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

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

SSCNET SERVO SYSTEM CONTROLLER NETWORK

MELSOFT

ISO 14001 JACO EC97J1113 UKAS ENVIRONMENTAL MANAGEMENT 051

Certified ISO 9001 by BVQI UKAS QUALITY MANAGEMENT 008

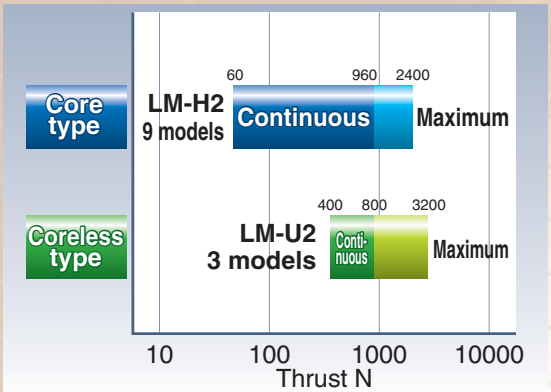
Always Ahead of the Scene, Seize

Linear Servo Features

1 Achieving high speeds and high accuracies

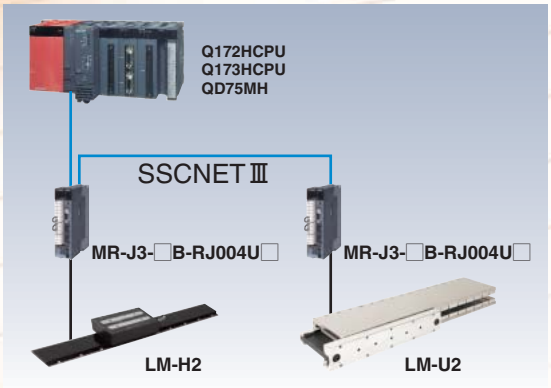
- The linear servo motor can attain a high rigidity since it is a direct drive, and the full closed system realizes high accuracy operation.
- High speed operation (2m/s) is now possible. (The conventional transmission mechanism had a difficulty realizing the above operation speed.)

2 Lineup including core and coreless types



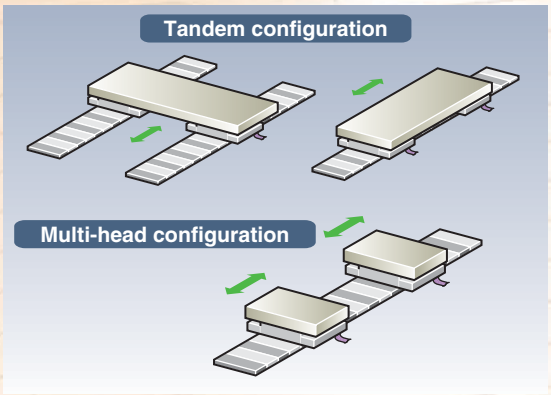
- The LM-H2 Series has realized a compact size, large thrust.
  This model is applicable for a variety of systems from chipmounters to material handing systems.
- The LM-U2 Series is coreless and compatible with large thrusts.
  This model is suitable for diverse systems which require operation with no thrust fluctuation, such as printing machines or inspection systems.

3 Compatible with high-performance servo amplifier MR-J3-B



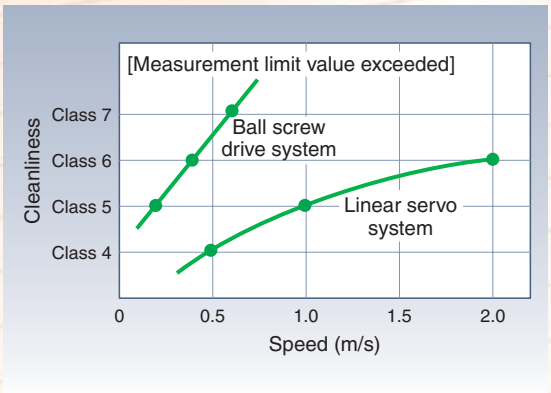
- Highly accurate synchronous operation and multi-head operation can be easily structured when used in combination with the SSCNET Ⅲ compatible Q motion controller.
- Compatibility with the MR-J3-B Series allows high-response and high-accuracy system with improved reliability to be structured.
- The MR-J3-B "robust disturbance compensation function" suppresses uneven speeds resulting from disturbance.

4 Ideal for structuring multi-head systems



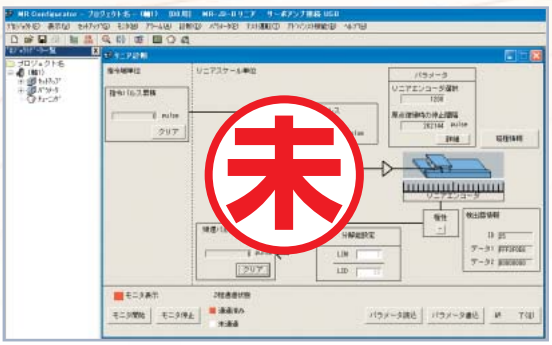
- The tandem configuration is compatible with large systems which require highly accurate synchronization between two axes.
- The multi-head configuration allows two movable motor coil (primary side coils) to be controlled with independent commands, making the machine structure to be simplified. This is best suited for systems which require a shorter tact time.

5 Eco-friendly and perfect for clean applications



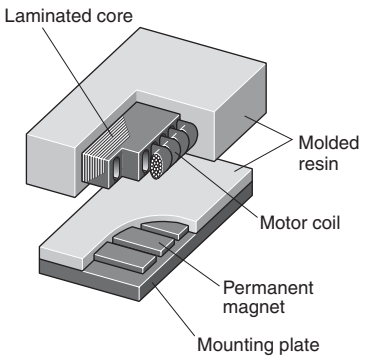
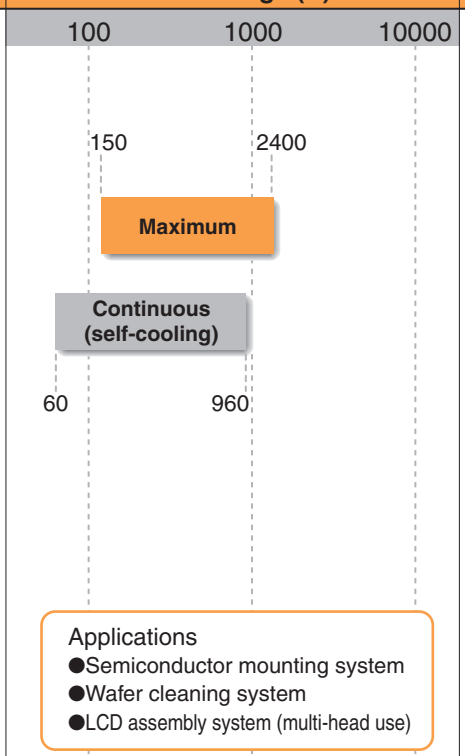
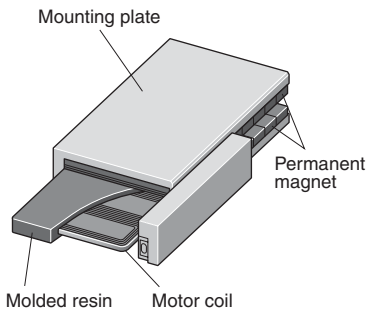
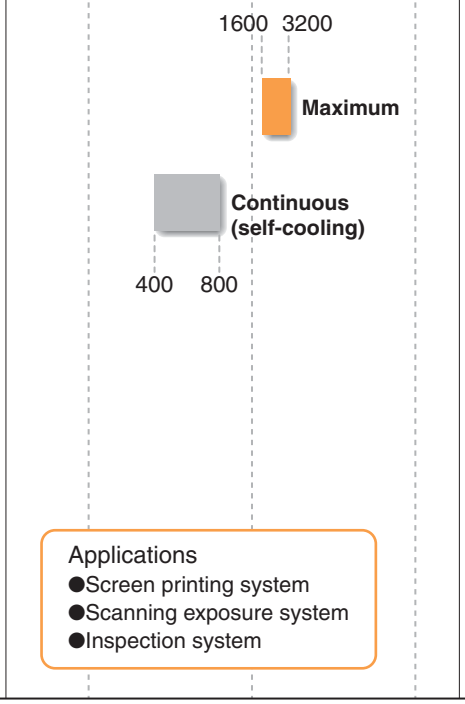
- Use in clean environment is possible since no ball screws are used and grease does not splatter.
- Elimination of transmission mechanisms, which include backlash, enables smooth and quiet operation even at high speeds.

6 Linear servo compatible setup software



- Parameter setting, gain adjustment, monitoring, diagnosis and test operation can be carried out easily with MR Configurator (setup software).
- The advanced auto-tuning function and machine analyzer function allow the linear servo to be appropriately adjusted, and reduce the system startup time.

Linear Servo Motor Series

	Motor series	Thrust range (N)	Features
Core type	**LM-H2 Series**  	 	**Structure** ●The motor is configured of the primary side (laminated core + motor coil) and the secondary side (permanent magnet + mounting plate). ●The primary side has slots on the laminated core. The motor coil is wound on this laminated core, and the entire section is encased in molded resin. ●The secondary side has a flat permanent magnet positioned and fixed on the mounting plate. The entire section is molded by resin. **Features** ●The thrust/volume ratio can be increased, allowing space-saving. (High thrust density) ●The attraction force functions as the preload on the guide, allowing high-rigidity to be attained.
Coreless type	**LM-U2 Series**  	 	**Structure** ●The motor is configured of the primary side (motor coil) and the secondary side (permanent magnet + mounting plate). ●The primary side does not have a laminated core. The motor coil is accurately positioned on the base and encased in molded resin. ●On the secondary side, permanent magnets are accurately positioned and fixed to face each other in a U shaped-like mounting plate. **Features** ●Elimination of magnetic attraction force and cogging achieves small speed fluctuation. ●The guide life can be extended as there is no attraction force.

Model configurations for linear servo motor

LM-H2 Series

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

Symbol	Maximum speed
M	2m/s

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

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

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

LM-H2S20-288 (Secondary side: Magnet)

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

Symbol	Width (nominal dimension)
1	40mm
2	64mm
3	104mm

LM-U2 Series

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

Symbol	Maximum speed
M	2m/s

Symbol	Rated thrust
40	400N
60	600N
80	800N

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

LM-U2S20-480 (Secondary side: Magnet)

Symbol	Length (nominal dimension)
480	480mm

Model configurations for servo amplifier

MR-J3-40B-RJ004□

MELSERVO -J3 Series

Linear compatible servo amplifier
SSCNET Ⅲ compatible

Amplifier model
40, 70, 200, 350, 500

Symbol	Motor model
U500	LM-H2P1A-06M
U501	LM-H2P2A-12M
U502	LM-H2P2B-24M
U503	LM-H2P2C-36M
U504	LM-H2P2D-48M
U505	LM-H2P3A-24M
U506	LM-H2P3B-48M
U507	LM-H2P3C-72M
U508	LM-H2P3D-96M
U509	LM-U2P2B-40M
U510	LM-U2P2C-60M
U511	LM-U2P2D-80M

Linear servo motor specifications

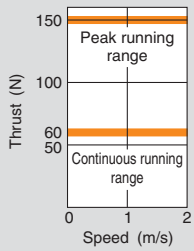
●LM-H2 Series

Specifications \ Motor model		LM-H2P1A-06M	LM-H2P2A-12M	LM-H2P2B-24M	LM-H2P2C-36M	LM-H2P2D-48M	LM-H2P3A-24M	LM-H2P3B-48M	LM-H2P3C-72M	LM-H2P3D-96M
Amplifier model MR-J3-		40B-RJ004U500	40B-RJ004U501	70B-RJ004U502	200B-RJ004U503	200B-RJ004U504	70B-RJ004U505	200B-RJ004U506	350B-RJ004U507	500B-RJ004U508
Power facility capacity (kVA)		0.9	0.9	1.3	3.5	3.5	1.3	3.5	5.5	7.5
Cooling method		Self-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 (m/s) (Note)		2.0								
Magnetic attraction force (N)		500	1000	1900	2700	3500	2000	3700	5300	7000
Mass (kg [lb])	Primary side	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	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-H2S10-□□□	LM-H2S20-□□□				LM-H2S30-□□□			
Recommended load / motor volume ratio		30 times linear servo motor primary side weight maximum								
Structure		Open (protection level: 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								

Note: The linear servo motor's maximum speed or linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.

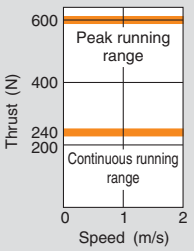
●LM-H2 series thrust characteristics

■LM-H2P1A-06M



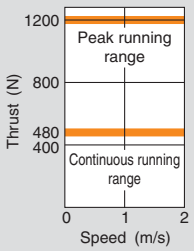
■LM-H2P2A-12M

■LM-H2P2B-24M

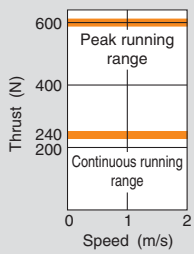


■LM-H2P2C-36M

■LM-H2P2D-48M

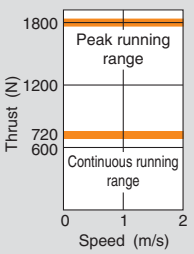


■LM-H2P3A-24M

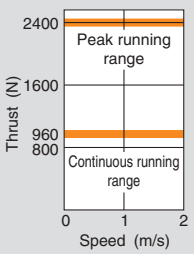


■LM-H2P3B-48M

■LM-H2P3C-72M



■LM-H2P3D-96M



Note:
: For 3-phase 200VAC or 1-phase 230VAC.

●Electrical wires

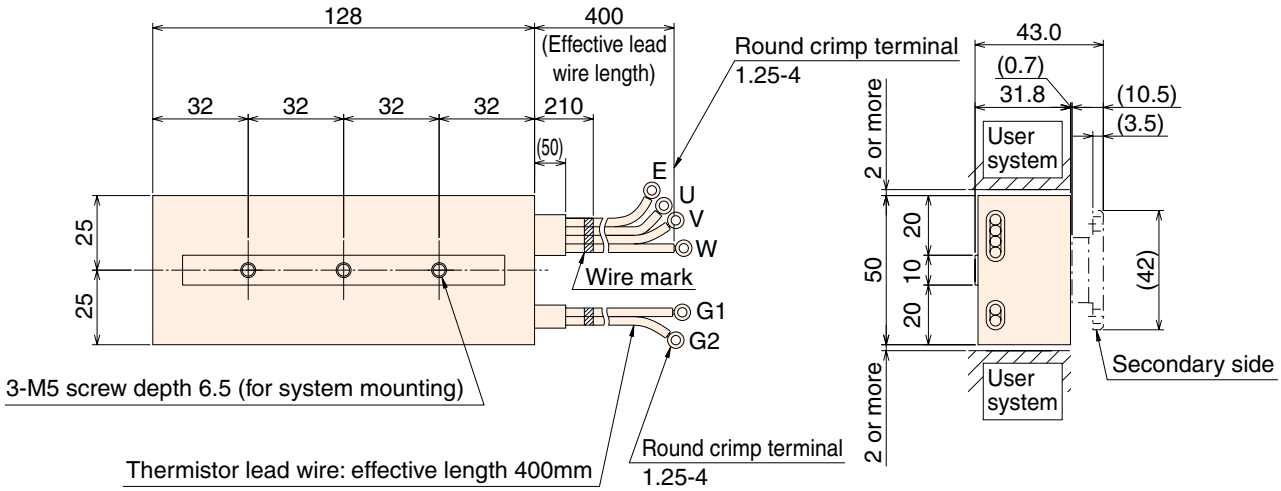
Servo amplifier model	Electrical wire size (mm^2) (Note)				
	L1, L2, L3	U, V, W, Earth	L11, L21	P, C, D	G1, G2
MR-J3-40B-RJ004U□	2 (AWG14)	1.25 (AWG16)	1.25 (AWG16)	2 (AWG14)	0.2 (AWG24)
MR-J3-70B-RJ004U□					
MR-J3-200B-RJ004U□	3.5 (AWG12)	3.5 (AWG12)			
MR-J3-350B-RJ004U□	5.5 (AWG10)	5.5 (AWG10)			
MR-J3-500B-RJ004U□					

Note: The wires in the above table are assumed to use 600V polyvinyl chloride electrical wire having a length of 30m.

Linear servo motor dimensions

●Primary side (coil)

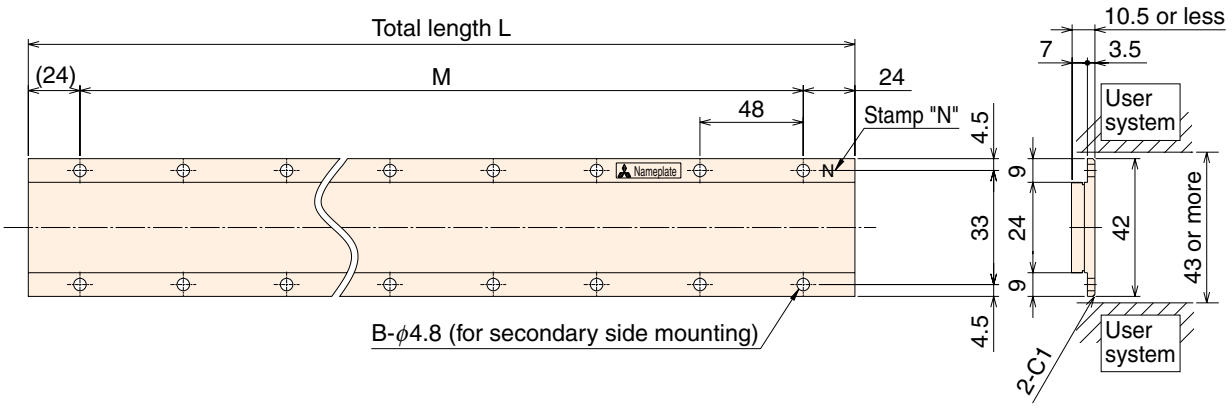
●LM-H2P1A-06M



(Unit : mm)

●Secondary side (magnet)

●LM-H2S10-288
●LM-H2S10-384
●LM-H2S10-480
●LM-H2S10-768



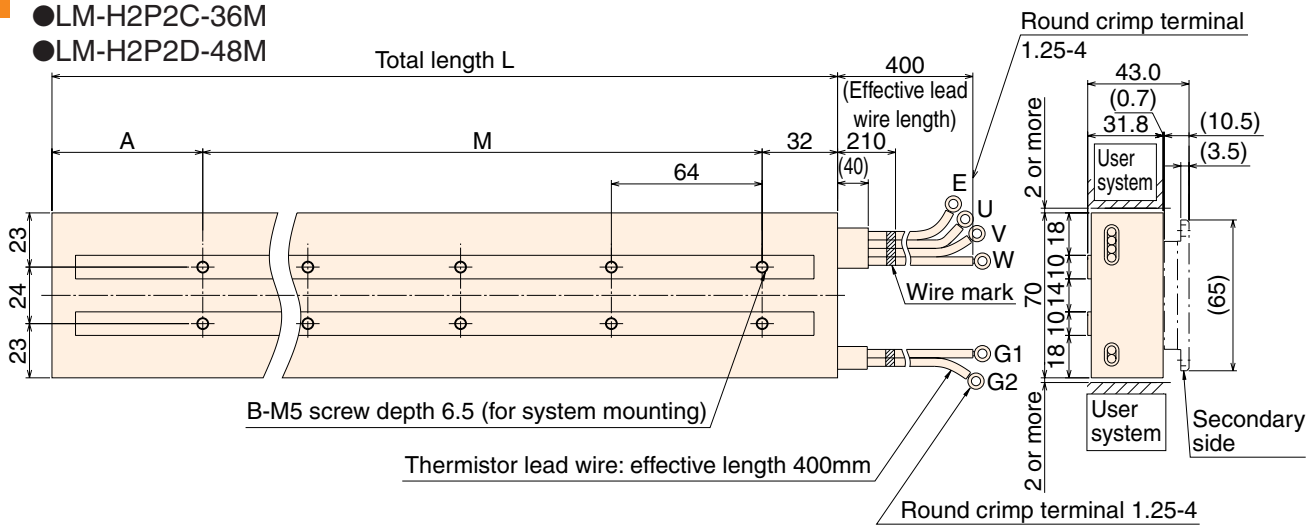
(Unit : mm)

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

Linear servo motor dimensions

●Primary side (coil)

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

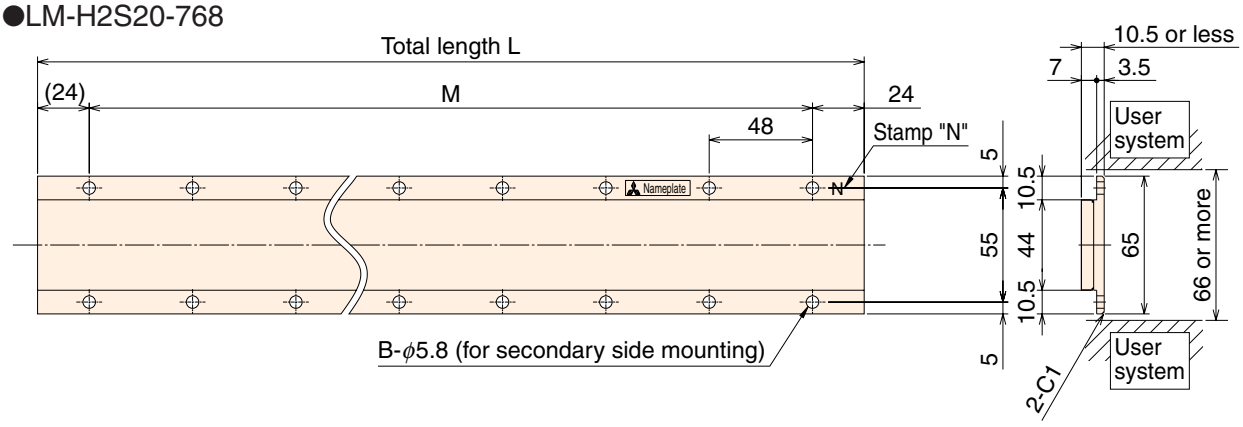


(Unit : mm)

Model	Variable dimensions			
	L	M	A	B
LM-H2P2A-12M	128	64	32	3×2
LM-H2P2B-24M	224	2×64(=128)	64	6×2
LM-H2P2C-36M	320	4×64(=256)	32	9×2
LM-H2P2D-48M	416	5×64(=320)	64	12×2

●Secondary side (magnet)

●LM-H2S20-288
●LM-H2S20-384
●LM-H2S20-480
●LM-H2S20-768



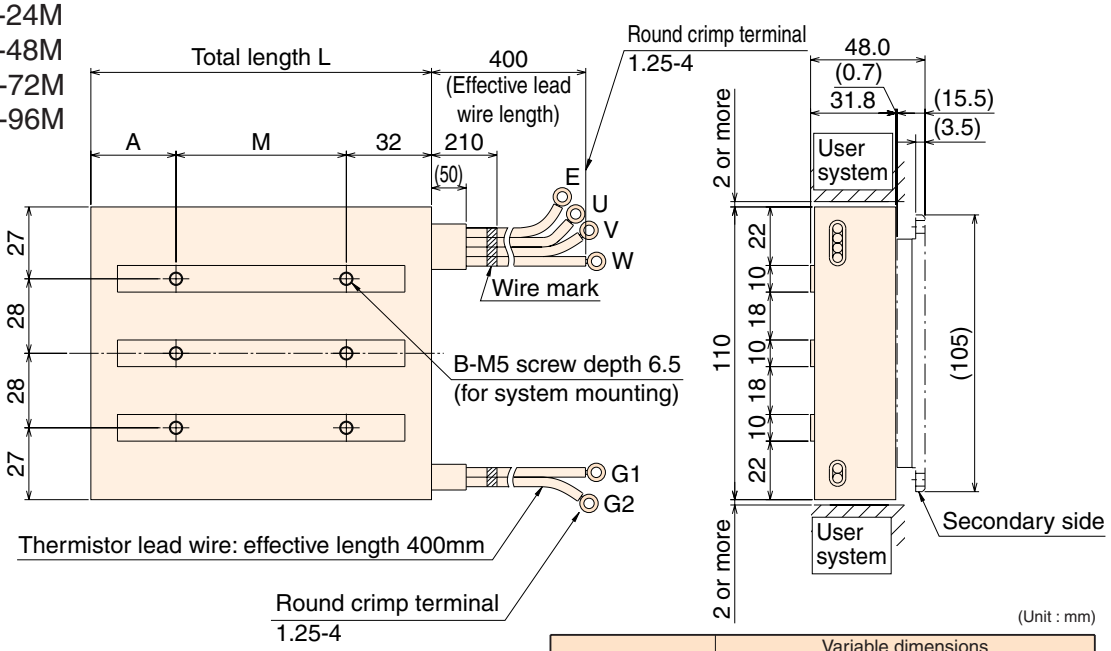
(Unit : mm)

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

Linear servo motor dimensions

●Primary side (coil)

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

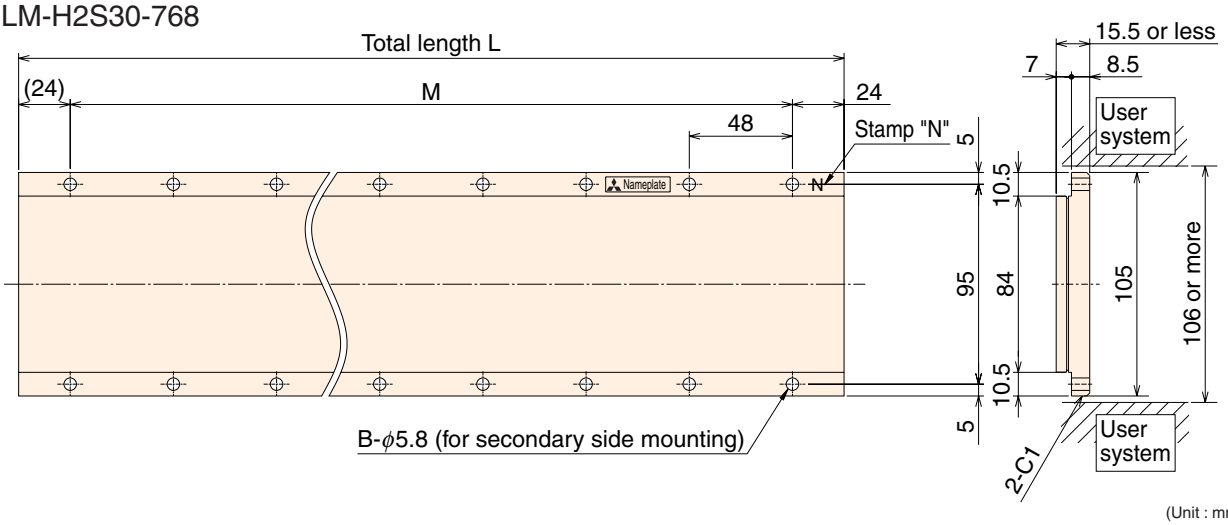


(Unit : mm)

Model	Variable dimensions			
	L	M	A	B
LM-H2P3A-24M	128	64	32	3×3
LM-H2P3B-48M	224	2×64(=128)	64	6×3
LM-H2P3C-72M	320	4×64(=256)	32	9×3
LM-H2P3D-96M	416	5×64(=320)	64	12×3

●Secondary side (magnet)

●LM-H2S30-288
●LM-H2S30-384
●LM-H2S30-480
●LM-H2S30-768



(Unit : mm)

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

Linear servo motor specifications

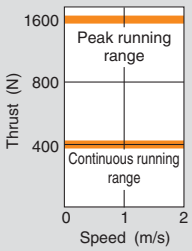
●LM-U2 Series

Specifications \ Motor model		LM-U2P2B-40M	LM-U2P2C-60M	LM-U2P2D-80M
Amplifier model		MR-J3-200B-RJ004U509	MR-J3-350B-RJ004U510	MR-J3-500B-RJ004U511
Power facility capacity (kVA)		3.5	5.5	7.5
Cooling method		Self-cooling		
Thrust	Continuous (N)	400	600	800
	Maximum (N)	1600	2400	3200
Maximum speed (m/s) (Note)		2.0		
Magnetic attraction force (N)		0		
Mass (kg [lb])	Primary side	2.9 (6.4)	4.2 (9.3)	5.5 (13)
	Secondary side	15.3 (34)		
Secondary side model		LM-U2S20-480		
Recommended load / motor volume ratio		30 times linear servo motor primary side weight maximum		
Structure		Open (protection level: 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		

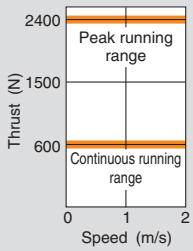
Note: The linear servo motor's maximum speed or linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.

●LM-U2 series thrust characteristics

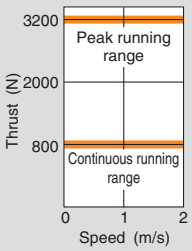
■LM-U2P2B-40M



■LM-U2P2C-60M



■LM-U2P2D-80M



Note:
: For 3-phase 200VAC.

●Electrical wires

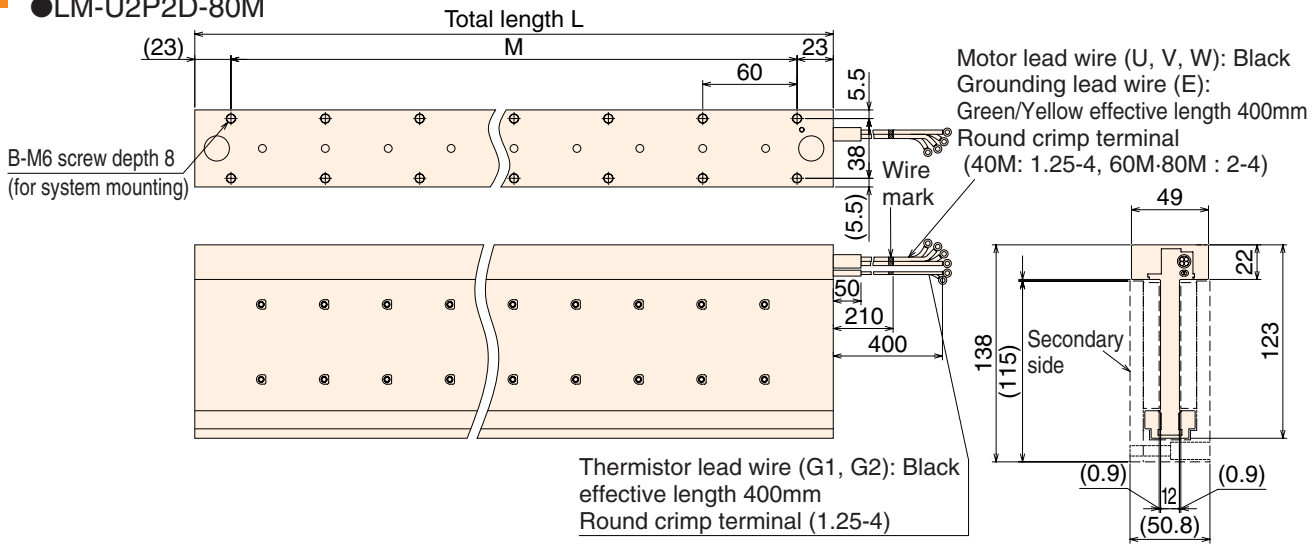
Servo amplifier model	Electrical wire size (mm^2) (Note)				
	L1, L2, L3	U, V, W, Earth	L11, L21	P, C, D	G1, G2
MR-J3-200B-RJ004U□	3.5 (AWG12)	3.5 (AWG12)	1.25 (AWG16)	2 (AWG14)	0.2 (AWG24)
MR-J3-350B-RJ004U□	5.5 (AWG10)	5.5 (AWG10)			
MR-J3-500B-RJ004U□					

Note: The wires in the above table are assumed to use 600V polyvinyl chloride electrical wire having a length of 30m.

Linear servo motor dimensions

●Primary side (coil)

●LM-U2P2B-40M
●LM-U2P2C-60M
●LM-U2P2D-80M

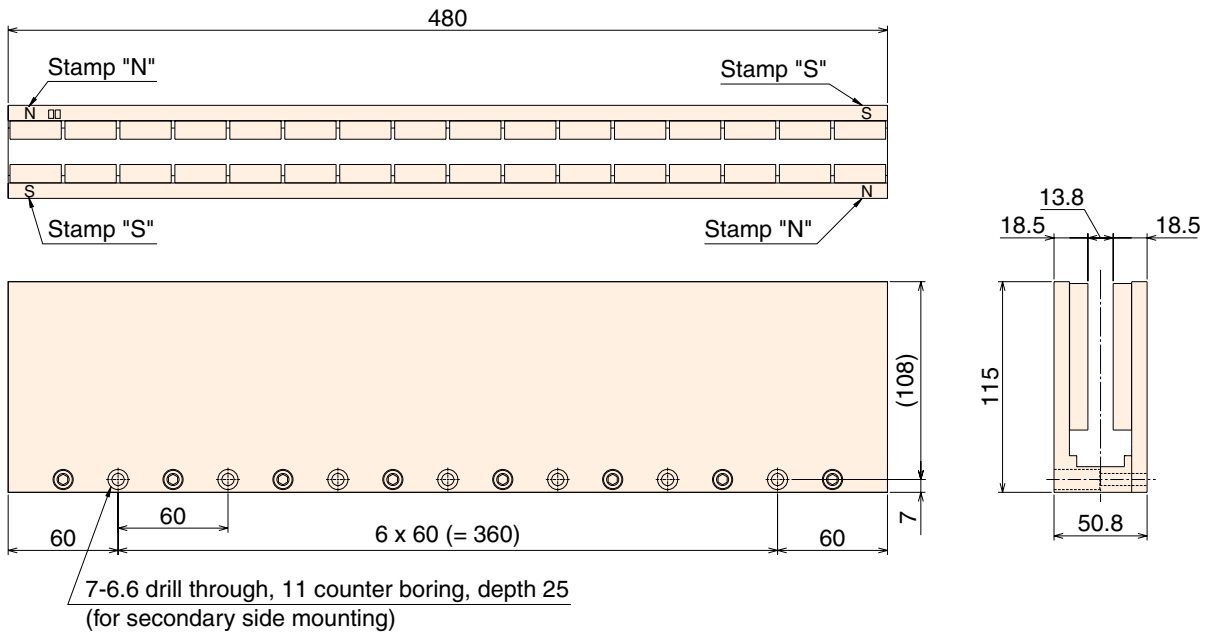


(Unit : mm)

Model	Variable dimensions		
	L	M	B
LM-U2P2B-40M	286	240	5×2
LM-U2P2C-60M	406	360	7×2
LM-U2P2D-80M	526	480	9×2

●Secondary side (magnet)

●LM-U2S20-480



(Unit : mm)

Servo amplifier specifications

●MR-J3-B type

Servo amplifier model			MR-J3-40B-RJ004U□	MR-J3-70B-RJ004U□	MR-J3-200B-RJ004U□	MR-J3-350B-RJ004U□	MR-J3-500B-RJ004U□
Main circuit power supply	Voltage/frequency (Note 1)		3-phase 200 to 230VAC 50/60Hz or 1-phase 230VAC 50/60Hz		3-phase 200 to 230VAC 50/60Hz		
	Permissible voltage fluctuation		For 3-phase 200 to 230VAC: 3-phase 170 to 253VAC For 1-phase 230VAC: 1-phase 207 to 253VAC		3-phase 170 to 253VAC		
	Permissible frequency fluctuation		±5% maximum				
Control circuit power supply	Voltage/frequency		1-phase 200 to 230VAC 50/60Hz				
	Permissible voltage fluctuation		1-phase 170 to 253VAC				
	Permissible frequency fluctuation		±5% maximum				
	Power consumption (W)		30				45
Interface power supply			24VDC ±10% (required current capacity: 150mA (Note 3))				
Linear encoder interface	Serial interface		Mitsubishi high-speed serial communication				
	Pulse train interface	Input signal	ABZ phase differential input signal				
		Minimum phase difference	200ns				
Control system			Sine-wave PWM control/current control system				
Dynamic brake			Built-in				
Safety features			Overcurrent shutdown, regeneration overvoltage shutdown, overload shutdown (electronic thermal), servo motor overheat protection, encoder fault protection, regeneration fault protection, undervoltage/sudden power outage protection, overspeed protection, excess error protection				
Structure			Self-cooling open (IP00)	Fan cooling open (IP00)			
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 maximum				
Mass (kg [lb])			1.0 (2.2)	1.4 (3.1)	2.3 (5.1)	2.3 (5.1)	4.6 (10)

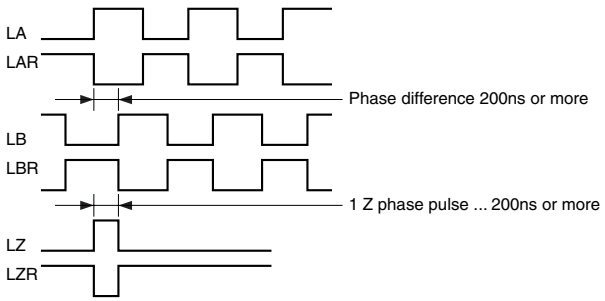
Notes: 1. Rated thrust and rated speed of the linear servo motor used in combination with the servo amplifier are as indicated when using the power supply voltage and frequency listed. The thrust drops when the power supply voltage is less than specified.
2. The MR-J3-350B-RJ004 or smaller servo amplifier can be installed closely. In this case, keep the ambient temperature within 0 to 45°C (32 to 113°F), or use them with 75% or less of the effective load rate.
3. 150mA 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.

Compatible linear encoders

●List of compatible linear encoders (Notes 1, 2)

Linear encoder type		Manufacturer	Model	Resolution	Rated speed (Note 4)	Effective measurement length (maximum)	Communication method	Absolute position system
Mitsubishi serial interface compatible	Absolute type	Mitutoyo Corporation	AT343A	0.05μm	2.0m/s	3000mm	2-wire type	○
			AT543A-SC		2.5m/s	2200mm		
			ST741A	0.5μm	4.0m/s	3000mm		
		Heidenhain Corporation	LC491M (Note 3)	0.05μm	2.0m/s	2040mm	4-wire type	○
	Incremental type	Sony Manufacturing Systems Corporation	SL710+PL101-R/RH +MJ830 or MJ831	0.2μm (Note 5)	6.4m/s	3000mm	2-wire type	×
			SH13 +MJ830 or MJ831	0.005μm (Note 5)	1.4m/s	1240mm		×
		Renishaw Inc.	RGH26P	5μm	4.0m/s	70000mm	2-wire type	×
			RGH26Q	1μm	3.2m/s			×
			RGH26R	0.5μm	1.6m/s			×
		Heidenhain Corporation	LIDA485+APE391M	0.005μm (20/4096μm)	4.0m/s	30040mm	4-wire type	×
			LIDA487+APE391M			6040mm		
ABZ phase differential output type (Note 7)	Incremental type	Not designated	–	Within tolerable resolution range (Note 6)	Depends on linear encoder	Depends on linear encoder	Differential 3-pair type	×

Notes: 1. Consult with each 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 structuring the system.
3. The linear encoder could malfunction if the ambient temperature is too high. Keep the linear encoder's ambient temperature within the temperature range specified by the manufacturer.
4. 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 linear encoder's rated speed, whichever is smaller, is the upper limit value of the linear servo motor's speed.
5. The resolution differs according to the setting value of the interpolator, MJ830/MJ831 made by Sony Manufacturing Systems Corporation. Set the resolution between the minimum resolution and 5μm.
6. The tolerable resolution range is 0.005 to 5μm. Select the linear encoder within this range.
7. Output the A phase, B phase and Z phase signals in the differential line driver. The A phase pulse and B phase pulse phase difference must be 200ns or more, and the Z phase pulse width must be wider than 200ns.
Zero point return is not possible with a linear encoder which is not equipped with a Z phase.



●Handling the linear encoder

If the linear encoder is improperly mounted, alarms could occur or the position could deviate, etc.
Check the linear encoder mounting state in such cases.

■General confirmation items for linear encoder

(a) Is the gap between the linear encoder's head and scale appropriate?

(b) Is there any rolling or yawing (looseness at the linear encoder head section) at the linear encoder head section?

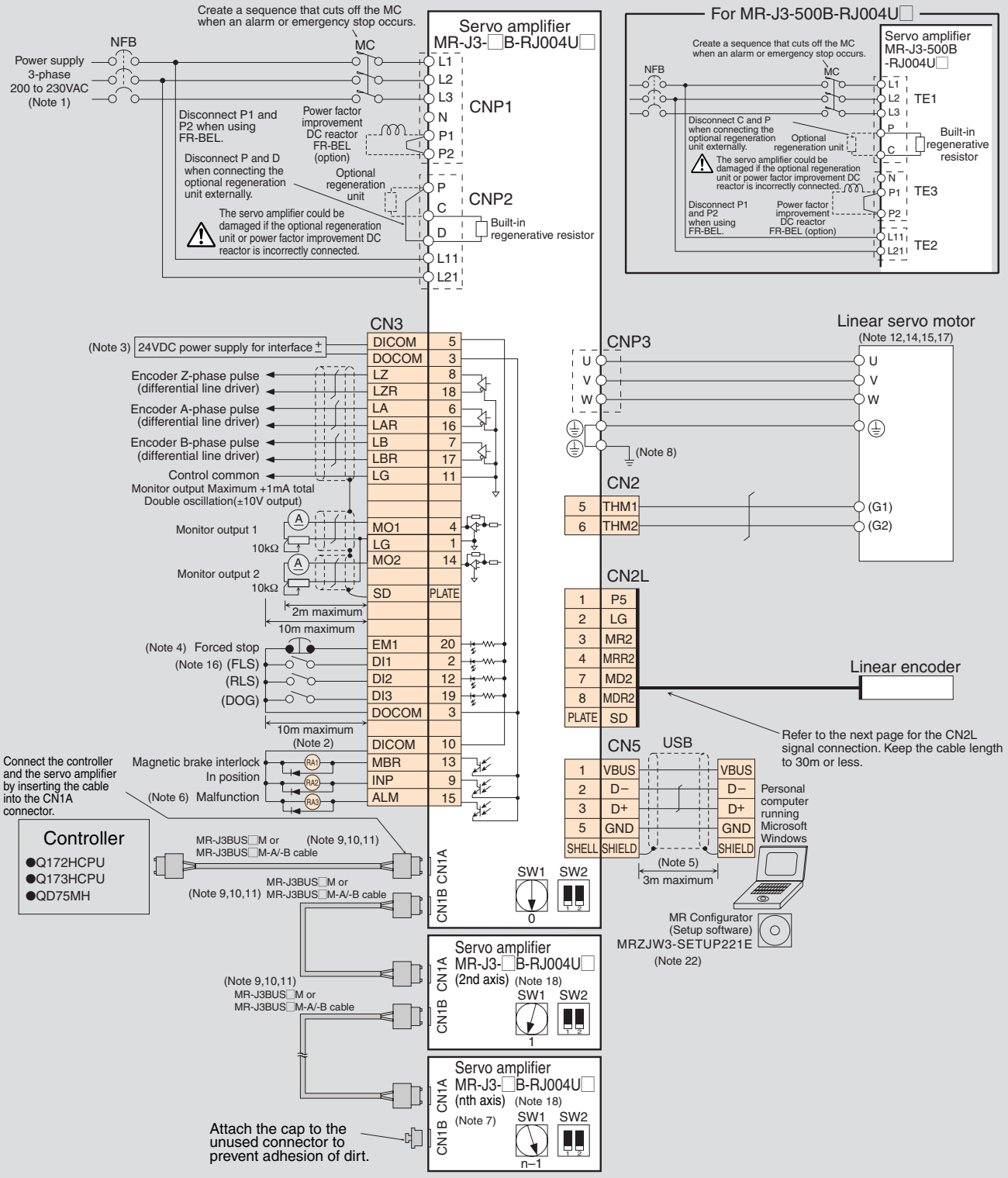
(c) Is the linear encoder's head or scale surface dirty or scratched?

(d) Are the vibration and temperature within the specified range?

(e) Has the speed exceeded the tolerable range because of overshooting, etc.?

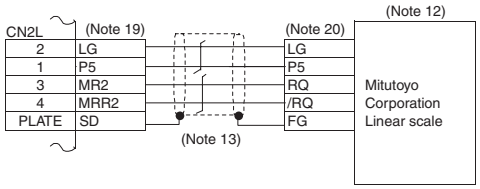
Note: Contact the linear encoder manufacturer for detailed confirmation items.

Standard wiring diagram for MR-J3-B type

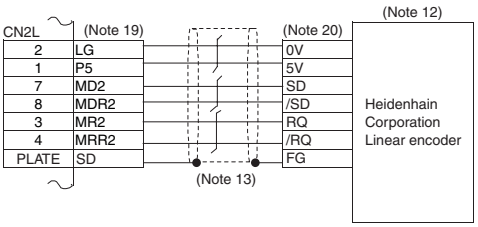


Connecting signals with linear encoder

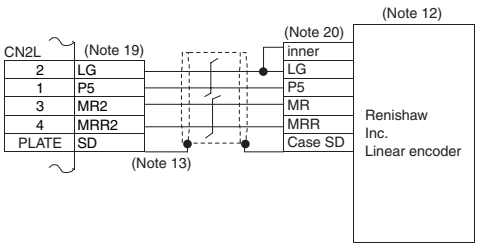
Mitutoyo Corporation Linear scale



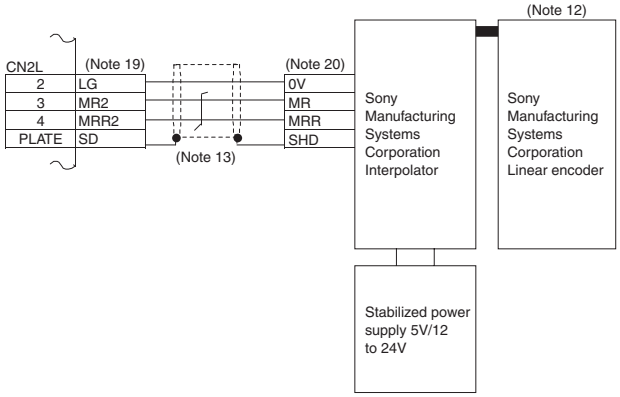
Heidenhain Corporation Linear encoder



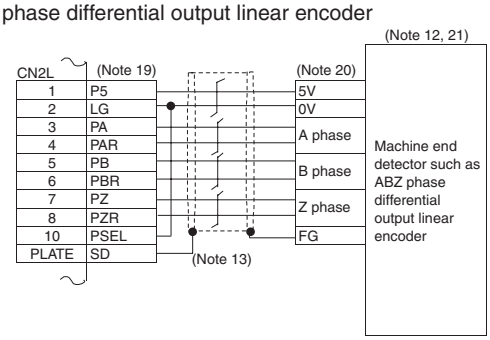
Renishaw Inc. Linear encoder



Sony Manufacturing Systems Corporation Linear encoder



ABZ phase differential output linear encoder

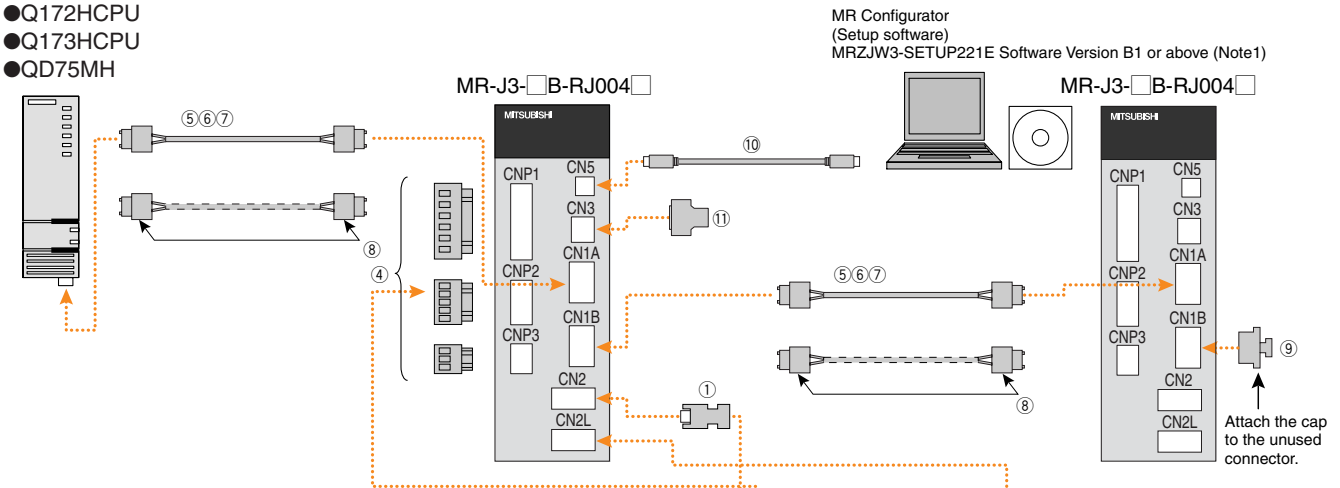


Notes:
1. When using a power supply, 1-phase 230VAC (for MR-J3-70B-RJ004U□ or smaller), connect the power supply to the L1 and L2 terminals. Do not connect anything to L3.
2. Do not reverse the diode's direction. Connecting it backwards could cause the servo amplifier to malfunction that signals are not output, and emergency stop and other safety circuits are inoperable.
3. Use the power supply 24VDC±10% (required current capacity:150mA). 150mA 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.
4. The forced stop signal is issued for each axis' servo amplifier individually. Use this as necessary when Q172HCPU, Q173HCPU or QD75MH is connected. When not using, invalidate the forced stop input with the parameter No. PA04, or short-circuit across EM1 and DOCOM in the connector. For overall system, apply the emergency stop on the controller side.
5. The cable length up to 3m is possible in a low noise environment.
6. Malfunction signal (ALM) is turned on during normal operation when no alarms have been triggered.
7. Up to 16 axes (n = 1 to 16) using the axis selection rotary switch (SW1).
8. For grounding, connect the ground wire to the control box's protection ground terminal via the servo amplifier's protection ground terminal.
9. Do not apply excessive tension when cabling.
10. The minimum bending radius is 25mm for MR-J3BUS□M and 50mm for MR-J3BUS□M-A/-B. Using these cables under the minimum bending radius cannot be guaranteed.
11. If the ends of the fiber-optic cable are dirty, the light will be obstructed and could result in malfunctions. Always clean the ends if dirty.
12. Do not connect a linear servo motor or a linear encoder which is not listed in this catalog. The linear servo motor could malfunction.
13. Connect the shield wire securely to the plate inside the connector (ground plate).
14. Linear servo motor with an electromagnetic brake is not available. Do not use the linear servo motor for vertical axis.
15. If the magnetic pole is detected while an external force is applied, the magnetic pole detection will not be accurate, and the linear servo motor may not operate. If there is no friction, change the magnetic pole detection parameters. Make sure that the linear servo motor does not operate with an external force while servo is OFF.
16. Signals with ( ) can be assigned with the settings of the controller (Q172HCPU, Q173HCPU or QD75MH). Refer to the instruction manuals for each controller for details on the setting method.
17. The linear servo motor could reach high speeds, so a mechanical stopper must be installed at the end of the travel path to avoid hazards.
18. The motor side connections for the second and following axes are omitted from the diagram on the previous page.
19. When manufacturing the linear encoder connection cable, use the optional CN2L connector (MR-J3CN2).
20. Contact each manufacturer for details on the encoder and interpolator side pin numbers.
21. If the encoder's current consumption exceeds 350mA, supply power from an external source.
22. Setup software MRZJW3-SETUP221E Software version B1 or above is planned to be compatible with MR-J3-□B-RJ004U□. Refer to the following for software versions of Q172HCPU and Q173HCPU compatible with linear servo LM Series.
    - Q172HCPU, Q173HCPU OS software (SW6RN-SV13□□/-SV22□□): Software version: 00D or above
    - Integrated start-up support software MT Developer (SW6RNC-GSVPROE/-GSVSETE): Software version: 0AC or above

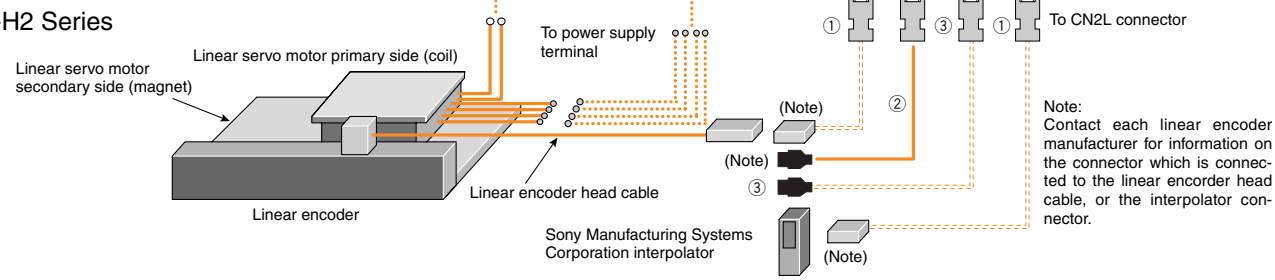
Options

●Options for MR-J3-B type

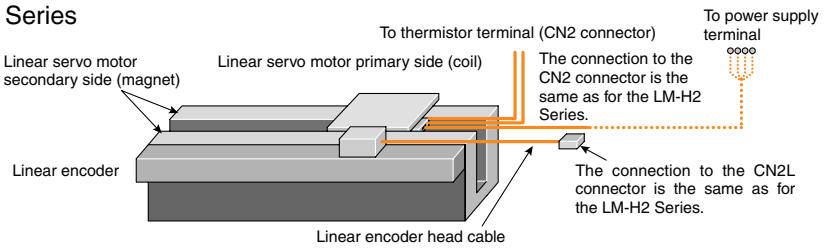
Controller
- ●Q172HCPU
- ●Q173HCPU
- ●QD75MH



●LM-H2 Series



●LM-U2 Series



Notes:
1. Setup software MRZJW3-SETUP221E Software version B1 or above is planned to be compatible with MR-J3-□B-RJ004U□.
   Refer to the following for software versions of Q172HCPU and Q173HCPU compatible with linear servo LM Series.
   • Q172HCPU, Q173HCPU OS software (SW6RN-SV13□□/-SV22□□): Software version: 00D or above
   • Integrated start-up support software MT Developer (SW6RNC-GSVPROE/-GSVSETE): Software version: 0AC or above
2. The linear encoder, linear encoder head cable and encoder cable are not enclosed with the purchased linear servo motor and must be prepared by the user.
3. Use the recommended linear encoder manufacturer's products for the linear encoder and linear encoder head cable.
4. Consult with the linear encoder manufacturer regarding the working environment and specifications, and select the proper products.

●Cables and connectors for MR-J3-B type

		Item		Model	Protection level	Description
For CN2, CN2L	①	CN2 connector CN2L connector		MR-J3CN2	IP20	Amplifier-side connector 36210-0100FD (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex)
	②	Encoder cable Connectable to the linear encoder head cable for Mitutoyo Corporation AT343A or AT543A-SC (long bending life cable)		MR-EKCBL□M-H □=cable length 2, 5, 10m	IP20	Amplifier-side connector 36210-0100FD (receptacle, 3M) 36310-3200-008 (shell kit, 3M), or 54599-1019 (connector set, Molex) Junction connector (made by Tyco Electronics AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by TOA ELECTRIC INDUSTRIAL) Scale
	③	Encoder connector set Connectable to the linear encoder head cable for Mitutoyo Corporation AT343A or AT543A-SC		MR-ECNM	IP20	Amplifier-side connector 54599-1019 (connector set, Molex), or 36210-0100FD (receptacle, 3M) 36310-3200-008 (shell kit, 3M) Junction connector (made by Tyco Electronics AMP) 1-172161-9 (housing) 170359-1 (connector pin) MTI-0002 (cable clamp, made by TOA ELECTRIC INDUSTRIAL) <Applicable cable example> Wire size: 0.3mm² (AWG22) Completed cable outer diameter: ϕ8.2mm Crimping tool (91529-1) is required.
For CNP1, CNP2, CNP3	④	Servo amplifier power supply connector set for MR-J3-40B-RJ004 to MR-J3-350B-RJ004 (Note 1)		(Standard accessory: Insertion type)	—	CNP1 connector • For 1kW or less (made by Molex or an equivalent product) 54928-0610 (connector) • For 2, 3.5kW (PHOENIX or an equivalent product) PC4/6-STF-7.62-CRWH (connector) <Applicable cable example> (Note 2) • CNP2 connector for 1kW or less, 2 and 3.5kW Wire size: 0.14mm² (AWG26) to 2.5mm² (AWG14) Completed cable outer diameter: to ϕ3.8mm CNP2 connector (made by Molex or an equivalent product) 54927-0510 (connector) CNP3 connector • For 1kW or less (made by Molex or an equivalent product) 54928-0310 (connector) • For 2, 3.5kW (PHOENIX or an equivalent product) PC4/3-STF-7.62-CRWH (connector) <Applicable cable example> (Note 2) • CNP1 and CNP3 connectors for 2 and 3.5kW Wire size: 0.2mm² (AWG24) to 5.5mm² (AWG10) Completed cable outer diameter: to ϕ5mm Insertion tool (made by Molex or an equivalent product) 54932-0000
For controller, CN1A, CN1B	⑤	SSCNET Ⅲ cable (Standard cord for inside panel) (Minimum bending radius: 25mm)		MR-J3BUS□M □=cable length 0.15, 0.3, 0.5, 1, 3m	—	Connector (made by Japan Aviation Electronics Industry) PF-2D103 (connector) Connector (made by Japan Aviation Electronics Industry) PF-2D103 (connector) Note: Look carefully through the precautions enclosed with the options before the use.
	⑥	SSCNET Ⅲ cable (Standard cable for outside panel) (Minimum bending radius: 50mm)		MR-J3BUS□M-A □=cable length 5, 10, 20m	—	
	⑦	SSCNET Ⅲ cable (Long distance cable) (Note 3) (Minimum bending radius: 50mm)		MR-J3BUS□M-B □=cable length 30, 40, 50m	—	Connector (made by Japan Aviation Electronics Industry) CF-2D103-S (connector) Connector (made by Japan Aviation Electronics Industry) CF-2D103-S (connector)
	⑧	Connector set for SSCNET Ⅲ		MR-J3BCN1	—	Connector (made by Japan Aviation Electronics Industry) PF-2D103 (connector) Connector (made by Japan Aviation Electronics Industry) PF-2D103 (connector)
For CN1B	⑨	Connector cap for SSCNET Ⅲ		(Standard accessory)	—	
For CN5	⑩	Personal computer communication cable	USB cable	MR-J3USBCBL3M Cable length 3m	—	Amplifier-side connector mini-B connector (5 pins) Personal computer-side connector A connector Note: This cable cannot be used with the SSCNET Ⅲ compatible controller.
For CN3	⑪	Input/output signal connector		MR-CCN1	—	Amplifier-side connector (made by 3M or an equivalent product) 10120-3000VE (connector) 10320-52F0-008 (shell kit) (Note 4)

Notes: 1. The connector type terminal block is available only for the MR-J3-350B-RJ004 or smaller servo amplifier.
2. Refer to "MR-J3-□B SERVO AMPLIFIER INSTRUCTION MANUAL" for details on the electrical wire size recommended.
3. Contact Mitsubishi for details on cables shorter than 30m.
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).

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.
- These products have been manufactured as a general-purpose part for general industries, and have not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the products for special purposes such as nuclear power, electric power, aerospace, medicine, passenger movement vehicles or underwater relays, contact Mitsubishi.
- These products have been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

Cautions concerning use of linear servo

- The linear servo system uses a powerful magnet on the secondary side. The person installing the linear servo motor, as well as the machine operator, must pay special attention. This includes preventing persons wearing a pacemaker from approaching the machine.
- The person installing the linear servo motor, as well as the machine operator, should avoid wearing items (watches, calculators, etc.) which could malfunction or fail because of the magnetic force.
- Always use non-magnetic tools when installing the linear servo motor or working in the vicinity of the linear servo motor.
- Mount the servo amplifier and linear servo motor on non-combustible material. Directly mounting these on flammable material or near flammable material could result in fires.
- Do not get on or place heavy objects on the linear servo motor. There is a risk of injury.
- Always use the linear servo motor within the designated environment conditions range.
- The servo amplifier and linear servo motor are precision devices. Do not drop or apply strong impacts on them.
- Do not use a servo amplifier or linear servo motor which is damaged or missing parts.
- Securely fix the linear servo motor onto the machine. Insufficient fixing could cause the linear servo motor to dislocate during operation.
- The permanent magnet on the secondary side generates a force to attract magnetic objects. Use caution to prevent your hands from being caught.
  Take care especially when installing the primary side (coil) after installing the secondary side (magnet).
- Install an electrical and mechanical stopper at the stroke end.
- Measures must be taken to prevent magnetic powder or magnetic pieces from being attracted to the permanent magnet on the secondary side.
- Install so that the center of gravity of the moving section comes directly above the center of the primary side (coil).
- Provide a mechanism that can withstand high speeds and high acceleration / deceleration.
- All available linear servo motor and amplifier combinations are predetermined. Confirm the models of the motor and amplifier to be used before installation.
- The linear servo motor's protection level is IP00. Provide measures to prevent dust and oil, etc., as necessary.
- Replace the linear servo motor when it is damaged.
- If the servo amplifier's protection function activates, turn the power OFF immediately. Remove the cause before turning the power ON again. If operation is continued without removing the cause of the fault, the servo motor could malfunction and result in injury or damage.
- Do not touch the linear servo motor during or after operation until it has had sufficient time to cool. The motor could be very hot, and severe burns may result from touching the 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.
- 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 use where the linear servo motor could be constantly subject to cutting water or lubricant, or where dew could condense because of oil mist, overcooling or excessive humidity. These could cause the linear servo motor's insulation to deteriorate.
- Do not touch the linear servo motor with wet hands.
- Do not modify the linear servo motor.
- To enable high-accuracy positioning, ensure the machine's rigidity, and keep the machine's resonance point at a high level.

Warranty

1. Free warranty period and scope of warranty

[Free warranty period]

This warranty shall be valid for one year after installation at the customer or end user's site, or for 18 months (Calculating from date of manufacture) after shipping from Mitsubishi, whichever comes first.

[Scope]

(1) Fault diagnosis

As a rule, the customer is responsible for the primary fault diagnosis. When requested, this service may be provided for a fee by the Mitsubishi Service Network.
In this case, if the product is found to be defective due to Mitsubishi's workmanship, etc., this fee will be waived.

(2) Repairs

The customer shall be responsible for the costs of repairs, replacements or onsite work carried out in cases ①, ②, ③ and ④ below. All other repairs shall be completed free of charge.

①Problems arising from inappropriate storage or handling, carelessness by the customer or end user, as well as problems arising from the customer's software or hardware designs, etc.

②Problems due to modifications or alterations made to Mitsubishi product without consent from Mitsubishi.

③Problems arising from the use of Mitsubishi products under conditions which do not satisfy the working range.

④Other problems which the customer recognizes as not the responsibility of Mitsubishi.

2. Exceptions to warranty obligations, including opportunity loss and secondary loss

Regardless of whether within or outside the warranty period, Mitsubishi will not be liable for losses arising from problems found not to be the responsibility of Mitsubishi, any opportunity losses, passive damages, damage arising from special situations regardless of Mitsubishi's predictions, secondary damages, accident compensation, damages to products other than Mitsubishi products, nor will Mitsubishi compensate for replacement work carried out by customer, readjustment of onsite machines and equipment, trial operation or any other duties.

3. Repair period after discontinuation of production

Models (products) for which production has been discontinued shall be repaired for seven years starting from the month/year that production was discontinued.

4. Delivery conditions

Delivery of standard products which do not require setting or adjustment of applications shall be completed upon transfer to the customer. Onsite adjustments and trial operations shall be excluded from the scope of Mitsubishi's work.

MEMO

⚠ Safety Warning

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

MITSUBISHI ELECTRIC CORPORATION
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