

## Instructions and Cautions for Safe Use of AC Servos

If this is the first time for you to use the MELSERVO-J2M Series, the optionally available MR-J2M Instruction Manual and MELSERVO Servo Motor Instruction Manual are required. Always purchase them and use the MELSERVO-J2M Series safely.

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## ● Safety Instructions ●

(Please read the instructions carefully before using the equipment.)

Install, and peruse all this guide and attached documents before the drive and maintenance and the check. After that, use these correctly. Use it after it is skilled of the knowledge of the equipment, information on safety, and all of notes.

In this guide, the safety instruction levels are classified into "WARNING" and "CAUTION".

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

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

What must not be done and what must be done are indicated by the following diagrammatic symbols.

	Indicates what must not be done. For example, "No Fire" is indicated by  .
	Indicates what must be done. For example, grounding is indicated by  .

In this guide, instructions at a lower level than the above, instructions for other functions, and so on are classified into "POINT".

After reading this guide, always keep it accessible to the operator.

### 1. To prevent electric shock, note the following

	<b>WARNING</b>
<ul style="list-style-type: none"> <li>• Before wiring or inspection, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Then, confirm that the voltage between P and N is safe with a voltage tester and others. Otherwise, an electric shock may occur. In addition, always confirm from the front of the interface unit, whether the charge lamp is off or not.</li> <li>• Connect the base unit and servo motor to ground.</li> <li>• Any person who is involved in wiring and inspection should be fully competent to do the work.</li> <li>• Do not attempt to wire the unit and servo motor until they have been installed. Otherwise, you may get an electric shock.</li> </ul>	

	<b>WARNING</b>
<ul style="list-style-type: none"> <li>• Operate the switches with dry hand to prevent an electric shock.</li> <li>• The cables should not be damaged, stressed loaded, or pinched. Otherwise, you may get an electric shock.</li> <li>• To avoid an electric shock, insulate the connections of the power supply terminals.</li> </ul>	

### 2. To prevent fire, note the following

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Install the base unit, servo motor and regenerative resistor on incombustible material. Installing them directly or close to combustibles will lead to a fire.</li> <li>• Always connect a magnetic contactor (MC) between the main circuit power supply and L1, L2, and L3 of the base unit, and configure the wiring to be able to shut down the power supply on the side of the base unit's power supply. If a magnetic contactor (MC) is not connected, continuous flow of a large current may cause a fire when the each unit malfunctions.</li> <li>• When a regenerative resistor is used, use an alarm signal to switch main power off. Otherwise, a regenerative transistor fault or the like may overheat the regenerative resistor, causing a fire.</li> </ul>	

### 3. To prevent injury, note the following

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Only the voltage specified in the instruction manual should be applied to each terminal. Otherwise, a burst, damage, etc. may occur.</li> <li>• Connect the terminals correctly to prevent a burst, damage, etc.</li> <li>• Ensure that polarity (+, -) is correct. Otherwise, a burst, damage, etc. may occur.</li> <li>• During power-on or for some time after power-off, do not touch or close a parts (cable etc.) to the regenerative resistor, servo motor, etc. Their temperatures may be high and you may get burnt or a parts may damaged.</li> <li>• During operation, never touch the rotating parts of the servo motor. Doing so can cause injury.</li> </ul>	

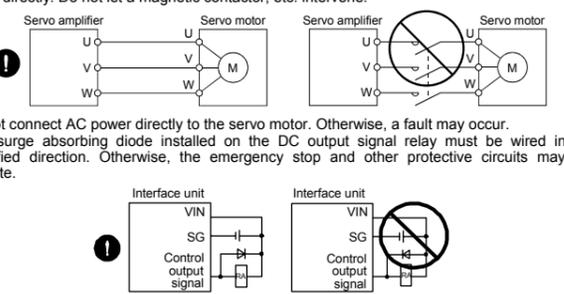
### 4. Additional instructions

The following instructions should also be fully noted. Incorrect handling may cause a fault, injury, electric shock, etc.

#### (1) Transportation and installation

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Transport the products correctly according to their weights.</li> <li>• Stacking in excess of the specified number of products is not allowed.</li> <li>• Do not carry the motor by the cables, shaft or encoder.</li> <li>• Do not hold the front cover to transport the unit. The unit may drop.</li> <li>• Install the unit in a load-bearing place in accordance with the instruction manual.</li> <li>• Do not climb or stand on servo equipment. Do not put heavy objects on equipment.</li> <li>• The base unit and servo motor must be installed in the specified direction.</li> <li>• Leave specified clearances between the base unit and control enclosure walls or other equipment.</li> <li>• Do not install or operate the unit and servo motor which has been damaged or has any parts missing.</li> <li>• Provide adequate protection to prevent screws and other conductive matter, oil and other combustible matter from entering the each unit.</li> <li>• Do not drop or strike each unit or servo motor. Isolate from all impact loads.</li> <li>• When storing or using the each unit and servo motor, comply with the environmental conditions given in the MELSERVO-J2M Instruction Manual and Servo Motor Instruction Manual.</li> <li>• Securely attach the servo motor to the machine. If attach insecurely, the servo motor may come off during operation.</li> <li>• The servo motor with reduction gear must be installed in the specified direction to prevent oil leakage.</li> <li>• Take safety measures, e.g. provide covers, to prevent accidental access to the rotating parts of the servo motor during operation.</li> <li>• Never hit the servo motor or shaft, especially when coupling the servo motor to the machine. The encoder may become faulty.</li> <li>• Do not subject the servo motor shaft to more than the permissible load. Otherwise, the shaft may break.</li> <li>• When the equipment has been stored for an extended period of time, contact your local sales office.</li> <li>• When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.</li> </ul>	

#### (2) Wiring

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Wire the equipment correctly and securely. Otherwise, the servo motor may operate unexpectedly.</li> <li>• Do not install a power capacitor, surge absorber or radio noise filter (FR-BIF option) between the servo motor and interface unit.</li> <li>• Connect the wires to the correct phase terminals (U, V, W) of the drive unit and servo motor. Otherwise, the servo motor does not operate properly.</li> <li>• Connect the servo motor power terminal (U, V, W) to the servo motor power input terminal (U, V, W) directly. Do not let a magnetic contactor, etc. intervene.</li> </ul>	
	
<ul style="list-style-type: none"> <li>• Do not connect AC power directly to the servo motor. Otherwise, a fault may occur.</li> <li>• The surge absorbing diode installed on the DC output signal relay must be wired in the specified direction. Otherwise, the emergency stop and other protective circuits may not operate.</li> </ul>	
<ul style="list-style-type: none"> <li>• When the cable is not tightened enough to the terminal block (connector), the cable or terminal block (connector) may generate heat because of the poor contact. Be sure to tighten the cable with specified torque.</li> </ul>	

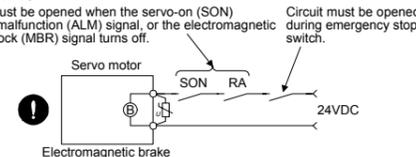
### (3) Test run adjustment

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Before operation, check the parameter settings. Improper settings may cause some machines to perform unexpected operation.</li> <li>• The parameter settings must not be changed excessively. Operation will be instable.</li> </ul>	

### (4) Usage

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Provide an external emergency stop circuit to ensure that operation can be stopped and power switched off immediately.</li> <li>• Any person who is involved in disassembly and repair should be fully competent to do the work.</li> <li>• Before resetting an alarm, make sure that the run signal of the interface unit is off to prevent an accident. A sudden restart is made if an alarm is reset with the run signal on.</li> <li>• Do not modify the equipment.</li> <li>• Use a noise filter, etc. to minimize the influence of electromagnetic interference, which may be caused by electronic equipment used near the MELSERVO-J2M.</li> <li>• Use the MELSERVO-J2M with the specified servo motor.</li> <li>• The electromagnetic brake on the servo motor is designed to hold the motor shaft and should not be used for ordinary braking.</li> <li>• For such reasons as service life and mechanical structure (e.g. where a ball screw and the servo motor are coupled via a timing belt), the electromagnetic brake may not hold the motor shaft. To ensure safety, install a stopper on the machine side.</li> <li>• Burning or breaking a each unit may cause a toxic gas. Do not burn or break a each unit.</li> </ul>	

### (5) Corrective actions

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• When it is assumed that a hazardous condition may take place at the occur due to a power failure or a product fault, use a servo motor with electromagnetic brake or an external brake mechanism for the purpose of prevention.</li> <li>• Configure the electromagnetic brake circuit so that it is activated not only by the unit signals but also by a forced stop signal.</li> </ul>	
	
<ul style="list-style-type: none"> <li>• When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation.</li> <li>• When power is restored after an instantaneous power failure, keep away from the machine because the machine may be restarted suddenly (design the machine so that it is secured against hazard if restarted).</li> </ul>	

### (6) Maintenance, inspection and parts replacement

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• With age, the electrolytic capacitor of the drive unit will deteriorate. To prevent a secondary accident due to a fault, it is recommended to replace the electrolytic capacitor every 10 years when used in general environment. Please contact your local sales office.</li> </ul>	

### (7) General instruction

<ul style="list-style-type: none"> <li>• To illustrate details, the equipment in the diagrams of this guide and instruction manual may have been drawn without covers and safety guards. When the equipment is operated, the covers and safety guards must be installed as specified. Operation must be performed in accordance with this guide and instruction manual.</li> </ul>	
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In this guide, the drive unit, the interface unit, and the base unit are occasionally described as follows.

Drive unit :DRU  
Interface unit :IFU  
Base unit :BU

## ● DISPOSAL OF WASTE ●

Please dispose a servo amplifier, battery (primary battery) and other options according to your local laws and regulations.

### BATTERY transportation

The revision (Edition 44) of the Dangerous Goods Rule of the International Air Transport Association (IATA) went into effect on January 1, 2003 and was enforced immediately. In this rule, "provisions of the lithium and lithium ion batteries" were revised to tighten the restrictions on the air transportation of batteries. However, since the battery for this servo amplifier is not dangerous goods (Class9), air transportation of 24 or less batteries is outside the range of the restrictions. Air transportation of more than 24 batteries requires packing compliant with the Packing Standard 903. When a self-certificate is necessary for battery safety tests, contact our branch or representative. For more information, contact your local sales office.

### SOUTH KOREA COMPLIANCE

This product complies with the Radio Wave Law (KC mark). 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.)

## 1. INTRODUCTION

### 1.1 Introduction to the manuals

If this is the first time for you to use the MELSERVO-J2M Series, the optionally available MR-J2M-□ Servo Amplifier Instruction Manual (see the list below) and MELSERVO Servo Motor Instruction Manual (SH(NA)3181) are required. Please read them all carefully to use the MELSERVO-J2-M.

Interface unit	Manual name	Manual No.
MR-J2M-P8A	MELSERVO-J2M General-purpose interface Servo Amplifier Instruction Manual (Sale schedule)	SH(NA)030014
MR-J2M-P8B	MELSERVO-J2M SSCNET Servo Amplifier Instruction Manual (Sale schedule)	SH(NA)030012

### 1.2 Contents of the packing

After unpacking, check the rating plate to confirm that the each unit you received are as you ordered.

#### (1) Base unit (MR-J2M-BU)

Contents	Quantity
Base unit	1
MELSERVO-J2M Series Instructions and Cautions for Safe Use of AC Servos (This guide)	1

#### (2) Interface unit (MR-J2M-P8□)

Contents	Quantity
Interface unit	1
MELSERVO-J2M Series Instructions and Cautions for Safe Use of AC Servos (This guide)	1

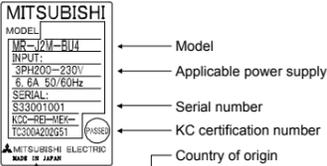
#### (3) Drive unit (MR-J2M-DU)

Contents	Quantity
Drive unit	1
MELSERVO-J2M Series Instructions and Cautions for Safe Use of AC Servos (This guide)	1

### 1.3 Model code definition

#### (1) Base unit

##### (a) Rating plate



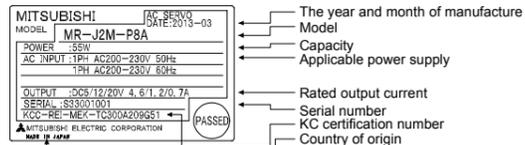
##### (b) Model code

MR-J2M-BU□

Symbol	Slots No.	Connection and maximum capacity of motor [W]	Connection capacity [W]
4	4slot	1600	1280
6	6slot	2400	1600
8	8slot	3200	2560

#### (2) Interface unit

##### (a) Rating plate



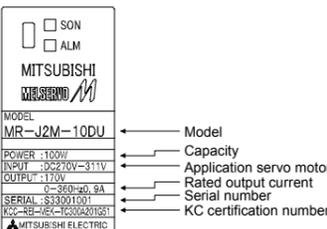
##### (b) Model code

MR-J2M-P8□

Symbol	Type
A	General-purpose interface
B	SSCNET

#### (3) Drive unit

##### (a) Rating plate



##### (b) Model code

MR-J2M-□DU

Symbol	Rated output	Application servo motor [W]
10	100	100
20	200	200
40	400	400
70	750	750

## 2. COMPLIANCE WITH CE MARKING

### 2.1 What is CE marking?

The CE marking is mandatory and must be affixed to specific products placed on the European Union. When a product conforms to the requirements, the CE marking must be affixed to the product. The CE marking also applies to machines and equipment incorporating servos. When you need a copy of Declaration of Conformity of CE marking, contact your local sales office.

#### (1) EMC directive

The EMC directive applies to the servo units alone. This servo is designed to comply with the EMC directive. The EMC directive also applies the servo-incorporated machines and equipment. This requires the EMC filters to be used with the servo-incorporated machines and equipment to comply with the EMC directive. For specific EMC directive conforming methods, refer to the EMC Installation Guidelines (IBNA)67310).

#### (2) Low voltage directive

The low voltage directive applies also to servo units alone. This servo is designed to comply with the low voltage directive.

### 2.2 For compliance

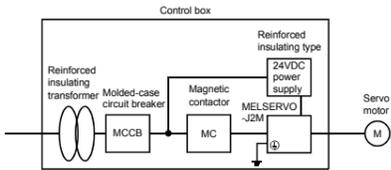
Be sure to perform an appearance inspection of every unit before installation. In addition, have a final performance inspection on the entire machine/system, and keep the inspection record.

#### (1) Drive unit , interface unit , base unit and servo motors used

Use the drive unit , interface unit , base unit and servo motors which standard product.

Drive unit :MR-J2M-□ DU  
Interface unit :MR-J2M-P□  
Base unit :MR-J2M-BU□  
Servo motor :HC-KFS□  
HC-MFS□  
HC-UFS□

#### (2) Structure



#### (3) Environment

Operate MELSERVO-J2M at or above Pollution degree 2 set forth in EN664-1. For this purpose, install MELSERVO-J2M in a control box which is protected against water, oil, carbon, dust, dirt, etc. (IP54).

#### (4) Power supply

(a) Operate MELSERVO-J2M to meet the requirements of the overvoltage category II set forth in EN664-1. For this purpose, a reinforced insulating transformer conforming to the EN Standard should be used in the power input section.

(b) When supplying interface power from external, use a 24VDC power supply which has been insulation-reinforced in I/O.

#### (5) Grounding

(a) To prevent an electric shock, the protective earth (PE) terminal (marked ⊕) of the base unit must be connected to the protective earth (PE) of the control box.

(b) Do not connect two ground cables to the same protective earth (PE) terminal. Always connect cables to the terminals one-to-one.

(c) If an earth leakage circuit breaker is used, always earth the protective earth (PE) terminal of the base unit to prevent an electric shock.

#### (6) Peripheral devices, options

(a) Use the molded-case circuit breaker and magnetic contactor models which are EN/IEC Standard-compliant products given in the MELSERVO-J2M Instruction Manual.

(b) The sizes of the wires given in the MELSERVO-J2M Instruction Manual meet the following conditions. For use in any other conditions, follow Table 5 and Annex C of EN60204-1.

- Ambient temperature : 40°C (104°F)
- Sheath : PVC (polyvinyl chloride)
- Installation on wall surface or open cable tray

(c) Use the EMC filter for noise reduction.

(d) The protective earth (PE) of the servo motor is connected with the protective earth (PE) of the base unit via the screw which fixes the drive unit to the base unit. Therefore, please tighten the screw surely and fix the drive unit to the base unit.

#### (7) Performing EMC tests

When EMC tests are run on a machine/device into which MELSERVO-J2M has been installed, it must conform to the electromagnetic compatibility (immunity/emission) standards after it has satisfied the operating environment/electrical equipment specifications. For the other EMC directive guidelines on MELSERVO-J2M, refer to the EMC Installation Guidelines (IBNA)67310).

· MR-J2M Series are not intended to be used on a low-voltage public network which supplies domestic premises;

· radio frequency interference is expected if used on such a network.

The installer shall provide a guide for Installation and use, including recommended mitigation devices.

## 3. CONFORMANCE WITH UL/cUL STANDARD

MELSERVO-J2M has suited UL508C.

#### (1) Drive unit , interface unit , base unit and servo motors used

Use the drive unit , interface unit , base unit and servo motors which standard product.

Drive unit :MR-J2M-□ DU  
Interface unit :MR-J2M-P□  
Base unit :MR-J2M-BU□  
Servo motor :HC-KFS□  
HC-MFS□  
HC-UFS□

#### (2) Installation

The MR-J2M series have been approved as the products which have been installed in the electrical enclosure. The minimum enclosure size is based on 150 of each MR-J3 combination. And also, design the enclosure so that the ambient temperature in the enclosure is 55°C (131°F) or less. The drive unit must be installed in the metal cabinet. For environment, the units should be used in open type (UL 50) and overvoltage category II or lower. The converter unit and servo amplifier (drive unit) need to be installed at or below of pollution degree 2. For connection, use copper wires.

#### (3) 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.

#### (4) Flange

Mount the servo motor on a flange which has the following size or produces an equivalent or higher heat dissipation effect.

Flange size [mm(in)]	Servo motor		
	HC-KFS□	HC-MFS□	HC-UFS□
150×150×6 (5.91×5.91×0.24)	053・13	053・13	13
250×250×6 (9.84×9.84×0.24)	23	23	23
250×250×12 (9.84×9.84×0.47)	43	43	43
300×300×12 (11.81×11.81×0.47)	73	73	73

#### (5) Capacitor discharge time

The capacitor discharge time is as follows. To ensure safety, do not touch the charging section for 15 minutes after power-off.

Base unit	Discharge time (min)
MR-J2M-BU4	1
MR-J2M-BU6	1
MR-J2M-BU8	1

#### (6) Options, peripheral devices

Use the UL/cUL Standard-compliant products. Use the following molded-case circuit breaker and fuse.

##### (a) Molded-case circuit breaker

Servo motor output total	Molded-case circuit breaker	Rated current [A]
550W max.	30A frame5A	5
More than 550W to 1100W max.	30A frame10A	10
More than 1100W to 1650W max.	30A frame15A	15
More than 1650W to 2200W max.	30A frame20A	20
More than 2200W to 3300W max.	30A frame30A	30

##### (b) Fuse

Servo motor output total	Fuse		
	Class	Current [A]	Voltage [V]
800W max.	K5	15	AC250
More than 800W to 1100W max.	K5	20	AC250
More than 1100W to 1650W max.	K5	30	AC250
More than 1650W to 2200W max.	K5	40	AC250
More than 2200W to 3300W max.	K5	70	AC250

#### (7) Selection example of wires

To comply with the UL/cUL Standard, use UL-approved copper wires rated at 60/75°C (140/167°F) for wiring.

Unit	(Note 1) Crimping terminals, crimping tools				
	L <sub>1</sub> ・L <sub>2</sub> ・L <sub>3</sub> ・⊕	L <sub>11</sub> ・L <sub>21</sub>	U・V・W・⊕	P・C	B1・B2
MR-J2M-BU4	2(AWG14)	2(AWG14)	1.25(AWG16)	2(AWG14)	1.25(AWG16)
MR-J2M-BU6	3.5(AWG12)				
MR-J2M-BU8	5.5(AWG10)				
MR-J2M-10DU	1.25(AWG16)	1.25(AWG16)	1.25(AWG16)	1.25(AWG16)	1.25(AWG16)
MR-J2M-20DU					
MR-J2M-40DU					
MR-J2M-70DU					

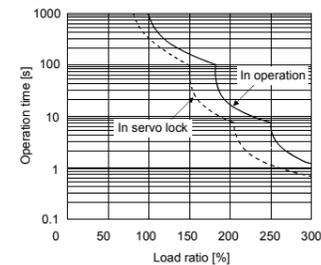
#### (8) About wiring protection

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 Canada Electrical Code and any applicable provincial codes.

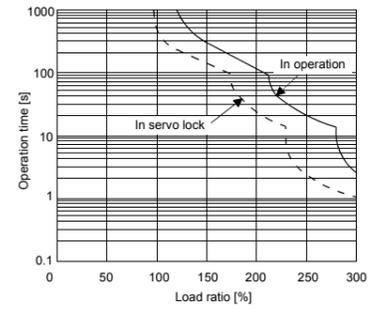
#### (9) Overload Protection Characteristics

An electronic thermal relay is built in the drive unit to protect the servo motor and drive unit from overloads. The operation characteristics of the electronic thermal relay are shown below. It is recommended to use an unbalanced torque-generated machine, such as a vertical motion shaft, so that unbalanced torque is not more than 70% of the rated torque. MR-J2M series servo amplifiers have each solid-state servo motor overload protection. (The motor full load current is 115% rated current.)

##### (a) MR-J2M-10DU to MR-J2M-40DU



##### (b) MR-J2M-70DU



#### (10) Over-temperature protection for motor

Motor Over temperature sensing is not provided by the drive.

## 4. INSPECTION

WARNING	CAUTION
<ul style="list-style-type: none"> <li>Before starting maintenance and/or inspection, turn off the power and wait for 15 minutes or more until the charge lamp turns off. Then, confirm that the voltage between P and N is safe with a voltage tester and others. Otherwise, an electric shock may occur. In addition, always confirm from the front of the interface unit whether the charge lamp is off or not.</li> <li>Any person who is involved in inspection should be fully competent to do the work. Otherwise, you may get an electric shock. For repair and parts replacement, contact your sales representative.</li> </ul>	<ul style="list-style-type: none"> <li>Do not test MELSERVO-J2M with a megger (measure insulation resistance), or it may become faulty.</li> <li>Do not disassemble and/or repair the equipment on customer side.</li> </ul>

#### (1) Inspection

It is recommended to make the following checks periodically.

- Check the screw which fixes each unit. Retighten any loose screws.
- Check the servo motor bearings, brake section, etc. for unusual noise.
- Check the cables and the like for scratches and cracks. Perform periodic inspection according to operating conditions.
- Check the servo motor shaft and coupling for misalignment.

#### (2) Life

The following parts must be changed periodically as listed below. If any part is found faulty, it must be changed immediately even when it has not yet reached the end of its life, which depends on the operating method and environmental conditions. For use in the atmosphere having much oil mist, dust, etc., clean and inspect every three months.

For parts replacement, please contact your sales representative.

Part name	Standard life
Smoothing capacitor	10 years
Relay	Number of power-on and number of forced stop times: 100,000 times
Cooling fan	10,000 to 30,000 hours (2 to 3 years)
Absolute position battery unit	Refer to MELSERVO-J2M Instruction Manual.
Servo motor Bearings	20,000 to 30,000 hours
Encoder	20,000 to 30,000 hours
Oil seal, V ring	5,000 hours

##### (a) Smoothing capacitor

Affected by ripple currents, etc. and deteriorates in characteristic. 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.

##### (b) Relays

Their contacts will wear due to switching currents and contact faults occur. The relay becomes longevity by the power supply turning on frequency and 100,000 times of the forced stop frequency. However, this value changes by the difference of the power supply capacity.

##### (c) Drive unit cooling fan

The cooling fan bearings reach the end of their life in 10,000 to 30,000 hours. Normally, therefore, the fan must be changed in a few years of continuous operation as a guideline. It must also be changed if unusual noise or vibration is found during inspection.

##### (d) Servo motor bearings

When the servo motor is run at rated speed under rated load, change the bearings in 20,000 to 30,000 hours as a guideline. This differs on the operating conditions. The bearings must also be changed if unusual noise or vibration is found during inspection.

##### (e) Servo motor oil seal, V ring

Must be changed in 5,000 hours of operation at rated speed as a guideline. This differs on the operating conditions. These parts must also be changed if oil leakage, etc. is found during inspection.

## 5. ALARMS AND WARNINGS

### 5.1 Alarms

Indication	Name	Definition
A.10	Under voltage	Power supply voltage dropped to 160V or less.
A.12	Memory error 1	RAM memory fault
A.13	Clock error	Printed board fault
A.14	Watchdog	CPU/parts fault
A.15	Memory error 2	EPP-ROM fault
A.16	Encoder error 1	Communication error occurred between encoder and drive unit.
A.17	Board error 2	CPU/parts fault
A.19	Memory error 3	ROM memory alarm
A.1A	Motor combination error	Wrong combination of drive unit and servo motor.
A.1B.	Axis set error	The axis number of the drive unit set up in the same base unit overlaps
A.1C	The base unit bus error 1	Abnormality is found in the communication between the interface unit and the drive unit.
A.1D	The base unit bus error 2	Abnormality is found in the communication between the interface unit and the drive unit.
A.1E	The drive unit mounting error	The drive unit came off from the base unit after the initializing.
A.20	Encoder error 2	Communication error occurred between encoder and drive unit.
A.24	Main circuit error	Ground fault occurred at the servo motor outputs (U, V and W phases) of the drive unit.

Indication	Name	Definition
A.25	Absolute position erase	Absolute position data in error. Power was switched on for the first time in absolute position detection system.
A.30	Regenerative error	Permissible regenerative power of the built-in regenerative resistor or regenerative option is exceeded.
A.31	Over-speed	Speed has exceeded the instantaneous permissible speed.
A.32	Overcurrent	Current that flew is higher than the permissible current of the drive unit.
A.33	Overvoltage	Converter bus voltage exceeded 400V.
A.34	CRC error	CRC alarm command cable fault
A.35	Command frequency error	Input pulse frequency is too high.
A.36	Transfer error	Bus cable/Printed board fault
A.37	IFU parameter error / DRU parameter error	A set value of the IFU parameter or the DRU parameter is abnormal.
A.38	DRU parameter adjustment error	There is a drive unit which sets a value different by the parameter which should set all axes in the same value.
A.45	Main circuit device overheat	Main circuit device overheat
A.46	Servo motor overheat	Servo motor temperature rise actuated the thermal protector.
A.50	Overload 1	Load exceeded overload protection characteristic of drive unit.
A.51	Overload 2	Machine collision or the like caused max. output current to flow successively for several seconds.
A.52	Error excessive	Droop pulse value of the deviation counter exceeded the parameter No.31 setting value (initial value: 8 revolutions)
A.53	Multiple spindle overload	The drive unit of 85% in the regenerative load ratio is adjacent on the base unit.
A.54	Drive unit alarm	The alarm was generated in one drive unit or more set up in the base unit.
A.8A	Serial communication time-out	Serial communication stopped for longer than the time set in IFU parameter No.56.
A.8E	Serial communication error	Serial communication error occurred between interface unit and communication device (e.g. personal computer).
88888	Watchdog	CPU, parts faulty

### 5.2 Warnings

Indication	Name	Definition
A.92	Battery cable disconnection warning	Voltage of battery unit for absolute position detection system reduced.
A.96	Zero setting warning	Home position setting failed.
A.9F	Battery warning	Voltage of battery unit for absolute position detection system reduced.
A.E0	Excessive regenerative warning	There is a possibility that regenerative power may exceed permissible regenerative power of built-in regenerative resistor or regenerative option.
A.E1	Overload warning	There is a possibility that overload alarm 1 or 2 may occur.
A.E3	Absolute position counter warning	Absolute position encoder pulses faulty.
A.E4	Parameter Warning	Parameter outside setting range
A.E6	Servo forced stop warning	EM1-EM2 are open.
A.E7	Controller emergency stop warning	Emergency stop command was received from servo system controller.
A.E9	Main circuit off warning	Servo was switched on with main circuit power off.

## FOR MAXIMUM SAFETY

- 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 under water relays, contact your local sales office.
- 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.

## Precautions for Choosing the Products

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