

Mitsubishi Electric AC Servo System

MELSERVO-15 MR-J5 Servo amplifier Model

Safety Instructions and Precautions for AC Servos

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Specifications are subject to change without notice. Compliance with the indicated global standards and regulations is current as of the release date of this installation guide. The original instructions for Europe are in English.

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IB(NA)-0300391-H(2309)MEE

Contents of the package

Unpack the product and check the rating plate to	see ii trie servo ampiliier is as you ordered				
Contents					
Servo amplifier		1			
MELSERVO-J5 Series Safety Instructions and Precautions for AC Servos (This guide)					
Rating plate Regulation/legislation mark					

Refund plate

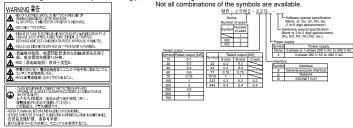
Regulation/legislation marking

Regulation/legislation marking is shown
of each item





Warning plate
The following shows an example of warning plate.
The following describes what each block of a model name indicates
Not all combinations of the symbols are available.



1. About the manuals

To use the MELSERVO-J5 series safely, read MR-J5 User's Manual carefully

MELSERVO-J5 relevant manuals
 This installation guide explains how to mount MR-J5 servo amplifiers. You can also check it with our website for free. http://www.misubshielectric.com/fa/

http://www.missubsinelectric.com/ra/ if you have any questions about the operation and 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-J5 servo amplifiers for engineers of machinery manufacturers and machine operators. This installation guide does not explain how to operate machines in which safe servo system is, or will be integrated. For detailed information of the products, refer to MR-J5 User's Manual.

1.3 Terms related to safety
1.3.1 IEC 61800-5-2 Stop function
STO function (Refer to IEC 61800-5-2:2016 4.2.3.2 STO.) The MR-J5 servo amplifiers have the STO function. The STO function shuts down energy to servo motors, thus removing torque. This function electronically cuts off power supply in the servo amplifiers without the CN8 connector do not support this function. STO function does not support Stop category 1 and 2 for IEC/EN 60204-1.

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.

	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.

In this installation guide, cautionary items such as precautions that may lead to property damages, and instructions for other functions are classified as "POINT".

2.1 Professional engineer
Only professional engineers should mount MR-J5 servo amplifiers.
Here, professional engineers should meet all the conditions below.
(1) Persons who took a proper training of related work of electrical equipment or persons who can avoid risk based on past experience.

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-J5 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), IEC/EN 60204-1 (Stop

category)
ISO/EN ISO 13849-1:2015 Category 3 PL e, IEC/EN IEC 62061:2021 maximum SIL 3, IEC/EN 61800-5-2 (STO)

2.3 Correct use Use the MR-J5 servo amplifiers within specifications. Refer to MR-J5 User's 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.

WARNING Prisk of electrical shock. Do not touch drive unit and terminals immediately after power-off. Allow approx. 15 minutes for capacitor to discharge.

Н

2.3.1 Peripheral device and power wiring The followings are selected based on IEC/EN/UL 61800-5-1, and CSA C22.2 No. 274.

(1) Power Wiring (local wiring and crimping tool) The following table shows the stranded wire sizes [AWG] and the crimp terminal symbols rated at 75 °C.

Table 1. Recommended wires Table 2. Recommended crimp termi 75 °C stranded wire [AWG] Servo amplifier " L11/L21 14 12: b *3 8 *3

value in the table are sizes based on rated output of the serve amplifiers. To remember 1-phase 200 V AC power input and "(T)" means 3-phase 200 V AC power input and "(T)" means 3-phase 200 V AC in the constraint of the competence of the recommended crimp terminals. Refer to Table 2 for recommended crimp terminals result of the Table 2 for recommended crimp terminals result of the table constraint of the commended crimp terminals.

sminals. Refer to Table 2 for recommended crimp terminals. Selection example of MCCB and semiconductor fuse Use UL recognized semiconductor fuses or molded-case circuit breaker (UL 489 Listed MCCB) as the following table. The semiconductor 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 of the servo amplifiers of the servo amplifi

Servo amplifier (200 V class) "1	Molded-case circuit breaker (240 V AC) SCCR 50 kA	Semiconductor fuse (700 V) SCCR 100 kA
MR-J5-10_/MR-J5-20_/MR-J5-40_/MR-J5-60_(T)/MR-J5-70_(T)/MR-J5W2-22_(T)	NF125-SVU-15A (125 A frame 15 A)	170M1408 (10 A)
MR-J5-60_ (S)/MR-J5-70_ (S) /MR-J5-100_ (T)/MR-J5W2-22_ (S)/ MR-J5W2-44_ (T)/MR-J5W3-222_ (T)	NF125-SVU-15A (125 A frame 15 A)	170M1409 (16 A)
MR-J5-100_(S)/MR-J5-200_(T)/MR-J5W2-44_(S)/MR-J5W2-77_(T)/ MR-J5W2-1010_/MR-J5W3-222_(S)/MR-J5W3-444_(T)	NF125-SVU-15A (125 A frame 15 A)	170M1412 (32 A)
MR-J5-200_ (S)/MR-J5-350_/MR-J5W2-77_ (S)/MR-J5W3-444_ (S)	NF125-SVU-20A (125 A frame 20 A)	170M1413 (40 A)
MR-J5-500_	NF125-SVU-30A (125 A frame 30 A) 12	170M1415 (63 A)
MR-J5-700_	NF125-SVU-40A (125 A frame 40 A) 12	170M1416 (80 A)

"(S)" means 1-phase 200 V AC power input and "(T)" means 3-phase 200 V AC power input in the table Use semiconductor fuses for when the servo amplifiers are compliant with UL/CSA standard.

Servo amplifier (400 V class)	Molded-case circuit breaker (480 V AC) SCCR 30 kA	Semiconductor fuse (700 V) SCCR 100 kA
MR-J5-60_4_/MR-J5-100_4_	NF125-SVU-15A (125 A frame 15 A) "1	170M1408 (10 A)
MR-J5-200_4_	NF125-SVU-15A (125 A frame 15 A) "1	170M1409 (16 A)
MR-J5-350_4_	NF125-SVU-15A (125 A frame 15 A) "1	170M1412 (32 A)

ductor fuses for when the servo amplifiers are compliant with UL/CSA standard

(3) Power supply This servo amplifier can be supplied from star-connected supply with grounded neutral point of overvoltage category III. For the interface power supply, use an external 24 V DC power supply with reinforced insulation on I/O terminals.

I/O terminals.
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 amplifier (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 net her rating plate of the servo motor to check that the servo motor temperature is under 105 °C with sensing device. (Refer to Chapter

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-J5 servo amplifiers comply with EN/BS EN IEC 61800-3. As for I/O wires (max. length 10 m), motor cables and encoder cables (max. length 50 m), use shielded wires and ground the shields. Install the surge protector on the primary side of the EMC filter. The recommended products are as follows:

EMC filter: COSEL FSB Series or Soshin Electric HF3000C-SZB series

Surge protector: Okaya Electric Industries RSPD series or Soshin Electric LT-CS-WS series

Line noise filter thistubish Electric FR-BIF

MR-J5 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 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 the signal cables. Install the DC power supply for I/O signals of the servo amplifiers in the same cabinet. Do not connect the other electric devices to the DC power supply.

(2) For Declaration of Conformity (DoC)

We declaration of Conformity (DoC)

For Declaration of Conforming (Differ) are in compliance with EC directives (Machinery directive (2006/42/EC), EMC directive (2014/30/EU), Low-voltage directive (2014/35/EU), and RoHS directive (2011/65/EU, (EU) 2015/66/EU), 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 61800-5-1 and CSA C22.2 No. 274. (1) Institution

Installation
The minimum cabinet size is 150 % of each MR-J5 servo amplifier's volume. Also, design the cabinet so that the ambient temperature in the cabinet is 60 °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

2. Short-circuit current rating (SCCR)
Short-circuit current rating (SCCR)
Suitable For Use On A Clircuit Capable Of Delivering Not More Than 100 kA rms Symmetrical Amperes, 240 Volts Maximum for 200 V AC servo amplifiers. or Not More Than 100 kA rms Symmetrical Amperes, 480 Volts Maximum for 200 V AC servo amplifiers. For SCCR (25 kA and 50 kA) when using a motor circuit breaker (Type E combination motor controller), refer to "MR-J5 User's Manual (Hardware)".

2. 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.

Products mat bear me K. mark comply with me Radio wave Law. Please note the following to use the product of 기기는 업무용 (A급) 전자파적합기기로서 판매자 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.)
In addition, use an EMC fifter, surge protector, ferrite core, and line noise filter on the primary side for inputs. Use a ferrite core and line noise filter for outputs.

2.4 General cautions for safety protection and protective measures
Observe the following items to ensure proper use of the MR-JS servo amplifiers.
(1) Only qualified personnel and professional engineers should perform the installation of safety components and systems.

(2) When mounting, installing, and using the MR-J5 servo amplifier, always observe the standards and directives applicable in the respective countries.

2.5 Residual risk

(1) Be sure that all safety related switches, relays, sensors, etc., meet the required safety standards.

(2) Perform all risk assessments and safety level certification to the machine or the system as a whole.

(3) If the upper and lower power module in the servo amplifier are shorted and damaged simultaneously, the servo motor may make a half revolution at a maximum.

(4) Only qualified personnel are authorized to install, start-up, repair or service the machines in which these components are installed. Only trained engineers should install and operate the equipment. (ISO 13849-1:2015 Table F. I No. 5)

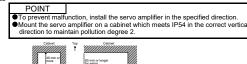
(5) Separate the wiring for safety sub-function from other signal wirings. (ISO 13849-1:2015 Table F.1 No. 1)

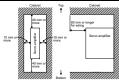
(6) Protect the cables with appropriate ways (routing them in a cabinet, using a cable guard, etc.). (7) Keep the required clearance/creepage distance depending on voltage you use.

Z.o. 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)

2.7. 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, 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 Recommendation

3. Mounting/dismounting





4. Electrical Installation and configuration diagram

POINT mplies with IEC/EN 60204-1. The voltage supply to machine must be 20 ms or more of tolerance against insta specified in IEC/EN 60204-1. ent of the servo motor, securely connect the To prevent unexpected movement of the ser wire with the specified method and torque.

The following shows representative configuration examples to conform to the IEC/EN/UL/CSA standards. The connectors described by rectangles are safely separated from the main circuits described by circles. (1) 3-phase input for MR-J5 1-axis servo amplifier (2) 1-phase input for MR-J5 1-axis servo a

(2) 1-phase input for MR-J5 1-axis servo amplifier (1-phase 230 V AC) MC L1L2L3 P+ (3-phase M22s MC L1L2L3 P+ Power supply Semination to 121 (21 (3.0 hase to 10.0 V AC) Transformer (star-connected)



"1 When the wire sizes of L1 and L11 are the same, MCCB or semiconductor fuse is not required 2 For 1-phase 200 V AC servo amplifiers, connect the lines to L1 and L3. "3 For 400 V class, a step-down transformer is not required.

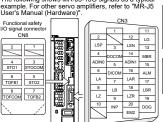
Connectable motors are limited as follows:

(1) Servo motors manufactured by Mitsubishi Electric (HK/LM/TM series)

(2) Other servo motors complying with IEC 60034-1 which are used with a Mitsubishi Electric serial interface-compatible encoder or with an A/B/Z-phase differential output type encoder

5. Signals

5.1 Signal
The following shows MR-J5-10G signals as a typical
example. For other servo amplifiers, refer to "MR-J5
User's Manual (Hardware)".



inal for input signals 5.3 Signals and STO state

6 Maintenance service and trouble shooting

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

(1) Check for loose terminal block screws. Retighten any loose screws

Servo amplifier		Tightening torque [N•m]													
		L2	L3	N-	P3	P4	P+	С	D	L11	L21	U	٧	W	0
R-J5-10_/MR-J5-20_/MR-J5-40_/MR-J5-60_(4)_/ R-J5-70_/MR-J5-100_(4)_/MR-J5-200_(4)_/ R-J5-350_(4)_/MR-J5-500_/MR-J5-700_															1.2
R-J5W															

(2) Servo motor bearings, brake section, etc. for unusual noise.
 (3) 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 an operation can be stopped immediately and a power is shut off by the emergency stop switch.

6.2 Parts having service life

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 '3
Relay	Total number of power-ons, stops by a dynamic brake, and forced stops: 100,000 times
Cooling fan	50,000 hours to 70,000 hours (7 years to 8 years)
Battery backup time *1	Approximately 20,000 hours (equipment power supply: off, ambient temperature: 20 °C)
Battery life "2	5 years from date of manufacture

When MR-J51-axis servo amplifier is being used in combination with a rotary servo motor that requires battery to configure an absolute position detection system, and if being used with either MR-BAT6V1SET or MR-BAT6V1SET-A. For details and other battery backup time, refer to "MR-J5 Liser's Manual (Harrhazam").

Users Manual (Hardware).

2 Quality of the batteries degrades by the storage condition. The battery life is 5 years from the production date regardless of the connection status.

3 If a 5-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 up to 2000 m).

The characteristic of smoothing capacitor is deteriorated due to rippie currents, etc. The service life of the capacitor greatly varies depending on ambient temperatures and operating conditions.

6.3 Trouble shooting for STO

6.3 I rouble shooting for STO When the input signals status (STO1 / STO2) do not same, and the fault detected by the diagnostic function, the alarm number [AL. 068 STO diagnosis error] is displayed on the LED of the servo amplifier. 7. Environment

Transport the products correctly according to their mass. For detailed information on transportation and handling of the battery, refer to "MR-J5 User's Manual (Hardware)". Install the product in a load-bearing place of servo amplifier and servo motor in accordance with the User's manual. Do not put excessive load on the machine. When you keep or use it, please fulfill the following environment.

	Operation	Transportation	Storage
Ambient temperature	0 °C to 60 °C (non-freezing) Class 3K3 (IEC 60721-3-3)	-25 °C to 70 °C (non-freezing) Class 2K12 (IEC 60721-3-2)	-25 °C to 70 °C (non-freezing) Class 1K4 (IEC 60721-3-1)
Ambient humidity	5 %RH to 95 %RH (non-condensing)	5 %RH to 95 %RH (non-condensing)	5 %RH to 95 %RH (non-condensing)
Ambience	Indoors (no direct sunlight); no corrosive gar	s, inflammable gas, oil mist or dust	
Altitude/ atmospheric pressure	Altitude: Max. 2000 m *1	Transportation conditions: Overland/sea transportation, or transporting by an airplane whose cargo compartment is pressurized at 700 hPa or higher	Atmospheric pressure: 700 hPa to 1060 hPa (Equivalent to altitudes from -400 m to 3000 m)
Vibration resistance	Under intermittent vibration: 10 Hz to 57 Hz, displacement amplitude 0.075 mm 57 Hz to 150 Hz, acceleration amplitude 9.8 m/s² Class 3M1 (IEC 60721-3-3) Under continuous vibration (X, Y, Z axes): 10 Hz to 55 Hz, acceleration amplitude 5.9 m/s²	2 Hz to 9 Hz, displacement amplitude (single amplitude) 7.5 mm 9 Hz to 200 Hz, acceleration amplitude 20 m/s² Class 2M3 (IEC 60721-3-2)	2 Hz to 9 Hz, displacement amplitude (single amplitude) 1.5 mm 9 Hz to 200 Hz, acceleration amplitude 5 m/s² Class 1M2 (IEC 60721-3-1)

8. Specifications

O. I IV	in-35 servo ampliller						
Item		MR-J5-10_/MR-J5-20_/MR-J5-40_/ MR-J5-60_/MR-J5-70_/MR-J5-100_/ MR-J5-200_/MR-J5W2-22_/ MR-J5W2-44_/MR-J5W2-77_/ MR-J5W3-222_/MR-J5W3-444_	MR-J5-60_4_/MR-J5-100_4_/ MR-J5-200_4_/MR-J5-350_4_				
	Main circuit (line voltage)	3-phase or 1-phase 3-phase 200 V AC to 240 V AC, 200 V AC to 240 V AC, 50 Hz/60 Hz		3-phase 380 V AC to 480 V AC, 50 Hz/60 Hz			
Power supply	Control circuit (line voltage)	1-phase 200 V AC to	1-phase 380 V AC to 480 V AC, 50 Hz/60 Hz				
	Interface (SELV)	24 V DC (required current capacit MR-J5W3G_, 450 mA; MR-	300 mA; MR-J5W2G_, 350 mA; mA; MR-J5W3B_, 450 mA)				
Contro	I method	Sine-wave PWM control, current control method					
Pollutio	on degree	2 (IEC/EN 60664-1)					
Overvo	oltage category	III (IEC/EN 60664-1)					
Protective class		I (IEC/EN 61800-5-1)					
Enclos	ure	Open type, IP20 (The IP rating of the terminal block for the MR-J5-500_ and MR-J5-700_ is IP10.)					
Short-o	circuit current rating (SCCR)	100 kA					

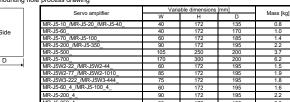
8.2 Functional safety

		Specifi	cations				
Item		MR-J5G(4)_/MR-J5A(4)_/MR-J5A(4)-RJ_/ MR-J5B(4)_/MR-J5B(4)-RJ_/MR-J5WB_	MR-J5G(4)-RJ_/MR-J5WG_				
Safety sub-fu	nction	STO (IEC/EI	N 61800-5-2)				
Compliance with standards		EN ISO 13849-1:2015 Category 3 PL e, IEC 61508 SIL 3, EN IEC 62061:2021 maximum SIL 3, EN 61800-5-2	EN ISO 13849-1:2015 Category 4 PL e, IEC 61508 SIL 3, EN IEC 62061:2021 maximum SIL 3, EN 61800-5-2				
	Response performance	8 ms or less (STO input off → energy shut off)					
Safety	Test pulse input (STO) "1	Test pulse interval: 1 Hz to 25 Hz, test pulse off time: Up to 1 ms					
performance	Mean time to dangerous failure (MTTFd)	MTTFd ≥ 100 [years] (314a)	MTTFd ≥ 100 [years] (750a)				
	Diagnostic coverage (DC)	DC = Medium, 97.6 [%]	DC = Medium, 96.5 [%]				
	Probability of dangerous Failure per Hour (PFH)	PFH = 6.4 × 10 ⁻⁹ [1/h]	PFH = 3 × 10 ⁻⁹ [1/h]				
	Mission time (T _M) "2	T _M = 20	[years]				

1 A test pulse is a signal which instantaneously turns off a signal to the servo amplifier at a constant period for external circuit to selfdiagnose.

2 The performance of special proof tests within the mission time of the product is regarded as not necessary, however, the diagnostic interval is suggested as at least one test per three months for Category 3 Pt. e, Sll. 3 on IEC 61800-5-22016.

8.3 Dimensions/mounting hole process drawing



a1 e1 c f b c f a d e	Servo amplifier		Variable dimensions [mm]									
		a	a1	b	С	d	d1	e	e1	f		
	MR-J5-10_/MR-J5-20_/MR-J5-40_/ MR-J5-60_	6	6	156 ± 0.5	6					M		
	MR-J5-60_4_/MR-J5-70_/ MR-J5-100_(4)_	12	12	156 ± 0.5	6	42 ± 0.3				M		
	MR-J5-200_(4)_/MR-J5-350_(4)_	6	6	156 ± 0.5	6	78 ± 0.3			/	M:		
	MR-J5W2-22_/MR-J5W2-44_	6	6	156 ± 0.5	6				/	M:		
	MR-J5W2-77_/MR-J5W2-1010_	6	6	156 ± 0.5	6	73 ± 0.3			/	M:		
411.	MR-J5W3-222_/MR-J5W3-444_	6	6	156 ± 0.5	6	63 ± 0.3			/	M:		
	MR-J5-500_	6	6	235 ± 0.5	7.5	93 ± 0.5	93 ± 0.5		/	M:		
	MR-J5-700_	5	5	285 ± 0.5	7.5	160 ± 0.5	160 ± 0.5			M:		
9. Check list for user documentation												

Warranty period and coverage

Warranty

MP I5 inetallati

MR-J5 installation checklist for manufacturer/installer

The following items must be satisfied by the initial test operation at least. The manufacturer/installer must be responsible for checking the standards in the items.

Maintain and keep this checklist with related documents of machines to use this for periodic inspection.

1. Is it based on directive/standard applied to the machine?

2. Is directive/standard contained in Declaration of Conformity (DoC)? Yes | No |

3. Does the protection instrument conform to the category required? Yes | No |

4. Are electric shock protective measures (protective class) effective? Yes | No |

5. Is the STO function checkled (test of all the shut-off wiring)? Yes | No |

Checking the items will not be instead of the first test operation or periodic inspection by professional engineer

. Watranky Deriod and coverage
We will repair any failure or defect hereinafter referred to as "failure" in our FA equipment hereinafter referred to as the "Product" arises 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.

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

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

a failure caused by your improves soming or solutions, and a failure caused by any attention, 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

 4. 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.) 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

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

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

work may differ depending on each FA Center. Please ask your local FA center for details.

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

Regardless of the gratis warranty term, Mitsubishi shall not be flable 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 Falures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseable or not, compensation for accidents, an damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks. sation for accidents, and compensation for

5. Change of Product specifications Specifications listed in our catalogs, manuals or technical documents may be changed without notice. Specifications listed in our catalogs, manuals or tect 6. Application and use of the Product

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

failure or malfunction occurs.

(2) Our 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 compan 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.

In addition, applications which may be substantially influential to human lives or properties for such as arilines, medical treatment 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 faiture 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.

(3) Missubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.