

MR-JN-10A/MR-JN-20A/MR-JN-40A MR-JN-10A1/MR-JN-20A1

Instructions and Cautions for Safe Use of AC Servos

Н MITSUBISHI ELECTRIC AUTOMATION, INC. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A. Tel:+1-847-478-2100 Fax:+1-847-478-2253 MITSUBISHI ELECTRIC EUROPE B.V. German Branch Gothaer Strasse 8. D-40880 Ratingen, Germany Tel:+49-2102-486-0 Fax:+49-2102-486-1120 MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. No.1386 Hongqiao Road, Mitsubishi Electric Automation Center, Changning District, Shanghai, Tel:+86-21-2322-3030 Fax:+86-21-2322-3000 MITSUBISHI ELECTRIC AUTOMATION KOREA CO. LTD. 1480-6, Gayang-Dong, Gangseo-Gu, Seoul, 157-200, Korea Tel: +82-2-3660-9510 Fax: +82-2-3664-8372/8335

MITSUBISHI ELECTRIC CORPORATION

This quide uses recycled paper

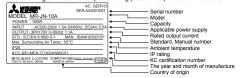
cifications are subject to change without notice.

Copyright@2009 Mitsubishi Electric Corporation All Right Reserved

IB(NA)0300157-H(1407)MEE Printed in Japan

Unpack the product and check the rating plate to see if the servo amplifier is as you ordered os and Cautions for Safe Use of AC Servos (this quid

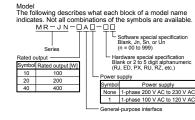
Rating plate
The following shows an example of rating plate for explanation of each item



Warning plate WARNING 警告 OUCH DRIVE UNIT AND WIRING IMMEDIATI RISQUE DE CHOC ÉLECTRIQUE. NE PAS TOUCHER L'AMPLIFICATEUR CABLAGE JUSTE APRÈS L'EXTINCTION DE L'APPAREIL. LE TEMPS DE DECHLAGEMENT DES CONDENSATEUR EST DE 15 MNUTES. TOULOURS BRANCHER LA TERRE [PE] AU COMJUCIEUR DE P 为了防止触电,请务必进行保护接地(PE) 感電防止の為、保護ア-X(PE)の接続を必ず行うこと NE PAS TOUCHEZ LE DISSIPATEUR THERMIQUE.
 散熱片恐有高温。
 故勢なになった。 幸幸のみれたリ と。高温の恐れあり。 ・ONLY B TYPE RCD IS ALLOWED

◆ SELL EMBIT DISJONICITEUR DE TYPE B RCD AUTORISÉ.

・ 只有中型型の(瀬田代井/部) RCD様允许。
・ RCD(瀬電波新春) はタイタであること。
・ RCFERT O MANULE BEFORE INSTALLING OR SERVICING.
・ REPOPER CHAST I TRILE IMAILE, DOJJINANINA MAN' THO FILLATION OUNNITOHANCE. - WERCIDE CONSULTER LE MANUEL DUTILISATION AVANT INSTALLATION DUT - 在安装及維护前,请参考手册。 - 撰付と保守サービスの前に、マニュアルを参照すること。



1. About the manual

1.1 MELSERVO MR-JN relevant manual
This installation guide explains how to mount MR-JN servo amplifiers.
If you have any questions about the operation or programming of the equipment described in this guide, contact your

local sales office. In addition, when you mount a protective device, specific technical skills which are not detailed in the guide will be

1.2 Purpose of this guide
This installation guide explains the safe operation of MR-JN servo amplifiers for engineers of machinery manufacturers and machine operators. For detailed information of the products, refer to "MR-JN-_A Servo Amplifier Instruction Manual".

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.

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

2.1 Professional engineer
Only professional engineers should mount MR-JN servo amplifiers.
Persons who took a proper engineering training or qualified persons who are engaged in electrical equipment.
Check if applicable technical training is available at your local Mitsubishi Electric office. Contact your local sales office for schedules and locations.

2.2 Applications of the device MR-JN servo amplifiers comply with the following standards. IEC/EN 61800-5-1, IEC/EN 61800-3

Always use the MR-JN servo amplifiers within specifications (voltage, temperature, etc. Refer to "MR-JN_A Servo Amplifier instruction Manual" for details.). Misubishi Electric Co, accepts no claims for liability if the equipment is any other way or if modifications are made to the device, even in the context of mounting and installation.



2.3.1 Selection of peripheral equipment and wire The followings are selected based on IEC/EN 61800-5-1, UL 508C, and CSA C22.2 No.14.

Local wiring
 Use only copper wires for wiring. The following table shows the stranded wires [AWG] rated at 75 °C/60 °C.

Recommended wire					
	75 °C/60 °C stranded wires [AWG]				
Servo amplifier	(Note 2) L1/L2/L3/⊕	P+/C	(Note 1, 2) U/V/W/⊕	P/C	B1/B2
MR-JN-10A(1)/MR-JN-20A(1)/MR-JN-40A	14/14	14/14	(Note 3) 14/14	14/14	16/16

Select wire sizes depending on the rated output of the servo motors. The values in the table are sizes based on the rated output of the servo amplifiers.

The following shows the PE terminal specifications of the servo amplifier.

Tightening torque: 1.2 [N-m]

Recommended crimp terminal: R2-4 (JST)

Crimping tool: YPT-60-21 (JST)

Crimping tool: YPT-60-21 (JST)

To write with the servo motor, use LE-CSM (option). To extend the wiring, use the AWG14 wire size.

(2) Selection example of MCCB and fuse
Use a fuse (T class) or the molded-case circuit breaker (UL489 Listed MCCB) indicated in the table below. The T
class fuses and molded-case circuit breakers in the table are selected examples based on rated I/O of the servo
amplifiers. When you select a smaller capacity servo motor to connect it to the servo amplifier, you can also use
smaller capacity T class fuses or molded-case circuit breaker than ones in the table. For selecting ones other than
Class T fuses and molded-case circuit breaker selow, refer to "MR-JN-_A Servo Amplifier Instruction Manual".

Servo amplifier	Molded-case circuit breaker (240 V AC)	Fuse (300 V)
MR-JN-10A	NF50-SVFU-5A (50 A frame 5 A)	10 A
MR-JN-20A/MR-JN-10A1	NF50-SVFU-10A (50 A frame 10 A)	15 A
MR-JN-40A/MR-JN-20A1	NF50-SVFU-15A (50 A frame 15 A)	20 A

(3) Power supply
This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category set forth in IEC/EN 60664-1 and shown in the table of section 8.1. However, when you use the neutral point for single phase supply, a reinforced insulating transformer is required in the power input section. For the interface power supply, use an external 24 V DC power supply with reinforced insulation on I/O eminals.

(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. If using an earth-leakage current breaker, always ground the protective earth (PE) terminal of the servo amplifier to prevent an electric shock. 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.



2.3.2 EU compliance The MR-JN servo amplifiers are designed to comply with the following directions to meet requirements for mounting, using, and periodic technical inspections: EMC directive (2004/108/EC) and Low-voltage directive (2006/95/EC).

ENVEL requirement

MR-JN servo amplifiers comply with category C3 in accordance with IEC/EN 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 encode
cables (max. length 50 m), use shielded wires and ground the shields. The following shows recommended

EMC filter: Soshin Electric HF3000A-UN series

Surge protector: Okava Electric Industries RSPD-250-U4 series

MR-JN servo amplifiers are not intended to be used on a low-voltage public network which supplies domestic premises; Radio frequency interference is expected if it is used on such a network. The installer shall provide a guide for installation and use, including recommended mitigation devices.

(2) For Declaration of Conformity (DoC) Hereby, MITSUBISHI ELECTRIC EUROPE B.V., declares that the servo amplifiers are in compliance with the necessary requirements and standards (2004/108/EC and 2006/95/EC). 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.14.

(1) Installation

The minimum cabinet size is 150% of the MR-JN 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 a 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 (U) and overvoltage category shown in table in section 8.1. The servo amplifier needs to be installed at or below of pollution degree 2. For connection, use only 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

(3) Overload protection characteristics
The MR-JN servo amplifiers have servo motor overload protective function. (It is set on the basis (full load current) of 120% rated current of the servo amplifier.)

(4) Over-temperature protection for motor
Motor Over temperature sensing is not provided by the drive.
Integral thermal protection(s) is necessary for motor. Refer to chapter 4 for details of the proper connections.

(5) Branch circuit protection For installation in the 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 Canada Electrical Code and any applicable provincial codes.

2.3.4 South Korea compliance
This product complies with the Radio Wave Law (KC mark). Please note the following to use the product.
이 기기는 업무용 (A리) 전자파직합기기로서 판 매자 또는 사용자는 이 점을 주의하시기 바라며, 가정의의
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.)

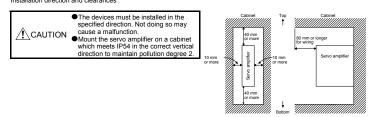
2.4 General cautions for safety protection and protective measures Observe the following items to ensure proper use of the MELSERVO MR-JN servo amplifiers.

- (1) Only qualified personnel and professional engineers should perform system installation
- (2) When mounting, installing, and using the MELSERVO MR-JN servo amplifier, always observe applicable standards and directives 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)

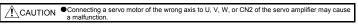
3 Mounting/dismounting

Installation direction and clearances

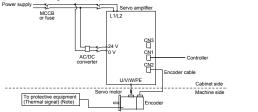


4. Electrical Installation and configuration diagram





The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards.

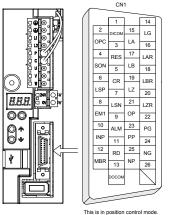


Note: Please use a thermal sensor, etc. for thermal protection of the servo motor

The control circuit connectors described by rectangles are safely separated from the main circuits described by circles The connected motors will be limited as follows.

HF-KN/HF-KP series servo motors (Mfg.: Mitsubishi Electric)

The following shows CN1 connector signals as a typical example. For the other connector details, refer to "MR-JN-_A Servo Amplifier Instruction Manual".



6. Maintenance and service

WARNING To avoid an electric shock, only qualified personnel should attempt inspections. For repair and parts replacement, contact your local sales office.

6.1 Inspection items It is recommended that the following points periodically be checked.

- (1) Check servo motor bearings, brake section, etc. for unusual noise.
- (2) Check the cables and the like for scratches or cracks. Perform periodic inspection according to operating
- (3) Check that the connectors are securely connected to the servo motor
- (4) Check that the wires are not coming out from the connector
- (5) Check for dust accumulation on the servo amplifier. (6) Check for unusual noise generated from the servo amplifier
- (7) Check the servo motor shaft and coupling for connection.

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

Part name	Life guideline
Smoothing capacitor	(Note) 10 years
Relay	Number of power-on times and forced stop times: 100,000 in total

Note. The characteristic of smoothing capacitor is deteriorated due to ripple currents, etc. The life of the capacitor greatly depends on ambient temperature and operating conditions.
The capacitor will reach the end of its life in 10 years of continuous operation in normal air-conditioned environment (40 °C surrounding air

7. Transportation and storage

Transport the products correctly according to their mass.

Stacking in excess of the limited number of product packages is not allowed.

CAUTION

Install the servo amplifer and servo motor in a load-bearing place in accordance with "MR-JN-A Servo Amplifer Instruction Manual".
 Do not get on or put heavy load on the equipment.
 Do not bold the lead wire of the built-in regenerative resistor when transporting the servo

When you keep or use the product, please fulfill the following environment.

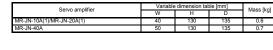
item			Liviolillent			
	Operation [°C]		0 to 55 Class 3K3 (IEC/EN 60721-3-3)			
Ambient temperature	Transportation (Note)	[°C]	-20 to 65 Class 2K4 (IEC/EN 60721-3-2)			
emperature	Storage (Note)	[°C]	-20 to 65 Class 1K4 (IEC/EN 60721-3-1)			
Ambient humidity	Operation, transportation, storage		5 %RH to 90 %RH			
			10 Hz to 57 Hz with constant amplitude of 0.075 mm			
Vibration	Test condition		57 Hz to 150 Hz with constant acceleration of 9.8 m/s ² to IEC/EN 61800-5-1 (Test Fc of IE 60068-2-6)			
resistance	Operation		5.9 m/s ²			
	Transportation (Note)		Class 2M3 (IEC/EN 60721-3-2)			
	Storage		Class 1M2 (IEC/EN 60721-3-2)			
Pollution degree	9		2			
IP rating		IP20 (IEC/EN 60529)				
			Open type (UL 50)			
Altitude	Operation, storage		1000 m or less above sea level			
Altitude	Transportation		10000 m or less above sea level			

8. Technical data

8.1 MR-JN servo amplifier

Item		MR-JN-10A/MR-JN-20A/MR-JN-40A	MR-JN-10A1/MR-JN-20A1		
Power	Main circuit (line voltage)	1-phase 200 V AC to 230 V AC, 50 Hz/60 Hz	1-phase 100 V AC to 120 V AC, 50 Hz/60 Hz		
supply	Control circuit	24 V DC			
	Interface (SELV)	24 V DC			
Control method		Sine-wave PWM control, current control method			
Pollution degree		2 (IEC/EN 60664-1)			
Overvoltage category		III (IEC/EN 60664-1)			
Protective class		I (IEC/EN 61800-5-1)			
Short-circuit current rating (SCCR)		100 kA			

8.2 Servo amplifier dimension



8.3 Mounting hole



[Warranty]

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 bispatching our engineer for an on-site repair work on request by customer in Japan or overseas countries. We are not responsible for an on-site required work or request by customer in Japan or overseas countries. We are not responsible for an on-site required work or repair work on request by customer in Japan or overseas countries. We are not responsible for an on-site required work or repair work on request by customer in Japan or overseas countries. We are not responsible for an on-site required work or repair work or repair work or request by customer in Japan or overseas countries. We are not responsible for an on-site required to the required to the responsible for an on-site required to the repair work or res on-site repair work on request by customer in Japan or overseas countries, we are stment and/or trial run that may be required after a defective unit are repaired or rep

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 eightiesn (18) months from the date of manifacture whichever comes first ("Warrant) Period"). Warranty period for repaired Product cannot exceed beyond the original warranty period before any repair work. 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

You are requested to conduct an initial railure diagnosis by yourself, as a general rule. It can also be carried out by us or or service company upon your request and the actual cost will be charged. However, it will not be charged if he end 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 varranty, the repair cost will be charged on you in the following cases.

Even during the term of varranty, the repair cost will be charged on you in the following case.

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

(vi) a reluce wind: may be regarded to the properties of the prope

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.

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.

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 meachines and the Product and any other operations conducted by you.

Change of Product specifications

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

Application and use of the Product

Application and use of the Product

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 matfunction 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.

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.