MITSUBISHI

Mitsubishi Safety Programmable Controller



Safety Guideline

Thank you for buying the Mitsubishi programmable controller

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

1	MODEL	QS-SR-U-HW
	MODEL CODE	13JZ09
j	IB(NA)-	0800411-B(0809)MEE

© 2008 MITSUBISHI ELECTRIC CORPORATION

SAFETY PRECAUTIONS

(Always read these instructions before using this equipment.)

Before using the product, please read this manual, the detailed manuals introduced in this manual, standard programmable controller manuals, and the safety standards carefully and pay full attention to safety to handle the product correctly.

In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

Indicates that incorrect handling may cause

and the second of the second

DANGER hazardous conditions, resulting in death or severe injury. Indicates that incorrect handling may cause ⚠ CAUTION hazardous conditions, resulting in minor or

Note that the ACAUTION level may lead to a serious consequence according to the circumstances.

Always follow the instructions of both levels because they are impor-

moderate injury or property damage.

tant to personal safety

Please save this manual to make it accessible when required and always forward it to the end user

[Design Precautions]

DANGER

- A safety relay module turns OFF all outputs by safety input or a failure of external power supply. Create an external circuit to securely stop the power of hazard by turning OFF the outputs. Incorrect configuration may result in an accident. Incorrect configuration may result in an accident.
- When overcurrent due to such as load short-circuit or load curren exceeding the rating flows for a long time, it may cause smoke or fire To prevent this, create external safety circuit such as a fuse.
- Create short-circuit current protection for a safety relay and a protection circuit such as a fuse and breaker, outside a safety relay
- To inhibit a restart without manual operation after safety function of th safety relay module was performed and outputs were turned OFF, create reset start-up circuit using such as a reset switch outside the safety relay module.

⚠ CAUTION

- The safety category is evaluated by the whole equipment. Make sure that the whole equipment meets the requirements before use
- Use the programmable controller in an environment that meets the general specifications contained in this manual. Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product
- The life of safety relay used for the safety relay module depends on the open-close condition and load. Be sure to operate the equipment by use conditions to make sure that the number of allowable times that the relay opens/closes.
- Do not install the wiring of external devices or communication cables together with the main circuit or power lines, or bring them close to each other. Keep a distance of 100mm (3.94 inch) or more between them. Not doing so could result in noise that would cause erroneous

[Installation Precautions]

♦ DANGER

 Do not use the product in flammable gas atmosphere or explosive gas atmosphere. Doing so may result in fire or explosion due to such as an arc caused by opening/closing the relays.

⚠ CAUTION

- For Q series safety relay module, while pressing the module mounting lever located at the bottom of a module, fully insert the module fixing projection into the fixing hole on the base unit. Then, mount the module with the fixing hole as a supporting point.
 Incorrect loading of the module can cause a malfunction, failure or
- drop. When using the programmable controller in the environment of much vibration, tighten the module with a screw. Tighten the screw in the specified torque range Undertightening can cause a drop, short circuit or malfunction.

 Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- Make sure to fix CC-Link safety relay module and extension safety relay module with a DIN rail fixing bracket.

 Be sure to shut off all phases of the external supply power used by the
- system before mounting/removing a module. Not doing so may result in damage to the product.
- When mounting a module, make room for 5cm (1.97 inch) or more at above and below of the module for ventilation. When powering ON a contact at 3A or more consecutively, make room for 5mm (0.20 inch) or more at the sides of the contact for ventilation.
- Do not directly touch the module's conductive parts or electronic components. Doing so may cause malfunctions or a failure. Securely connect connectors for each cable to the applied parts. Not doing so may cause a malfunction due to poor connection.

[Wiring Precautions]

DANGER

- Be sure to shut off all phases of the external supply power used by the system before wiring. Not completely turning off all power could result in electric shock or damage to the product.
- When energizing or operating the module after installation or wiring, be sure to close the attached terminal cover. Not doing so may result in electric shock

⚠ CAUTION

- Ground the FG and LG terminals correctly.

 Not doing so could result in electric shock or malfunctions. Wire the module correctly after confirming the rated voltage and
- terminal layout. Connecting a power supply of a different rated voltage or incorrect wiring may cause a fire or failure. Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause a fire, failure, or malfunctions

⚠ CAUTION

- Tighten a terminal block mounting screw, terminal screw, and module nounting screw within the specified torque range. If the terminal block mounting screw or terminal screw is too loose, it may cause a short circuit, fire, or malfunctions. If too tight, it may damage the screw and/or the module, resulting in a drop of the screw or module, a short circuit or malfunctions. If the module mounting screw is too loose, it may cause a drop of the screw or module Over tightening the screw may cause a drop due to the damage of the screw or module
- Be sure to fix the communication cables or power cables by ducts or be sure to fix the communication causes or power causes by ducts or clamps when connecting them to the module. Failure to do so may cause damage of the module or cables due to a wobble, unintentional shifting, or accidental pull of the cables, or malfunctions due to poor contact of the cable.
- maillunctions due to poor contact of the cable.

 When removing the connected communication cables or power cables do not pull the cable with grasping the cable part.

 Remove the cable connected to the terminal block after loosening the terminal block screws. Pulling the cable connected to a module may result in malfunctions or damage of the module or cable.
- Use applicable solderless terminals and crimp them with a tool specified by maker. Imperfect connections could result in short circuit fires, or erroneous operation.
- A protective film is attached to the top of the Q series safety relay module to prevent foreign matter such as wire chips from entering the module during wiring. Do not peel this label during wiring. Before starting system operation, be sure to peel this label because of heat dissipation.
- Install our programmable controller in a control panel complying with the IP standard of 54 or more.

 Wire the main power supply to the power supply module installed in a control panel through a distribution terminal block.

 Furthermore, the wiring and replacement of a power supply module have to be performed by a maintenance worker who acquainted with shock protection.
- shock protection.

 For wiring method, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).
- Do not install the control lines together with the communication cables or bring them close to each other.

 Doing so may cause a malfunction due to noise.

[Startup and Maintenance Precautions]

DANGER

- Do not touch the terminals while power is on. Doing so could result in electric shock.
- Turn off all phases of the external supply power used in the system when cleaning the module or retightening the terminal block mounting screws, terminal screws, or module mounting screws.

screws, terminal screws, or module mounting screws. Not doing so could result in electric shock.

Tighten a terminal block mounting screw and module mounting screw within the specified torque range. If the terminal block mounting screw is too loose, it may cause a short-circuit, fire or malfunctions. If too tight, it may damage the screw and/or the module, resulting in a drop of the screw or module, a short circuit or malfunctions. If the module mounting screw is too loose, it may cause a drop of the screw or module. Over tightening the screw may cause a drop due to the damage of the screw or module.

⚠ CAUTION

- Do not disassemble or remodel the module. Doing so could cause a failure, malfunctions, injury, or fire.

 If the product is repaired or remodeled by other than the specified FA centers or us, the warranty is not covered.
 - A electric fuse for overcurrent prevention is incorporated in the contro circuit part of the safety relay module.

 If the electric fuse operates, power OFF the module once, and power i ON again after resolving the failure.
 - On again after resolving the failure.

 Restrict the mounting/removal of a module, base unit, and terminal block up to 50 times (IEC61131-2-compliant), after the first use of the product. Failure to do so may cause the module to malfunction due to poor contact of connector.

 Since the module case is made of resin, do not drop or apply any strong impact to the module. Doing so may damage the module.
- Completely turn off the externally supplied power used in the system before mounting or removing the module to/from the panel. Not doing so may result in a failure or malfunctions of the module.

⚠ CAUTION

- Use any radio communication device such as a cellular phone or a PHS phone more than 25cm (9.85 inch) away in all directions of the programmable controller. Not doing so can cause a malfunction
- Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body, etc. Not doing so can cause the module to fail or malfunction

[Disposal Precautions]

⚠ CAUTION

When disposing of this product, treat it as industrial waste.

About the Manuals

Before using this product, always read the following detailed

Detailed Manual

Manual name	Manual No. (Model code)
Safety Relay Module User's Manual	SH-080746ENG (13JY62)

1. Overview

This manual explaius precautions for using the safety ralay

Included Parts

The following shows the parts included with the base module

(1) O series safety relay module

(1) Q series salety relay illoudle	
Product	Quantity
QS90SR2SP-Q safety relay module	1
QS90SR2SN-Q safety relay module	ľ
Included manual	1

(2) CC-Link safety relay module	
Product	Quantity
QS90SR2SP-CC safety relay module	1
QS90SR2SN-CC safety relay module	'
Included manual	1

(3) Extension safety relay module

Product	Quantity	
QS90SR2SP-EX safety relay module	1	
QS90SR2SN-EX safety relay module		
Included manual	1	

2. General Specifications

This section explaius specifications common to various modules.

Item Specifications							
Operating ambient temperature	0 to 55°C						
Storage ambient temperature	-25 to 75°C ^{*3}						
Operating ambient humidity	30 to 85%RH, non-condensing						
Storage ambient humidity	30 to 85%RH, non-condensing						
		Under intermittent vibration			Sweep count		
		Frequency	Acceleration	Amplitude			
	JIS B 3502, IEC 61131-2 compliant	10 to 57Hz	-	0.075mm (0.003 inch)	10 times each in X,		
Vibration resistance		57 to 150Hz	9.8m/s ²	-			
resistance		Under continuous vibration			Y, Z directions		
		Frequency	Acceleration	Amplitude	(for 80 minutes)		
		10 to 57Hz	-	0.035mm (0.001 inch)			
		57 to 150Hz	4.9m/s ²	-			
Shock resistance	JIS B 3502, IEC 61131-2 compliant (147m/s ² , 3 times each in X, Y, Z directions)						
Operating ambience	No corrosive gases						
Operating altitude*4	2000m (6562ft.) or less						
Installation location	Inside of control panel of IP standard 54 or more						
Overvoltage category*1	III or less						
Pollution degree ^{*2} 2 or less							
Equipment category							
*1: This indicates the section of power supply to which the equipment is							

- This indicates the section of power supply to which the equipment assumed to be connected between the public electrical power distribution network and the machinery within the premises. Category III applies to devices in fixed equipment such as switching device and industrial machine.
- The surge voltage withstand level of equipment for up to the rated voltage of 300V is 4000V.

 *2: This index indicates the degree to which conductive material is
- generated in the environment where the equipment is used. Pollution degree 2 is when non-conductive pollution occurs. However, temporary conductivity may be produced due to condensation.
- *3: The storage ambient temperature is -20 to 75°C if the system includes
- any CC-Link safety relay modules or extension safety relay modules.
 *4: Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause a malfunction.
 - When using the programmable controller under pressure, please contact your local Mitsubishi office

WARRANTY
Please confirm the following product warranty details before using this product.

- Limited Warranty and Product Support.
 a. Mitsubishi Electric Company ("MELCO") warrants that for a period of forty two (42) months after date of delivery from the point of manufacture or three(3) years from date of Customer's purchase, whichever is less, Mitsubishi safety relay module (the "Products") will be free from defects in material and workmanshin
- workmanship.

 b. At MELCO's option, for those Products MELCO determines are not as warranted, MELCO shall either repair or replace them or issue a credit or return the purchase price paid for them.

 c. For this warranty to apply:

 (1) Customer shall give MELCO (i) notice of a warranty claim to MELCO and the authorized dealer or distributor from whom the Products were purchased, (ii) the notice shall describe in reasonable details the warranty problem, (iii) the notice shall be provided promptly and in no event later than thirty (30) days after the Customer knows or has reason to believe that Products are not as warranted, and (iv) in any event, the notice must given within the warranty period;
- period.

 (2) Customer shall cooperate with MELCO and MELCO's representatives in MELCO's investigation of the warranty claim, including preserving evidence of the claim and its causes, meaningfully responding to MELCO's questions and investigation of the problem, grant MELCO access to witnesses, personnel, documents, physical evidence and records concerning the warranty problem, and allow MELCO to examine and test the Products in question offsite or at the premises where they are installed or used; and (3) ff MELCO crequests, Customer shall remove Products it claims are defective and ship them to MELCO or MELCO's authorized representative for examination and, if found defective, for repair or replacement. The costs of removal, shipment to and from MELCO's designated examination point, and reinstallation of repaired or replaced Products shall be at Customer's expense.
- reinstallation of repaired or replaced Products shall be at Customer's expense.

 (4)If Customer requests and MELCO agrees to effect repairs onsite at any domestic or overseas location, the Customer will pay for the costs of sending repair personnel and shipping parts. MELCO is not responsible for any recommissioning, maintenance, or testing on-site that involves repairs or replacing of the Products.

 d. Repairs of Products located outside of Japan are accepted by MELCO's local authorized service facility centers ("FA Centers"). Terms and conditions on which each FA Center offers repair services for Products that are out of warranty or not covered by MELCO's limited warranty may vary.

 e. Subject to availability of spare parts, MELCO will offer Product repair services for (7) years after each Product model or line is discontinued, at MELCO's or its FA Centers' rates and charges and standard terms in effect at the time of repair. MELCO usually produces and retains sufficient spare parts for repairs of its Products for a period of seven (7) years after production is discontinued.

 f. MELCO generally announces discontinuation of Products through MELCO's Technical Bulletins. Products discontinued and repair parts for them may not be available after their production is discontinued.

- 2. Limits of Warranties.
 a.MELCO does not warrant or guarantee the design, specify, manufacture, construction or installation of the materials, construction criteria, functionality, use, properties or other characteristics of the equipment, systems, or production lines into which the Products may be incorporated, including any safety, fail-safe and shut down systems using the Products.

 b.MELCO is not responsible for determining the suitability of the Products for their intended purpose and use, including determining if the Products provide appropriate safety margins and redundancies for the applications, equipment or
- appropriate safety margins and redundances in the approximate systems into which they are incorporated. Systems into which they are incorporated experienced personnel are required to determine the suitability, application, design, construction and proper installation and integration of the Products. MELCO does not supply such
- personnel.

 d.MELCO is not responsible for designing and conducting tests to determine that the Product functions appropriately and meets application standards and requirements as installed or incorporated into the end-user's equipment, production lines or systems.

 e.MELCO does not warrant any Product:
- (1)repaired or altered by persons other than MELCO or its authorized engineers or FA Centers; (2)subjected to negligence, carelessness, accident, misuse, or damage; (3)improperly stored, handled, installed or maintained; (3)Improperty stored, francised, instance of francisco, (4)integrated or used in connection with improperly designed, incompatible or
- (4)integrated or used in connection with improperly designed, incompatible or defective hardware or software; (5)that fails because consumable parts were not tested, serviced or replaced; (6)exchange of a consumable part such as relay, batteries, backlights, or fuses; (7)operated or used with equipment, production lines or systems that do not meet applicable and commensurate legal, safety and industry-accepted

- (8)operated or used in abnormal applications;

 (9)installed, operated or used in contravention of instructions, precautions or warnings contained in MELCO's user, instruction and/or safety manuals, technical bulletins and guidelines for the Products;

 (10)used with obsolete technologies or technologies not fully tested and widely accepted and in use at the time of the Product's manufacture;

 (11)subjected to excessive heat or moisture, abnormal voltages, shock, excessive vibration, physical damage or other improper environment, or

 (12)damaged or malfunctioning due to Acts of God, fires, acts of vandals, criminals or terrorists, communication or power failures, or any other cause or failure that results from circumstances beyond MELCO's control.

 All Product information and specifications contained on MELCO's website and in catalogs, manuals, or technical information materials provided by MELCO are subject to change without prior notice.

- g. The Product information and statements contained on MELCO's website and in catalogs, manuals, technical bulletins or other materials provided by MELCO are provided as a guide for Customer's use. They do not constitute warranties and are not incorporated in the contract of sale for the Products.

 h. These terms and conditions constitute the entire agreement between Customer and MELCO with respect to warranties, remedies and damages and supersede any other understandings, whether written or oral, between the parties. Customer expressly acknowledges that any representations or statements made by MELCO or others concerning the Products outside these terms are not part of the basis of the bargain between the parties and are not factored into the pricing of the Products.

 i. The warranties and remedies set forth in these terms are the exclusive and only warranties and remedies that apply to the products.

 j. Melco disclaims the implied warranties of merchantability and fitness for a particular purpose.

- particular purpose.

 3. Limits on Damages.

 a. MELCO's maximum cumulative liability based on any claims for breach of warranty or contract, negligence, strict tort liability or other theories of recovery regarding the sale, repair, replacement, delivery, performance, condition, suitability, compliance, or other aspects of the products or their sale, installation or use shall be limited to the price paid for products not as warranted.

 D.Although MELCO has obtained the certification for Product's compliance to the international safety standards ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be fire from any maffunction or failure. The user of this Product shall comply with any and all applicable safety standard, regulation or law and take appropriate safety measures for the system in which the Product is installed or used and shall take the second or third safety measures other than the Product. MELCO is not liable for damages that could have been prevented by compliance with any applicable safety standard, regulation or law.

 C. MELCO prohibits the use of Products with or in any application involving power plants, trains, railway systems, airplanes, airline operations, other transportation systems, amusement equipments, hospitals, medical care, dialysis and life support facilities or equipment, incineration and fuel devices, handling of nuclear or hazardous materials or chemicals, mining and drilling, and other applications where the level of risk to human life, health or property are elevated.
- handling of nuclear or hazardous materials or chemicals, mining and drilling, and other applications where the level of risk to human life, health or property are elevated.

 I. MELCO shall not be liable for special, incidental, consequential, indirect or punitive damages, for loss of profits, sales, or revenue, for increased labor or overhead costs, for downtime or loss of production, for cost overruns, or for environmental or pollution damages or clean-up costs, whether the loss is based on claims for breach of contract or warranty, violation of statute, negligence or other tort, strict liability or otherwise.

 In the event that any damages which are asserted against MELCO arising out of or relating to the Products or defects in them, consist of personal injury, wrongful death and/or physical property damages as well as damages of a pecuniary nature, the disclaimers and limitations contained in these terms shall apply to all three types of damages to the fullest extent permitted by law. If, however, the personal injury, wrongful death and/or physical property damages cannot be disclaimed or limited by law or public policy to the extent provided by these terms, then in any such event the disclaimer of and limitations on pecuniary or economic consequential and incidental damages shall nevertheless be enforceable to the fullest extent allowed by law.

 In no event shall any cause of action arising out of breach of warranty or otherwise concerning the Products be brought by Customer more than one year after the cause of action accrues.

 Separate and independently enforceable, notwithstanding the unenforceability or failure of essential purpose of any warranty, undertaking, damage limitation, other provision of these terms or other terms comprising the contract of sale between Customer and MELCO.

- 4. Delivery/Force Majeure.

 a. Any delivery date for the Products acknowledged by MELCO is an estimated and not a promised date. MELCO will make all reasonable efforts to meet the delivery schedule set forth in Customer's order or the purchase contract but shall not be liable for failure to do so.

 b. Products stored at the request of Customer or because Customer refuses or delays shipment shall be at the risk and expense of Customer.

 c. MELCO shall not be liable for any damage to or loss of the Products or any delay in or failure to deliver, service, repair or replace the Products arising from shortage of raw materials, failure of suppliers to make timely delivery, labor difficulties of any kind, earthquake, fire, windstorm, flood, theft, criminal or terrorist acts, war, embargoes, governmental acts or rulings, loss or damage or delays in carriage, acts of God, vandals or any other circumstances reasonably beyond MELCO's control.

5. Choice of Law/Jurisdiction.
These terms and any agreement or contract between Customer and MELCO shall be governed by the laws of the State of New York without regard to conflicts of laws. To the extent any action or dispute is not arbitrated, the parties consent to the exclusive jurisdiction and venue of the federal and state courts located in the Southern District of the State of New York. Any judgment there obtained may enforced in any court of competent jurisdiction.

6. Arbitration.

sy or claim arising out of, or relating to or in connection with the Any controversy or claim anising out of, or relating to or in connection with the Products, their sale or use or these terms, shall be settled by arbitration conducted in accordance with the Center for Public Resources (CPR) Rules for Non-Administered Arbitration of International Disputes, by a sole arbitrator chosen from the CPR's panels of distinguished neutrals, Judgment upon the award rendered by the Arbitrator shall be final and binding and may be entered by any court having jurisdiction thereof. The place of the arbitration shall be New York City, New York. The language of the arbitration shall be English. The neutral organization designated to perform the functions specified in Rule 6 and Rules 7.7(b), 7.8 and 7.0 abull b. bb CDD.

Country/Region Sales office/Tel

Sales office/Tel Mitsubish Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, U.S.A. Tel: +1-1847-478-2100 MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias, 184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil Tel: +55-11-5908-8331 Brazil

rei . +05-11-5908-8331 Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0 Tel: +49-2102-486-0
Mitsubishi Electric Europe B.V. UK Branch
Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, U.K.
Tel: +44-1707-276100
Mitsubishi Electric Europe B.V. Italian Branch
Centro Dir. Colleoni, Pal. Perseo-Ingr.2
Via Paracelso 12, 1-20041 Agrate Brianza., Milano, Italy
Tel: +39-039-80531
Mitsubishi Electric Europe B.V. Spanish Branch
Carretera de Rubi 76-80.
E-08190 Sant Cugat del Valles, Barcelona, Spain
Tel: +34-93-565-313
Mitsubishi Electric Europe B.V. French Branch
25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France
Tel: +33-1-5568-568
Circuit Breaker Industries Ltd. U.K

France South Africa

ı EL: +33-1-9568-5568 Circuit Breaker Industries Ltd. Private Bag 2016, ZA-1600 Isando, South Africa โล! + +77-11-928-2000 Hong Kong

Iel: +2/-11-928-2000
Mitsubish Electric Automation (Hong Kong) Ltd.
10th Floor, Manulife Tower, 169 Electric
Road, North Point, Hong Kong
Tel: +852-2887-8870
Mitsubish Electric Automation (Shanghai) Ltd.
4/F Zhi Fu Plazz, No 80 Xin Chang Road,
Shanghai 200003, China
Tel: +86-21-6120-0808

Taiwan

Singapore

Thailand

Tel: +65-6470-2460
Mitsubishi Electric Automation (Thailand) Co., Ltd.
Bang-Chan Industrial Estate No.111 Moo 4, Serithai Rd,
T.Kannayao, A.Kannayao, Bangkok 10230 Thailand
Tel: +66-2-517-1326
P.T. Autoteknindo Sumber Makmur
Muara Karang Selatan, Block A/Utara
No.1 Kav. No.11 Kawasan industri Pergudangan
Jakarta - Utara 14440, P.O.Box 5045 Jakarta, 11050 Indonesia

Iel: +62-21-6630833
Messung Systems Pvt, Ltd.
Electronic Sadan NO:III Unit No15, M.I.D.C Bhosari,
Pune-411026, India
Rit: +91-20-2712-3130
Mitsubishi Electric Australia Pty. Ltd.
348 Victoria Road, Rydalmere, N.S.W 2116, Australia
Tel: +61-2-9684-7777

AMITSUBISHI ELECTRIC CORPORATION HEAD O

EAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPA AGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAI

Specifications subject to change without notice