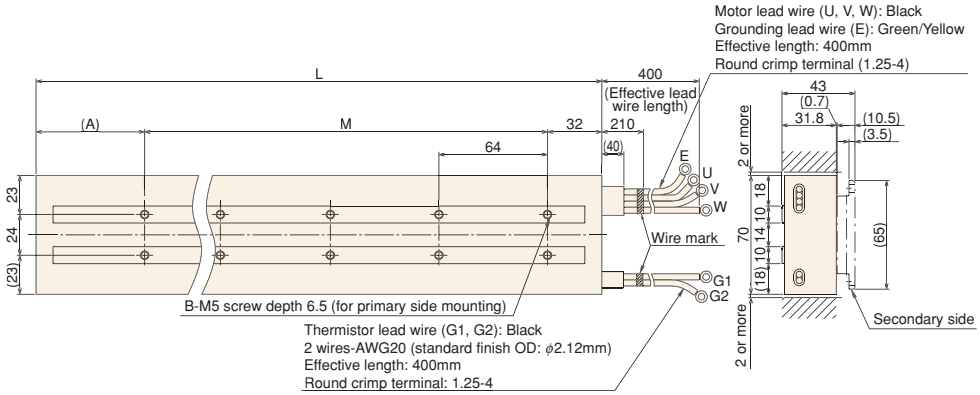
## ●LM-H2 series: primary side (coil) (Note 1, 2)

(Unit: mm)

### ●LM-H2P1A-06M-4SS0

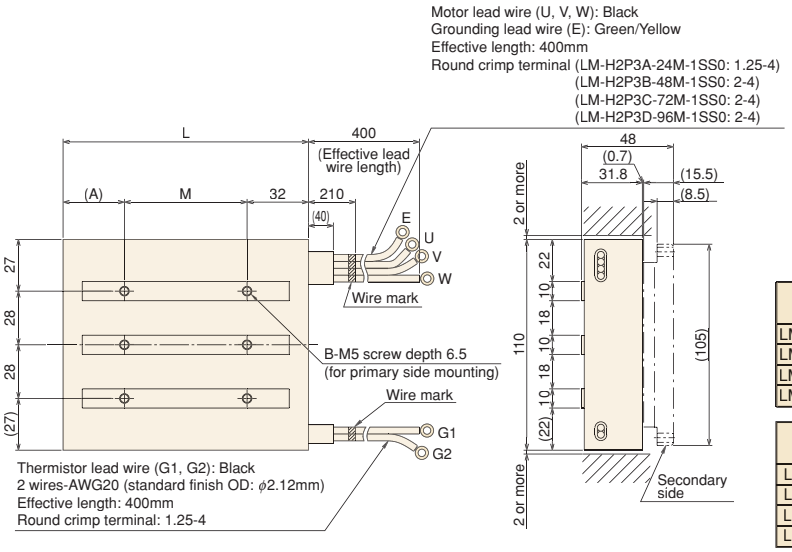



### ●LM-H2P2A-12M-1SS0 ●LM-H2P2B-24M-1SS0 ●LM-H2P2C-36M-1SS0 ●LM-H2P2D-48M-1SS0




| Model | Variable dimensions | | | | Motor/grounding lead wire | |
|---|---|---|---|---|---|---|
| | L | M | A | B | Size | Standard finish OD |
| LM-H2P2A-12M-1SS0 | 128 | 64 | 32 | 2×2 | AWG20 | ϕ2.12 |
| LM-H2P2B-24M-1SS0 | 224 | 2×64 (=128) | 64 | 3×2 | AWG16 | ϕ2.7 |
| LM-H2P2C-36M-1SS0 | 320 | 4×64 (=256) | 32 | 5×2 | | |
| LM-H2P2D-48M-1SS0 | 416 | 5×64 (=320) | 64 | 6×2 | | |

### ●LM-H2P3A-24M-1SS0 ●LM-H2P3B-48M-1SS0 ●LM-H2P3C-72M-1SS0 ●LM-H2P3D-96M-1SS0




| Model | Variable dimensions | | | |
|---|---|---|---|---|
| | L | M | A | B |
| LM-H2P3A-24M-1SS0 | 128 | 64 | 32 | 2×3 |
| LM-H2P3B-48M-1SS0 | 224 | 2×64 (=128) | 64 | 3×3 |
| LM-H2P3C-72M-1SS0 | 320 | 4×64 (=256) | 32 | 5×3 |
| LM-H2P3D-96M-1SS0 | 416 | 5×64 (=320) | 64 | 6×3 |

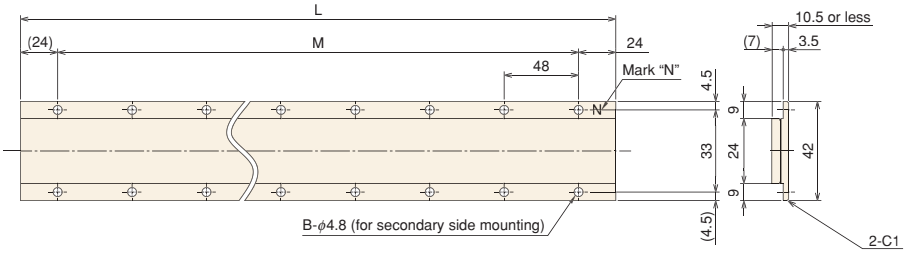
| Model | Motor/grounding lead wire | |
|---|---|---|
| | Size | Standard finish OD |
| LM-H2P3A-24M-1SS0 | AWG20 | ϕ2.12 |
| LM-H2P3B-48M-1SS0 | AWG14 | ϕ3.12 |
| LM-H2P3C-72M-1SS0 | | |
| LM-H2P3D-96M-1SS0 | | |

Notes: 1. The motor and thermistor lead wires do not have a long bending life. Fix the wires led from the primary side (coil) to a movable part to prevent the wires from repetitive bending.
2. Minimum cable bending radius equals to six times the standard finish outer diameter of the cable.

## ●LM-H2 series: secondary side (magnet)

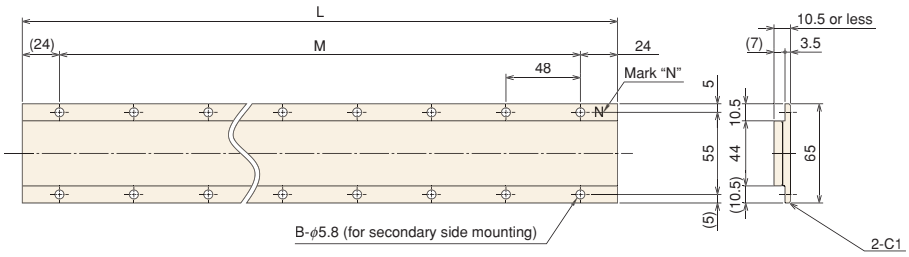
(Unit: mm)

### ●LM-H2S10-288-4SS0 ●LM-H2S10-384-4SS0 ●LM-H2S10-480-4SS0 ●LM-H2S10-768-4SS0



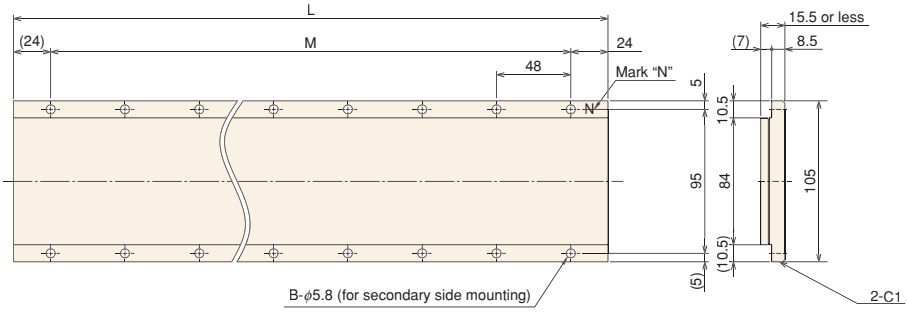

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-H2S10-288-4SS0 | 288 | 5×48 (=240) | 6×2 |
| LM-H2S10-384-4SS0 | 384 | 7×48 (=336) | 8×2 |
| LM-H2S10-480-4SS0 | 480 | 9×48 (=432) | 10×2 |
| LM-H2S10-768-4SS0 | 768 | 15×48 (=720) | 16×2 |

### ●LM-H2S20-288-1SS0 ●LM-H2S20-384-1SS0 ●LM-H2S20-480-1SS0 ●LM-H2S20-768-1SS0




| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-H2S20-288-1SS0 | 288 | 5×48 (=240) | 6×2 |
| LM-H2S20-384-1SS0 | 384 | 7×48 (=336) | 8×2 |
| LM-H2S20-480-1SS0 | 480 | 9×48 (=432) | 10×2 |
| LM-H2S20-768-1SS0 | 768 | 15×48 (=720) | 16×2 |

### ●LM-H2S30-288-1SS0 ●LM-H2S30-384-1SS0 ●LM-H2S30-480-1SS0 ●LM-H2S30-768-1SS0



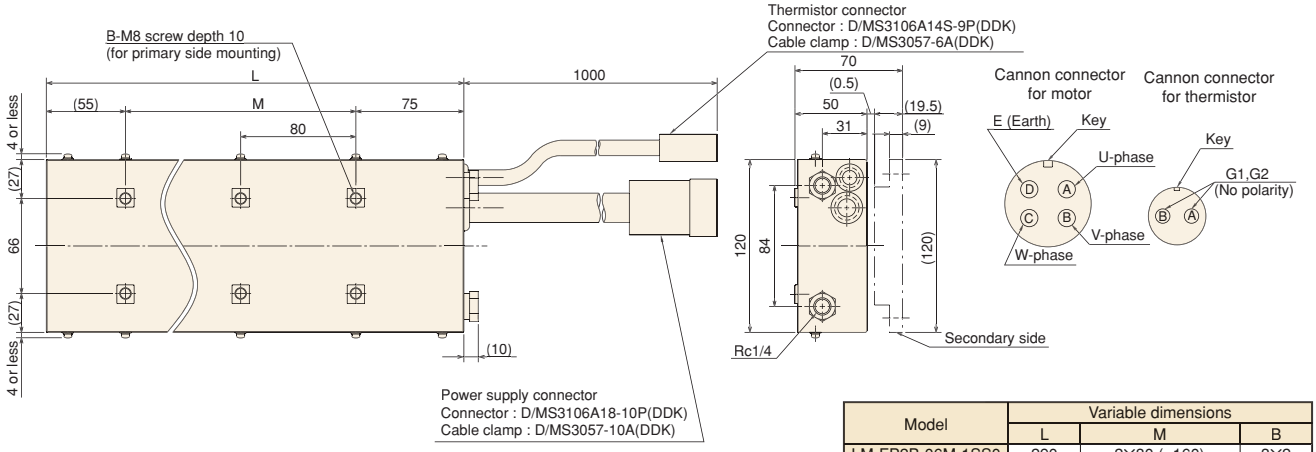

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-H2S30-288-1SS0 | 288 | 5×48 (=240) | 6×2 |
| LM-H2S30-384-1SS0 | 384 | 7×48 (=336) | 8×2 |
| LM-H2S30-480-1SS0 | 480 | 9×48 (=432) | 10×2 |
| LM-H2S30-768-1SS0 | 768 | 15×48 (=720) | 16×2 |

# Linear servo motor dimensions

## ●LM-F series: primary side (coil) (Note 1)

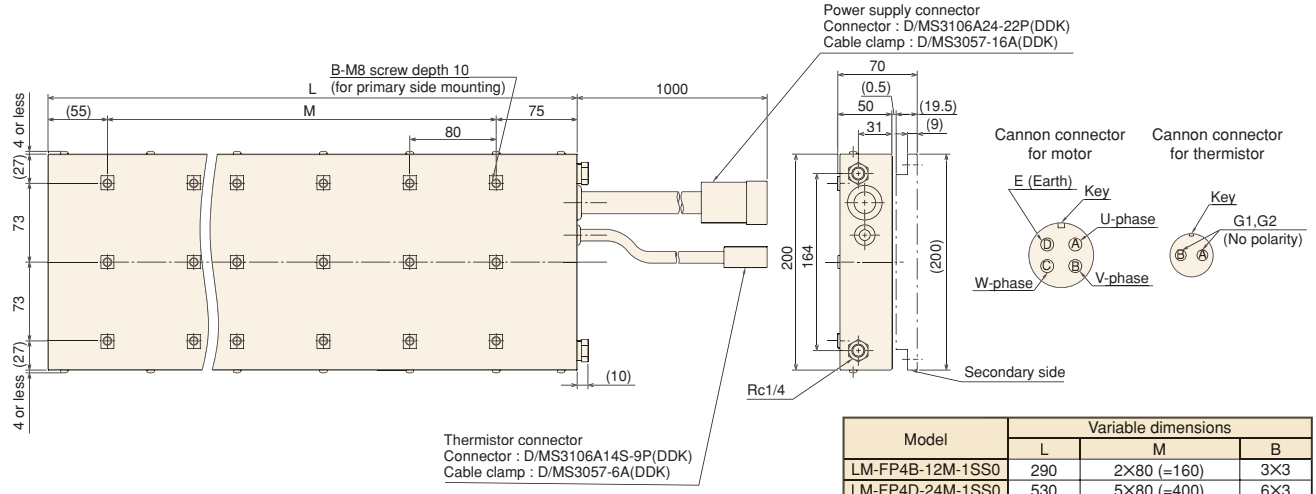
(Unit: mm)

### ●LM-FP2B-06M-1SS0 ●LM-FP2D-12M-1SS0 ●LM-FP2F-18M-1SS0



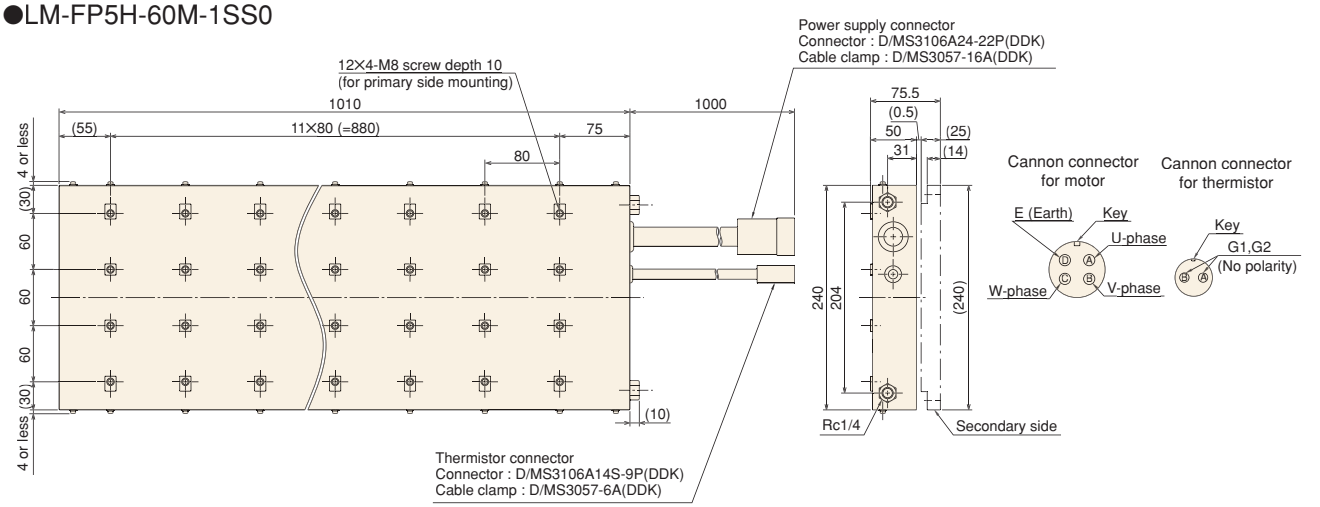

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-FP2B-06M-1SS0 | 290 | 2×80 (=160) | 3×2 |
| LM-FP2D-12M-1SS0 | 530 | 5×80 (=400) | 6×2 |
| LM-FP2F-18M-1SS0 | 770 | 8×80 (=640) | 9×2 |

### ●LM-FP4B-12M-1SS0 ●LM-FP4D-24M-1SS0 ●LM-FP4F-36M-1SS0 ●LM-FP4H-48M-1SS0




| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-FP4B-12M-1SS0 | 290 | 2×80 (=160) | 3×3 |
| LM-FP4D-24M-1SS0 | 530 | 5×80 (=400) | 6×3 |
| LM-FP4F-36M-1SS0 | 770 | 8×80 (=640) | 9×3 |
| LM-FP4H-48M-1SS0 | 1010 | 11×80 (=880) | 12×3 |

### ●LM-FP5H-60M-1SS0

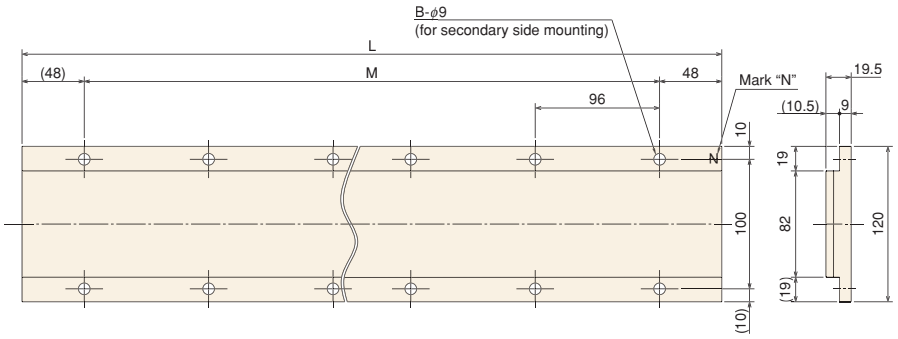



Notes: 1. The motor and thermistor lead wires do not have a long bending life. Fix the wires led from the primary side (coil) to a movable part to prevent the wires from repetitive bending.

## ●LM-F series: secondary side (magnet)

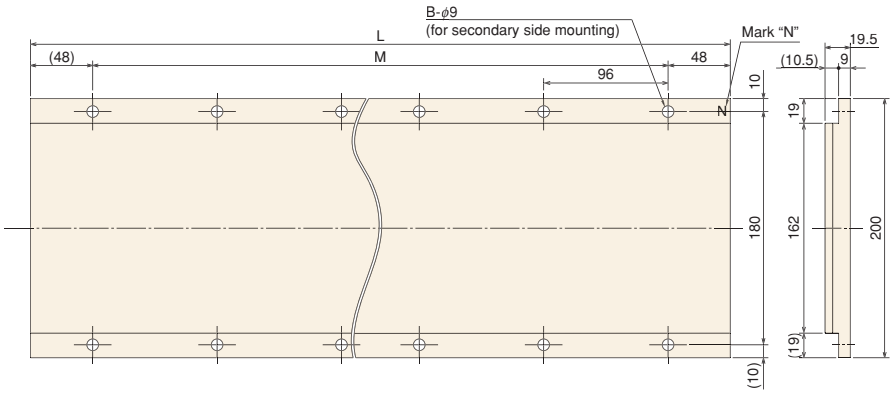
(Unit: mm)

### ●LM-FS20-480-1SS0 ●LM-FS20-576-1SS0



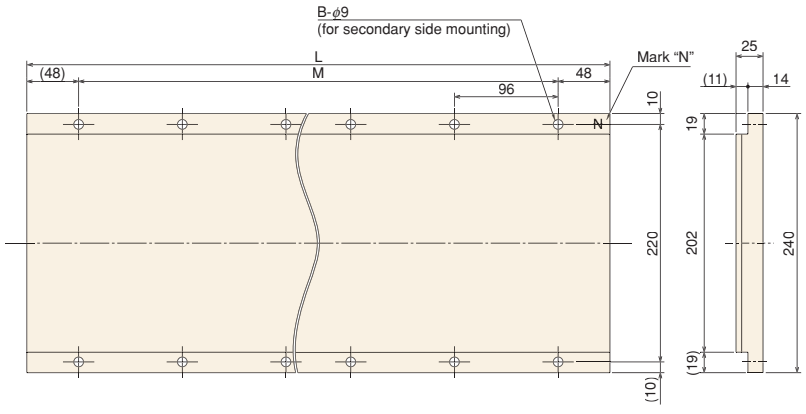

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-FS20-480-1SS0 | 480 | 4×96 (=384) | 5×2 |
| LM-FS20-576-1SS0 | 576 | 5×96 (=480) | 6×2 |

### ●LM-FS40-480-1SS0 ●LM-FS40-576-1SS0




| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-FS40-480-1SS0 | 480 | 4×96 (=384) | 5×2 |
| LM-FS40-576-1SS0 | 576 | 5×96 (=480) | 6×2 |

### ●LM-FS50-480-1SS0 ●LM-FS50-576-1SS0



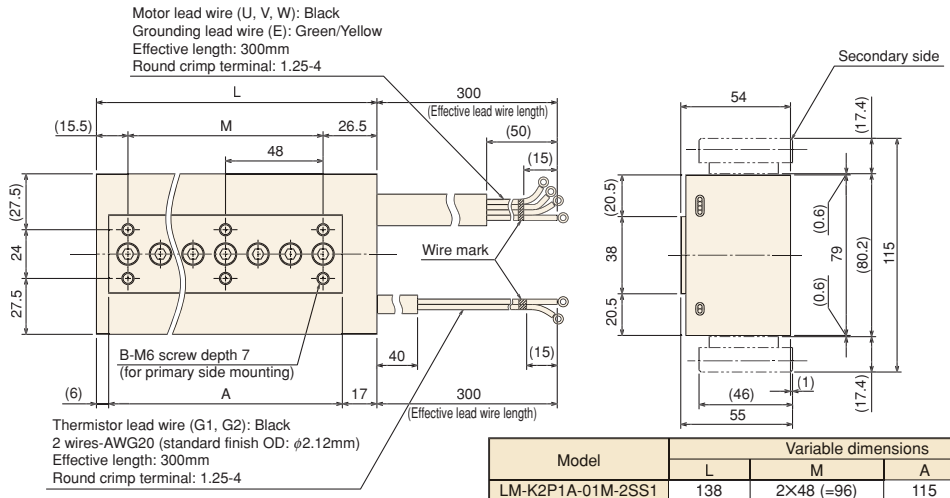

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-FS50-480-1SS0 | 480 | 4×96 (=384) | 5×2 |
| LM-FS50-576-1SS0 | 576 | 5×96 (=480) | 6×2 |

# Linear servo motor dimensions

## ●LM-K2 series: primary side (coil) (Note 1, 2)

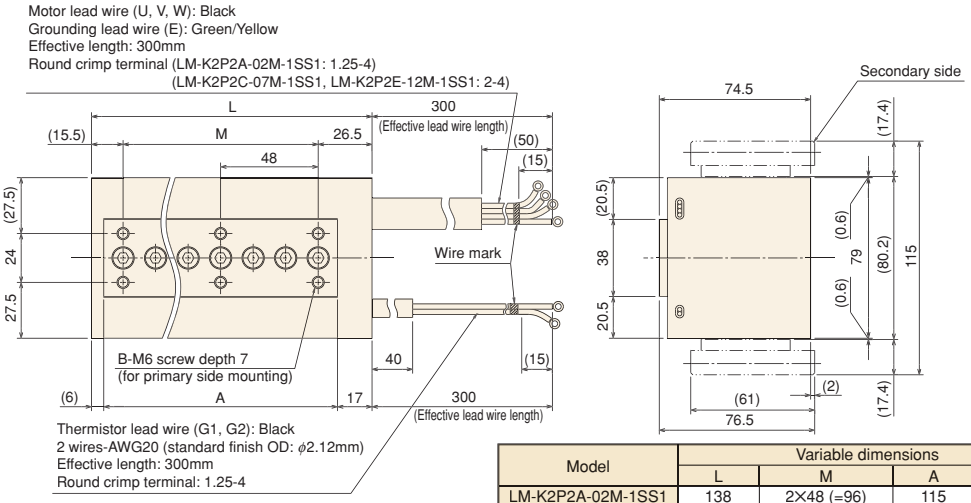
(Unit: mm)

### ●LM-K2P1A-01M-2SS1 ●LM-K2P1C-03M-2SS1



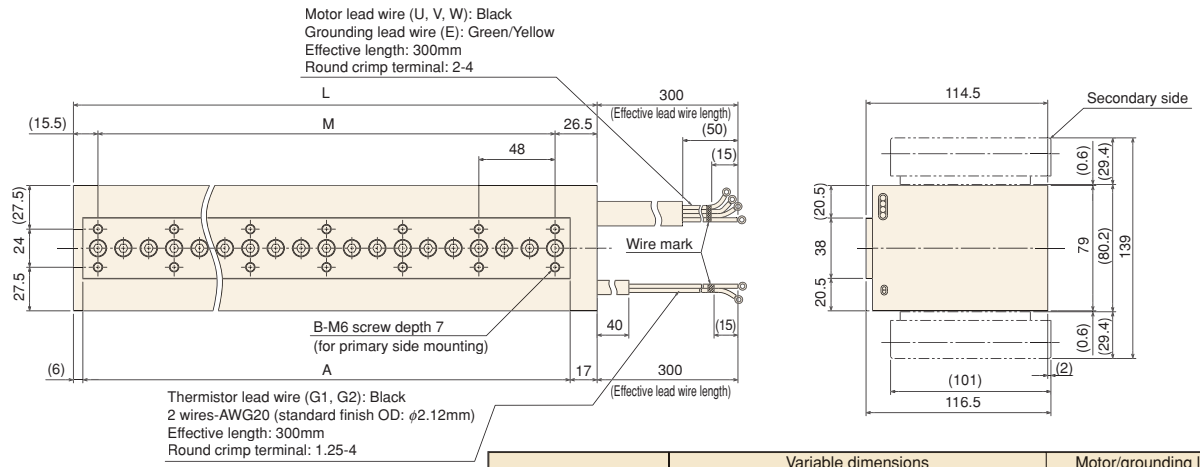

| Model | Variable dimensions | | | | Motor/grounding lead wire | |
|---|---|---|---|---|---|---|
| | L | M | A | B | Size | Standard finish OD |
| LM-K2P1A-01M-2SS1 | 138 | 2×48 (=96) | 115 | 3×2 | AWG20 | ϕ2.12 |
| LM-K2P1C-03M-2SS1 | 330 | 6×48 (=288) | 307 | 7×2 | AWG16 | ϕ2.7 |

### ●LM-K2P2A-02M-1SS1 ●LM-K2P2C-07M-1SS1 ●LM-K2P2E-12M-1SS1




| Model | Variable dimensions | | | | Motor/grounding lead wire | |
|---|---|---|---|---|---|---|
| | L | M | A | B | Size | Standard finish OD |
| LM-K2P2A-02M-1SS1 | 138 | 2×48 (=96) | 115 | 3×2 | AWG16 | ϕ2.7 |
| LM-K2P2C-07M-1SS1 | 330 | 6×48 (=288) | 307 | 7×2 | AWG14 | ϕ3.12 |
| LM-K2P2E-12M-1SS1 | 522 | 10×48 (=480) | 499 | 11×2 | | |

### ●LM-K2P3C-14M-1SS1 ●LM-K2P3E-24M-1SS1



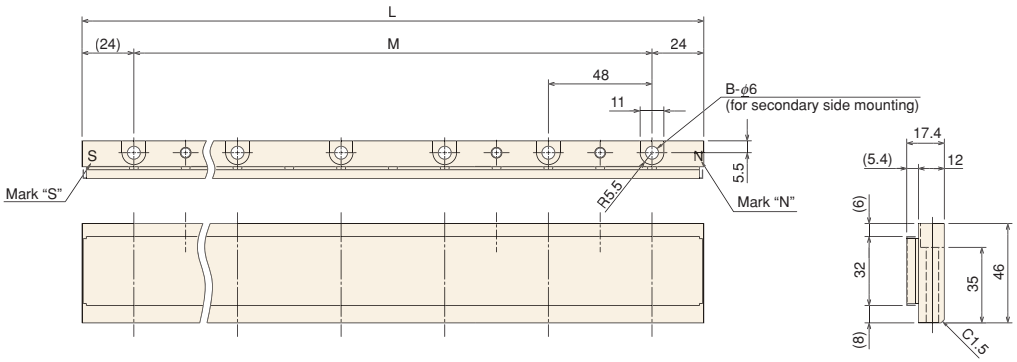

| Model | Variable dimensions | | | | Motor/grounding lead wire | |
|---|---|---|---|---|---|---|
| | L | M | A | B | Size | Standard finish OD |
| LM-K2P3C-14M-1SS1 | 330 | 6×48 (=288) | 307 | 7×2 | AWG14 | ϕ3.12 |
| LM-K2P3E-24M-1SS1 | 522 | 10×48 (=480) | 499 | 11×2 | | |

Notes: 1. The motor and thermistor lead wires do not have a long bending life. Fix the wires led from the primary side (coil) to a movable part to prevent the wires from repetitive bending.
2. Minimum cable bending radius equals to six times the standard finish outer diameter of the cable.

## ●LM-K2 series: secondary side (magnet)

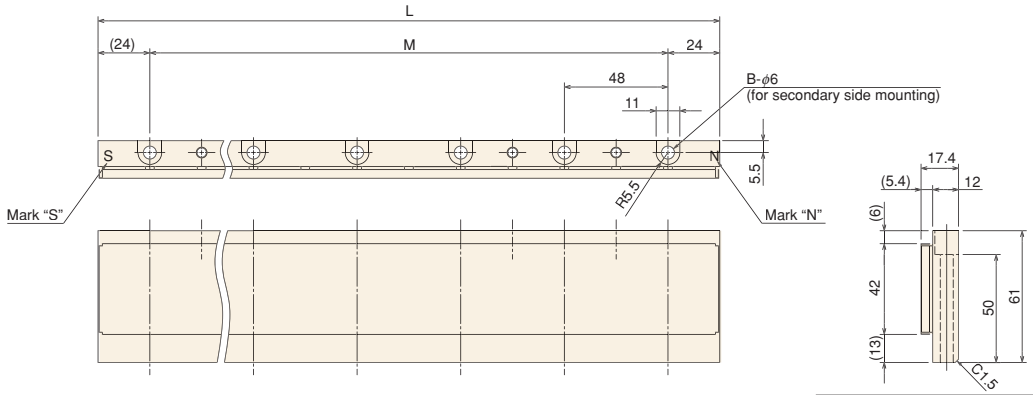
(Unit: mm)

### ●LM-K2S10-288-2SS1 ●LM-K2S10-384-2SS1 ●LM-K2S10-480-2SS1 ●LM-K2S10-768-2SS1



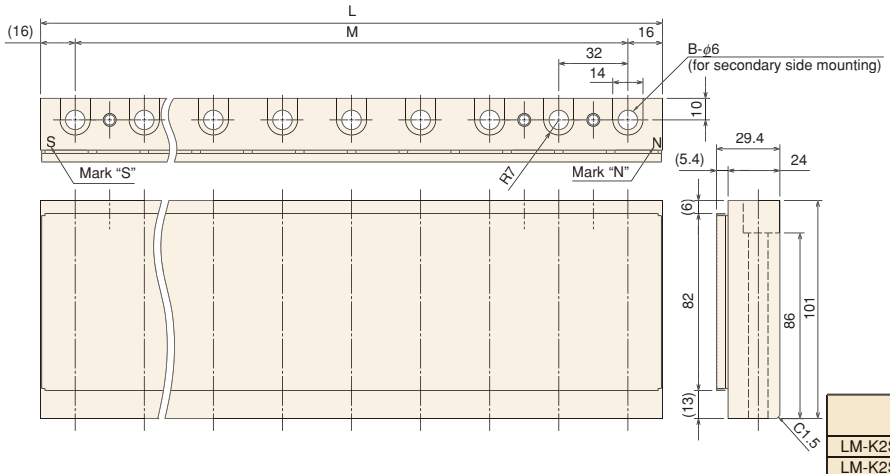

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-K2S10-288-2SS1 | 288 | 5×48 (=240) | 6 |
| LM-K2S10-384-2SS1 | 384 | 7×48 (=336) | 8 |
| LM-K2S10-480-2SS1 | 480 | 9×48 (=432) | 10 |
| LM-K2S10-768-2SS1 | 768 | 15×48 (=720) | 16 |

### ●LM-K2S20-288-1SS1 ●LM-K2S20-384-1SS1 ●LM-K2S20-480-1SS1 ●LM-K2S20-768-1SS1




| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-K2S20-288-1SS1 | 288 | 5×48 (=240) | 6 |
| LM-K2S20-384-1SS1 | 384 | 7×48 (=336) | 8 |
| LM-K2S20-480-1SS1 | 480 | 9×48 (=432) | 10 |
| LM-K2S20-768-1SS1 | 768 | 15×48 (=720) | 16 |

### ●LM-K2S30-288-1SS1 ●LM-K2S30-384-1SS1 ●LM-K2S30-480-1SS1 ●LM-K2S30-768-1SS1



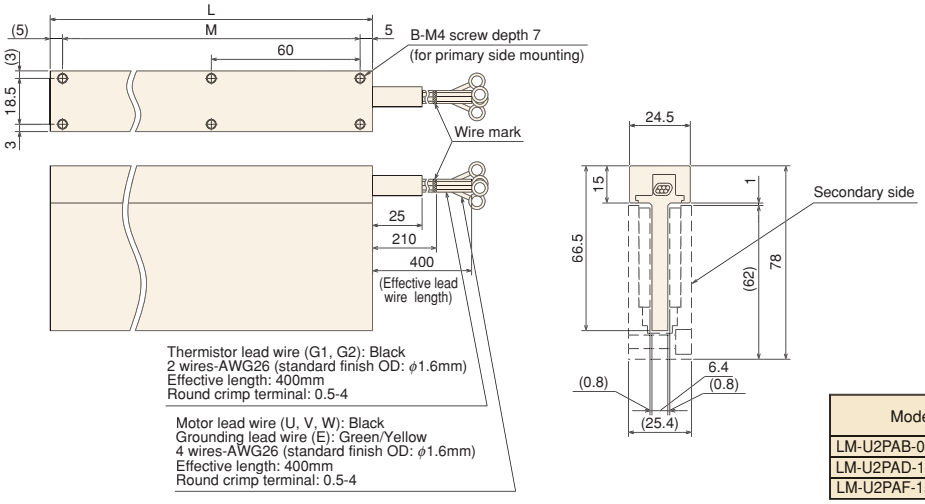

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-K2S30-288-1SS1 | 288 | 8×32 (=256) | 9 |
| LM-K2S30-384-1SS1 | 384 | 11×32 (=352) | 12 |
| LM-K2S30-480-1SS1 | 480 | 14×32 (=448) | 15 |
| LM-K2S30-768-1SS1 | 768 | 23×32 (=736) | 24 |

# Linear servo motor dimensions

## ●LM-U2 series: primary side (coil) (Note 1, 2)

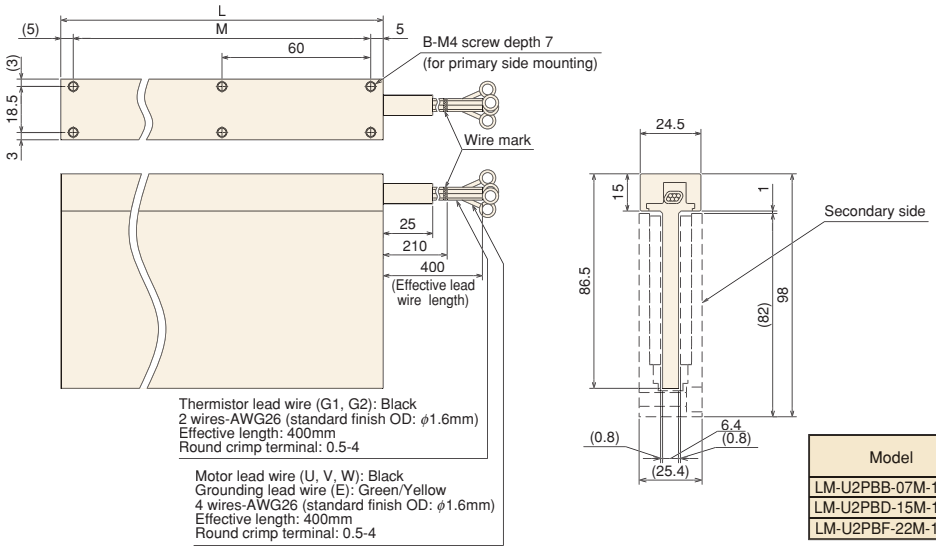
(Unit: mm)

### ●LM-U2PAB-05M-0SS0 ●LM-U2PAD-10M-0SS0 ●LM-U2PAF-15M-0SS0



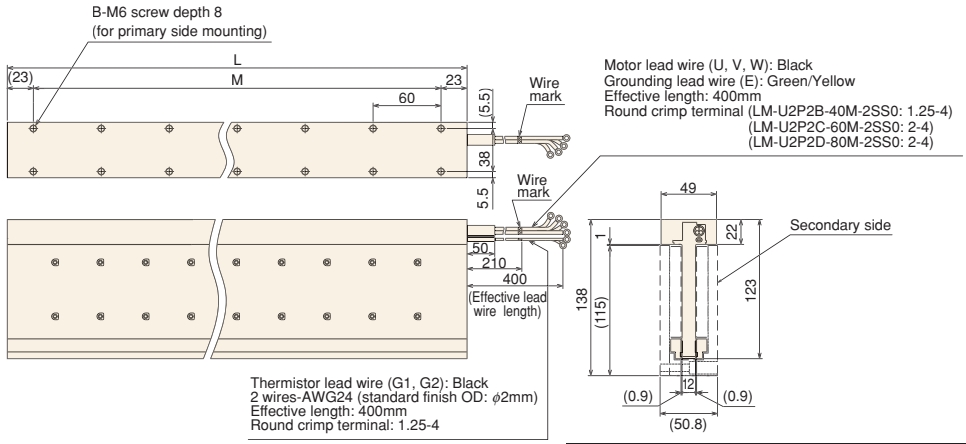

| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-U2PAB-05M-0SS0 | 130 | 2×60 (=120) | 3×2 |
| LM-U2PAD-10M-0SS0 | 250 | 4×60 (=240) | 5×2 |
| LM-U2PAF-15M-0SS0 | 370 | 6×60 (=360) | 7×2 |

### ●LM-U2PBB-07M-1SS0 ●LM-U2PBD-15M-1SS0 ●LM-U2PBF-22M-1SS0




| Model | Variable dimensions | | |
|---|---|---|---|
| | L | M | B |
| LM-U2PBB-07M-1SS0 | 130 | 2×60 (=120) | 3×2 |
| LM-U2PBD-15M-1SS0 | 250 | 4×60 (=240) | 5×2 |
| LM-U2PBF-22M-1SS0 | 370 | 6×60 (=360) | 7×2 |

### ●LM-U2P2B-40M-2SS0 ●LM-U2P2C-60M-2SS0 ●LM-U2P2D-80M-2SS0



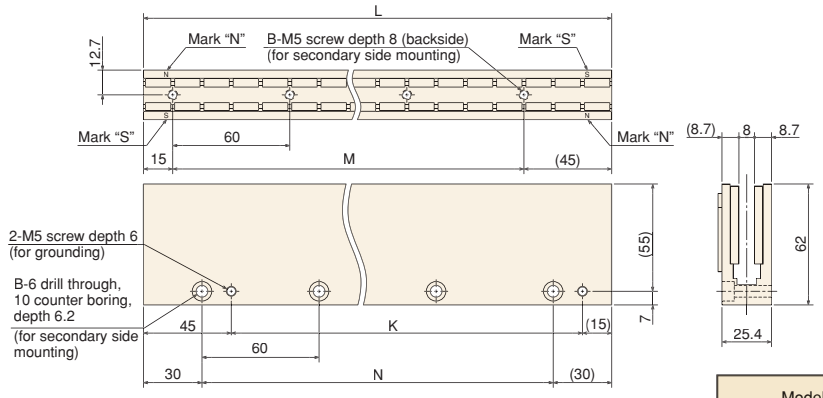

| Model | Variable dimensions | | | Motor/grounding lead wire | |
|---|---|---|---|---|---|
| | L | M | B | Size | Standard finish OD |
| LM-U2P2B-40M-2SS0 | 286 | 4×60 (=240) | 5×2 | AWG16 | ϕ2.7 |
| LM-U2P2C-60M-2SS0 | 406 | 6×60 (=360) | 7×2 | AWG14 | ϕ3.12 |
| LM-U2P2D-80M-2SS0 | 526 | 8×60 (=480) | 9×2 | | |

Notes: 1. The motor and thermistor lead wires do not have a long bending life. Fix the wires led from the primary side (coil) to a movable part to prevent the wires from repetitive bending.
2. Minimum cable bending radius equals to six times the standard finish outer diameter of the cable.

## ●LM-U2 series: secondary side (magnet)

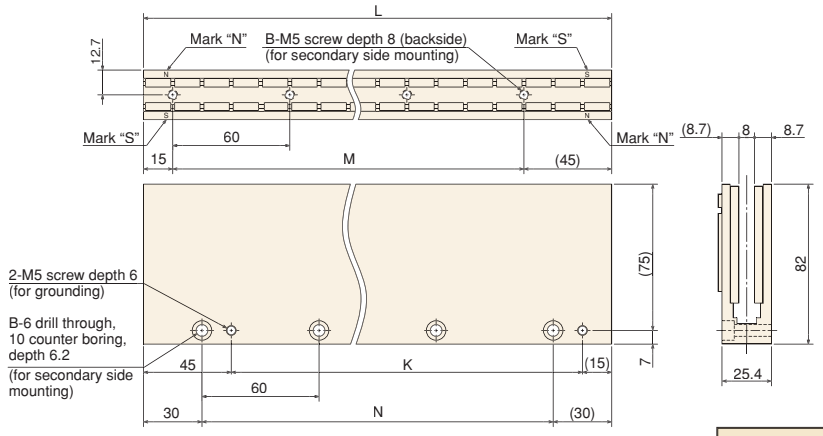
(Unit: mm)

### ●LM-U2SA0-240-0SS0 ●LM-U2SA0-300-0SS0 ●LM-U2SA0-420-0SS0



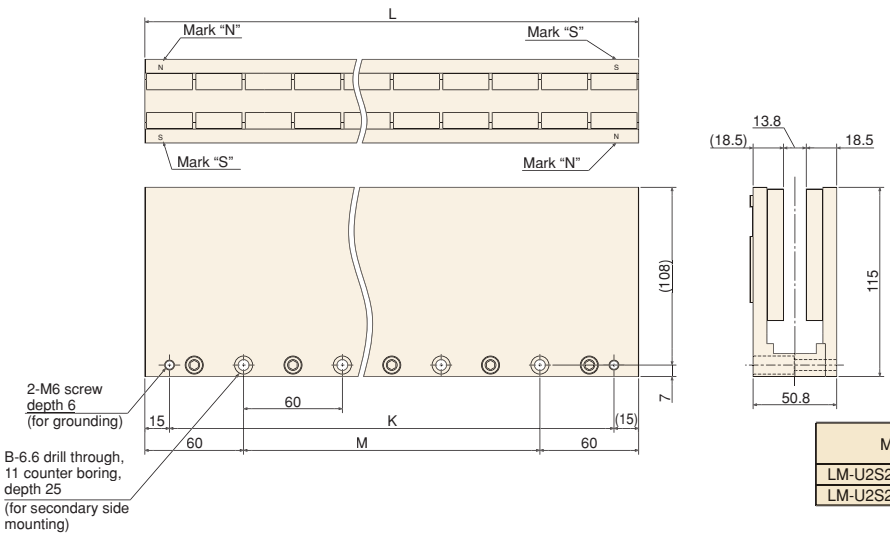

| Model | Variable dimensions | | | | |
|---|---|---|---|---|---|
| | L | M | B | K | N |
| LM-U2SA0-240-0SS0 | 240 | 3×60 (=180) | 4 | 180 | 3×60 (=180) |
| LM-U2SA0-300-0SS0 | 300 | 4×60 (=240) | 5 | 240 | 4×60 (=240) |
| LM-U2SA0-420-0SS0 | 420 | 6×60 (=360) | 7 | 360 | 6×60 (=360) |

### ●LM-U2SB0-240-1SS0 ●LM-U2SB0-300-1SS0 ●LM-U2SB0-420-1SS0




| Model | Variable dimensions | | | | |
|---|---|---|---|---|---|
| | L | M | B | K | N |
| LM-U2SB0-240-1SS0 | 240 | 3×60 (=180) | 4 | 180 | 3×60 (=180) |
| LM-U2SB0-300-1SS0 | 300 | 4×60 (=240) | 5 | 240 | 4×60 (=240) |
| LM-U2SB0-420-1SS0 | 420 | 6×60 (=360) | 7 | 360 | 6×60 (=360) |

### ●LM-U2S20-300-2SS0 ●LM-U2S20-480-2SS0




| Model | Variable dimensions | | | |
|---|---|---|---|---|
| | L | M | B | K |
| LM-U2S20-300-2SS0 | 300 | 3×60 (=180) | 4 | 270 |
| LM-U2S20-480-2SS0 | 480 | 6×60 (=360) | 7 | 450 |

# MR-J3-B-RJ004 servo amplifier specifications

| Servo amplifier model (Note 7) MR-J3- | | | 20B-RJ004(U□) | 40B-RJ004(U□) | 60B-RJ004(U□) | 70B-RJ004(U□) | 200BN-RJ004(U□) | 350B-RJ004(U□) | 500B-RJ004(U□) | 700B-RJ004U□ | 11KB-RJ004U□ | 15KB-RJ004U□ | 22KB4-RJ004U□ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output | Rated voltage | | 3-phase 170VAC | | | | | | | | | | 3-phase 323VAC |
| | Rated current | (A) | 1.5 | 2.8 | 3.2 | 5.8 | 11.0 | 17.0 | 28.0 | 37.0 | 68.0 | 87.0 | 63.0 |
| Main circuit power supply | Voltage/frequency (Note 1) | | 3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz | | | | 3-phase 200 to 230VAC 50/60Hz | | | | | | 3-phase 380 to 480VAC 50/60Hz |
| | Rated current | (A) | 1.5 | 2.6 | 3.2 | 3.8 | 10.5 | 16.0 | 21.7 | 28.9 | 46.0 | 64.0 | 47.6 |
| | Permissible voltage fluctuation | | For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC<br>For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC | | | | 3-phase 170 to 253VAC | | | | | | 3-phase 323 to 528VAC |
| | Permissible frequency fluctuation | | ±5% maximum | | | | | | | | | | |
| Control circuit power supply | Voltage/frequency | | 1-phase 200 to 230VAC 50/60Hz | | | | | | | | | | 1-phase 380 to 480VAC 50/60Hz |
| | Rated current | (A) | 0.2 | | | | | | 0.3 | | | | 0.2 |
| | Permissible voltage fluctuation | | 1-phase 170 to 253VAC | | | | | | | | | | 1-phase 323 to 528VAC |
| | Permissible frequency fluctuation | | ±5% maximum | | | | | | | | | | |
| | Power consumption (W) | | 30 | | | | | | 45 | | | | |
| Interface power supply | | | 24VDC ±10% (required current capacity: 0.15A (Note 3)) | | | | | | | | | | |
| Linear encoder interface | Serial interface | | Mitsubishi high-speed serial communication | | | | | | | | | | |
| | Pulse train interface | Input signal | A/B/Z-phase differential input signal | | | | | | | | | | |
| | | Minimum phase difference | 200ns | | | | | | | | | | |
| Tolerable regenerative power of regenerative resistor (W) (Note 4, 5) | Built-in regenerative resistor | | 10 | 10 | 10 | 20 | 100 | 100 | 130 | 170 | — | — | — |
| | External regenerative resistor (standard accessory) (Note 6) | | — | — | — | — | — | — | — | — | 500 (800) | 850 (1300) | 850 (1300) |
| Control system | | | Sine-wave PWM control/current control system | | | | | | | | | | |
| Dynamic brake | | | Built-in | | | | | | | | External option (Note 8) | | |
| Safety features | | | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), linear servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection, magnetic pole detection protection, linear servo control fault protection | | | | | | | | | | |
| Structure | | | Natural-cooling open (IP rating: IP00) | | | | Fan cooling open (IP rating: IP00) | | | | | | |
| Environment | Ambient temperature (Note 2) | | 0 to 55°C (32 to 131°F) (non freezing), storage: -20 to 65°C (-4 to 149 F) (non freezing) | | | | | | | | | | |
| | Ambient humidity | | 90% RH maximum (non condensing), storage: 90% RH maximum (non condensing) | | | | | | | | | | |
| | Atmosphere | | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust | | | | | | | | | | |
| | Elevation | | 1000m or less above sea level | | | | | | | | | | |
| | Vibration | | 5.9m/s$^2$ or less at 10 to 55Hz (directions of X, Y and Z axes) | | | | | | | | | | |
| Mass | | (kg [lb]) | 0.8 (1.8) | 1.0 (2.2) | 1.0 (2.2) | 1.4 (3.1) | 2.3 (5.1) | 2.3 (5.1) | 4.6 (10) | 6.2 (14) | 18 (40) | 18 (40) | 19 (42) |

Notes: 1. Rated thrust and speed of a linear servo motor are applicable when the servo amplifier, combined with the linear servo motor, is operated within the specified power supply voltage and frequency. Thrust drops when the power supply voltage is below the specified value. Refer to the section “thrust characteristics” in this catalog for thrust characteristics of each linear servo motor.

2. MR-J3-350B-RJ004(U□) or smaller servo amplifiers can be mounted closely. In this case, operate them at the ambient temperature of 0 to 45°C (32 to 113°F) or at 75% or less of the effective load ratio.
3. 0.15A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use.
4. Optimal regenerative resistor varies for each system.
5. Refer to the section “Options ● Optional regeneration unit” in this catalog for the tolerable regenerative power (W).
6. The value in ( ) is applicable when the external regenerative resistors, GRZG400-□Ω (standard accessory) are used with cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m$^3$/min). Note that change in parameter No. PA02 is required.
7. Servo amplifier model that is compatible with LM-F series is MR-J3-□B-RJ004U□. Refer to “Servo amplifier model designation” for more details.
8. Use an optional external dynamic brake with the servo amplifier. Without the external dynamic brake, a linear servo motor does not stop immediately at emergency stop and falls in free-run status, causing an accident such as machine collision, etc. Take measures to ensure safety on the entire system.

# MR-J3W-B (2-axis servo amplifier) specifications

| Servo amplifier model | | MR-J3W-22B | | MR-J3W-44B | | MR-J3W-77B | | MR-J3W-1010B | |
|---|---|---|---|---|---|---|---|---|---|
| Rated output capacity | | A-axis 200W | B-axis 200W | A-axis 400W | B-axis 400W | A-axis 750W | B-axis 750W | A-axis 1kW | B-axis 1kW |
| Output | Rated voltage | 3-phase 170VAC | | | | | | | |
| | Rated current (A) | 1.5 | 1.5 | 2.8 | 2.8 | 5.8 | 5.8 | 6.0 | 6.0 |
| Main circuit power supply (Note 7) | Voltage/frequency (Note 1) | 3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz | | | | 3-phase 200 to 230VAC 50/60Hz or 1-phase 200 to 230VAC 50/60Hz (Note 8) | | 3-phase 200 to 230VAC 50/60Hz | |
| | Rated current (A) | 3.5 | | 6.1 | | 10.4 | | 13.9 | |
| | Permissible voltage fluctuation | For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC<br>For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC | | | | For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC<br>For 1-phase 200 to 230VAC: 1-phase 170 to 253VAC (Note 9) | | 3-phase 170 to 253VAC | |
| | Permissible frequency fluctuation | ±5% maximum | | | | | | | |
| Control circuit power supply | Voltage/frequency | 1-phase 200 to 230VAC 50/60Hz | | | | | | | |
| | Rated current (A) | 0.4 | | | | | | | |
| | Permissible voltage fluctuation | 1-phase 170 to 253VAC | | | | | | | |
| | Permissible frequency fluctuation | ±5% maximum | | | | | | | |
| | Power consumption (W) | 55 | | | | | | | |
| Interface power supply | | 24VDC ±10% (required current capacity: 0.25A (Note 2)) | | | | | | | |
| Capacitor circuit | Reusable regenerative energy (Note 3) (J) | 17 | | 22 | | 46 | | | |
| | Linear servo motor's mass equivalent to permissible charging amount (Note 4) (kg [lb]) | 8.5 (19) | | 11.0 (24.0) | | 23.0 (51.0) | | | |
| Tolerable regenerative power of regenerative resistor (W) | Built-in regenerative resistor | 10 | | | | 100 | | | |
| Control system | | Sine-wave PWM control/current control system | | | | | | | |
| Dynamic brake | | Built-in (Note 5) | | | | | | | |
| Safety features | | Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), linear servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection, magnetic pole detection protection, linear servo control fault protection | | | | | | | |
| Structure | | Natural cooling open (IP rating: IP00) | | Fan cooling open (IP rating: IP00) | | | | | |
| Environment | Ambient temperature (Note 6) | 0 to 55°C (32 to 131°F) (non freezing), storage: –20 to 65°C (–4 to 149°F) (non freezing) | | | | | | | |
| | Ambient humidity | 90% RH maximum (non condensing), storage: 90% RH maximum (non condensing) | | | | | | | |
| | Atmosphere | Indoors (no direct sunlight); no corrosive gas, inflammable gas, oil mist or dust | | | | | | | |
| | Elevation | 1000m or less above sea level | | | | | | | |
| | Vibration | 5.9m/s$^2$ or less at 10 to 55Hz (directions of X, Y and Z axes) | | | | | | | |
| Mass (kg [lb]) | | 1.4 (3.1) | | | | 2.3 (5.1) | | | |

Notes: 1. Rated thrust and speed of a linear servo motor are applicable when the servo amplifier, combined with the linear servo motors, is operated within the specified power supply voltage and frequency. Thrust drops when the power supply voltage is below the specified value. Refer to the section "thrust characteristics" in this catalog for thrust characteristics of each linear servo motor.

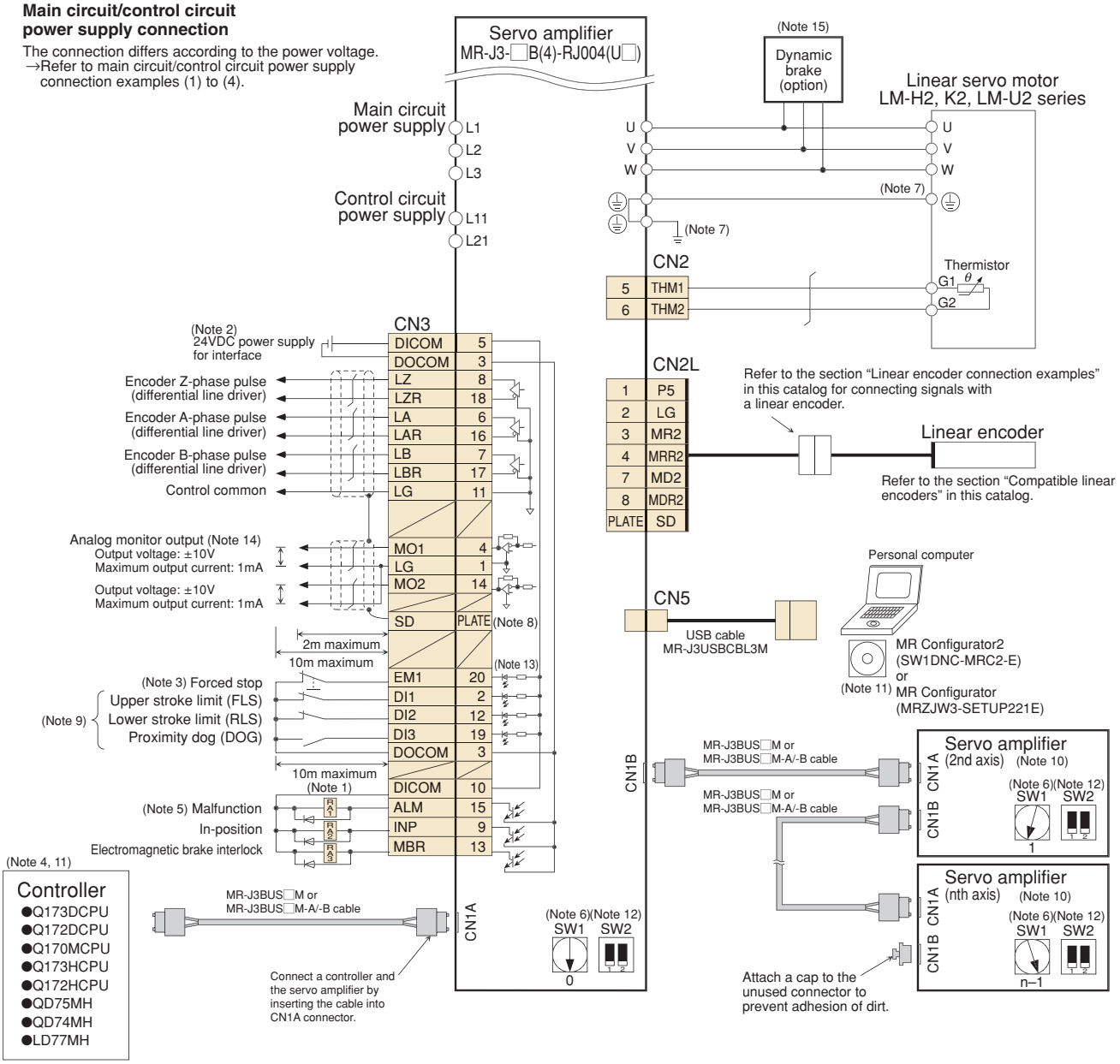
2. 0.25A is the value when all of the input/output points are used. The current capacity can be stepped down according to the number of input/output points in use.
3. "Regenerative energy" is the energy generated when a machine, which has mass equivalent to the permissible charging amount, decelerates from the maximum speed to a stop.
4. Mass of primary side (coil) is included. When two axes are simultaneously decelerated, the permissible charging amount is equivalent to the total masses of both axes. Otherwise, the permissible charging amount is equivalent to the mass of each axis.
5. When using the built-in dynamic brake, refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for permissible load to motor mass ratio.
6. MR-J3W-□B servo amplifiers can be mounted closely. In the case of MR-J3-44B, however, operate them at 90% or less of the effective load ratio.
7. Refer to the section "Linear servo motor specifications" for power supply capacity. Power supply capacity for this servo amplifier is equivalent to the total power supply capacities of each linear servo motor.
8. This input voltage will be applicable for the servo amplifier manufactured in January 2011 or later. For the servo amplifier manufactured in December 2010 or earlier, the input voltage is 3-phase 200VAC to 230VAC 50/60Hz.
9. This input voltage will be applicable for the servo amplifier manufactured in January 2011 or later. For the servo amplifier manufactured in December 2010 or earlier, the input voltage is 3-phase 170VAC to 253VAC 50/60Hz.

# MR-J3-B-RJ004 standard wiring diagram

## ●Connection example

**Main circuit/control circuit power supply connection**

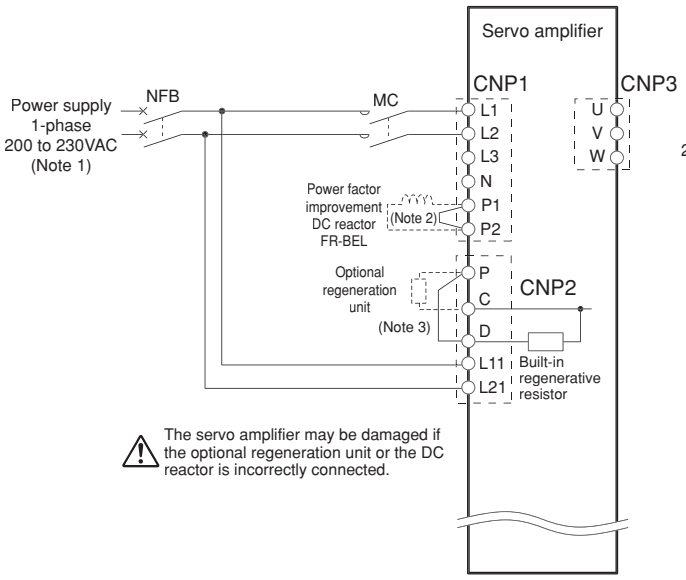
The connection differs according to the power voltage.
→Refer to main circuit/control circuit power supply connection examples (1) to (4).



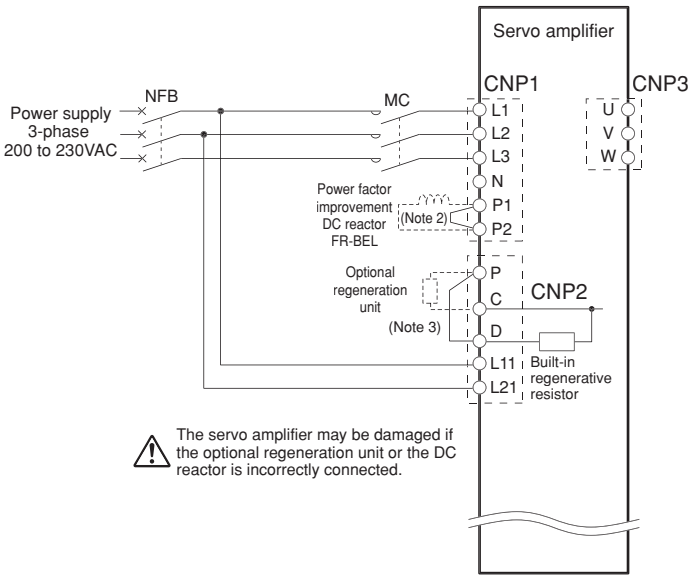

Notes:
1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the forced stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.15A). 0.15A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. The forced stop (EM1) signal is issued for each servo amplifier axis individually. Use this signal as necessary when Q173DCPU, Q172DCPU, Q170MCPU, Q173HCPU, Q172HCPU, QD75MH, QD74MH or LD77MH is connected. When not using, invalidate the forced stop input by parameter No. PA04, or short-circuit EM1 and DOCOM in the connector. For overall system, apply the emergency stop on the controller side.
4. For details on the controllers, refer to relevant controller's programming manual or user's manual.
5. The malfunction (ALM) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
6. Up to 16 axes (n = 1 to 16) can be set using the axis selection rotary switch (SW1).
7. For grounding, connect the ground wire to the cabinet's protective earth (PE) terminal via the servo amplifier's protective earth (PE) terminal.
8. Connect the shield wire securely to the plate inside the connector (ground plate).
9. Devices can be assigned for DI1, DI2 and DI3 with controller setting. Refer to the controller's instruction manuals for details on setting. These devices can be assigned with the controller: Q173DCPU, Q172DCPU, Q170MCPU, Q173HCPU, Q172HCPU, QD75MH, QD74MH or LD77MH.
10. Connections for the second and following axes are omitted.
11. Refer to the section "List of compatible software versions" in this catalog for the compatible software versions.
12. Test operation select switch (SW2-1) is used to perform test operation mode with MR Configurator2 or MR Configurator. SW2-2 is for manufacturer setting.
13. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
14. Output voltage range varies depending on the monitored signal.
15. Use an optional external dynamic brake with the 11kW or larger servo amplifier. Without the external dynamic brake, a linear 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.

# Main/control circuit power supply connection examples for MR-J3-B-RJ004

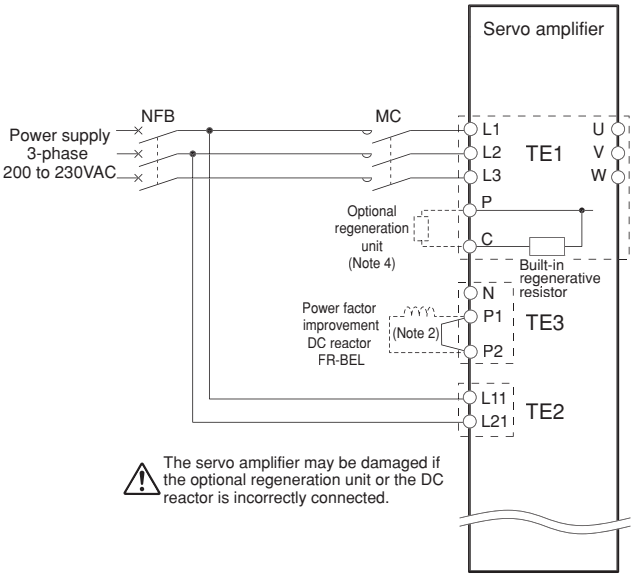
## (1) 1-phase 200V



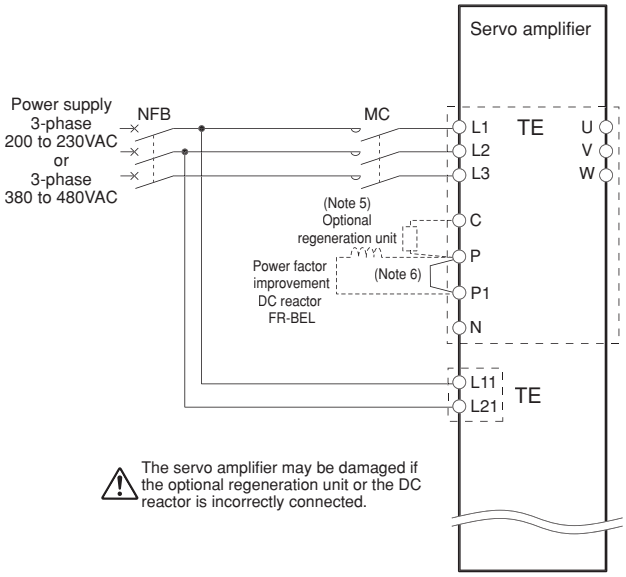

## (2) 3-phase 200V 3.5kW or smaller




## (3) 3-phase 200V 5kW or 7kW



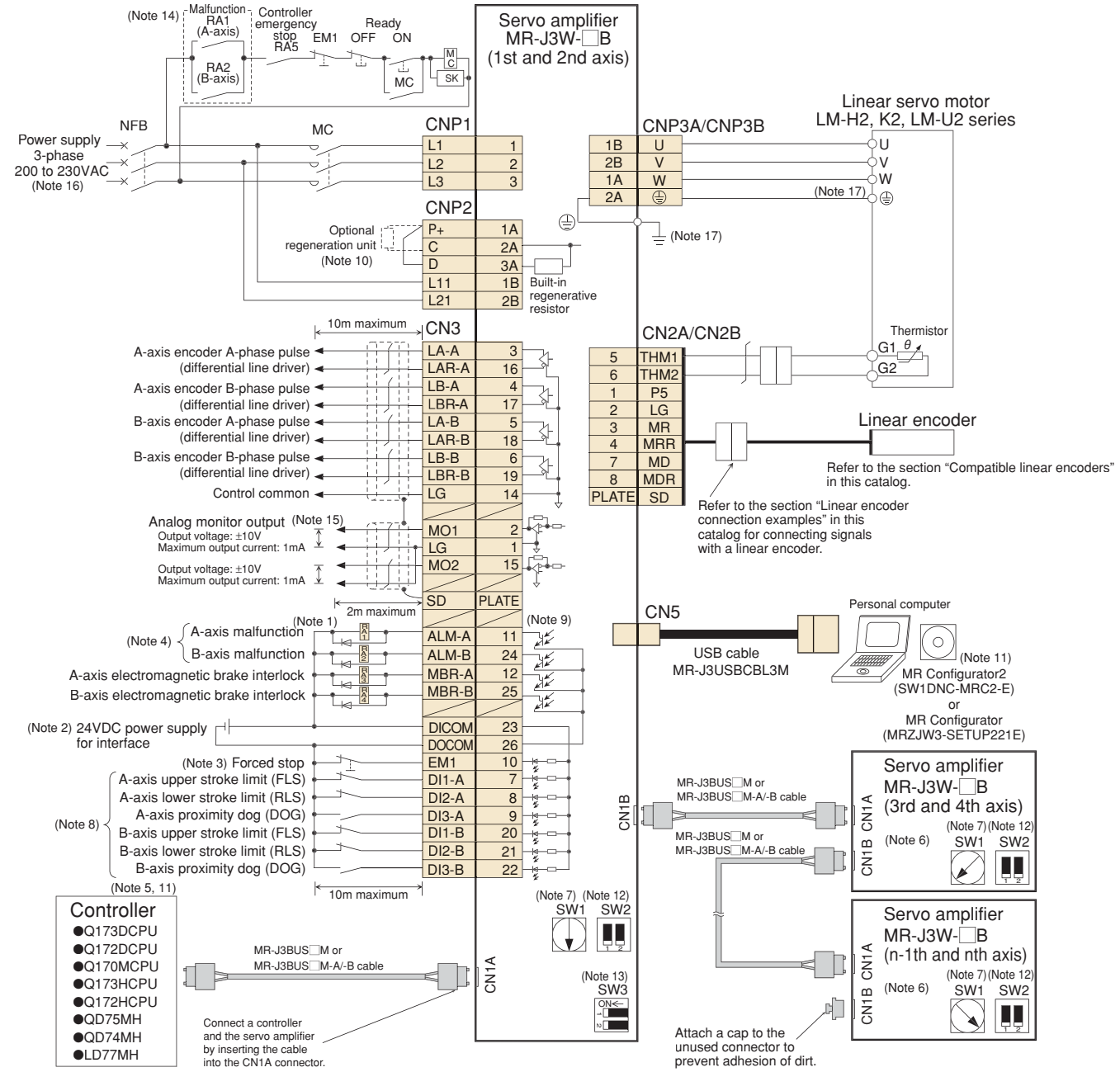

## (4) 3-phase 200V 11kW or 15kW, or 3-phase 400V, 22kW




Notes: 1. When using a 1-phase 200 to 230VAC (for MR-J3-70B-RJ004(U□) or smaller), connect the power supply to the L1 and L2 terminals. Do not connect anything to L3.
2. Disconnect P1 and P2 when using the DC reactor.
3. Disconnect P and D when connecting the optional regeneration unit externally.
4. Disconnect the wires for the built-in regenerative resistor (P and C) when connecting the optional regeneration unit externally.
5. 11kW or larger servo amplifiers do not have a built-in regenerative resistor.
6. Remove the short bar between P and P1 when using the DC reactor.

# MR-J3W-B standard wiring diagram

## ●Connection example

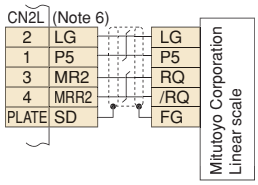



Notes:
1. Do not reverse the diode's direction. Connecting it backwards may cause the servo amplifier to malfunction such that the signals are not output, and the forced stop and other safety circuits are inoperable.
2. Use the power supply 24VDC±10% (required current capacity: 0.25A). 0.25A is the value when all of the input/output points are used. Note that the current capacity can be stepped down according to the number of input/output points in use. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. The forced stop (EM1) signal is issued for both axes of the servo amplifier. For overall system, apply the emergency stop on the controller side.
4. The malfunction (ALM-A/-B) signal (normally closed contact) is conducted to DOCOM in normal alarm-free condition.
5. For details on the controllers, refer to relevant controller's programming manual or user's manual.
6. Connections for the third and following axes are omitted.
7. Up to 16 axes (n=2 to 16) can be set using the axis selection rotary switch (SW1).
8. Devices can be assigned for DI1, DI2 and DI3 with controller setting. Refer to the controller's instruction manuals for details on setting. These devices can be assigned with the controller, Q173DCPU, Q172DCPU, Q170MCPU, Q173HCPU, Q172HCPU, QD75MH, QD74MH or LD77MH.
9. This is for sink wiring. Source wiring is also possible. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
10. When not using an optional regeneration unit, connect P+ and D to use the built-in regenerative resistor. When using an optional regeneration unit, disconnect P+ and D, and then connect the optional regeneration unit to P+ and C.
11. Refer to the section "List of compatible software versions" in this catalog.
12. Test operation select switch (SW2-1) is used to perform test operation mode with MR Configurator2 or MR Configurator. SW2-2 is for manufacturer setting.
13. Servo motor select switch (SW3) is located on the bottom of the servo amplifier. SW3-1 is for A-axis and SW3-2 for B-axis. Set the switch of the axis where a linear servo motor is connected to ON when using the linear servo motor.
14. This connection is for continuing operation with one axis when an alarm occurs on the other axis. To stop the operation of the both axes with an alarm on one axis, connect RA1 and RA2 in series.
15. Output voltage range varies depending on the monitored signal.
16. When using a 1-phase 200VAC to 230VAC, connect the power supply to the L1 and L2 terminals. Do not connect anything to L3. Refer to the section "Servo amplifier specifications" for power supply.
17. For grounding, connect the ground wire to the cabinet's protective earth (PE) terminal via the servo amplifier's protective earth (PE) terminal.

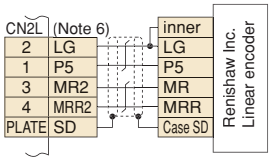
# Linear encoder connection examples

## ●For MR-J3-B-RJ004 (Note 1, 2)

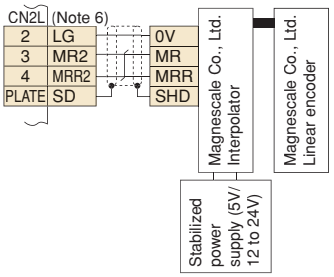
### Mitutoyo Corporation Linear scale



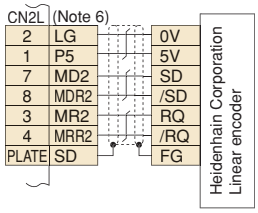

### Renishaw Inc. Linear encoder



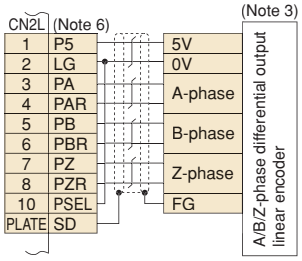

### Magnescale Co., Ltd. Linear encoder (Note 4)



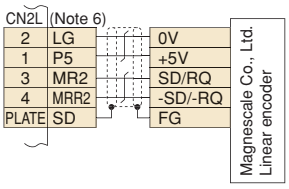

### Heidenhain Corporation Linear encoder




### A/B/Z-phase differential output Linear encoder

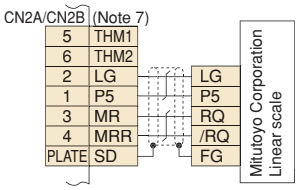



### Magnescale Co., Ltd. Linear encoder (Note 4)

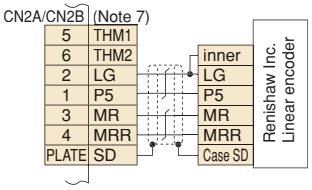



## ●For MR-J3W-B (Note 1, 5)

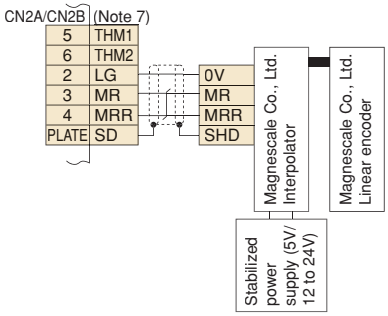
### Mitutoyo Corporation Linear scale



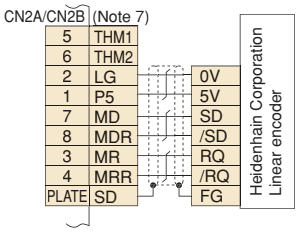

### Renishaw Inc. Linear encoder



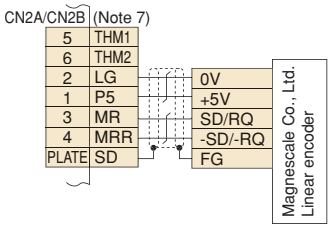

### Magnescale Co., Ltd. Linear encoder (Note 4)




### Heidenhain Corporation Linear encoder




### Magnescale Co., Ltd. Linear encoder (Note 4)



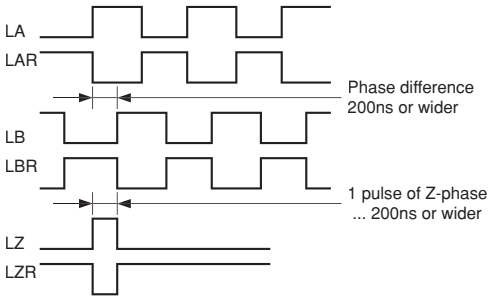

Notes: 1. When manufacturing the linear encoder connection cable, use an optional connector set (MR-J3CN2).
2. Refer to “MR-J3-□B-RJ004(U□) SERVO AMPLIFIER INSTRUCTION MANUAL” for manufacturing the cable.
3. If the encoder’s current consumption exceeds 350mA, supply power from an external source.
4. Former company name: Sony Manufacturing System Corporation (changed since April 2010)
5. Refer to “MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL” for manufacturing the cable.
6. For the number of the wire pairs for LG and P5, refer to “MR-J3-□B-RJ004(U□) INSTRUCTION MANUAL”.
7. For the number of the wire pairs for LG and P5, refer to “MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL”.

# Compatible linear encoders

## ●List of compatible linear encoders (Note 1, 2)

| Linear encoder type | | Manufacturer | Model (Note 13) | Resolution | Rated speed (Note 3) | Maximum effective measurement length (Note 8) | Communication method | Position detection system |
|---|---|---|---|---|---|---|---|---|
| Mitsubishi serial interface compatible | Absolute type | Magnescale Co., Ltd. (Note 12) | SR77 | 0.05μm /0.01μm | 3.3m/s | 2040mm | 2-wire type | Absolute |
| | | | SR87 | | | 3040mm | | |
| | | Mitutoyo Corporation | AT343A | 0.05μm | 2.0m/s | 3000mm | 2-wire type | |
| | | | AT543A-SC | | 2.5m/s | 2200mm | | |
| | | | AT545A-SC | 20/4096 (μm) (Approx. 0.005μm) | 2.5m/s | 2200mm | | |
| | | | ST741A | 0.5μm | 4.0m/s | 6000mm | | |
| | | | ST742A | | | | | |
| | | | ST743A | 0.1μm | | | | |
| | | | ST744A | | | | | |
| | | Heidenhain Corporation | LC 493M (Note 9) | 0.05μm /0.01μm | 3.0m/s | 2040mm | 4-wire type | |
| | | | LC 193M (Note 10) | | | 4240mm | | |
| | Incremental type | Magnescale Co., Ltd. (Note 12) | SR75 | 0.05μm /0.01μm | 3.3m/s | 2040mm | 2-wire type | Incremental |
| | | | SR85 | | | 3040mm | | |
| | | | SL710+PL101-R/RH +MJ830 or MJ831 (Note 4) | 0.2μm (Note 5) | 6.4m/s | 100000mm | | |
| | | Renishaw Inc. | RGH26P | 5μm | 4.0m/s | 70000mm | 2-wire type | |
| | | | RGH26Q | 1μm | 3.2m/s | | | |
| | | | RGH26R | 0.5μm | 1.6m/s | | | |
| | | Heidenhain Corporation | LIDA 485+EIB 392M (Note 11) | 20/16384 (μm) (Approx. 1.22nm) | 4.0m/s | 30040mm | 4-wire type | |
| | | | LIDA 487+EIB 392M (Note 11) | | | 6040mm | | |
| A/B/Z-phase differential output type (Note 6) | Incremental type | Not designated | – | Within tolerable resolution range (Note 7) | Depends on linear encoder | Depends on linear encoder | Differential 3-pair type | |

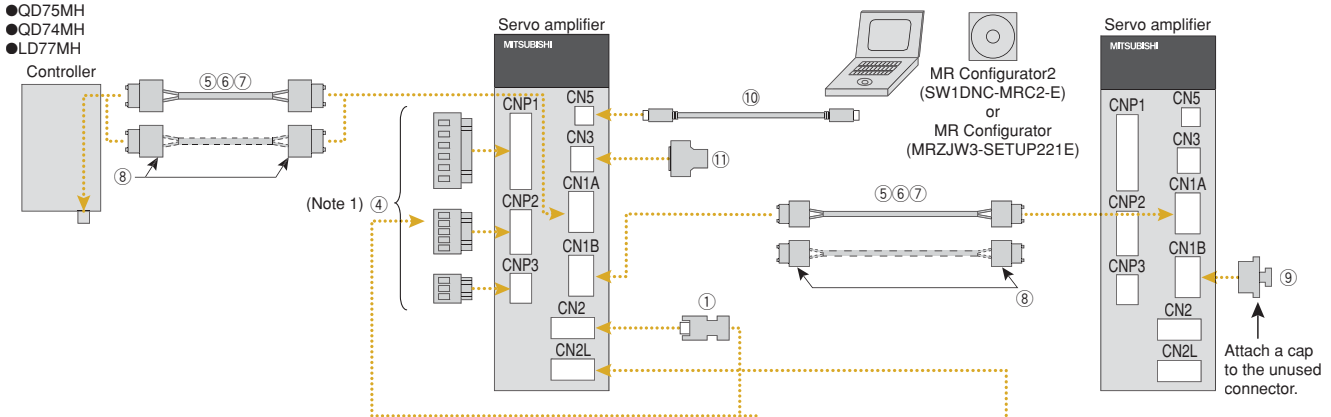
Notes:
1. Consult with the relevant linear encoder manufacturer for details on the linear encoder's working environment and specifications.
2. The linear servo motor generates heat. Take the linear encoder's working environment temperature into consideration when configuring the system.
3. The indicated values are the linear encoder's rated speed when used in combination with the Mitsubishi linear compatible servo amplifier. The values may differ from each manufacturer's specifications. The linear servo motor's maximum speed or the linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.
4. SH13 is out of production. Contact Magnescale Co., Ltd. for more details.
5. The resolution varies according to the setting value of the interpolator, MJ830/MJ831 manufactured by Magnescale Co., Ltd. Set the resolution between the minimum resolution and 5μm.
6. Output the A-phase, B-phase and Z-phase signals in the differential line driver. The phase difference of A-phase pulse and B-phase pulse, and the width of Z-phase pulse must be 200ns or wider. Home position return is not possible with a linear encoder which is not equipped with a Z-phase.
7. The tolerable resolution range is 0.005μm to 5μm. Select the linear encoder within this range.
8. The maximum length of Mitsubishi serial interface communication cable is 30m.
9. LC 493M is a replacement for LC 491M. Contact Heidenhain Corporation for more details.
10. LC 193M is a replacement for LC 192M. Contact Heidenhain Corporation for more details.
11. EIB 392M is a replacement for APE 391M. Contact Heidenhain Corporation for more details.
12. Former company name: Sony Manufacturing System Corporation (changed since April 2010)
13. For servo amplifiers' software versions that are compatible with the linear encoders, refer to the section "List of compatible servo amplifier software versions" in this catalog.



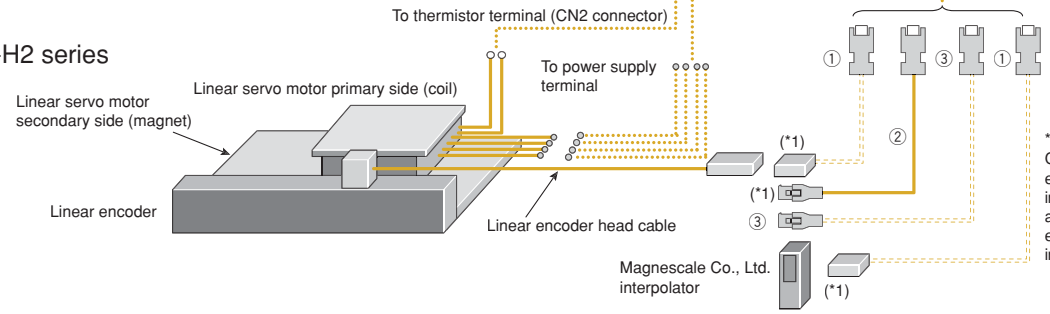
# Options

## ●Cables and connectors for MR-J3-B-RJ004

●Q173DCPU
●Q172DCPU
●Q170MCPU
●Q173HCPU
●Q172HCPU
●QD75MH
●QD74MH
●LD77MH

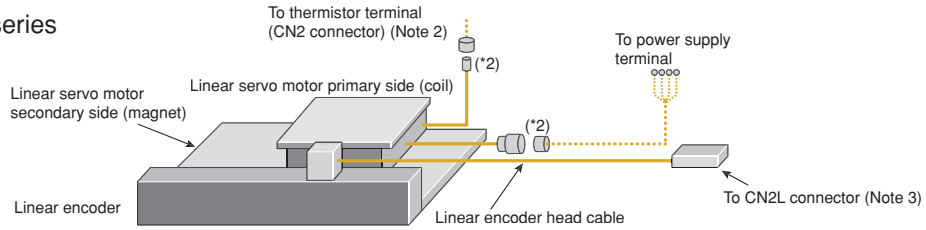



### ●LM-H2 series



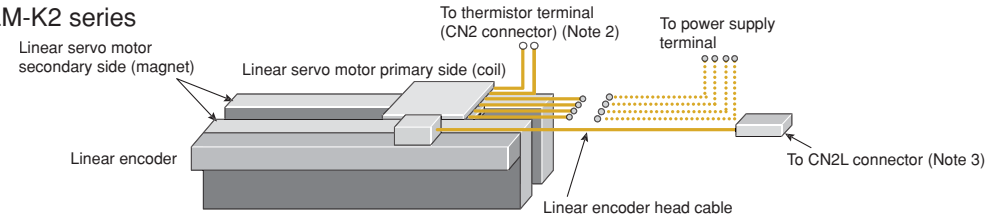

*1
Contact the relevant linear encoder manufacturer for information on the interpolator and the connectors for the linear encoder head cable and for the interpolator.

### ●LM-F series

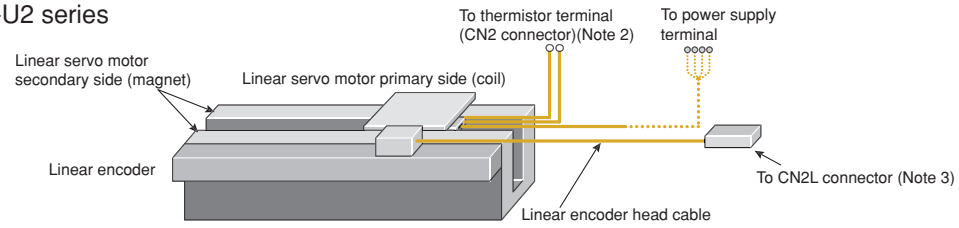



*2
Refer to the section “Ordering information for customers” in this catalog.

### ●LM-K2 series




### ●LM-U2 series




Notes: 1. This connector set is not required for 200V 5kW or larger servo amplifiers since terminal blocks are mounted.
2. The connection to the CN2 connector is the same as for the LM-H2 series.
3. The connection to the CN2L connector is the same as for the LM-H2 series.

## *Cautions regarding the linear encoders

- Linear encoder, head cable and encoder cable are not supplied with the linear servo motor. They must be prepared by user.
- Linear encoder and head cable, which are manufactured by the recommended manufacturers, must be used.
- Consult with the relevant manufacturers for details on the linear encoder’s working environment and specifications.

# Options

## ●Cables and connectors

| | | Item | | Model | IP rating | Description |
|---|---|---|---|---|---|---|
| For CN2, CN2L | ① | CN2 connector set<br>CN2L connector set | | MR-J3CN2 | IP20<br>(Note 1) | Amplifier connector<br>36210-0100PL (receptacle, 3M)<br>36310-3200-008 (shell kit, 3M),<br>or<br>54599-1019 (connector set, Molex) |
| | ② | Encoder cable<br>Connectable to output cable for Mitutoyo Corporation's scale AT343A, AT543A-SC or AT545A-SC (long bending life cable) | | MR-EKCBL□M-H<br>□=cable length<br>2, 5, 10m | IP20<br>(Note 1) | Amplifier connector<br>36210-0100PL (receptacle, 3M)<br>36310-3200-008 (shell kit, 3M),<br>or<br>54599-1019 (connector set, Molex)<br>Junction connector (Tyco Electronics)<br>1-172161-9 (housing)<br>170359-1 (connector pin)<br>MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)<br>Linear encoder |
| | ③ | Encoder connector set<br>Connectable to output cable for Mitutoyo Corporation's scale AT343A, AT543A-SC or AT545A-SC | | MR-ECNM | IP20<br>(Note 1) | Amplifier connector<br>36210-0100PL (receptacle, 3M)<br>36310-3200-008 (shell kit, 3M),<br>or<br>54599-1019 (connector set, Molex)<br>Junction connector (Tyco Electronics)<br>1-172161-9 (housing)<br>170359-1 (connector pin)<br>MTI-0002 (cable clamp, TOA ELECTRIC INDUSTRIAL)<br><Applicable cable example><br>Wire size: 0.3mm² (AWG22)<br>Completed cable outer diameter: ϕ8.2mm<br>Crimping tool (91529-1) is required. |
| For CNP1, CNP2, CNP3 | ④ | Servo amplifier power supply connector set<br>(Note 2) | For MR-J3-70B-RJ004(U□) or smaller | (Standard accessory: Insertion type) | — | CNP1 connector: 54928-0670 (connector) (Molex or an equivalent product)<br>CNP2 connector: 54928-0520 (connector) (Molex or an equivalent product)<br>CNP3 connector: 54928-0370 (connector) (Molex or an equivalent product)<br>Insertion tool: 54932-0000 (Molex or an equivalent product)<br><Applicable cable example><br>Wire size: 0.14mm² (AWG26) to 2.5mm² (AWG14)<br>Completed cable outer diameter: up to ϕ3.8mm |
| | | | For MR-J3-350B-RJ004(U□) | | | CNP1 connector: PC 4/ 6-STF-7,62-CRWH (connector) (PHOENIX or an equivalent product)<br>CNP2 connector: 54928-0520 (connector) (Molex or an equivalent product)<br>CNP3 connector: PC 4/ 3-STF-7,62-CRWH (connector) (PHOENIX or an equivalent product)<br>Insertion tool: 54932-0000 (Molex or an equivalent product)<br><Applicable cable example><br>Wire size: 0.2mm² (AWG24) to 5.5mm² (AWG10)<br>Completed cable outer diameter: up to ϕ5mm |
| | | | For MR-J3-200BN-RJ004(U□) (Note 7) | | | CNP1 connector: 721-207/026-000 (plug) (WAGO or an equivalent product)<br>CNP2 connector: 721-205/026-000 (plug) (WAGO or an equivalent product)<br>CNP3 connector: 721-203/026-000 (plug) (WAGO or an equivalent product)<br>Insertion tool: 231-131 (WAGO or an equivalent product)<br><Applicable cable example><br>Wire size: 0.08mm² (AWG28) to 2.5mm² (AWG12)<br>Completed cable outer diameter: up to ϕ4.1mm |
| For controller, CN1A, CN1B | ⑤ | SSCNET Ⅲ cable (Note 6)<br>(Standard cord for inside cabinet) | | MR-J3BUS□M<br>□=cable length<br>0.15, 0.3, 0.5, 1, 3m | — | Connector (Japan Aviation Electronics Industry)<br>PF-2D103 (connector) |
| | ⑥ | SSCNET Ⅲ cable (Note 6)<br>(Standard cable for outside cabinet) | | MR-J3BUS□M-A<br>□=cable length<br>5, 10, 20m | — | |
| | ⑦ | SSCNET Ⅲ cable (Note 6)<br>(Long distance cable, long bending life) | | MR-J3BUS□M-B<br>□=cable length<br>30, 40, 50m (Note 3) | — | Connector (Japan Aviation Electronics Industry)<br>CF-2D103-S (connector) |
| | ⑧ | Connector set for SSCNET Ⅲ<br>(Note 6) | | MR-J3BCN1<br>(Note 5) | — | Connector (Japan Aviation Electronics Industry)<br>PF-2D103 (connector) |
| For CN1B | ⑨ | Connector cap for SSCNET Ⅲ | | (Standard accessory) | — | |
| For CN5 | ⑩ | Personal computer communication cable | USB cable | MR-J3USBCBL3M<br>Cable length 3m | — | Amplifier connector<br>mini-B connector (5 pins)<br>Personal computer connector<br>A connector<br>Note: This cable cannot be used with the SSCNET Ⅲ compatible controller. |
| For CN3 | ⑪ | Input/output signal connector set | | MR-CCN1 | — | Amplifier connector (3M or an equivalent product)<br>10120-3000PE (connector)<br>10320-52F0-008 (shell kit) (Note 4) |

Notes: 1. The IP rating indicated is for the connector's protection against ingress of dust and water when coupled to a servo amplifier/linear servo motor. If the IP rating of the servo amplifier/linear servo motor differs from that of these connectors, overall IP rating depends on the lowest of all.
2. This connector set is not required for 5kW or larger servo amplifiers since terminal blocks are mounted.
3. For the ultra-long bending life cables and/or for unlisted lengths which are 20m or shorter (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
4. The connector and the shell kit are soldered type. Models for press bonding type are 10120-6000EL (connector) and 10320-3210-000 (shell kit).
5. Special tools are required. Contact your local sales office.
6. Look carefully through the precautions enclosed with the options before use.
7. Contact your local sales office for connectors for MR-J3-200B-RJ004(U□).

# Ordering information for customers

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

| Item | | Description |
|---|---|---|
| Power supply connector | For LM-FP2B/2D/2F | D/MS3101A18-10S (cable receptacle, DDK) / D/MS3057A-10A (cable clamp, DDK) |
| | For LM-FP4B/4D/4F/4H/5H | D/MS3101A24-22S (cable receptacle, DDK) / D/MS3057A-16A (cable clamp, DDK) |
| Thermistor connector | For LM-F series | D/MS3101A14S-9S (cable receptacle, DDK) / D/MS3057A-6A (cable clamp, DDK) |

# Options

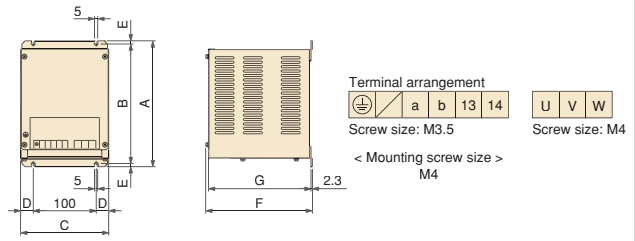
## ●Dynamic brake (for MR-J3-B-RJ004)

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

| Model | Servo amplifier | Fig. |
|---|---|---|
| DBU-11K | MR-J3-11KB-RJ004U□ | A |
| DBU-15K | MR-J3-15KB-RJ004U□ | |
| DBU-22K-4 | MR-J3-22KB4-RJ004U□ | B |

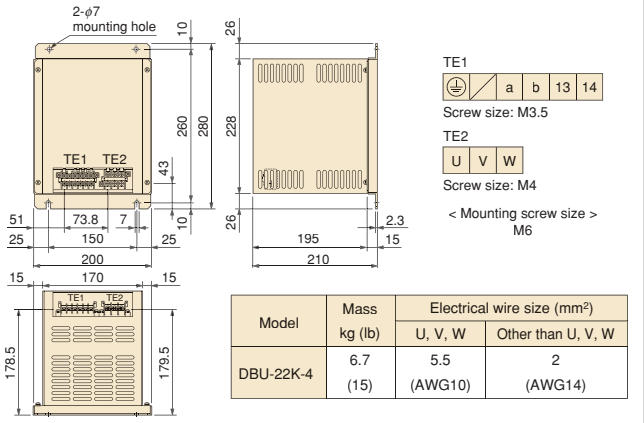
### External dimensions (Unit: mm)

A



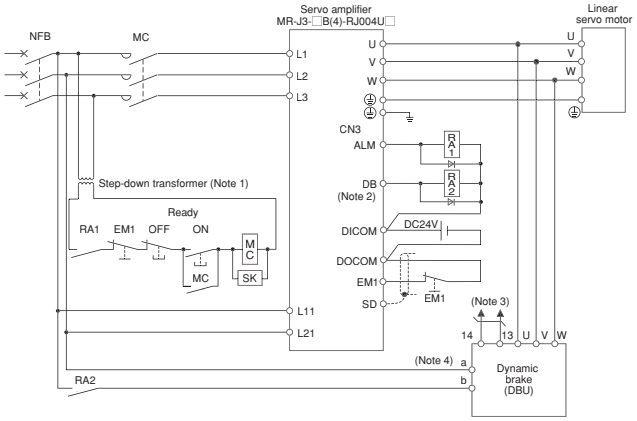

| Model | A | B | C | D | E | F | G | Mass kg (lb) | Electrical wire size (mm²) |
|---|---|---|---|---|---|---|---|---|---|
| DBU-11K | 200 | 190 | 140 | 20 | 5 | 170 | 163.5 | 2 (4.4) | 5.5 (AWG10) |
| DBU-15K | 250 | 238 | 150 | 25 | 6 | 235 | 228 | 6 (13) | 5.5 (AWG10) |

B




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

### Connections




Notes: 1. A step-down transformer is required when coil voltage of the magnetic contactor (MC) is 200V class, and the servo amplifier is 400V class.
2. Validate the dynamic brake interlock (DB) signal by parameter No. PD07 to PD09.
3. The terminals 13 and 14 are normally opened outputs. If the dynamic brake is welded, the terminals 13 and 14 will be opened. So, create the external sequence circuit that the servo on (SON) signal does not turn on when the terminals 13 and 14 are opened.
4. When using DBU-22K-4, the power supply must be between 1-phase 380VAC to 463VAC 50/60Hz. Refer to "MR-J3-□B SERVO AMPLIFIER MANUAL" for details.

# Options

## ●Optional regeneration unit (for MR-J3-B-RJ004)

| Servo amplifier | Tolerable regenerative power of built-in regenerative resistor (W) | Tolerable regenerative power of standard accessory (external regenerative resistor) (W) (Note 3) | | | Tolerable regenerative power of optional regeneration unit (W) (Note 3) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GRZG400- | | | MR-RB | | | | | | | | | |
| | | 1.5Ω×4 (Note 2) | 0.9Ω×5 (Note 2) | 2Ω×5 (Note 2) | 032 [40Ω] | 12 [40Ω] | 30 [13Ω] | 31 [6.7Ω] | 32 [40Ω] | 50 [13Ω] (Note 1) | 51 [6.7Ω] (Note 1) | 5E [6Ω] (Note 2) | 9P [4.5Ω] (Note 2) | 6K-4 [10Ω] (Note 2) |
| MR-J3-20B-RJ004(U□) | 10 | – | – | – | 30 | 100 | – | – | – | – | – | – | – | – |
| MR-J3-40B-RJ004(U□) | 10 | – | – | – | 30 | 100 | – | – | – | – | – | – | – | – |
| MR-J3-60B-RJ004(U□) | 10 | – | – | – | 30 | 100 | – | – | – | – | – | – | – | – |
| MR-J3-70B-RJ004(U□) | 20 | – | – | – | 30 | 100 | – | – | 300 | – | – | – | – | – |
| MR-J3-200BN-RJ004(U□) | 100 | – | – | – | – | – | 300 | – | – | 500 | – | – | – | – |
| MR-J3-350B-RJ004(U□) | 100 | – | – | – | – | – | 300 | – | – | 500 | – | – | – | – |
| MR-J3-500B-RJ004(U□) | 130 | – | – | – | – | – | – | 300 | – | – | 500 | – | – | – |
| MR-J3-700B-RJ004U□ | 170 | – | – | – | – | – | – | 300 | – | – | 500 | – | – | – |
| MR-J3-11KB-RJ004U□ | – | 500 (800) | – | – | – | – | – | – | – | – | – | 500 (800) | – | – |
| MR-J3-15KB-RJ004U□ | – | – | 850 (1300) | – | – | – | – | – | – | – | – | – | 850 (1300) | – |
| MR-J3-22KB4-RJ004U□ | – | – | – | 850 (1300) | – | – | – | – | – | – | – | – | – | 850 (1300) |

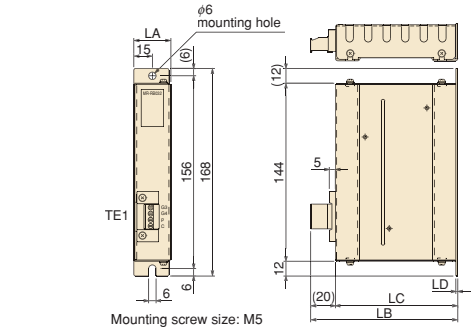
Notes: 1. Be sure cool the unit forcibly with a cooling fan (92 × 92mm, minimum air flow: 1.0m$^3$/min). The cooling fan must be prepared by user.
2. The values in ( ) indicate when cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m$^3$/min) are installed, and parameter No. PA02 is changed.
3. The power values in this table are resistor-generated powers, not rated powers.

### ∗Cautions when connecting the optional regeneration unit

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

## External dimensions (Unit: mm)

### ●MR-RB032, MR-RB12 (200VAC)




Mounting screw size: M5

<Terminal arrangement>

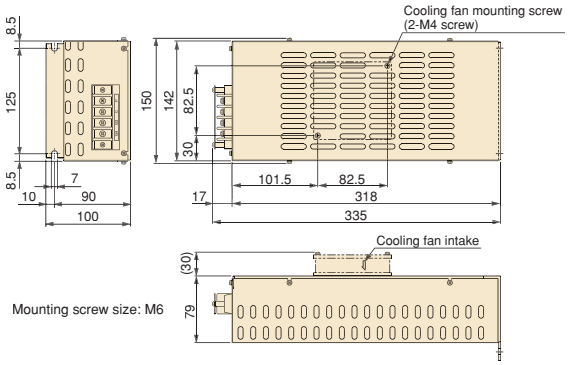
TE1

| |
|---|
| G3 |
| G4 |
| P |
| C |

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

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

### ●MR-RB30, MR-RB31, MR-RB32 (200VAC)




Mounting screw size: M6

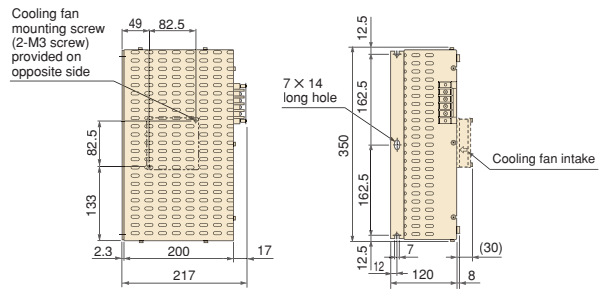
<Terminal arrangement>

| |
|---|
| P |
| C |
| G3 |
| G4 |

Terminal screw size: M4

| Model | Mass kg (lb) |
|---|---|
| MR-RB30<br>MR-RB31<br>MR-RB32 | 2.9 (6.4) |

### ●MR-RB50, MR-RB51 (200VAC)




Mounting screw size: M6

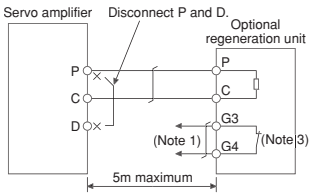
<Terminal arrangement>

| |
|---|
| P |
| C |
| G3 |
| G4 |

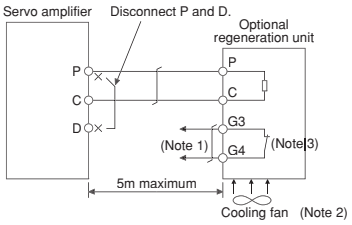
Terminal screw size: M4

| Model | Mass kg (lb) |
|---|---|
| MR-RB50<br>MR-RB51 | 5.6 (12) |

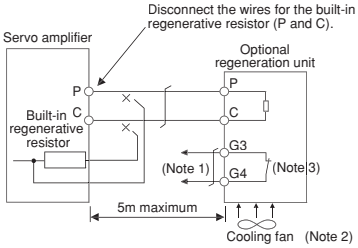
## Connections




### ●MR-J3-350B-RJ004(U□) or smaller




### ●MR-J3-500B-RJ004(U□)
### ●MR-J3-700B-RJ004U□



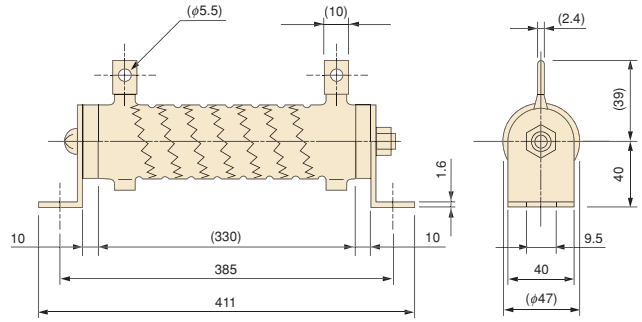

Notes: 1. Create a sequence circuit that turns off the magnetic contactor (MC) when abnormal overheating occurs.
2. When using MR-RB50 or MR-RB51, cool the unit forcibly with a cooling fan (92 × 92mm, minimum air flow: 1.0m³/min). The cooling fan must be prepared by user.
3. The G3 and G4 terminals are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

# Options

## ●Optional regeneration unit (for MR-J3-B-RJ004)

External dimensions (Unit: mm)

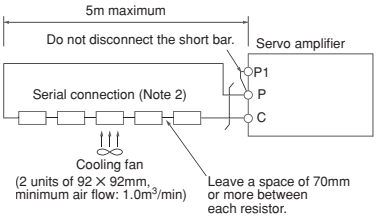
**Standard accessory** (Note 1)
**●GRZG400-1.5Ω, GRZG400-0.9Ω (200VAC)**
**●GRZG400-2Ω (400VAC)**



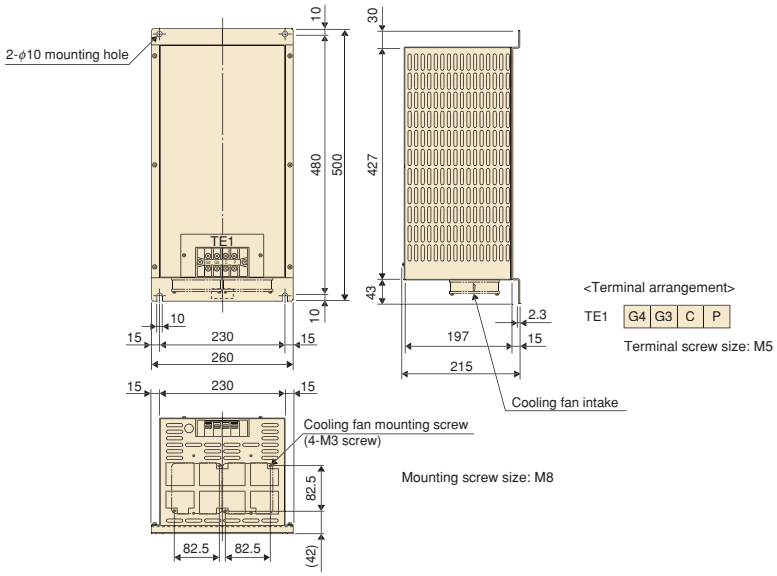

Mounting screw size: M8

| Model | Qty. | Tolerable regenerative power (W) | With cooling fan (W) | Resistance value (Ω) | Mass/unit kg (lb) |
|---|---|---|---|---|---|
| GRZG400-1.5Ω | 4 | 500 | 800 | 6 (1.5Ω × 4) | 0.8 (1.8) |
| GRZG400-0.9Ω | 5 | 850 | 1300 | 4.5 (0.9Ω × 5) | |
| GRZG400-2Ω | 5 | 850 | 1300 | 10 (2Ω × 5) | |

Connections




**●MR-RB5E, MR-RB9P (200VAC)** (Note 1)
**●MR-RB6K-4 (400VAC)** (Note 1)



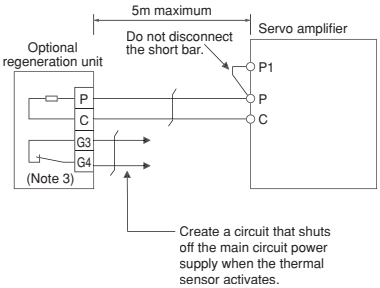

<Terminal arrangement>

| TE1 | G4 | G3 | C | P |
|---|---|---|---|---|

Terminal screw size: M5

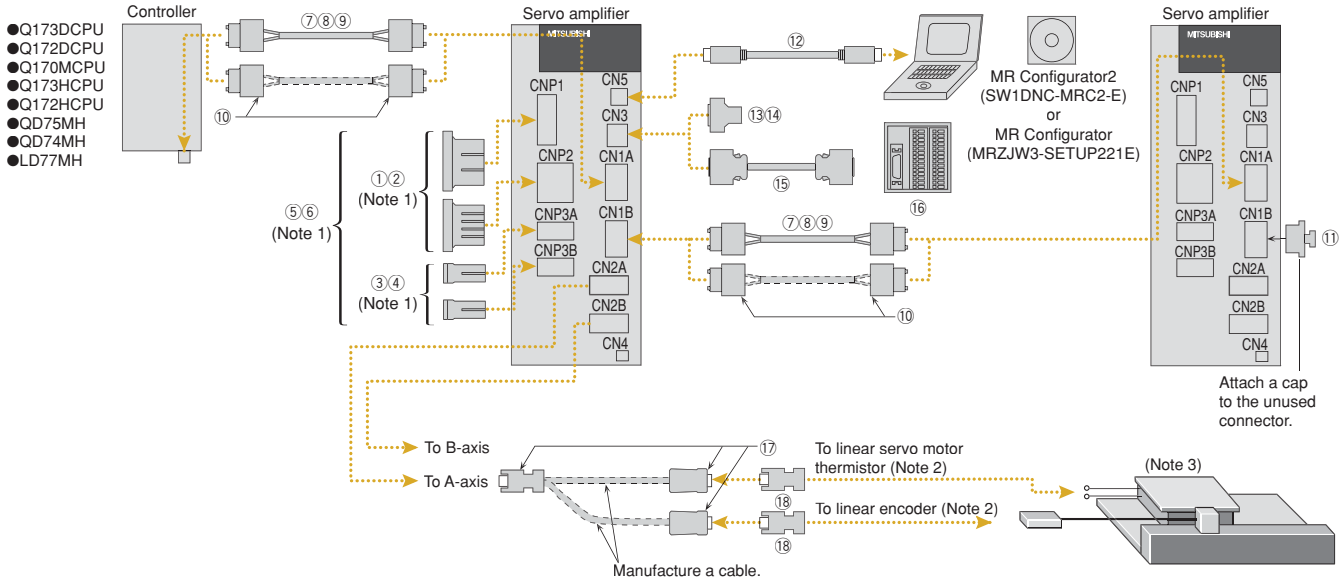
Mounting screw size: M8

| Model | Tolerable regenerative power (W) | With cooling fan (W) | Description | Mass kg (lb) |
|---|---|---|---|---|
| MR-RB5E | 500 | 800 | GRZG400-1.5Ω × 4 | 10 (22) |
| MR-RB9P | 850 | 1300 | GRZG400-0.9Ω × 5 | 11 (24) |
| MR-RB6K-4 | 850 | 1300 | GRZG400-2Ω × 5 | 11 (24) |




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

## ●Cables and connectors for MR-J3W-B




Notes: 1. These connector sets are not included with the servo amplifier. Please purchase them separately.
2. Necessary options vary depending on the linear encoder connected. Refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details.
3. Refer to the section "Cables and connectors for MR-J3-B-RJ004" in this catalog for the power supply connection with the linear servo motor.

| Item | | | Model | IP rating | Description |
|---|---|---|---|---|---|
| For CNP1 and CNP2 | ① | CNP1/CNP2 connector set (Qty: 1pc each) | MR-J3WCNP12-DM | — | CNP1 main circuit power supply connector set (JST Mfg.) J43FSS-03V-KX (receptacle housing) BJ4F-71GF-M3.0 (receptacle contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.0mm to ϕ3.8mm Crimping tool (YRF-1130) is required. CNP2 control circuit power supply connector set (JST Mfg.) F32FMS-06V-KXY (receptacle housing) BF3F-71GF-P2.0 (receptacle contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.4mm to ϕ3.4mm Crimping tool (YRF-1070) is required. |
| | ② | CNP1/CNP2 connector set (Qty: 10pcs each) | MR-J3WCNP12-DM-10P | — | |
| For CNP3A and CNP3B | ③ | CNP3A/CNP3B motor power supply connector set (Qty: 1pc) (for thick wires) | MR-J3WCNP3-D2L | — | CNP3A/CNP3B motor power supply connector set (JST Mfg.) F35FDC-04V-K (receptacle housing) BF3F-71GF-P2.0 (receptacle contact) <Applicable cable example> Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) Insulated outer diameter: ϕ2.4mm to ϕ3.3mm Crimping tool (YRF-1070) is required. |
| | ④ | CNP3A/CNP3B motor power supply connector set (Qty: 20pcs) (for thick wires) | MR-J3WCNP3-D2L-20P | — | |
| For CNP1, CNP2, CNP3A and CNP3B | ⑤ | MR-J3W-B power supply connector set (Set for 1 unit (for 2 axes)) | MR-J3WCNP123-SP | — | These are included in one set for one unit. CNP1 main circuit power supply connector (1pc) (JST Mfg.) 03JFAT-SAGFK-43 Applicable wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) CNP2 control circuit power supply connector (1pc) (JST Mfg.) 06JFAT-SAXYGG-F-KK Applicable wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14) CNP3A/CNP3B motor power supply connector (2pcs) (JST Mfg.) 04JFAT-SAGG-G-KK Applicable wire size: 0.75mm² (AWG19) to 2.0mm² (AWG14) Optional tool (1pc) (JST Mfg.) J-FAT-OT-EXL |
| | ⑥ | MR-J3W-B power supply connector set (Set for 10 units (for 20 axes)) | MR-J3WCNP123-SP-10P | — | |

# Options

## ●Cables and connectors for MR-J3W-B

| | | Item | | Model | IP rating | Description |
|---|---|---|---|---|---|---|
| For controller, CN1A and CN1B | ⑦ | SSCNETⅢ cable (Note 3)<br>(Standard cord for inside cabinet) | | MR-J3BUS□M<br>□=cable length:<br>0.15, 0.3, 0.5, 1, 3m | — | Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) — Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) |
| | ⑧ | SSCNETⅢ cable (Note 3)<br>(Standard cable for outside cabinet) | | MR-J3BUS□M-A<br>□=cable length:<br>5, 10, 20m | — | |
| | ⑨ | SSCNETⅢ cable (Note 3)<br>(Long distance cable, long bending life) | | MR-J3BUS□M-B<br>□=cable length:<br>30, 40, 50m (Note 1) | — | Connector (Japan Aviation Electronics Industry) CF-2D103-S (connector) — Connector (Japan Aviation Electronics Industry) CF-2D103-S (connector) |
| | ⑩ | Connector set for SSCNETⅢ (Note 3) | | MR-J3BCN1 (Note 2) | — | Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) — Connector (Japan Aviation Electronics Industry) PF-2D103 (connector) |
| For CN1B | ⑪ | Connector cap for SSCNETⅢ | | (Standard accessory) | — | |
| For CN5 | ⑫ | Personal computer communication cable | USB cable | MR-J3USBCBL3M<br>Cable length: 3m | — | Amplifier connector mini-B connector (5 pins) — Personal computer connector A connector<br>Note: This cable cannot be used with the SSCNETⅢ compatible controller. |
| For CN3 | ⑬ | Connector set (for CN3) | | MR-J2CMP2<br>(Qty: 1pc) | — | Amplifier connector (3M or an equivalent product)<br>10126-3000PE (connector)<br>10326-52F0-008 (shell kit) |
| | ⑭ | | | MR-ECN1<br>(Qty: 20pcs) | | |
| | ⑮ | Junction terminal block cable | | MR-TBNATBL□M<br>□=cable length:<br>0.5, 1m | — | Junction terminal block connector (3M or an equivalent product)<br>10126-6000EL (connector)<br>10326-3210-000 (shell kit) — Amplifier connector (3M or an equivalent product)<br>10126-6000EL (connector)<br>10326-3210-000 (shell kit) |
| | ⑯ | Junction terminal block | | MR-TB26A | — | |
| For linear servo motor | ⑰ | Connector set<br>(for linear encoder and thermistor) | | MR-J3THMCN2 | — | Junction connector (3M)<br>36110-3000FD (plug)<br>36310-F200-008 (shell kit) — Amplifier connector<br>36210-0100PL (receptacle, 3M),<br>36310-3200-008 (shell kit, 3M)<br>or<br>54599-1019 (connector set, Molex) |
| | ⑱ | Connector set<br>(for linear encoder and thermistor connection) | | MR-J3CN2 | — | Linear encoder and thermistor connection connector<br>36210-0100PL (receptacle, 3M),<br>36310-3200-008 (shell kit, 3M)<br>or<br>54599-1019 (connector set, Molex) |

Notes: 1. For the ultra-long bending life cables and/or for unlisted lengths which are 20m or shorter (available in the ultra-long bending life cables), contact Mitsubishi Electric System & Service Co., Ltd. FA PRODUCT DIVISION by email: oss-ip@melsc.jp
2. Special tools are required. Contact your local sales office for details.
3. Look carefully through the precautions enclosed with the options before use.

# Ordering information for customers

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

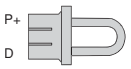
## ●Main circuit power supply cable (for CNP1)

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

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

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

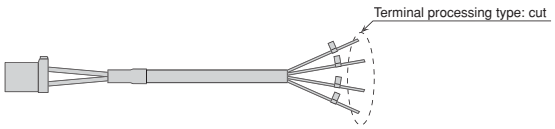
## ●Built-in regenerative resistor short connector (for CNP2-A(X))

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

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

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

## ●Power supply cable for LM-H2/LM-K2/LM-U2 linear servo motor

| Model | | Description | Wire size |
|---|---|---|---|
| SC-EPWS2CBL□M-L<br>□= cable length: 2, 5, 10, 20, 30m<br>(Note 2, 3) | Standard bending life |  <br>Mitsubishi Electric System & Service Co., Ltd. (Note 1) | AWG18 × 4C (2, 5, 10m)<br>AWG16 × 4C (20, 30m) |
| SC-EPWS2CBL□M-H<br>□= cable length: 2, 5, 10, 20, 30m<br>(Note 2, 3) | Long bending life | | AWG19 × 4C (2, 5, 10m)<br>AWG14 × 4C (20, 30m) |

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

## Ordering information for customers

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

| Model | | Description | Applicable wire example |
|---|---|---|---|
| Receptacle housing | Receptacle contact | | |
| J43FSS-03V-KX | BJ4F-71GF-M3.0 |  JST Mfg. Co., Ltd. | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$2.0mm to $\phi$3.8mm<br>Crimping tool (YRF-1130) is required. |

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

| Model | | Description | Applicable wire example |
|---|---|---|---|
| Receptacle housing | Receptacle contact | | |
| F32FMS-06V-KXY | BF3F-71GF-P2.0 |  JST Mfg. Co., Ltd. | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$2.4mm to $\phi$3.4mm<br>Crimping tool (YRF-1070) is required. |
| 3-178129-6 | 917511-2 |  Tyco Electronics Corporation | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$2.2mm to $\phi$2.8mm<br>Crimping tool (91560-1) is required. |
| | 353717-2 | | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$3.3mm to $\phi$3.8mm<br>Crimping tool (91561-1) is required. |

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

| Model | | Description | Applicable wire example |
|---|---|---|---|
| Receptacle housing | Receptacle contact | | |
| F35FDC-04V-K | BF3F-71GF-P2.0 |  JST Mfg. Co., Ltd. | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$2.4mm to $\phi$3.4mm<br>Crimping tool (YRF-1070) is required. |
| 175363-1 | 917511-2 |  Tyco Electronics Corporation | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$2.2mm to $\phi$2.8mm<br>Crimping tool (91560-1) is required. |
| | 353717-2 | | Wire size: 1.25mm² (AWG16) to 2.0mm² (AWG14)<br>Insulated outer diameter: $\phi$3.3mm to $\phi$3.8mm<br>Crimping tool (91561-1) is required. |

# Options

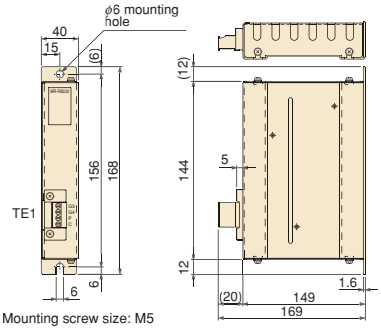
## ●Optional regeneration unit (for MR-J3W-B)

| Servo amplifier | Tolerable regenerative power of built-in regenerative resistor (W) | Tolerable regenerative power of optional regeneration unit (W) (Note1) | | |
|---|---|---|---|---|
| | | MR-RB14 [26Ω] | MR-RB34 [26Ω] | MR-RB3B [20Ω] |
| MR-J3W-22B<br>MR-J3W-44B | 10 | 100 | – | – |
| MR-J3W-77B | 100 | – | 300 | – |
| MR-J3W-1010B | 100 | – | – | 300 |

Notes: 1. The power values in this table are resistor-generated powers, not rated powers.

External dimensions (Unit: mm)

**●MR-RB14**




Mounting screw size: M5

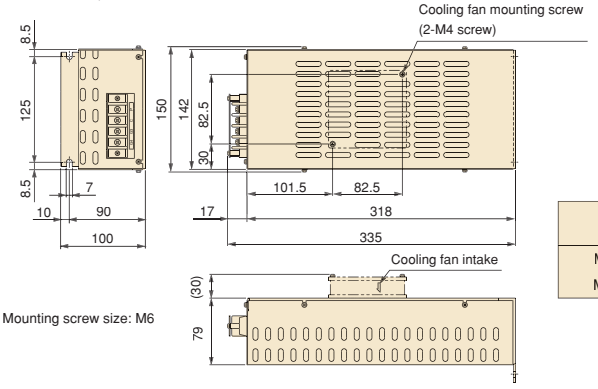
<Terminal arrangement>

| TE1 |
|---|
| G3 |
| G4 |
| P |
| C |

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

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

**●MR-RB34, MR-RB3B**




Mounting screw size: M6

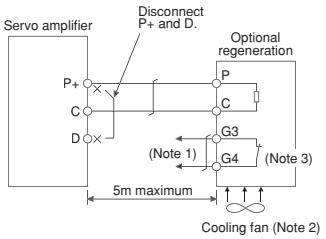
<Terminal arrangement>

| P |
|---|
| C |
| G3 |
| G4 |

Terminal screw size: M4

| Model | Mass kg (lb) |
|---|---|
| MR-RB34<br>MR-RB3B | 2.9 (6.4) |

Connections




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

# Peripheral equipment

## ●Electrical wires, circuit breakers and magnetic contactors (example of selection for MR-J3-B-RJ004)

The following are examples of wire sizes when 600V polyvinyl chloride insulated wires (IV wires) with a length of 30m are used.
When using LM-F series linear servo motors, be sure to use HIV wires for motor power supply.

| Servo amplifier | Circuit breaker | Magnetic contactor (Note 2) | Electrical wire size ($mm^2$) | | | | |
|---|---|---|---|---|---|---|---|
| | | | L1, L2, L3, ⏚ | L11, L21 | U, V, W, ⏚ | P, C | THM1, THM2 |
| MR-J3-20B-RJ004(U□) | 30A frame 5A | S-N10 | 2 (AWG14) | 1.25 (AWG16) | 1.25 (AWG16) | 2 (AWG14) | 0.2 (AWG24) |
| MR-J3-40B-RJ004(U□) | 30A frame 10A | | | | | | |
| MR-J3-60B-RJ004(U□) | 30A frame 15A | | | | | | |
| MR-J3-70B-RJ004(U□) | | | | | | | |
| MR-J3-200BN-RJ004(U□) | 30A frame 20A | S-N18 | | | 2 (AWG14)(Note 3) | | |
| MR-J3-350B-RJ004(U□) | 30A frame 30A | S-N20 | 3.5 (AWG12) | | 3.5 (AWG12) | | |
| MR-J3-500B-RJ004(U□) (Note 1) | 50A frame 50A | S-N35 | 5.5 (AWG10) | | 5.5 (AWG10)(Note 3) | | |
| MR-J3-700B-RJ004U□ (Note 1) | 100A frame 75A | S-N50 | 8 (AWG8) | | (Note 3) | 3.5 (AWG12) | |
| MR-J3-11KB-RJ004U□ (Note 1) | 100A frame 100A | S-N65 | 14 (AWG6) | | | 5.5 (AWG10) | |
| MR-J3-15KB-RJ004U□ (Note 1) | 225A frame 125A | S-N95 | 22 (AWG4) | | | | |
| MR-J3-22KB4-RJ004U□ (Note 1) | 225A frame 125A | S-N65 | 14 (AWG6) | | | | |

Notes: 1. When connecting wires to the terminal screws, be sure to use the screws attached to the terminal blocks.
2. Be sure to use a magnetic contactor (MC) with an operation delay time of 80ms or less. The operation delay time is the time interval between current being applied to the coil until closure of contacts.
3. When using LM-F series linear servo motor, refer to the following examples of HIV wires (U, V, W and ⏚) .

The following are examples of HIV wire sizes (for U, V, W and ⏚) for LM-F series.

| Linear servo motor | Cooling method | Electrical wire size ($mm^2$) U, V, W, ⏚ |
|---|---|---|
| LM-FP2B-06M-1SS0 | Natural-cooling | 2 (AWG14) |
| | Liquid-cooling | |
| LM-FP2D-12M-1SS0 | Natural-cooling | 3.5 (AWG12) |
| | Liquid-cooling | |
| LM-FP2F-18M-1SS0 | Natural-cooling | 3.5 (AWG12) |
| | Liquid-cooling | 5.5 (AWG10) |
| LM-FP4B-12M-1SS0 | Natural-cooling | 5.5 (AWG10) |
| | Liquid-cooling | |
| LM-FP4D-24M-1SS0 | Natural-cooling | 8 (AWG8) |
| | Liquid-cooling | |
| LM-FP4F-36M-1SS0 | Natural-cooling | 5.5 (AWG10) |
| | Liquid-cooling | 14 (AWG6) |
| LM-FP4H-48M-1SS0 | Natural-cooling | 8 (AWG8) |
| | Liquid-cooling | 22 (AWG4) |
| LM-FP5H-60M-1SS0 | Natural-cooling | 8 (AWG8) |
| | Liquid-cooling | 8 (AWG8) |

## ●Electrical wires, circuit breakers and magnetic contactors (example of selection for MR-J3W-B)

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

| Servo amplifier | Circuit breaker (Note 1) | Electrical wire size ($mm^2$) | | | | | |
|---|---|---|---|---|---|---|---|
| | | L1, L2, L3, ⏚ | L11, L21 | U, V, W, ⏚ | P+, C | P+, D | THM1, THM2 |
| MR-J3W-22B | S-N10 | 2 (AWG14) | | | | | 0.2 (AWG24) |
| MR-J3W-44B | | | | | | | |
| MR-J3W-77B | S-N18 | | | | | | |
| MR-J3W-1010B | | | | | | | |

Notes: 1. Be sure to use a magnetic contactor (MC) with an operation delay time of 80ms or less. The operation delay time is the time interval between current being applied to the coil until closure of contacts.

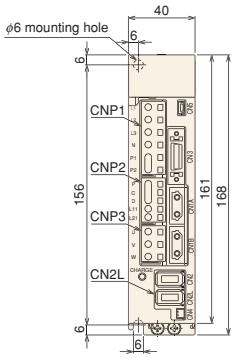
## ●Circuit breakers (example of selection for MR-J3W-B)

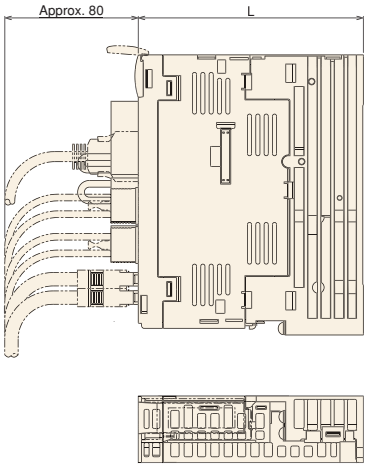
| Circuit breakers | Total continuous thrust of linear servo motors |
|---|---|
| 30A frame 10A | 120N or less |
| 30A frame 15A | Over 120N to 240N |
| 30A frame 20A | Over 240N to 480N |

# Servo amplifier dimensions

## ●MR-J3-20B-RJ004(U□), 40B-RJ004(U□), 60B-RJ004(U□) (Note 1)

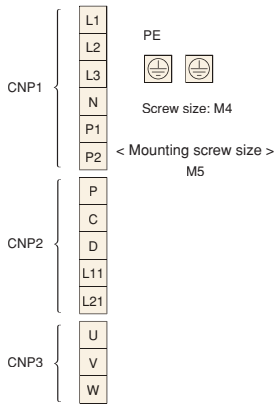
(Unit: mm)



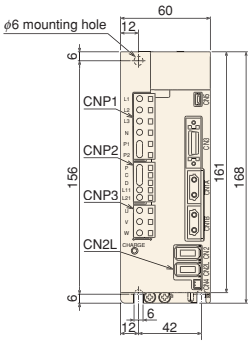



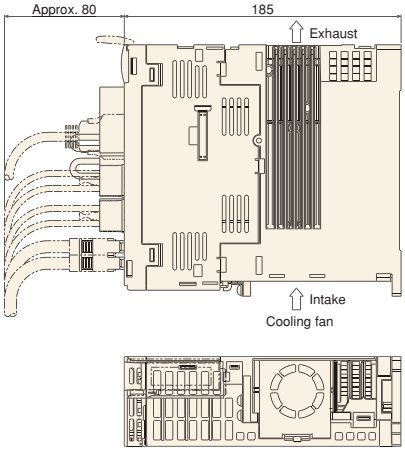

| Model | Variable dimension L |
|---|---|
| MR-J3-20B-RJ004(U□) | 135 |
| MR-J3-40B-RJ004(U□)<br>MR-J3-60B-RJ004(U□) | 170 |

< Terminal arrangement >

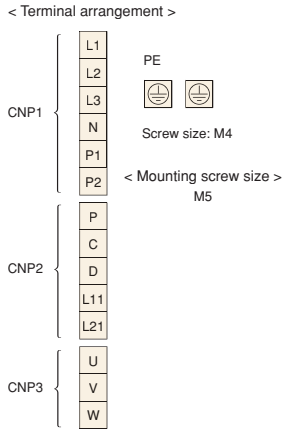



## ●MR-J3-70B-RJ004(U□) (Note 1)

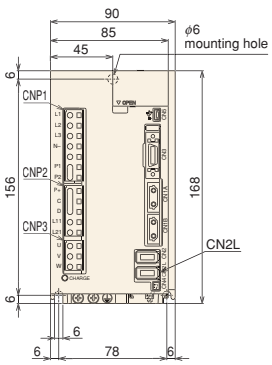


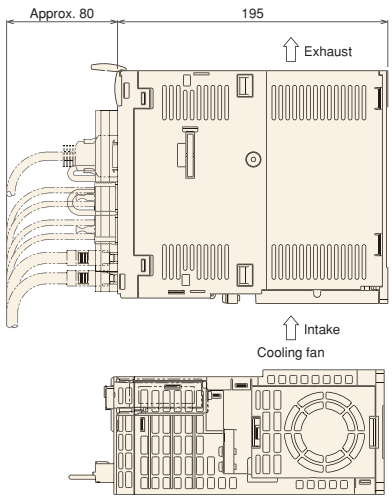




< Terminal arrangement >

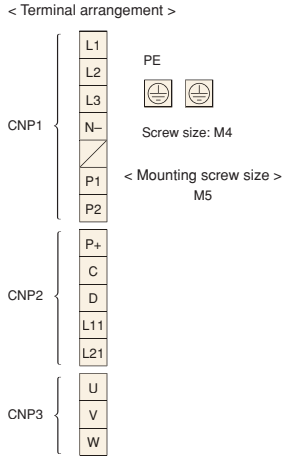



## ●MR-J3-200BN-RJ004(U□) (Note 1, 2)




< Terminal arrangement >



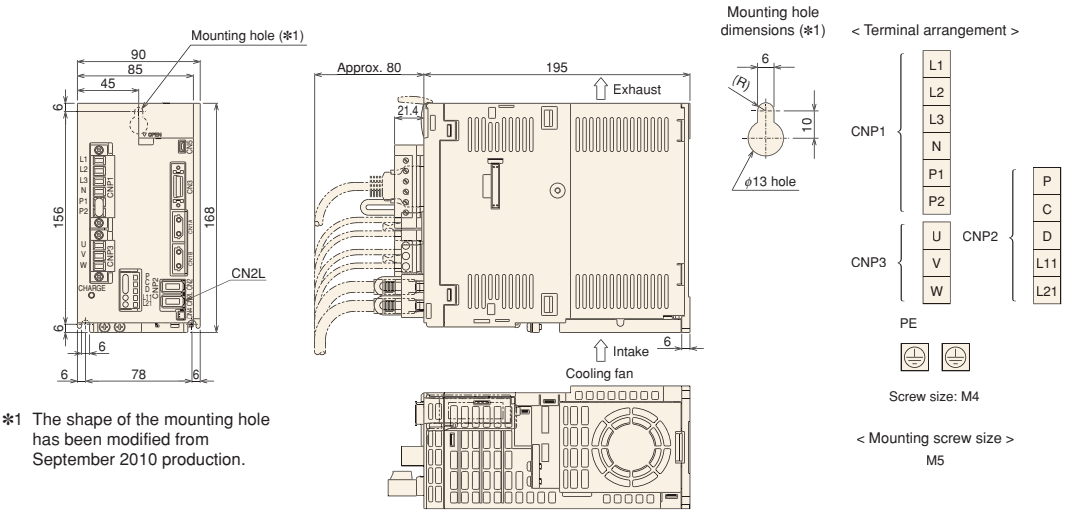

✻ The dimensions are applicable for the servo amplifier manufactured on August 2010 or later. The previous model is also available. Contact your local sales office for more details.

Notes: 1. The connectors CNP1, CNP2 and CNP3 (insertion type) are supplied with the servo amplifier.
2. Servo amplifier model that is compatible with LM-F series is MR-J3-□B-RJ004U□. Refer to the section “Servo amplifier model designation” for more details.

# Servo amplifier dimensions

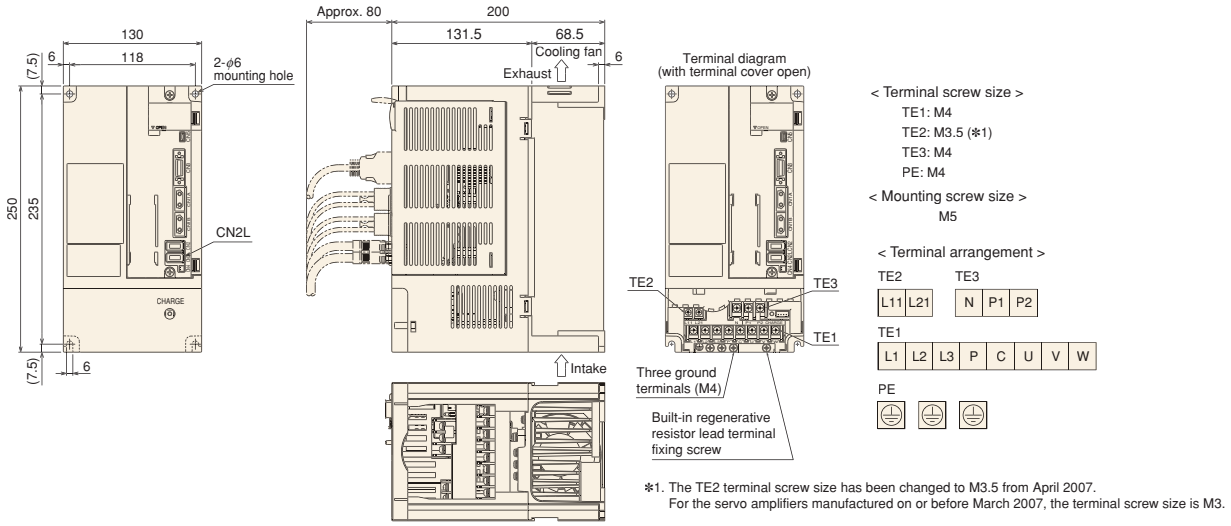
## ●MR-J3-350B-RJ004(U□) (Note 1)

(Unit: mm)




*1 The shape of the mounting hole has been modified from September 2010 production.

## ●MR-J3-500B-RJ004(U□) (Note 2)

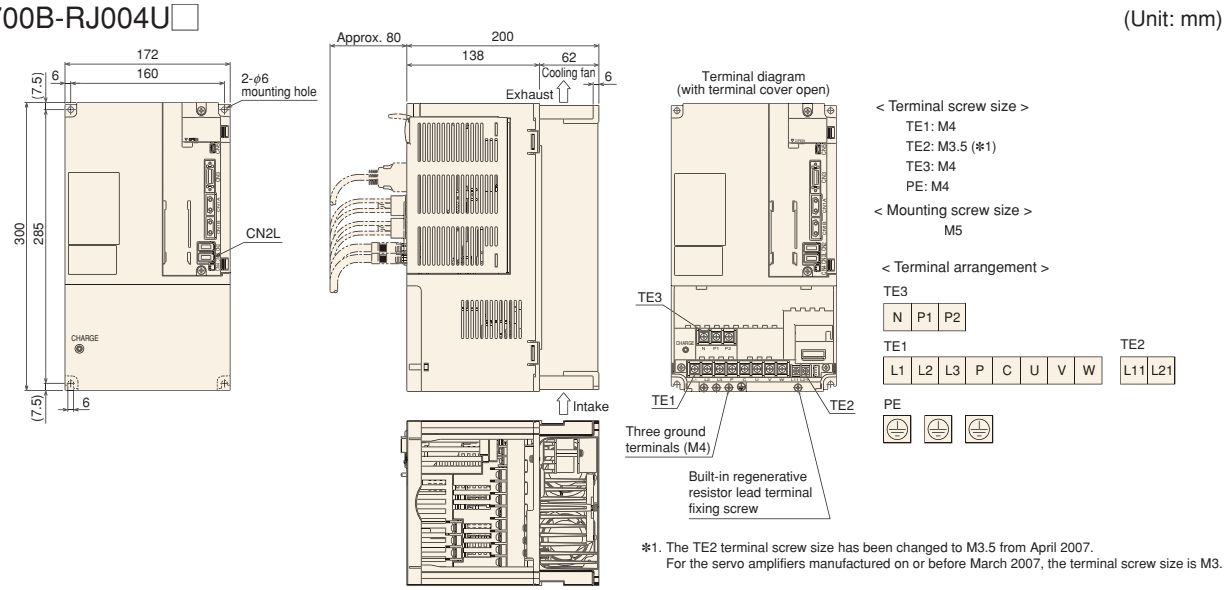



*1. The TE2 terminal screw size has been changed to M3.5 from April 2007.
For the servo amplifiers manufactured on or before March 2007, the terminal screw size is M3.

Notes: 1. The connectors CNP1, CNP2 and CNP3 (insertion type) are supplied with the servo amplifier.
2. Servo amplifier model that is compatible with LM-F series is MR-J3-□B-RJ004U□. Refer to the section “Servo amplifier model designation” for more details.

## ●MR-J3-700B-RJ004U□

(Unit: mm)




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

< Mounting screw size >
M5

< Terminal arrangement >

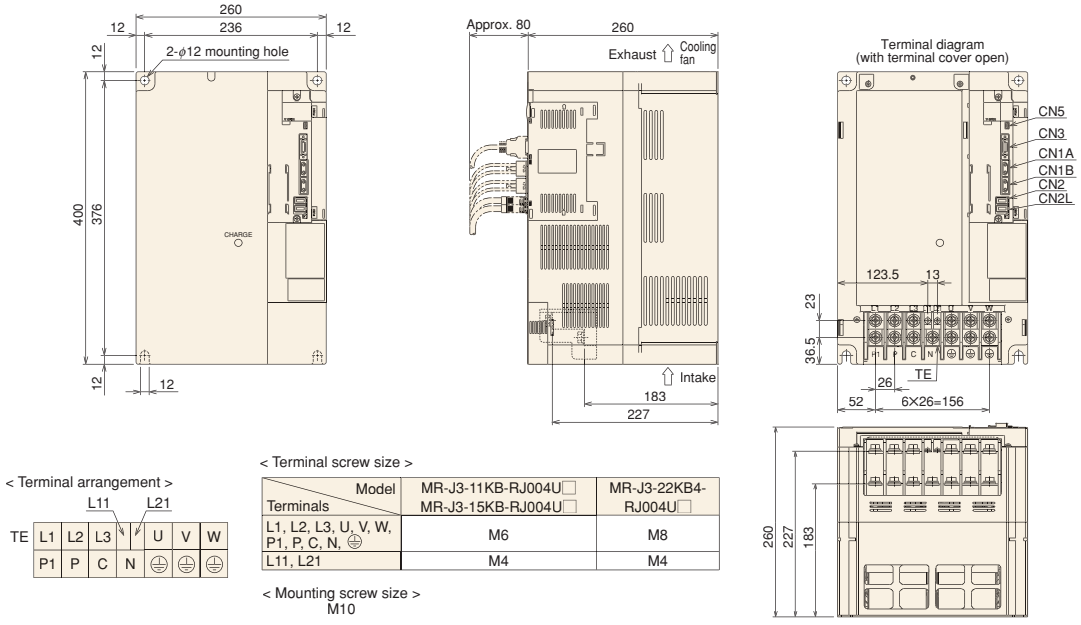
| TE3 | | |
|---|---|---|
| N | P1 | P2 |

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

| PE | | |
|---|---|---|
| ⏚ | ⏚ | ⏚ |

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

## ●MR-J3-11KB-RJ004U□, 15KB-RJ004U□, 22KB4-RJ004U□




< Terminal arrangement >

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

< Terminal screw size >

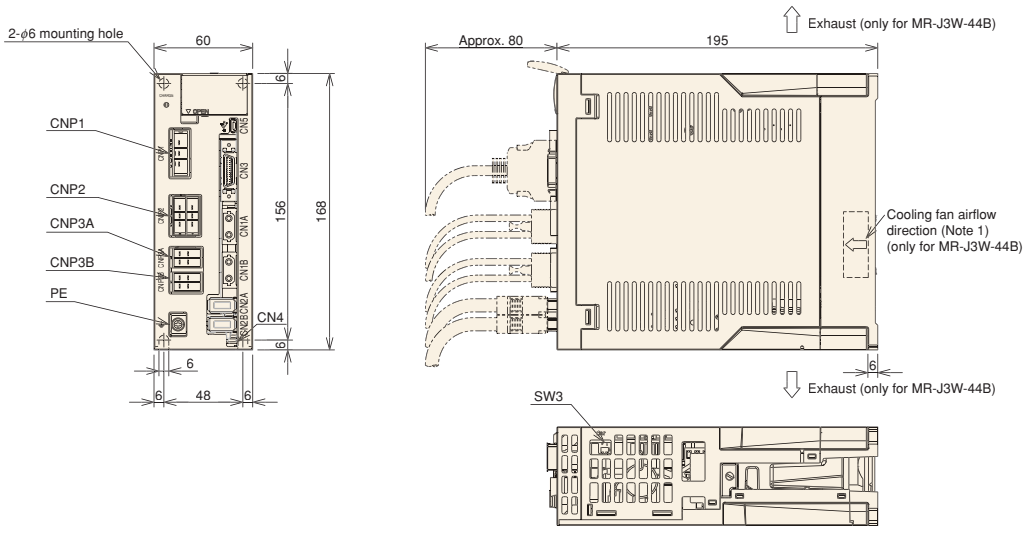
| Terminals \ Model | MR-J3-11KB-RJ004U□ MR-J3-15KB-RJ004U□ | MR-J3-22KB4-RJ004U□ |
|---|---|---|
| L1, L2, L3, U, V, W, P1, P, C, N, ⏚ | M6 | M8 |
| L11, L21 | M4 | M4 |

< Mounting screw size >
M10

# Servo amplifier dimensions

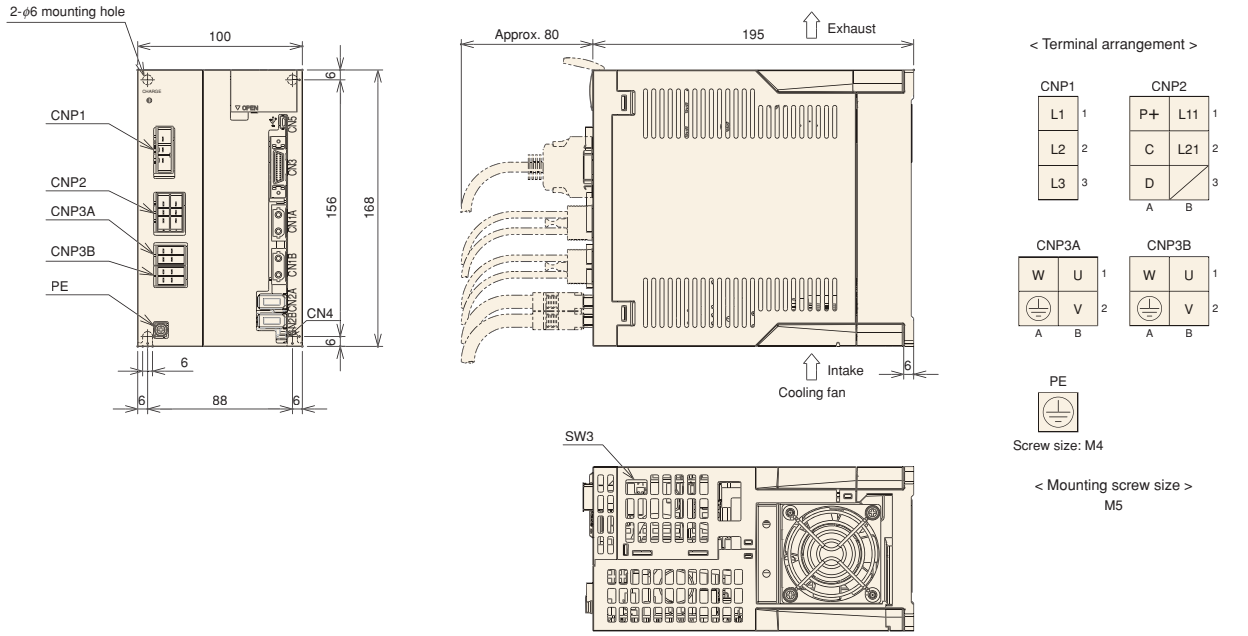
## ●MR-J3W-22B, MR-J3W-44B

(Unit: mm)




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

## ●MR-J3W-77B, MR-J3W-1010B



# Product list

| Item | Model | Description | | |
|---|---|---|---|---|
| Servo amplifier MR-J3-B-RJ004 (Note 1, 2, 3) | MR-J3-20B-RJ004(U□) | Main circuit power supply: 3-phase or 1-phase 200VAC to 230VAC | | |
| | MR-J3-40B-RJ004(U□) | | | |
| | MR-J3-60B-RJ004(U□) | | | |
| | MR-J3-70B-RJ004(U□) | | | |
| | MR-J3-200BN-RJ004(U□) | Main circuit power supply: 3-phase 200VAC to 230VAC | | |
| | MR-J3-350B-RJ004(U□) | | | |
| | MR-J3-500B-RJ004(U□) | | | |
| | MR-J3-700B-RJ004U□ | | | |
| | MR-J3-11KB-RJ004U□ | | | |
| | MR-J3-15KB-RJ004U□ | | | |
| | MR-J3-22KB4-RJ004U□ | Main circuit power supply: 3-phase 380VAC to 480VAC | | |
| Servo amplifier MR-J3W-B | MR-J3W-22B | Main circuit power supply: 3-phase or 1-phase 200VAC to 230VAC (Note 4) | | |
| | MR-J3W-44B | | | |
| | MR-J3W-77B | | | |
| | MR-J3W-1010B | Main circuit power supply: 3-phase 200VAC to 230VAC | | |
| Connector set | MR-CCN1 | Connector set for CN3 connector of MR-J3-B-RJ004 | | |
| | MR-J3CN2 | Connector set for CN2 or CN2L of MR-J3-B-RJ004, or Connector set for MR-J3W-B (for linear encoder and thermistor connection) | | |
| | MR-J2CMP2 | Connector set for CN3 of MR-J3W-B (1pc) | | |
| | MR-ECN1 | Connector set for CN3 of MR-J3W-B (20pcs) | | |
| | MR-J3THMCN2 | Connector set for CN2A/CN2B connector of MR-J3W-B (for linear encoder and thermistor) | | |
| Encoder cable | MR-EKCBL2M-H | 2m | Long bending life | Connectable to output cables for the linear scales manufactured by Mitutoyo Corporation |
| | MR-EKCBL5M-H | 5m | | |
| | MR-EKCBL10M-H | 10m | | |
| Encoder connector set (for junction) | MR-ECNM | Junction connector (1pc) and Servo amplifier connector (1pc) | | |
| MR-J3W-B servo amplifier Power supply connector set | MR-J3WCNP12-DM | CNP1/CNP2 connector set (1pc for each connector) | | |
| | MR-J3WCNP12-DM-10P | CNP1/CNP2 connector set (10pcs for each connector) | | |
| MR-J3W-B servo amplifier Motor power supply connector set | MR-J3WCNP3-D2L | CNP3A/CNP3B motor power supply connector set (for thick wires) (1pc) | | |
| | MR-J3WCNP3-D2L-20P | CNP3A/CNP3B motor power supply connector set (for thick wires) (20pcs) | | |
| MR-J3W-B servo amplifier Power supply connector set (Set for 1 unit (for 2 axes)) | MR-J3WCNP123-SP | CNP1 connector (1pc), CNP2 connector (1pc), CNP3A/CNP3B connectors (2pcs) and optional tool (1pc) | | |
| MR-J3W-B servo amplifier Power supply connector set (Set for 10 units (for 20 axes)) | MR-J3WCNP123-SP-10P | CNP1 connector (10pcs), CNP2 connector (10pcs), CNP3A/CNP3B connectors (20pcs) and optional tool (10pcs) | | |
| SSCNETⅢ cable (Standard cord for inside cabinet) | MR-J3BUS015M | 0.15m | Fiber-optic cable (Standard life cable) | |
| | MR-J3BUS03M | 0.3m | | |
| | MR-J3BUS05M | 0.5m | | |
| | MR-J3BUS1M | 1m | | |
| | MR-J3BUS3M | 3m | | |
| SSCNETⅢ cable (Standard cable for outside cabinet) | MR-J3BUS5M-A | 5m | | |
| | MR-J3BUS10M-A | 10m | | |
| | MR-J3BUS20M-A | 20m | | |
| SSCNETⅢ cable (Long distance cable) | MR-J3BUS30M-B | 30m | Fiber-optic cable (Long bending life) | |
| | MR-J3BUS40M-B | 40m | | |
| | MR-J3BUS50M-B | 50m | | |
| Connector set for SSCNETⅢ | MR-J3BCN1 | – | | |
| Junction terminal block | MR-TB26A | For MR-J3W-B | | |
| Junction terminal block cable (for MR-TB26A) | MR-TBNATBL05M | 0.5m | For CN3 connector of MR-J3W-B | |
| | MR-TBNATBL1M | 1m | | |
| Personal computer communication cable (USB cable) | MR-J3USBCBL3M | 3m | For CN5 connector of MR-J3-B-RJ004 or MR-J3W-B | |

Notes: 1. Servo amplifier model that is compatible with LM-F series is MR-J3-□B(4)-RJ004U□.
2. Servo amplifier model that is compatible with LM-H2 and LM-U2 series is MR-J3-□B-RJ004. However, MR-J3-□B-RJ004U□ is also available as before.
3. Servo amplifier model that is compatible with LM-K2 series is MR-J3-□B-RJ004.
4. For MR-J3W-77B, this input voltage will be applicable for the servo amplifier manufactured in January 2011 or later. For the servo amplifier manufactured in December 2010 or earlier, the input voltage is 3-phase 200VAC to 230VAC.
5. Contact your local sales office for the prices and the specifications.

# Product list

| Item | Model | Description |
|---|---|---|
| Linear servo motor<br>LM-H2 series<br>Primary side (coil) | LM-H2P1A-06M-4SS0 | Continuous thrust: 60N, Maximum thrust: 150N |
| | LM-H2P2A-12M-1SS0 | Continuous thrust: 120N, Maximum thrust: 300N |
| | LM-H2P2B-24M-1SS0 | Continuous thrust: 240N, Maximum thrust: 600N |
| | LM-H2P2C-36M-1SS0 | Continuous thrust: 360N, Maximum thrust: 900N |
| | LM-H2P2D-48M-1SS0 | Continuous thrust: 480N, Maximum thrust: 1200N |
| | LM-H2P3A-24M-1SS0 | Continuous thrust: 240N, Maximum thrust: 600N |
| | LM-H2P3B-48M-1SS0 | Continuous thrust: 480N, Maximum thrust: 1200N |
| | LM-H2P3C-72M-1SS0 | Continuous thrust: 720N, Maximum thrust: 1800N |
| | LM-H2P3D-96M-1SS0 | Continuous thrust: 960N, Maximum thrust: 2400N |
| Linear servo motor<br>LM-H2 series<br>Secondary side (magnet) | LM-H2S10-288-4SS0 | Length: 288mm |
| | LM-H2S10-384-4SS0 | Length: 384mm |
| | LM-H2S10-480-4SS0 | Length: 480mm |
| | LM-H2S10-768-4SS0 | Length: 768mm |
| | LM-H2S20-288-1SS0 | Length: 288mm |
| | LM-H2S20-384-1SS0 | Length: 384mm |
| | LM-H2S20-480-1SS0 | Length: 480mm |
| | LM-H2S20-768-1SS0 | Length: 768mm |
| | LM-H2S30-288-1SS0 | Length: 288mm |
| | LM-H2S30-384-1SS0 | Length: 384mm |
| | LM-H2S30-480-1SS0 | Length: 480mm |
| | LM-H2S30-768-1SS0 | Length: 768mm |
| Linear servo motor<br>LM-F series<br>Primary side (coil) | LM-FP2B-06M-1SS0 | Continuous thrust: 300N (natural-cooling)/600N (liquid-cooling), Maximum thrust: 1800N |
| | LM-FP2D-12M-1SS0 | Continuous thrust: 600N (natural-cooling)/1200N (liquid-cooling), Maximum thrust: 3600N |
| | LM-FP2F-18M-1SS0 | Continuous thrust: 900N (natural-cooling)/1800N (liquid-cooling), Maximum thrust: 5400N |
| | LM-FP4B-12M-1SS0 | Continuous thrust: 600N (natural-cooling)/1200N (liquid-cooling), Maximum thrust: 3600N |
| | LM-FP4D-24M-1SS0 | Continuous thrust: 1200N (natural-cooling)/2400N (liquid-cooling), Maximum thrust: 7200N |
| | LM-FP4F-36M-1SS0 | Continuous thrust: 1800N (natural-cooling)/3600N (liquid-cooling), Maximum thrust: 10800N |
| | LM-FP4H-48M-1SS0 | Continuous thrust: 2400N (natural-cooling)/4800N (liquid-cooling), Maximum thrust: 14400N |
| | LM-FP5H-60M-1SS0 | Continuous thrust: 3000N (natural-cooling)/6000N (liquid-cooling), Maximum thrust: 18000N |
| Linear servo motor<br>LM-F series<br>Secondary side (magnet) | LM-FS20-480-1SS0 | Length: 480mm |
| | LM-FS20-576-1SS0 | Length: 576mm |
| | LM-FS40-480-1SS0 | Length: 480mm |
| | LM-FS40-576-1SS0 | Length: 576mm |
| | LM-FS50-480-1SS0 | Length: 480mm |
| | LM-FS50-576-1SS0 | Length: 576mm |
| Linear servo motor<br>LM-K2 series<br>Primary side (coil) | LM-K2P1A-01M-2SS1 | Continuous thrust: 120N, Maximum thrust: 300N |
| | LM-K2P1C-03M-2SS1 | Continuous thrust: 360N, Maximum thrust: 900N |
| | LM-K2P2A-02M-1SS1 | Continuous thrust: 240N, Maximum thrust: 600N |
| | LM-K2P2C-07M-1SS1 | Continuous thrust: 720N, Maximum thrust: 1800N |
| | LM-K2P2E-12M-1SS1 | Continuous thrust: 1200N, Maximum thrust: 3000N |
| | LM-K2P3C-14M-1SS1 | Continuous thrust: 1440N, Maximum thrust: 3600N |
| | LM-K2P3E-24M-1SS1 | Continuous thrust: 2400N, Maximum thrust: 6000N |
| Linear servo motor<br>LM-K2 series<br>Secondary side (magnet) | LM-K2S10-288-2SS1 | Length: 288mm |
| | LM-K2S10-384-2SS1 | Length: 384mm |
| | LM-K2S10-480-2SS1 | Length: 480mm |
| | LM-K2S10-768-2SS1 | Length: 768mm |
| | LM-K2S20-288-1SS1 | Length: 288mm |
| | LM-K2S20-384-1SS1 | Length: 384mm |
| | LM-K2S20-480-1SS1 | Length: 480mm |
| | LM-K2S20-768-1SS1 | Length: 768mm |
| | LM-K2S30-288-1SS1 | Length: 288mm |
| | LM-K2S30-384-1SS1 | Length: 384mm |
| | LM-K2S30-480-1SS1 | Length: 480mm |
| | LM-K2S30-768-1SS1 | Length: 768mm |

Notes: 1. Contact your local sales office for the prices and the specifications.

| Item | Model | Description |
|---|---|---|
| Linear servo motor<br>LM-U2 series<br>Primary side (coil) | LM-U2PAB-05M-0SS0 | Continuous thrust: 50N, Maximum thrust: 150N |
| | LM-U2PAD-10M-0SS0 | Continuous thrust: 100N, Maximum thrust: 300N |
| | LM-U2PAF-15M-0SS0 | Continuous thrust: 150N, Maximum thrust: 450N |
| | LM-U2PBB-07M-1SS0 | Continuous thrust: 75N, Maximum thrust: 225N |
| | LM-U2PBD-15M-1SS0 | Continuous thrust: 150N, Maximum thrust: 450N |
| | LM-U2PBF-22M-1SS0 | Continuous thrust: 225N, Maximum thrust: 675N |
| | LM-U2P2B-40M-2SS0 | Continuous thrust: 400N, Maximum thrust: 1600N |
| | LM-U2P2C-60M-2SS0 | Continuous thrust: 600N, Maximum thrust: 2400N |
| | LM-U2P2D-80M-2SS0 | Continuous thrust: 800N, Maximum thrust: 3200N |
| Linear servo motor<br>LM-U2 series<br>Secondary side (magnet) | LM-U2SA0-240-0SS0 | Length: 240mm |
| | LM-U2SA0-300-0SS0 | Length: 300mm |
| | LM-U2SA0-420-0SS0 | Length: 420mm |
| | LM-U2SB0-240-1SS0 | Length: 240mm |
| | LM-U2SB0-300-1SS0 | Length: 300mm |
| | LM-U2SB0-420-1SS0 | Length: 420mm |
| | LM-U2S20-300-2SS0 | Length: 300mm |
| | LM-U2S20-480-2SS0 | Length: 480mm |
| Optional regeneration unit | MR-RB032 | Tolerable regenerative power: 30W, Resistance value: 40Ω |
| | MR-RB12 | Tolerable regenerative power: 100W, Resistance value: 40Ω |
| | MR-RB14 | Tolerable regenerative power: 100W, Resistance value: 26Ω |
| | MR-RB30 | Tolerable regenerative power: 300W, Resistance value: 13Ω |
| | MR-RB31 | Tolerable regenerative power: 300W, Resistance value: 6.7Ω |
| | MR-RB32 | Tolerable regenerative power: 300W, Resistance value: 40Ω |
| | MR-RB34 | Tolerable regenerative power: 300W, Resistance value: 26Ω |
| | MR-RB3B | Tolerable regenerative power: 300W, Resistance value: 20Ω |
| | MR-RB50 | Tolerable regenerative power: 500W, Resistance value: 13Ω |
| | MR-RB51 | Tolerable regenerative power: 500W, Resistance value: 6.7Ω |
| | MR-RB5E | Tolerable regenerative power: 500W, (800W with cooling fans), Resistance value: 6Ω |
| | MR-RB9P | Tolerable regenerative power: 850W, (1300W with cooling fans),<br>Resistance value: 4.5Ω |
| | MR-RB6K-4 | Tolerable regenerative power: 850W, (1300W with cooling fans),<br>Resistance value: 10Ω, For 400V |
| Dynamic brake | DBU-11K | For MR-J3-11KB-RJ004U□ |
| | DBU-15K | For MR-J3-15KB-RJ004U□ |
| | DBU-22K-4 | For MR-J3-22KB4-RJ004U□ |
| MR Configurator2<br>(Setup software) | SW1DNC-MRC2-E | Servo setup software for installing on a personal computer (Note 1) |
| MR Configurator<br>(Setup software) | MRZJW3-SETUP221E | Servo setup software for installing on a personal computer (Note 1) |

Notes: 1. Refer to the section "List of compatible software versions".
2. Contact your local sales office for the prices and the specifications.

## List of compatible software versions

| Software | Compatible software version |
|---|---|
| MR Configurator2（SW1DNC-MRC2-E） | Any version |
| MR Configurator（MRZJW3-SETUP221E） | MR-J3-20B-RJ004(U□) to 700B-RJ004U□: B1 or above<br>MR-J3-11KB-RJ004U□ to 22KB4-RJ004U□: C0 or above<br>MR-J3W-B: C3 or above<br>LM-F series (LM-FP2D-12M, LM-FP2F-18M, LM-FP4F-36M,<br>LM-FP4H-48M, LM-FP5H-60M): C3 or above<br>LM-K2 series: will be compatible with C4 or above<br>LM-U2 series (LM-U2PBD-15M): C3 or above<br>*Note that software version C0 or above is compatible with<br>Q173DCPU/Q172DCPU, C2 or above with Q170MCPU, B0 or above with<br>Q173HCPU/Q172HCPU, and C1 or above with MT Works2. |
| Motion controller engineering environment<br>MELSOFT MT Works2 (SW1DNC-MTW2-E) | Any version |
| Integrated start-up support software<br>MT Developer（SW6RNC-GSVPROE/-GSVSETE） | 00N or above<br>*Note that 00Q or above is compatible with Q173DCPU/Q172DCPU. |
| Q173DCPU/Q172DCPU<br>OS software（SW8DNC-SV□□Q□/SW7DNC-SV□□Q□） | Any version |
| Q170MCPU<br>OS software（SW8DNC-SV13□□/-SV22□□） | Any version |
| Q173HCPU/Q172HCPU<br>OS software（SW6RN-SV□□Q□/SW5RN-SV□□Q□） | SV13/SV22: 00D or above<br>SV43: Not compatible<br>SV54: Any version |
| QD75MH | Product information 080320000000000-B or above |
| QD74MH | Any version |
| LD77MH | Any version |

## List of compatible servo amplifier software versions

Servo amplifiers with the listed software version or above are compatible with the following linear encoders.

| Manufacturer | Model | Compatible software versions | |
|---|---|---|---|
| | | MR-J3-B-RJ004 | MR-J3W-B |
| Magnescale Co., Ltd. | SR77 | B0 | A1 |
| | SR87 | B0 | A1 |
| | SR75 | A0 | A1 |
| | SR85 | A0 | A1 |
| | SL710 | A0 | A1 |
| Mitutoyo Corporation | AT343A | A0 | A1 |
| | AT543A-SC | A0 | A1 |
| | AT545A-SC | A4 | A1 |
| | ST741A | A0 | A1 |
| | ST742A | A0 | A1 |
| | ST743A | A1 | A1 |
| | ST744A | A1 | A1 |
| Heidenhain Corporation | LC 493M | B0 | A1 |
| | LC 193M | B0 | A1 |
| | LIDA 485 | B0 | A1 |
| | LIDA 487 | B0 | A1 |
| Renishaw Inc. | RGH26P | A0 | A1 |
| | RGH26Q | A0 | A1 |
| | RGH26R | A0 | A1 |

## MEMO

# Selecting linear servo motor

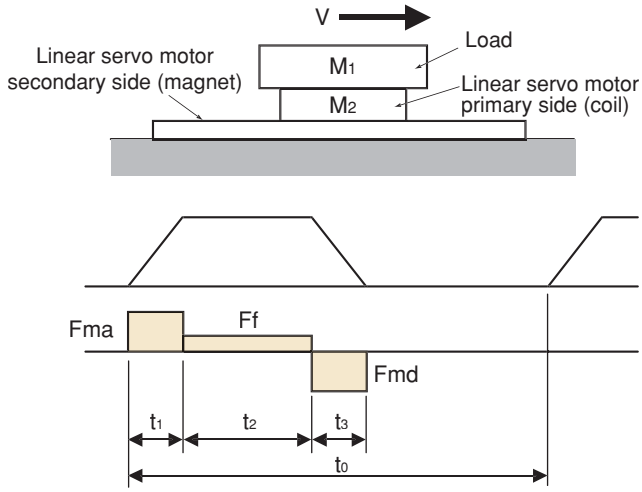
● Linear servo motor must be selected according to the purpose of the application.
Select the optimal linear servo motor after completely understanding the characteristics of the guides, the linear encoders and the linear servo motors.

● Maximum velocity
The maximum velocity of the linear servo motor is 2m/s.
Note that the maximum velocity may not be able to reach 2m/s, depending on the selected linear encoder.

## Selecting motors

● Continuous effective load thrust and necessary maximum thrust during acceleration or deceleration should be calculated from the machine data and the operation patterns. Then, a suitable linear servo motor can be selected.
In this catalog, the linear servo motor is selected according to linear acceleration/deceleration operation patterns.

### ■Configurations




$M_1$ : Load mass (kg)
$M_2$ : Linear servo motor primary side (coil) mass (kg)
a : Acceleration (m/s²)
Ff : Resistive force (N)
(including friction, unbalance and cable chain)
V : Maximum velocity (m/s)
$t_0$ : 1 cycle time (s)
$t_1$ : Acceleration time (s)
$t_2$ : Constant velocity time (s)
$t_3$ : Deceleration time (s)
$\eta$ : Mechanical efficiency
$\mu$ : Coefficient of friction

### ■Selecting procedures

#### 1. Method of selecting linear servo motor (theoretical value)

●Select a linear servo motor

From the linear servo motor series that is suitable for your application or machine, tentatively select a linear servo motor which makes the mass ratio of the load to the primary side (coil) equal to 30 or less. (Note 1)

$$30 \text{ times} \geq M_1 / M_2 \text{ (Note 1)}$$

●Calculate necessary thrust

(1) Resistive force

$$M = M_1 + M_2 \ (kg)$$
$$Ff = \mu \cdot (M \cdot 9.8 + \text{magnetic attraction force (N)}) \text{ (when considering only friction)}$$

(2) Thrust during acceleration and deceleration

$$Fma = M \cdot a + Ff \ (N)$$
$$Fmd = -M \cdot a + Ff \ (N)$$

(3) Continuous effective load thrust

$$Frms = \sqrt{(Fma^2 \cdot t_1 + Ff^2 \cdot t_2 + Fmd^2 \cdot t_3) / t_0}$$

●Qualify the selected linear servo motor

$Frms/\eta \leq$ Rated thrust [n] of the linear servo motor
$Fma/\eta \leq$ Maximum thrust [n] of the linear servo motor

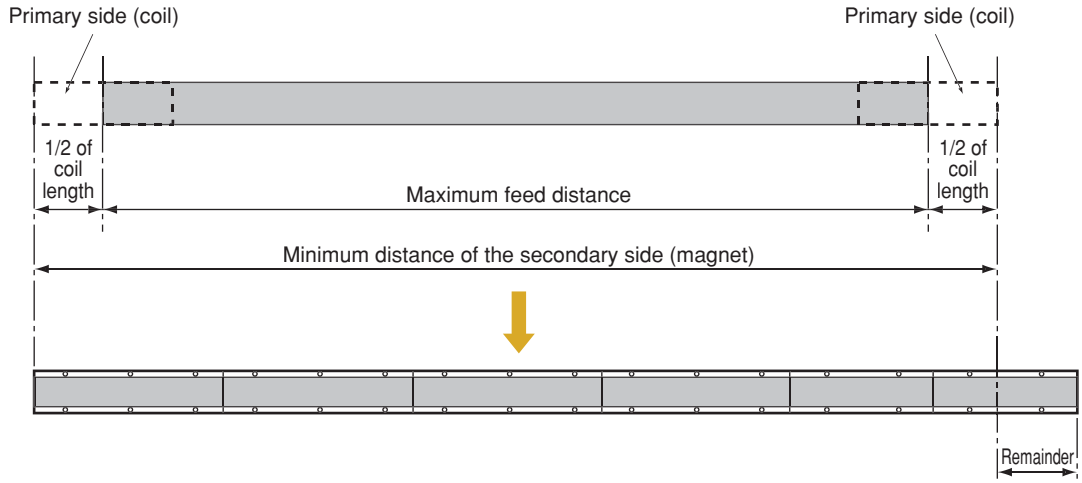
If the above conditions are not satisfied, select one rank larger capacity linear servo motor and recalculate.

Notes: 1. The ratio of 30 times is applicable for LM-H2, LM-K2 and LM-U2 series.
When using LM-F series, tentatively select a linear servo motor which has a ratio of 15 times or less.

## 2. Determining the number of secondary side (magnet) blocks

The number of the secondary side (magnet) blocks is determined according to the total distance calculated from the following equation:

(Total length of aligned secondary side (magnet)) ≥ (maximum feed distance) + (Length of the primary side (coil))




Note: When aligning two or more secondary sides (magnets), cumulative tolerance of the mounting hole must be within ±0.2mm. Therefore, spaces may exist between each secondary side (magnet) block.

## 3. Selecting optional regeneration unit

The following table shows the energy charged into the capacitor of the servo amplifier and the inverse efficiency of the linear servo motor.

The energy consumed by regenerative resistor is calculated as follows:

$$\text{Regenerative energy } P(W) = (-Fmd \cdot t_3 \cdot (\text{speed}/2) \cdot (\text{inverse efficiency}/100) - \text{Capacitor charging}) / t_0$$

Select a suitable optional regeneration unit as necessary to keep the consumed regenerative energy below the regeneration power shown in the following table:

| Servo amplifier MR-J3- (Note 3) | Capacitor charging (J) | Inverse efficiency (%) | Tolerable regenerative power (W) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Built-in regenerative resistor | External regenerative resistor (standard accessory) | Optional regeneration unit MR-RB | | | | | | | | | |
| | | | | | 032 [40Ω] | 12 [40Ω] | 30 [13Ω] | 31 [6.7Ω] | 32 [40Ω] | 50 [13Ω] (Note 1) | 51 [6.7Ω] (Note 1) | 5E [6Ω] (Note 2) | 9P [4.5Ω] (Note 2) | 6K-4 [10Ω] (Note 2) |
| 20B-RJ004(U□) | 9 | 70 | 10 | — | 30 | 100 | — | — | — | — | — | — | — | — |
| 40B-RJ004(U□) | 11 | 85 | 10 | — | 30 | 100 | — | — | — | — | — | — | — | — |
| 60B-RJ004(U□) | 11 | 85 | 10 | — | 30 | 100 | — | — | — | — | — | — | — | — |
| 70B-RJ004(U□) | 18 | 80 | 20 | — | 30 | 100 | — | — | 300 | — | — | — | — | — |
| 200BN-RJ004(U□) | 40 | 85 | 100 | — | — | — | 300 | — | — | 500 | — | — | — | — |
| 350B-RJ004(U□) | 40 | 85 | 100 | — | — | — | 300 | — | — | 500 | — | — | — | — |
| 500B-RJ004(U□) | 45 | 90 | 130 | — | — | — | — | 300 | — | — | 500 | — | — | — |
| 700B-RJ004U□ | 70 | 90 | 170 | — | — | — | — | 300 | — | — | 500 | — | — | — |
| 11KB-RJ004U□ | 120 | 90 | — | 500 (800) | — | — | — | — | — | — | — | 500 (800) | — | — |
| 15KB-RJ004U□ | 170 | 90 | — | 850 (1300) | — | — | — | — | — | — | — | — | 850 (1300) | — |
| 22KB4-RJ004U□ | 250 | 90 | — | 850 (1300) | — | — | — | — | — | — | — | — | — | 850 (1300) |

Notes: 1. Be sure to cool the unit forcibly with a cooling fan (92 × 92mm, minimum air flow: 1.0m³/min). The cooling fan must be prepared by user.
2. The values in ( ) indicate when cooling fans (2 units of 92 × 92mm, minimum air flow: 1.0m³/min) are installed, and parameter No. PA02 is changed.
3. For selecting an optional regeneration unit for MR-J3W-B servo amplifier, refer to "MR-J3W-□B SERVO AMPLIFIER INSTRUCTION MANUAL".

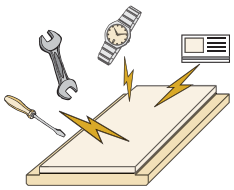
## To ensure safe use

■ To use the products given in this catalog properly, always read the “Installation Guide” and “MR-J3-□B-RJ004U□ INSTRUCTION MANUAL” before starting to use them.

## Cautions concerning use

### Handling linear servo

■ The linear servo system uses a powerful magnet on the secondary side. Magnetic force is inversely proportional to the square of the distance from the magnetic material. Therefore, the magnetic force will be drastically stronger as closer to the magnetic material. Persons installing as well as operating the linear servo motor must be fully cautious when handling the machine. Persons with pacemakers or other medical devices must keep away from the machine.



■ Do not carry products that may malfunction or fail due to the magnetic force such as watches, cell phones and calculators, and avoid wearing metals such as earrings or necklaces when handling the machine.

■ Place a sign such as “CAUTION! POWERFUL MAGNET” to give warning against the machine.

■ Use non-magnetic tools when installing or working near the linear servo motor.
e.g., Explosion-proof beryllium copper alloy safety tools: bealon (NGK Insulators, Ltd.)

■ The permanent magnet on the secondary side generates a force to attract magnetic objects. Use caution to prevent your hands from being caught. Take extra caution especially when installing the primary side (coil) after installing the secondary side (magnet).

■ Measures must be taken to prevent magnetic powder or magnetic pieces from being attracted to the permanent magnet on the secondary side.

■ Replace the linear servo motor when it is damaged.

■ Do not touch the linear servo motor with wet hands.

### Installation

■ Combinations of the linear servo motor and servo amplifier are predetermined. Confirm the models of the linear servo motor and servo amplifier to be used before installation.

■ Use the linear servo motor in the designated environment.

■ Do not drop or apply strong impact on the servo amplifier and the linear servo motor as they are precision devices and may be damaged from such stress or shock.

■ Avoid installation in an environment in which oil mist, dust, etc. are in the air. When using in such an environment, enclose the servo amplifier in a sealed cabinet.

■ Do not use where the linear servo motor may be constantly subject to cutting fluid or lubricant, or where dew could condense because of oil mist, overcooling or excessive humidity. These may cause the linear servo motor’s insulation to deteriorate.

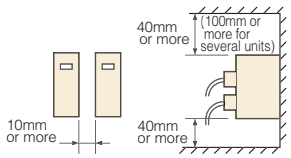
■ The linear servo motor is rated IP00. Provide measures to prevent dust and oil, etc., as necessary.

■ Mount the servo amplifier and linear servo motor on non-combustible material. Mounting them directly on or near flammable material may result in fires.

■ Mount the servo amplifier vertically on a wall.

■ Do not block intake and exhaust areas of the servo amplifier. Doing so may cause the servo amplifier to malfunction.

■ When installing several servo amplifiers in a row in a sealed cabinet, leave 10mm or more open between each servo amplifier. The MR-J3-350B-RJ004(U□) or smaller servo amplifier can be installed closely. In this case, keep the ambient temperature within 0°C to 45°C (32°F to 113°F), or use them with 75% or less of the effective load rate.
When using one servo amplifier, always leave 40mm or more open in the upward and downward directions. To ensure the life and reliability, keep space as open as possible toward the top plate so that heat does not build up.




Take special care, especially when installing several servo amplifiers in a row.

■ The optional regeneration unit becomes hot (a temperature rise of 100°C or more) with frequent use. Do not install within flammable objects or objects subject to thermal deformation. Take care to ensure that electrical wires do not come into contact with the unit.

■ Do not get on or place heavy objects on the linear servo motor. There is a risk of injury.

■ Do not modify the linear servo motor.

■ The magnetic pole cannot be detected when mounted on a vertical axis, so do not use the linear servo motor for a vertical axis applications.

■ Provide a mechanism that can withstand high speeds and high acceleration/deceleration.

■ To enable high-accuracy positioning, ensure the machine’s rigidity, and keep the machine’s resonance point at a high level.

■ Securely fix the linear servo motor onto the machine. Insufficient fixing may cause the linear servo motor to dislocate during operation.

■ Install electrical and mechanical stoppers at the stroke end.

■ Install your system so that the center of gravity of the moving section comes directly above the center of the primary side (coil).

■ If the linear encoder is improperly mounted, an alarm or a positioning deviation may occur. In this case, refer to the following general inspection of the linear encoder to verify the mounting state.

■ General inspection of linear encoder
(a) Verify that the gap between the linear encoder’s head and linear encoder is appropriate.
(b) Check for any rolling or yawing (looseness) on the linear encoder head.
(c) Check for contaminations and scratches on the linear encoder’s head and scale surface.
(d) Verify that vibration and temperature are within the specified range.
(e) Verify that the speed does not exceed the tolerable range due to overshooting.

Note: Contact the relevant linear encoder manufacturers for more details.

## Grounding

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

## Wiring

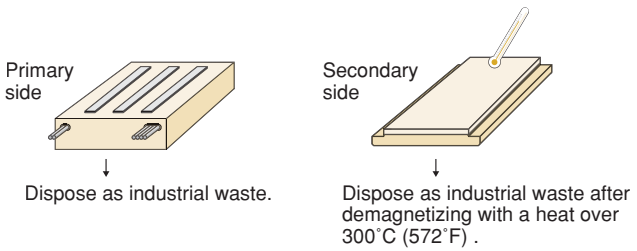
- When a commercial power supply is applied to the servo amplifier's output terminals (U, V, W), the servo amplifier will be damaged. Before switching the power on, perform thorough wiring and sequence checks to ensure that there are no wiring errors, etc.
- When a commercial power supply is applied to the linear servo motor's input terminals (U, V, W), the linear servo motor will be damaged. Connect the linear servo motor to the servo amplifier's output terminals (U, V, W).
- Match the phase of the linear servo motor's input terminals (U, V, W) to the servo amplifier's output terminals (U, V, W) before connecting. If they do not match, the linear servo motor cannot be controlled.
- The power cables, etc., protruding from the primary side (coil) cannot withstand bending operation for long periods of time. Fix these cables to the moving section, etc., so that they do not bend.
- Do not apply excessive tension on the fiber-optic cable when cabling.
- The minimum bending radius of the fiber-optic cable is 25mm for MR- J3BUS□M and 50mm for MR-J3BUS□M-A/-B. If using these cables under the minimum bending radius, performance cannot be guaranteed.
- If the ends of the fiber-optic cable are dirty, the light will be obstructed, resulting malfunctions. Always clean the ends if dirty.
- Do not tighten the fiber-optic cable with cable ties, etc.
- Do not directly look at the light when the fiber-optic cable is not connected.
- Carefully consider the cable clamping method, and make sure that bending stress and the stress of the cable's own weight are not applied on the cable connection section.

## Operation

- When a magnetic contactor (MC) is installed on the servo amplifier's primary side, do not perform frequent starts and stops with the MC. Doing so may cause the servo amplifier to malfunction.
- When an error occurs, the servo amplifier's safety features activate, halting output, and the dynamic brake instantly stops the linear servo motor.
- Validate the stroke end signals (LSP, LSN) in position control or speed control mode. The linear servo motor will not start if the signals are invalid.
- If the servo amplifier's safety features activate, turn the power OFF immediately. Remove the cause before turning the power ON again. If operation is continued without removing the cause of the error, the linear servo motor may malfunction and result in injury or damage.
- Do not use a servo amplifier or linear servo motor which is damaged or has missing parts.
- Do not touch the linear servo motor during or after operation until it has had sufficient time to cool. The linear servo motor can be very hot, and severe burns may result from touching the motor.

## Disposal of linear servo motor

- Dispose the primary side as industrial waste.
- Demagnetize the secondary side with a heat over 300˚C (572˚F) and dispose as industrial waste. If not possible to demagnetize, return the secondary side to us in an appropriate package.
- Do not leave the product unattended.



## Warranty

**1. Warranty period and coverage**

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

**[Term]**

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

**[Limitations]**

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

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

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

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

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

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

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

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

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

(vii) a failure generated by an unforeseeable cause with a scientific technology that was not available at the time of the shipment of the Product from our company

(viii) any other failures which we are not responsible for or which you acknowledge we are not responsible for

**2. Term of warranty after the stop of production**

(1) We may accept the repair at charge for another seven (7) years after the production of the product is discontinued. The announcement of the stop of production for each model can be seen in our Sales and Service, etc.

(2) Please note that the Product (including its spare parts) cannot be ordered after its stop of production.

**3. Service in overseas countries**

Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA Center for details.

**4. Exclusion of responsibility for compensation against loss of opportunity, secondary loss, etc.**

Whether under or after the term of warranty, we assume no responsibility for any damages arisen from causes for which we are not responsible, any losses of opportunity and/or profit incurred by you due to a failure of the Product, any damages, secondary damages or compensation for accidents arisen under a specific circumstance that are foreseen or unforeseen by our company, any damages to products other than the Product, and also compensation for any replacement work, readjustment, start-up test run of local machines and the Product and any other operations conducted by you.

**5. Change of Product specifications**

Specifications listed in our catalogs, manuals or technical documents may be changed without notice.

**6. Application and use of the Product**

(1) For the use of our General-Purpose AC Servo, its applications should be those that may not result in a serious damage even if any failure or malfunction occurs in General-Purpose AC Servo, and a backup or fail-safe function should operate on an external system to General-Purpose AC Servo when any failure or malfunction occurs.

(2) Our General-Purpose AC Servo is designed and manufactured as a general purpose product for use at general industries. Therefore, applications substantially influential on the public interest for such as atomic power plants and other power plants of electric power companies, and also which require a special quality assurance system, including applications for railway companies and government or public offices are not recommended, and we assume no responsibility for any failure caused by these applications when used.

In addition, applications which may be substantially influential to human lives or properties for such as airlines, medical treatments, railway service, incineration and fuel systems, man-operated material handling equipment, entertainment machines, safety machines, etc. are not recommended, and we assume no responsibility for any failure caused by these applications when used.

We will review the acceptability of the abovementioned applications, if you agree not to require a specific quality for a specific application. Please contact us for consultation.

## Global FA Centers


**Shanghai FA Center**
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.
80 Xin Chang Road, 4th Floor,
Shanghai Intelligence Fortune Leisure Plaza
Huang Pu district, Shanghai 200003, China
Tel: 86-21-6121-2460 Fax: 86-21-6121-2424

**Beijing FA Center**
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.
BEIJING OFFICE
Unit 917/918, 9/F Office Tower 1, Henderson Center,
18 Jianguomennei Dajie, Dongcheng District, Beijing 100005, China
Tel: 86-10-6518-8830 Fax: 86-10-6518-8030

**Tianjin FA Center**
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.
TIANJIN OFFICE
B-2 801/802 Youyi Building, No.50 Youyi Road, Hexi District,
Tianjin 300061, China
Tel: 86-22-2813-1015 Fax: 86-22-2813-1017

**Guangzhou FA Center**
MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD.
GUANGZHOU OFFICE
Rm.1609, North Tower, The Hub Center, No.1068,
Xing Gang East Road, Haizhu District, Guangzhou 510335, China
Tel: 86-20-8923-6713 Fax: 86-20-8923-6715

**Hong Kong FA Center**
MITSUBISHI ELECTRIC AUTOMATION (HONG KONG) LTD.
(FA DIVISION)
10th Floor, Manulife Tower, 169 Electric Road,
North Point, Hong Kong
Tel: 852-2887-8870 Fax: 852-2887-7984

**Taiwan FA Center**
SETSUYO ENTERPRISE CO., LTD.
6F No.105 Wu Kung 3rd RD, Wu-Ku Hsiang,
Taipei Hsien, Taiwan
Tel: 886-2-2299-2499 Fax: 886-2-2299-2509

**Korean FA Center**
MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD.
1480-6 Gayang-dong, Gangseo-gu, Seoul 157-200, Korea
Tel: 82-2-3660-9607 Fax: 82-2-3663-0475

**Thailand FA Center**
MITSUBISHI ELECTRIC AUTOMATION THAILAND CO., LTD.
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Bangkok 10230, Thailand
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**ASEAN FA Center**
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307 Alexandra Road #05-01/02
Mitsubishi Electric Building, Singapore 159943
Tel: 65-6470-2480 Fax: 65-6476-7439

**India FA Center**
MITSUBISHI ELECTRIC ASIA PVT. LTD. GURGAON BRANCH
2nd Floor, DLF Building No.9B, DLF Cyber City Phase Ⅲ,
Gurgaon 122002, Haryana, India
Tel: 91-124-4630300 Fax: 91-124-4630399

**North American FA Center**
MITSUBISHI ELECTRIC AUTOMATION, INC.
500 Corporate Woods Parkway, Vernon Hills, IL 60061, USA
Tel: 1-847-478-2330 Fax: 1-847-478-2396

**Brazil FA Center**
MELCO-TEC REPRESENTACAO COMERCIAL E ASSESSORIA TECNICA LTDA.
Av.Paulista 1439, conj.74, Bela Vista CEP;01311-200
Sao Paulo-SP Brazil
Tel: 55-11-3146-2202 Fax: 55-11-3146-2217

**European FA Center**
MITSUBISHI ELECTRIC EUROPE B.V. GERMAN BRANCH
Gothaer Strasse 8 D-40880 Ratingen, GERMANY
Tel: 49-2102-486-2630 Fax: 49-2102-486-7170

**Central and Eastern Europe FA Center**
MITSUBISHI ELECTRIC AUTOMATION EUROPE B.V.
CZECH BRANCH
Radlická 714/113a, 15800 Praha 5, Czech Republic
Tel: 420-251-551-470 Fax: 420-251-551-471

**UK FA Center**
MITSUBISHI ELECTRIC EUROPE B.V. UK BRANCH
(Customer Technology Centre)
Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.
Tel: 44-1707-278843 Fax: 44-1707-278992

**Russian FA Center**
MITSUBISHI ELECTRIC EUROPE B.V. RUSSIAN BRANCH
Sverdlovskaya Emb., 44, Bld Sch, BC "Benua";195027,
St. Peterssburg, Russia
Tel: 7-812-633-3496 Fax: 7-812-633-3499

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

Empowering Industries
SSCNET III SERVO SYSTEM CONTROLLER NETWORK
MELSOFT

**Safety Warning**

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

MITSUBISHI ELECTRIC CORPORATION
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