



MR-JE Servo amplifier Model MR-JE-10_ to MR-JE-300_

Instructions and Cautions for Safe Use of AC Servos

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2. About safety
This chapter explains safety of users and machine operators. Please read the chapter carefully before mounting the equipment. In this installation guide, the specific warnings and cautions levels are classified as follows.

	WARNING Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
	CAUTION Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight injury to personnel or may cause physical damage.

2.1 Professional engineer

Only professional engineers should mount MR-JE servo amplifiers. Here, professional engineers should meet all the conditions below.

- Persons who took a proper training of related work of electrical equipment or persons who can avoid risk based on past experience.
- Persons who have read and familiarized himself/herself with this installation guide and operating manuals for the protective devices (e.g. light curtain) connected to the safety control system.

2.2 Applications of the devices

MR-JE servo amplifiers are used to drive servo motors, and comply with the standards shown below.
IEC/EN 61800-5-1/GB 12668.501, IEC/EN 61800-3/GB 12668.3/KN 61800-3 (KS C 9800-3)

2.3 Correct use

Use the MR-JE servo amplifiers within specifications. Refer to each instruction manual for specifications such as voltage, temperature, etc. Mitsubishi Electric Co. accepts no claims for liability if the equipment is used in any other way or if modifications are made to the device, even in the context of mounting and installation.

	<ul style="list-style-type: none"> If you need to get close to the moving parts of the machine for inspection or others, ensure safety by confirming the power off, etc. Otherwise, it may cause an accident. It takes 15 minutes maximum for capacitor discharging. Do not touch the unit and terminals immediately after power off.
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2.3.1 Peripheral device and power wiring

The followings are selected based on IEC/EN 61800-5-1, UL 508C, and CSA C22.2 No. 274.

(1) Local wiring

The following table shows the stranded wire sizes [AWG] symbols rated at 75 °C/60 °C.

Servo amplifier (Note 3)	75 °C/60 °C stranded wire [AWG]		
	L1/L2/L3 (Note 2)	P+V	UV/W (Note 1,2)
MR-JE-10 /MR-JE-20 /MR-JE-40 /MR-JE-70 /MR-JE-100 /MR-JE-200 /MR-JE-300 (S)	14/14	14/14	14/14

- Select wire sizes depending on the rated output of the servo motors. The values in the table are sizes based on rated output of the servo amplifiers.
- The following shows the PE terminal specifications of the servo amplifier.
Screw size: M4
Tightening torque: 1.2 [N·m]
Recommended crimp terminals: R2-4 (Manufactured by JST)
Crimping tool: YPT-60-21 (Manufactured by JST)
- *(S) means 1-phase 200 V AC power input and *(T) means 3-phase 200 V AC power input in the table.

(2) Selection example of MCCB and fuse

To prevent an electric shock, always connect the protective earth (PE) terminal (marked ⊕) of the servo amplifier to the protective earth (PE) of the cabinet. Do not connect two grounding cables to the same protective earth (PE) terminal. Always connect cables to the terminals one-to-one. This product can cause a DC current in the protective earthing conductor. To protect direct/indirect contact using an earth-leakage current breaker (RCD), only an RCD of type B can be used for the power supply side of the product.

Servo amplifier (Note)	Molded-case circuit breaker (240 V AC)	Fuse (300 V)
MR-JE-10 /MR-JE-20 /MR-JE-40 /MR-JE-70 (T)	NF50-SVFU-SA (50 A frame 5 A)	10 A
MR-JE-70 (S)/MR-JE-100 (T)	NF50-SVFU-10A (50 A frame 10 A)	15 A
MR-JE-200 (T)/MR-JE-300 (S)	NF50-SVFU-15A (50 A frame 15 A)	30 A
MR-JE-100 (S)	NF50-SVFU-15A (50 A frame 15 A)	30 A
MR-JE-200 (S)	NF50-SVFU-20A (50 A frame 20 A)	40 A

Note: *(S) means 1-phase 200 V AC power input and *(T) means 3-phase 200 V AC power input in the table.

(3) Power supply

This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category III (overvoltage category II for 1-phase servo amplifiers) set forth in IEC/EN 60664-1. For the interface power supply, use an external 24 V DC power supply with reinforced insulation on I/O terminals.

(4) Grounding

To prevent an electric shock, always connect the protective earth (PE) terminal (marked ⊕) of the servo amplifier to the protective earth (PE) of the cabinet. Do not connect two grounding cables to the same protective earth (PE) terminal. Always connect cables to the terminals one-to-one. This product can cause a DC current in the protective earthing conductor. To protect direct/indirect contact using an earth-leakage current breaker (RCD), only an RCD of type B can be used for the power supply side of the product.

(5) Motor overload and Over temperature protection

The overload protection of the servo motor does not include a thermal memory function, and is not speed sensitive. The servo amplifier cannot detect overheating of the servo motor. The servo motors are protected by the servo motor overheat protection function of the servo amplifiers (a protection characteristic based on 120 % of the rated current). To provide the servo motor with overheat protection, use a magnetic contactor (electromagnetic switch) with a thermal relay. Alternatively, install a thermal sensor or equivalent equipment near the rating plate of the servo motor to check that the servo motor temperature is under 105 °C with sensing device. (Refer to Chapter 4)

2.3.2 Europe/UK compliance

The CE/UKCA marking proves the compliance of the servo product with the essential requirements specified in the relevant EU Directives and UK Regulations, and this marking also applies to machines and equipment incorporating servos.

(1) EMC requirement

MR-JE servo amplifiers comply with ENBS EN IEC 61800-3. Install an EMC filter and surge protector on the primary side of the servo amplifier. As for I/O signal wires (max. length 10 m) and encoder cables (max. length 50 m), use shielded wires and ground the shields. However, when the encoder cable length is longer than 30 m for MR-JE-70_ and MR-JE-100_ set, a radio noise filter (FR-BIF) to the input power supply side of the servo amplifier. The following shows recommended products.

- EMC filter: Soshin Electric HF3000A-UN series
- Surge protector: Okaya Electric Industries RSPD series
- Radio noise filter: Mitsubishi Electric FR-BIF

MR-JE Series are not intended to be used on a low-voltage network which supplies domestic premises; electromagnetic interference is expected if used on such a network. The installer shall provide a guide for installation and use, including recommended mitigation devices. To avoid the risk of crosstalk to signal cables, the installation instructions shall either recommend that the power interface cable be segregated from signal cables. Install the DC power supply for I/O signals of the servo amplifiers in the same cabinet. Do not connect the other electrical devices to the DC power supply.

(2) For Declaration of Conformity (DoC)

We declare that the servo amplifiers are in compliance with EC directives (EMC directive (2014/30/EU), Low voltage directive (2014/35/EU), and RoHS directive (2011/65/EU, (EU) 2015/863)) and applicable regulations of the UK. For the copy of Declaration of Conformity, contact your local sales office.

2.3.3 USA/Canada compliance

This servo amplifier is designed in compliance with UL 508C and CSA C22.2 No. 274.

(1) Installation

The minimum cabinet size is 150% of MR-JE servo amplifier's volume. Also, design the cabinet so that the ambient temperature in the cabinet is 55 °C or less. The servo amplifier must be installed in the metal cabinet. Additionally, mount the servo amplifier on a cabinet that the protective earth based on the standard of IEC/EN 60204-1 is correctly connected. For environment, the units should be used in open type (UL 50) and overvoltage category shown in table in section 8.1. The servo amplifier needs to be installed at or below pollution degree 2. For connection, use copper wires.

(2) Short-circuit current rating (SCCR)

Suitable For Use On A Circuit Capable Of Delivering Not More Than 100 kA rms Symmetrical Amperes, 500 Volts Maximum. For SCCR when using a Type E Combination motor controller, refer to each servo amplifier instruction manual.

(3) Branch circuit protection

For installation in United States, branch circuit protection must be provided, in accordance with the National Electrical Code and any applicable local codes. For installation in Canada, branch circuit protection must be provided, in accordance with the Canadian Electrical Code and any applicable provincial codes.

2.3.4 South Korea compliance

Products that bear the KC mark comply with the Radio Wave Law. Please note the following to use the product. 이 기기는 업무용 (A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다. (The product is for business use (Class A) and meets the electromagnetic compatibility requirements. The seller and the user must note the above point, and use the product in a place except for home.)

2.4 General cautions for safety protection and protective measures

Observe the following items to ensure proper use of the MR-JE servo amplifiers.

- For installing systems, only qualified personnel and professional engineers should perform.

- When mounting, installing, and using the MR-JE servo amplifier, always observe standards and directives applicable in the country.

2.5 Disposal

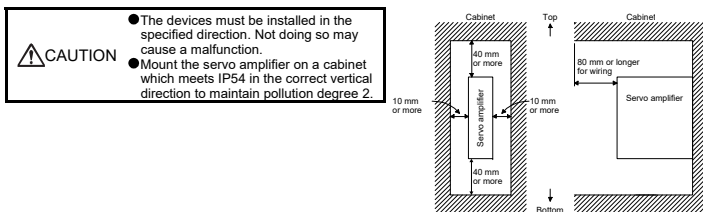
Disposal of unusable or irreparable devices should always occur in accordance with the applicable country-specific waste disposal regulations. (Example: European Waste 16 02 14)

2.6 Lithium battery transportation

To transport lithium batteries, take actions to comply with the instructions and regulations such as the United Nations (UN), the International Civil Aviation Organization (ICAO), and the International Maritime Organization (IMO). The batteries (MR-BAT6V1SET-A and MR-BAT6V1) are assembled batteries from two batteries (lithium metal battery CR17335A) which are not subject to the dangerous goods (Class 9) of the UN Recommendations.

3. Mounting/dismounting

Installation direction and clearances



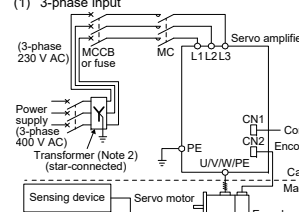
4. Electrical Installation and configuration diagram

	<ul style="list-style-type: none"> Turn off the molded-case circuit breaker (MCCB) to avoid electrical shocks or damages to the product before starting the installation or wiring.
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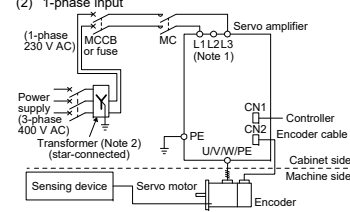
	<ul style="list-style-type: none"> Connecting a servo motor for different axis to U, V, W, or CN2 of the servo amplifier may cause a malfunction. Securely connect the cables in the specified method and tighten them with the specified torque. Otherwise, the servo motor may operate unexpectedly.
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The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards.

(1) 3-phase input



(2) 1-phase input



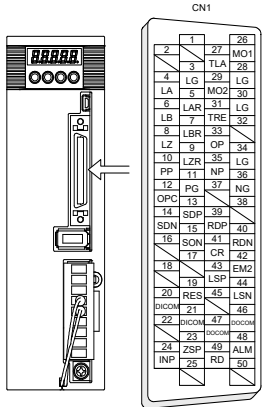
- For the MR-JE-200_ servo amplifiers, connect the power supply to L1 and L2. Leave L3 open.
- Supply neutral needs to be earthed.

The connectors described by rectangles are safely separated from the main circuits described by circles. Use MR-JE servo amplifiers in combination with HG series or HJ series servo motors.

5. Signals

5.1 Signal

The following shows CN1 connector signals of MR-JE-10A as a typical example. For the other connector details, refer to each servo amplifier instruction manual.



5.2 I/O device

The following shows typical I/O devices of MR-JE_ A. For the other devices, refer to each servo amplifier instruction manual.

Symbol	Device	Connector	Pin No.
SON	Servo-on	CN1	15
RES	Reset		19
CR	Clear		41
EM2	Forced stop 2		42
LSP	Forward rotation stroke end	CN1	43
LSN	Reverse rotation stroke end		44
ZSP	Zero speed detection	CN1	23
INP	In-position		24
ALM	Malfunction		48
RD	Ready	Plate	49
		CN1	20, 21
DZSP	Digital I/F power supply input		46, 47
SD	Shield	Plate	48, 49

6. Maintenance and service

	<ul style="list-style-type: none"> To avoid an electric shock, only qualified personnel should attempt inspections. For repair and parts replacement, contact your local sales office.
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6.1 Inspection items

It is recommended that the following points periodically be checked.

- Check for loose screws on the protective earth (PE) terminal. Retighten any loose screws. (tightening torque: 1.2 N·m)
- Servo motor bearings, brake section, etc. for unusual noise.
- Check the cables and the like for scratches or cracks. Perform periodic inspection according to operating conditions.
- Check that the connectors are securely connected to the servo motor.
- Check that the wires are not coming out from the connector.
- Check for dust accumulation on the servo amplifier.
- Check for unusual noise generated from the servo amplifier.
- Check the servo motor shaft and coupling for connection.
- Make sure that the emergency stop circuit operates properly such that the operation can be stopped immediately and a power is shut off by the emergency stop switch.

6.2 Parts having service life

Service life of the following parts is listed below. However, the service life varies depending on operation and environment. If any fault is found in the parts, they must be replaced immediately regardless of their service life. For parts replacement, please contact your local sales office.

Part name	Life guideline
Smoothing capacitor	10 years (Note 3)
Relay	Number of power-on, forced stop, and controller forced stop times: 100,000 times
Cooling fan	50,000 hours to 70,000 hours (7 years to 8 years)
Battery backup time (Note 1)	Approximately 20,000 hours (equipment power supply: off, ambient temperature: 20 °C)
Battery life (Note 2)	5 years from date of manufacture

- The time is for using MR-BAT6V1SET-A. For details and other battery backup time, refer to each servo amplifier instruction manual.
- Quality of the batteries degrades by the storage condition. The battery life is 5 years from the production date regardless of the connection status.
- If a 3-phase power supply is used, the service life of the capacitor is 10 years under continuous operation in air-conditioned environments (ambient temperatures of 40 °C or less at altitudes of up to 1000 m and 30 °C or less at altitudes of up to 2000 m). The characteristic of smoothing capacitor is deteriorated due to ripple currents, etc. The service life of the capacitor greatly varies depending on ambient temperatures and operating conditions.

7. Transportation and storage

	<ul style="list-style-type: none"> Transport the products correctly according to their mass. Stacking in excess of the limited number of product packages is not allowed. For detailed information on the battery's transportation and handling refer to each servo amplifier instruction manual. Install the product in a load-bearing place of servo amplifier and servo motor in accordance with instruction manual. Do not put excessive load on the machine. Do not hold the lead of the built-in regenerative resistor, cables, or connectors when carrying the servo amplifier. Otherwise, it may drop.
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When you keep or use it, please fulfill the following environment.

Item	Environment
Ambient temperature	Operation: 0 to 55 Class 3K3 (IEC/EN 60721-3-3) Transportation (Note): -20 to 65 Class 2K12 (IEC/EN 60721-3-2)
Ambient humidity	Storage (Note): -20 to 65 Class 1K4 (IEC/EN 60721-3-1) Operation, transportation, storage: 5 %RH to 90 %RH
Vibration resistance	Test condition: 10 Hz to 57 Hz with constant amplitude of 0.075 mm (Test Fc of IEC 60068-2-6) 57 Hz to 150 Hz with constant acceleration of 9.8 ms ⁻² to IEC/EN 61800-5-1
Pollution degree	2 Class 2M3 (IEC/EN 60721-3-2) Class 1M2 (IEC/EN 60721-3-2)
IP rating	IP20 (IEC/EN 60529) Open type (UL 50)
Altitude	Operation, storage: Max. 2000 m above sea level (MR-JE_ AS: Max. 1000 m above sea level) Transportation: Max. 10000 m above sea level

Note: In regular transport packaging

8. Technical data

8.1 MR-JE servo amplifier

Item	MR-JE-10 /MR-JE-20 /MR-JE-40 /MR-JE-70 /MR-JE-100 /MR-JE-200	MR-JE-300_
Power supply	Line voltage: 3-phase or 1-phase 200 V AC to 240 V AC, 50 Hz /60 Hz Interface (SELV): 24 V DC, (required current capacity: MR-JE_ AS), 300 mA; MR-JE_ B, 300 mA; MR-JE_ C, 300 mA (Note)	3-phase 200 V AC to 240 V AC, 50 Hz/60 Hz
Control method	Sine-wave PWM control, current control method	
Pollution degree	2 (IEC/EN 60664-1)	
Overvoltage category	1-phase 200 V AC: II (IEC/EN 60664-1), 3-phase 200 V AC: III (IEC/EN 60664-1)	
Protective class	1 (IEC/EN 61800-5-1)	
Short-circuit current rating (SCCR)	100 kA	

Note: This will be 100 mA for the MR-JE_ B servo amplifiers manufactured in April 2016 or before (May 2016 or before for amplifiers manufactured in China).

8.2 Dimensions/mounting hole process drawing

Servo amplifier	Variable dimensions (mm)				Mass [kg]
	W	H	D	e	
MR-JE-10 /MR-JE-20 /MR-JE-40	50	168	135	0.8	
MR-JE-70 /MR-JE-100	70	168	185	1.5	
MR-JE-200 /MR-JE-300	90	168	195	2.1	

8.3 Mounting hole process drawing



Servo amplifier	Variable dimensions (mm)				Screw size
	a	a1	c	d	
MR-JE-10 /MR-JE-20 /MR-JE-40	6	6	156 ± 0.5	6	M5
MR-JE-70 /MR-JE-100	22	22	156 ± 0.5	6	42 ± 0.3 M5
MR-JE-200 /MR-JE-300	6	45	156 ± 0.5	6	78 ± 0.3 M5

[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 are repaired or replaced.

[Term]

For terms of warranty, please contact your original place of purchase.

[Limitations]

- 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.
- 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.
- Even during the term of warranty, the repair cost will be charged on you in the following cases.
 - a failure caused by your improper storing or handling, carelessness or negligence, etc., and a failure caused by your hardware or software problem
 - a failure caused by any alteration, etc. to the Product made on your side without our approval
 - 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
 - a failure which may be regarded as avoidable if consumable parts designated in the instruction manual, etc. are duly maintained and replaced
 - any replacement of consumable parts (battery, fan, smoothing capacitor, etc.)
 - 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
 - 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
 - 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

- 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.
- Please note that the Product (including its spare parts) cannot be ordered after its stop of production.
- Service in overseas countries

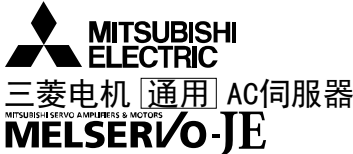
Our regional FA Center in overseas countries will accept the repair work of the Product. However, the terms and conditions of the repair work may differ depending on each FA Center. Please ask your local FA Center for details.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:
(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

- Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.
- Change of Product specifications

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



MR-JE 伺服放大器

型号名称 MR-JE-10 ~ MR-JE-300

安全使用AC伺服器

三菱电机株式会社

第1章 关于手册
为了安全使用MELSERVO-JE系列，请熟读各技术资料集。

1.1 MELSERVO-JE相关手册
本书就MR-JE伺服放大器的安装加以说明。如对本书所述的机械操作、设计有疑问，请咨询营业窗口。

1.2 本书的目的
本书以机械制造商的技术人员及机械操作人员为对象，就MR-JE伺服放大器的安全操作加以说明。关于本产品的详细内容，请参考各伺服放大器技术资料集。

第2章 关于安全
本书就用户安全及机械装置的安全操作加以说明。在开始安装前，请务必认真阅读本章内容。另外，为安全、正确地使用本产品，本书中的重要特殊警告如下所示。

危险 如操作失误，可能会发生危险情况，导致操作人员受到重伤甚至死亡。
注意 如操作失误，可能会发生危险情况，导致操作人员受到中度伤害、轻伤，或仅出现机械损坏。

2.1 专业技术人员
请务必由专业技术人员负责安装MR-JE伺服放大器。专业技术人员是指满足以下所有条件的人员。

- (1) 可以从事电气设备相关业务、接受过专业技术培训的人员，或基于经验可以事先避免危险的人员。
(2) 认真阅读并熟练掌握本书及与安全控制系统连接的保护装置（例：光幕）的操作手册的人员。

2.2 装置用途
MR-JE伺服放大器是驱动伺服电机的产品。本产品符合以下标准。
IEC/EN 61800-5-1/GB 12668.501、IEC/EN 61800-3/GB 12668.3/KN 61800-3 (KS C 9800-3)

2.3 正确的使用方法
请在规格范围内使用MR-JE伺服放大器。关于电压、温度等的规格，请参考各伺服放大器技术资料集。包括本装置的安装与设置，如以其他方法使用本装置，或对本装置进行任何改造，请恕三菱电机株式会社（本公司）不予负责。

危险 进行检査等需要靠近机械的可动部时，应在确认电源已经切断等确保了安全的基础上进行操作。否则可能会导致事故发生。
电容放电最多需要15分钟。电源断电后，请不要触摸模块和接线。

2.3.1 周边设备及电线选择
基于IEC/EN 61800-5-1、UL 508C及CSA C22.2 No.274选择。

(1) 现场接线
下表所示为75℃/60℃额定股线 [AWG]。

Table with columns: 伺服放大器 (注3), 75℃/60℃股线(AWG), U/V/W/PE (注1,2), L1/L2/L3 (注2), P+/C, U/V/W/PE (注1,2)

- 1. 请根据伺服电机的额定输出功率选择电线大小，表中数值是基于伺服放大器额定输出功率的尺寸。
2. 伺服放大器的端子规格如下所示。
3. 表中的“*”表示单相AC 200V电源输入时，“△”表示三相AC 200V电源输入时。

(2) MCCB与保险丝的选择示例
请使用下表所示的保险丝 (T级) 或无熔丝断路器 (UL 489认证MCCB)。表中的保险丝 (T级) 或无熔丝断路器是基于伺服放大器的额定输入、输出功率的选择示例。如减少连接于伺服放大器的伺服电动机容量，可使用比表中容量更小的保险丝 (T级) 或无熔丝断路器。关于此处所涉熔丝 (T级) 或无熔丝断路器以外的选择及手动启动器的选择，请参考各伺服放大器技术资料集。

Table with columns: 伺服放大器 (台), 无熔丝断路器 (AC 240V), 保险丝 (300V)

(3) 电源
伺服放大器可在中性点已接地的星形联结电源中，IEC/EN 60664-1所规定的过电压类型III (单相伺服放大器为过电压类型II) 的条件下使用。若是用于接口的电源，请务必使用输入输出经过加强绝缘的DC 24V外部电源。

(4) 接地
为防止触电事故，请务必将伺服放大器的保护接地 (PE) 端子 (标有PE符号的端子) 连接于控制台的保护接地 (PE)。在将接地用电线连接于保护接地 (PE) 端子时，请勿一并加固。连接时，端子1请务必对应电线1。本产品可能向保护接地导体流出直流电流。对直接接触或间接接触的保护使用漏电断路器 (RCD) 时，仅类型B的RCD可安装在本产品的电源一侧。

(5) 伺服电机过载及过热保护
伺服电机的过载保护没有热存储功能。伺服电机的过载保护为非速度感应式。伺服放大器不能检测伺服电机的过热。伺服电机通过伺服放大器的伺服电机过载保护功能 (以额定电流的120 %为标准的保护特性) 被保护。对伺服电机设置过热保护时，应使用带有热过载继电器的电磁接触器 (电磁开关) 进行保护，或者是通过检测装置进行确认，例如在伺服电机的额定铭牌附近安装热过载传感器等确认测量的温度不超过105℃。(参照第4章)

2.3.2 对应欧洲/英国 CE/UKCA 标志，是证明伺服产品符合分类中的 EU 指令和英国规则等所要求的必须事项 (Essential Requirements) 的标志，组装有伺服的机械和装置也为对象。

(1) EMC要求事项
MR-JE伺服放大器遵循EN/BS EN IEC 61800-3标准。请在伺服放大器的一次侧安装EMC滤波器及电涌保护器。请在输入输出信号线 (最大长度10m) 及编码器电缆 (最大长度50m) 中使用防护线，并将防护线接地。但是，在MR-JE-70及MR-JE-100的编码器电缆长度超过30m时，请在伺服放大器的输入电源一侧设置无线电磁干扰滤波器 (FR-B1F)。以下为推荐产品。

EMC滤波器: 双电机 HF3000A-1N系列
电涌保护器: 冈谷电机产业 RSPD系列
无线电磁干扰滤波器: 三菱电机 FR-B1F
MR-JE系列未设想连接于住宅供电的低电压配线路路使用。连接于低电压配线路路使用时，可能会引发电磁干扰。服务人员必须提供包括所推荐的减噪设备在内的设置及使用指南。为避免信号线的混线风险，建议隔离电源及信号线。伺服放大器的输入输出信号用的DC电源，应使用与同一个控制柜中的其他电气设备分开连接的专用电源。

(2) 符合性声明 (DoC)
本公司声明，伺服放大器符合CE指令 (EMC指令 (2014/30/EU)、低电压指令 (2014/35/EU)、RoHS指令 (2011/65/EU、(EU) 2015/863)) 以及英国的相应规则。

2.3.3 支持美利坚合众国/加拿大的标准
本伺服放大器遵循UL 508C、CSA C22.2 No.274标准设计而成。

- (1) 设置
最小控制台尺寸是MR-JE伺服放大器体积的150%。另外，请将控制台内温度设计在55℃以下。请务必将伺服放大器设置于金属制控制台下。此外，请将基于IEC/EN 60204-1规格的伺服放大器设置在正确连接保护接地的控制台下。请在公用类型 (UL50) 及8.1节的表中显示的过电压类型的环境下使用。请将伺服放大器设置在污染度低于2的环境中。请使用铜制的连接电线。
(2) 短路额定电流 (SCCR)
经短路试验，已确认本伺服放大器适用于最大电压500V、对称电流低于100kA的电路。关于使用手动启动器时的SCCR (25kA或50kA)，请参照各伺服放大器技术资料集。
(3) 分支电路防护
如设置于美利坚合众国，请按照National Electrical Code以及当地规格进行分支电路防护。如设置于加拿大，请按照Canadian Electrical Code以及各州的规格进行分支电路防护。

2.3.4 支持韩国标准
产品上标有KC标志时，表示符合电波法。使用本产品时，应注意下述事项。
이 기기는 업무용 (A급) 전자파직접기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.
(本产品为业务用 (A级) 支持电磁波设备，销售者与使用者需注意这一点，在室外使用本产品。)

2.4 一般安全防护的注意事项及防护措施
为正确使用MR-JE伺服放大器，请遵守以下事项。

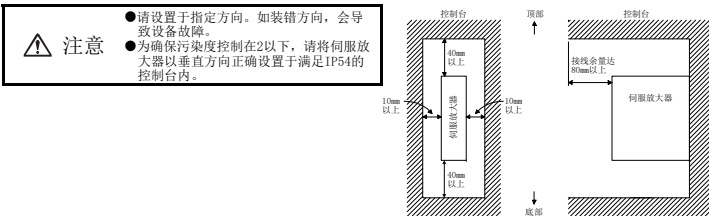
- (1) 必须由具备资质的人员或专业技术人员设置系统。
(2) 在安装、设施、使用MR-JE伺服放大器时，请务必遵守各国的适用规格、指令。

2.5 废弃
对于无法使用或无法修理的设备，请按照各国的废弃物处理规定进行妥善处理。(例: European Waste 16 02 14)

2.6 锂电池运输
锂电池需要按照联合国 (UN)、国际民用航空组织 (ICAO)、国际航空运输协会 (IATA)、国际海事组织 (IMO) 等的准则进行运输。
电池 (MR-BAT6V1SET-A及MR-BAT6V1) 是使用两个单电池 (锂离子电池CR17335A)，并且不属于UN危险货物运输相关的建议书 (Class9) 的危险货物的组电池产品。

第3章 安装/拆卸

安装方向及间距。

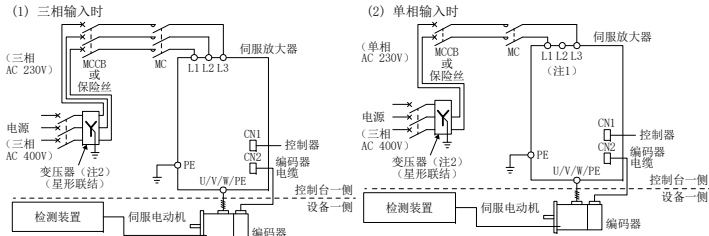


第4章 安装与结构图

危险 为防止保护部位的触电、损坏，在开始安装、接线前，请关闭无熔丝断路器 (MCCB)。

注意 在将轴的伺服电动机连接于伺服放大器的U、V、W及CN2时，切勿选错轴。否则会导致设备故障。
应按规定的方法及转矩正确地连接电线。否则可能会引起伺服电机的预料之外的动作。

遵循IEC/EN/UL/CSA标准的有代表性的构成示例如下所示。



- 1. MR-JE-200 伺服放大器时，请将电源与L1及L2连接，不与L3进行连接。
2. 请连接到中性接地的电涌。

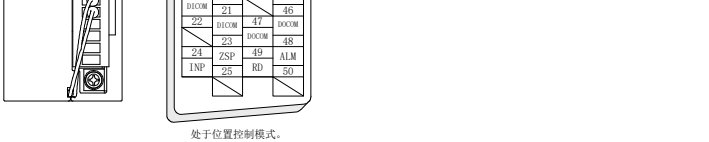
图中用 (□) 显示的连接器与用 (○) 显示的主电路安全分合使用。
请将MR-JE伺服放大器与BG系列或IJ系列的伺服电动机组合后使用。

第5章 信号

5.1 信号
作为模拟信号，MR-JE-10A的CN1连接器的信号如下所示。关于其他的设备，请参考各伺服放大器技术资料集。

Table with columns: 设备名称, 连接器, 引脚数. Lists input and output signals like S0N, RES, CR, DM2, LSN, etc.

Table with columns: 设备名称, 连接器, 引脚数. Lists power supply signals like ZSP, INP, ALM, RD.



第6章 维护与检查

危险 除专业技术人员以外，不得由其他人员进行检查，以免触电。另外，关于修理及更换配件等事宜，请与就近的营业窗口联系。

6.1 检查项目
建议定期进行如下检查。

- (1) 请确认伺服放大器的保护接地 (PE) 端子螺丝是否松动。如松动，请进行加固。(扭矩: 1.2N·m)
(2) 请确认伺服电动机的轴承、断路部位是否有异响。
(3) 请确认电线是否有伤痕或裂痕。请根据使用条件定期进行检查。
(4) 请确认连接器是否已完全与伺服电动机连接。
(5) 请确认电线是否会从连接器内飞出。
(6) 请确认伺服放大器内是否有灰尘。
(7) 请确认伺服放大器是否发出异响。
(8) 请确认伺服电动机轴与接头是否校准妥当。
(9) 请确认通过紧急停止开关可以立即停止运行、切断电源等的紧急停止电路是否正常运转。

6.2 配件检查
配件的使用寿命如下所示。但是，会由于使用方法及环境条件等各种因素而出现变化，因此如发现异常，应立即予以更换。配件更换事宜请与三菱电机系统服务联系。

Table with columns: 配件名称, 寿命标准. Lists components like 平滑电容器, 滤波器, 冷却风扇, etc.

- 注 1. 使用MR-BAT6V1SET-A时，关于详情及其他的电池寿命时间，请参考各伺服放大器技术资料集。
2. 电池的运输及操作的具体内容，请参考各伺服放大器技术资料集。
3. 在有空气调节的环境条件 (标高1000 m以下，环境温度40℃以下，标高高于1000 m但不超过2000 m时，环境温度为30℃以下) 下连续运行时，寿命为10年 (三相电源输入)。平滑电容器受脉动电流等影响其特性会变坏。电容器的寿命在很大程度上取决于环境温度和使用条件。

第7章 运输与保管

注意 请根据产品大小、质量，妥善进行运输。
请勿进行超出规定个数的包装。
电池的运输及操作的具体内容，请参考各伺服放大器技术资料集。
按照技术资料集，请将伺服放大器及伺服电动机设置于可承受其质量的场所。
请勿对设备给予过重的负荷。
搬运伺服放大器时，请勿握住内置再生电阻的引线、电缆和连接器。否则可能导致落下。

在使用时，请满足以下环境条件。

Table with columns: 项目, 环境条件. Lists environmental requirements for temperature, vibration, pollution, etc.

注 为正规包装

第8章 技术数据

8.1 MR-JE伺服放大器

Table with columns: 项目, MR-JE-10/MR-JE-20/MR-JE-40/MR-JE-70/MR-JE-100/MR-JE-200, MR-JE-300. Lists technical specifications like 电源, 控制方式, 污染度, etc.

注 2016年4月之前生产的MR-JE-B伺服放大器 (中国产的伺服放大器时，为2016年5月之前生产) 为100mA。

8.2 外形尺寸/安装孔加工图

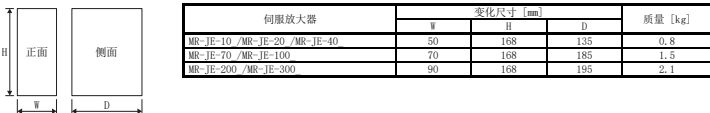


Table with columns: 伺服放大器, 变化尺寸 [mm], 质量 [kg]. Lists dimensions for different models.



[质保内容]

- 1. 免费保期和保修范围
如果产品在免费保期内发生了因本公司责任而导致的故障或瑕疵 (以下统称“故障”) 时，本公司将通过销售商或本公司的售后服务公司免费对产品进行修理。但如果需要在国内或海外出差维修时，则收取派遣技术人员人员的实际费用。此外，因故障部件的更换而发生的现场再调试，试运行不属于本公司责任范围。
[免费质保期限]
关于产品的免费质保期限，请向您的三菱产品销售商进行咨询。
[免费质保范围]
(1) 临时故障诊断原则上由贵公司负责实施。但应贵公司要求，本公司或者本公司维修网点可有偿提供该项业务。此时，如果故障是由于本公司原因而导致的，则该项业务免费。
(2) 仅限于使用状态，使用方法及使用环境等均遵照使用说明书、用户手册、产品机壳上注意标签规定的条件、注意事项等，并在正常使用下使用的情况。
(3) 即使在免费质保期内，以下情况也收取维修费用。
(i) 因客户保管或使用不当，疏忽、过失等引起的故障，以及因客户的硬件或软件设计内容引起的故障。
(ii) 因客户未在本公司允许对产品进行改造等而引起的故障。
(iii) 将本公司产品组合安装到用户的机器中时，如果用户的机器上安装了法规规定的安全装置或业界标准要求配备的功能，结构后即可避免的故障。
(iv) 如果正常维护，更换使用说明书中指定的消耗品即可防止的故障。
(v) 耗材 (电池、风扇、平滑电容等) 的更换。
(vi) 由于火灾、异常电压不可抗力引起的外部因素以及因地震、雷电、风灾水灾等自然灾害引起的故障。
(vii) 根据从本公司出货时的科技情报还无法预知的原因而导致的故障。
(viii) 其他任何非本公司责任或客户认为非本公司责任的故障。
2. 产品停产后的有偿维修期限
(1) 本公司在产品停产后的7年内受理该产品的有偿维修。关于停产的消息将通过本公司销售和售后服务人员进行通告。
(2) 产品停产时，将不再提供产品 (包括维修零件)。
3. 海外服务
在海外，由本公司在当地的海外FA中心受理维修。但是，请注意各个FA中心的维修条件等可能会不同。
4. 机会损失和间接损失不在质保责任范围内
无论是谁在免费质保期内，对于任何非本公司责任的原因而导致的损失，因本公司产品故障而引起的用户机会损失，利润损失，无论能否预测的特殊事件引起的损失和间接损失、事故赔偿，对本公司产品以外的损伤，以及由于用户更换设备，现场机械设备的再调试、运行测试及其他作业的赔偿，本公司将不承担责任。
5. 产品规格的更改
目录、手册及技术文档中的规格如有更改，恕不另行通知。
6. 关于产品的适用
(1) 在使用本公司AC伺服设备时，应该符合以下条件：即使在AC伺服设备出现问题或故障时也不会导致重大事故，并且应在设备外部系统地配备能应付任何问题或故障的备用设备及失效安全功能。
(2) 本公司AC伺服设备是以一般工业用途等为对象设计和制造的通用产品。因此，AC伺服设备不适用于面向各电力公司的核电站以及其他发电厂等对公众有较大影响的用途，以及面向铁路公司或行政机关等要求特殊质量保证体系的用途。此外，AC伺服设备也不适用于航空航天、医疗、铁路、焚烧·燃料装置、载人运输装置、娱乐设备、安全设备等预计对人体财产有较大影响的用途。然而，对于上述用途，如果顾客同意限定用途且无特殊质量要求的条件下，可对其适用性进行研究讨论，请与本公司服务窗口联系。