



**mitsubishi
ELECTRIC**

Mitsubishi Safety Programmable Controller

MELSEC **QS** series

CC-Link Safety System Master Module

User's Manual
(Hardware)

QS0J61BT12

Thank you for purchasing the Mitsubishi safety programmable controller, MELSEC-QS series. The MELSEC-QS programmable controller is suitable for establishing safety functions for general industrial machinery.

Prior to use, please read both this manual and detailed manual thoroughly to fully understand the product.



MODEL	QS0J61BT12-U-HW
MODEL CODE	13JP95
IB(NA)-0800344-G(1406)MEE	

● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read the Safety Guidelines included with the base unit.

Also, please read this manual, the relevant manuals, the manuals for standard programmable controllers, and the relevant safety standards carefully, and pay full attention to safety to handle the product correctly.

● PRÉCAUTIONS DE SÉCURITÉ ●

(Lire ces précautions avant toute utilisation du produit.)

Avant d'utiliser ce produit, prière de lire les "Safety Guidelines" (directive de sécurité) dans la documentation fournie avec l'unité de base.

De plus, prière de lire ce manuel et la documentation à laquelle il renvoie, les manuels des automates programmables standard et les normes de sécurité pertinentes, de façon à traiter le produit correctement.

● CONDITIONS OF USE FOR THE PRODUCT ●

- (1) Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508, EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction 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.

- (2) MELCO prohibits the use of Products with or in any application involving, and MELCO shall not be liable for a default, a liability for defect warranty, a quality assurance, negligence or other tort and a product liability in these applications.
 - (a) power plants,
 - (b) trains, railway systems, airplanes, airline operations, other transportation systems,
 - (c) hospitals, medical care, dialysis and life support facilities or equipment,
 - (d) amusement equipments,
 - (e) incineration and fuel devices,
 - (f) handling of nuclear or hazardous materials or chemicals,
 - (g) mining and drilling,
 - (h) and other applications where the level of risk to human life, health or property are elevated.

REVISIONS

*The manual number is given on the bottom right of the cover.

Print date	*Manual number	Revision
Sep., 2006	IB(NA)-0800344-A	First edition
Apr., 2008	IB(NA)-0800344-B	<u>Correction</u> Compliance with the EMC and Low Voltage Directives, WARRANTY
May, 2009	IB(NA)-0800344-C	<u>Correction</u> SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directives, Chapter 4, 6
Jun., 2010	IB(NA)-0800344-D	<u>Correction</u> SAFETY PRECAUTIONS, Section 2.1 <u>Addition</u> CONDITIONS OF USE FOR THE PRODUCT, Section 1.2, 2.4, 2.5, Chapter 7
Apr., 2011	IB(NA)-0800344-E	<u>Correction</u> Section 2.4, Chapter 7
Aug., 2011	IB(NA)-0800344-F	<u>Correction</u> SAFETY PRECAUTIONS
Jun., 2014	IB(NA)-0800344-G	<u>Correction</u> Section 2.1, 2.4, 3.1, 5.1, Chapter 7 <u>Addition</u> SAFETY PRECAUTIONS (French)

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

CONTENTS

1. OVERVIEW	1
1.1 Compatibility with CC-Link	1
1.2 Safety Programmable Controller Product List	1
2. SPECIFICATIONS	2
2.1 Performance Specifications	2
2.2 Maximum Overall Cable Distance	3
2.3 CC-Link Dedicated Cable Specifications	3
2.4 Safety Standards	4
2.5 Module Replacement	4
3. MOUNTING AND INSTALLATION	5
3.1 Handling Precautions	5
3.2 Installation Environment	6
4. PART NAMES AND SETTINGS	7
5. EXTERNAL WIRING	9
5.1 CC-Link Dedicated Cable Wiring	9
6. EXTERNAL DIMENSIONS	11
7. EC DECLARATION OF CONFORMITY FOR MACHINERY DIRECTIVE ...	12

ABOUT MANUAL

The following manual is also related to this product.

**In necessary, order it by quoting the details in the table below.*

Detailed Manual

Manual name	Manual No. (Model code)
CC-Link Safety System Master Module User's Manual QS0J61BT12	SH-080600ENG (13JR88)

COMPLIANCE WITH THE EMC, LOW VOLTAGE, AND MACHINERY DIRECTIVES

- (1) Method of ensuring compliance
To ensure that Mitsubishi programmable controllers maintain EMC, Low Voltage, and Machinery Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to the manual included with the base unit. The CE mark on the side of the programmable controller indicates compliance with EMC, Low Voltage, and Machinery Directives.
- (2) Additional measures
This product complies with the EMC, Low Voltage, and Machinery Directives. Before using this product, please read this manual, the relevant manuals, the manuals for standard programmable controllers, and the safety standards carefully and pay full attention to safety to handle the product correctly.
The descriptions are based on the requirements of the Directives and the harmonized standards. However, they do not guarantee that the entire machinery constructed according to the descriptions complies with the EMC, Low Voltage, and Machinery Directives. The manufacture of the machinery must determine the testing method for compliance and declare conformity to the EMC, Low Voltage, and Machinery Directives.

1. OVERVIEW

This manual describes the specifications, part names, and settings of the QS0J61BT12 CC-Link Safety system master module (hereinafter referred to as the QS0J61BT12), which is used with the MELSEC-QS series programmable controller CPUs.

After unpacking, confirm that the following items are enclosed.

Part name	Quantity
QS0J61BT12	1
Terminating resistor 110Ω 1/2W (brown, brown, brown)	2
CC-Link Safety System Master Module User's Manual (Hardware) QS0J61BT12	1

1.1 Compatibility with CC-Link

This product supports the following CC-Link functions and performance.

- Cyclic transmission
- Less restrictions on the station-to-station cable length
- CC-Link Safety

1.2 Safety Programmable Controller Product List

Product Name	Model	Description
CC-Link Safety system master module	QS0J61BT12	A module which is mounted on a safety main base unit and establishes connection to CC-Link Safety
	QS0J61BT12-K	An S-mark ^{*1} certified CC-Link Safety system master module

^{*1} S-mark is a safety certification issued by Korea Occupational Safety and Health Agency (KOSHA).

2. SPECIFICATIONS

2.1 Performance Specifications

Table 2.1 shows the performance specifications of the QS0J61BT12. Refer to the User's Manual of the CPU for the general specifications of the QS0J61BT12.

Table 2.1 Performance specifications

Item		Specifications				
Transmission rate		Select from 156kbps/625kbps/2.5Mbps/5Mbps/10Mbps				
Maximum overall cable distance (Maximum transmission distance)		Differs according to transmission rate (Refer to section 2.2)				
Maximum No. of connectable modules		64 modules				
Maximum No. of link points per system		Remote I/O (RX, RY) : 2048 points Remote register (RWr) : 256 points (remote device station → master station) Remote register (RWw): 256 points (master station → remote device station)				
Link points per remote station	Station type	Safety remote station	Standard remote station			
	Number of occupied stations	1 station	1 station	2 stations	3 stations	4 stations
	RX	32 points	32 points	64 points	96 points	128 points
	RY	32 points	32 points	64 points	96 points	128 points
	RWr	0 points	4 points	8 points	12 points	16 points
	RWw	0 points	4 points	8 points	12 points	16 points
Communication method		Broadcast polling method				
Synchronization method		Frame synchronous method				
Coding method		NRZI method				
Transmission path		Bus (RS-485)				
Transmission format		HDLC compliant				
Error control system		CRC32^{*2} $(X^{32}+X^{26}+X^{23}+X^{22}+X^{16}+X^{12}+X^{11}+X^{10}+X^8+X^7+X^5+X^4+X^2+X+1)$				
		CRC16 $(X^{16}+X^{12}+X^5+1)$				

Table 2.1 Performance specifications

Item	Specifications
Recommended connection cable <i>Câble de connexion recommandé</i>	Version 1.10 compatible CC-Link dedicated cable *1 <i>Câble dédié CC-Link compatible Ver.1.10 *1</i>
No. of I/O occupied points	32 points (I/O assignment: 32 intelligent points)
5V DC internal current consumption	0.46A
Weight	0.12kg

*1 CC-Link dedicated cable (Ver.1.00) or CC-Link dedicated high-performance cable can be also used. Using a cable together with another type of cable is not allowed. Attach terminating resistors which match the cable type.(Refer to section 5.1)

**1 On peut utiliser un câble dédié CC-Link (Ver.1.00) ou un câble dédié CC-Link haute performance. Associer des types de câble différents n'est pas autorisé. Fixer des résistances d'extrémité adaptées au type de câble.(Se reporter à la section 5.1)*

*2 Error detection using CRC32 is not performed for communication with standard remote I/O stations or remote device stations.

2.2 Maximum Overall Cable Distance

The maximum overall cable distance differs according to the transmission rate.

For the relation between the transmission rate and the maximum overall cable distance, refer to the following:

CC-Link Partner Association website: <http://www.cc-link.org/>

2.3 CC-Link Dedicated Cable Specifications

Use CC-Link dedicated cables in the CC-Link Safety systems.

Performance of the CC-Link Safety system cannot be guaranteed if any cables other than CC-Link dedicated cables are used.

For the specifications and any inquiries on the CC-Link dedicated cables, refer to the following:

CC-Link Partner Association website: <http://www.cc-link.org/>

Remarks

For details, refer to the CC-Link Cable Wiring Manual issued by the CC-Link Partner Association.

2.4 Safety Standards

Normes de sécurité

Use the product according to the following safety standards.

Region	Safety Standards
International	IEC61508 Parts 1-7:1998-2000, ISO13849-1:2006, IEC61131-2:2007, IEC61000-6-2:2005, IEC61000-6-4:2006, IEC61784-3:2010, IEC60204-1:2006
Europe	EN954-1:1996, EN ISO13849-1:2008, EN61131-2:2007, EN61000-6-2:2005, EN61000-6-4:2007
North America	UL508, NFPA79-2007

Utiliser le produit dans le respect des normes de sécurité suivantes.

Région	Normes de sécurité
International	IEC61508 Parts 1-7:1998-2000, ISO13849-1:2006, IEC61131-2:2007, IEC61000-6-2:2005, IEC61000-6-4:2006, IEC61784-3:2010, IEC60204-1:2006
Europe	EN954-1:1996, EN ISO13849-1:2008, EN61131-2:2007, EN61000-6-2:2005, EN61000-6-4:2007
Amérique du Nord	UL508, NFPA79-2007

2.5 Module Replacement

Replace the module according to the following replacement cycle.

Module	Replacement Cycle
CC-Link Safety system master module	10 years

3. MOUNTING AND INSTALLATION

3.1 Handling Precautions

The handling precautions for the module are given below.

- (1) Since the module case is made of resin, do not drop it or apply strong impacts on it.
- (2) Do not remove the PCB of each module from its case. This may cause a failure in the module.
- (3) Be careful not to let foreign matter such as wire offcuts enter the module during wiring. In the event any foreign matter enters, remove it immediately.
Otherwise, it may cause a fire, failure or malfunction.
- (4) The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, 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.
- (5) Crimp terminals with insulated sleeves cannot be used with the terminal block. Covering the wiring parts for the crimp terminals with mark tubes or insulated tubes is recommended.
- (6) 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.
- (7) Tighten the module mounting screws within the following ranges.
Serrer les vis de fixation du module dans les limites suivantes.

Screw name	Tightening torque range
Module mounting screw (M3 screw)	0.36 to 0.48N·m
Terminal block terminal screw (M3 screw) <i>Vis de fixation de bornier (vis M3)</i>	0.42 to 0.58N·m <i>0,42 à 0,58 N·m</i>
Terminal block mounting screw (M3.5 screw)	0.66 to 0.89N·m

- (8) To mount the module on a base unit, fully insert the module mounting tab into the mounting hole in the base unit and press the module into position.
Be sure to tighten the module mounting screws within the specified tightening torque range.

Improper installation may result in malfunction, failure, or drop of the module.

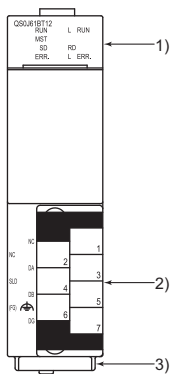
POINT


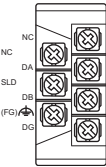
- | |
|---|
| <p>(1) Always turn the power of the corresponding station OFF before mounting or removing the terminal block. If it is mounted or removed without turning OFF the power, correct data transmission by the mounted or removed station will not be guaranteed.</p> <p>(2) Always power off the system in advance when removing the terminating resistor to change the system. If it is removed and mounted while the system is energized, correct data transmission will not be guaranteed.</p> |
|---|

3.2 Installation Environment

For the installation environment, refer to the QSCPU User's Manual (Hardware Design, Maintenance and Inspection).

4. PART NAMES AND SETTINGS



No.	Name	Details	
1)	LED indicators 	Indicates the data link state by turning the LEDs ON or OFF.	
		LED name	Details
		RUN	ON: Module is normal OFF: Watch dog timer error
		ERR.	ON: Communication error in all stations Turns ON when the following type of error occurs. <ul style="list-style-type: none"> • When master station is overlapped on the same line • When there is an error in the parameter settings • When the data link monitor timer timed out • When the cable is disconnected, or the transmission route is being affected by noise, etc. Flicker: A communication error station identified, or remote station No. overlapped.
		MST	ON: Operating as master station (during data link control)
		L RUN	ON: Executing data link
		L ERR.	ON: Communication error (host) Flickering of inconsistent intervals: The terminating resistor is not attached. Or, the module and CC-Link dedicated cable are affected by noise.
		SD	ON: Sending data
RD	ON: Receiving data		
2)	Terminal block 	Connect the CC-Link dedicated cable for the data link. Refer to section 5.1 for details on the connection methods. The terminals SLD and FG are connected inside the module. This is a 2-piece terminal block, and the module can be replaced without disconnecting the signal wires connected to the terminal block. (Replace the module after turning its power OFF.)	
3)	Serial number plate	Indicates the serial number of the QS0J61BT12.	

5. EXTERNAL WIRING

5.1 CC-Link Dedicated Cable Wiring

This section explains how to connect the safety master module, safety remote I/O module, standard remote I/O module and/or remote device module with CC-Link dedicated cables.

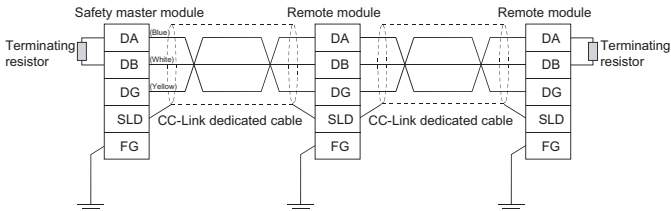
- (1) The cable connecting sequence is not related with the station No.
- (2) Be sure to connect the "terminating resistors" compatible with the cable type to the modules on both ends of the CC-Link Safety system. Connect each terminating resistor between "DA" and "DB".
- (3) In the CC-Link Safety system, the terminating resistor to be used is different depending on the applied cable.

Cable type	Terminating resistor
Version 1.10 compatible CC-Link dedicated cable	110 Ω 1/2 W * (brown-brown-brown)
CC-Link dedicated cable (Ver.1.00)	
CC-Link dedicated high-performance cable	130 Ω 1/2 W (brown-orange-brown)

* This resistors are provided with QS0J61BT12

- (4) The safety master module can be connected to any location other than both ends.
- (5) Star topology is not allowed.
- (6) A connection method is shown below.

L'illustration ci-dessous est un exemple de méthode de raccordement.



English	French
Safety master module	<i>Module maître de sécurité</i>
Remote module	<i>Module distant</i>
Terminating resistor	<i>Résistance d'extrémité</i>
CC-Link dedicated cable	<i>Câble dédié pour CC-Link</i>
Blue	<i>Bleu</i>
White	<i>Blanc</i>
Yellow	<i>Jaune</i>

IMPORTANT

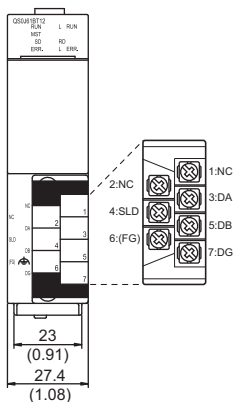
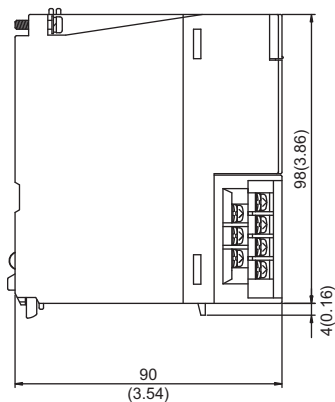
Each of the CC-Link dedicated cables (for Ver.1.10, Ver.1.00, and high-performance cables) cannot be used together with another type of cable.

If used together, correct data transmission will not be guaranteed.

POINT

Connect the shielded wire of the CC-Link dedicated cable to "SLD" of each module, and ground the both ends of the shielded wire via "FG". The SLD and FG are connected in the module.

6. EXTERNAL DIMENSIONS



Unit: mm (inch)

7. EC DECLARATION OF CONFORMITY FOR MACHINERY DIRECTIVE

EC Declaration of Conformity

Manufacturer: Mitsubishi Electric Corporation, Nagoya Works
Address: 1-14, 5-chome, Yada-Minami, Higashi-ku, Nagoya
461-8670, Japan

Products: Type: Programmable Controller
(Open Type equipment, Installation category II)
Model: QS0-Series
(Applicable units identified in Appendix)

These products comply with the following European directives:

Directive	Name
2006/42/EC	Machinery Directive

Further details of conformity to these directives are contained in the appendices (BCN-P9999-0618-B later).

Authorised Signature:

T. Takahashi
Senior Manager, FA System Department

Date: (signature)

11 / 03 / 2011



Authorised Representative: Mitsubishi Electric Europe BV
in the European Community Gothaer Str. 8, 40880 Ratingen, Germany
through Responsible person

Signature:

H. Pütz
Executive Vice President &
Deputy Product Marketing Director,
FA European Business Group

Date: (signature)

02 / 03 / 2011



The appendices are part of this declaration. This declaration certifies the conformity with the directives mentioned, but does not contain any warranted qualities. The installation, usage and safety directions of the product documentation have to be observed.

BCN-P9999-0617-B

Appendix

QS0-Series Programmable Controllers

Range of products:

QS001CPU	5
QS001CPU-K	5
QS034B	5
QS034B-E	5
QS034B-K	5
QS061P-A1	5

QS061P-A1-K	5
QS061P-A2	5
QS061P-A2-K	5
QS0J61BT12	5
QS0J61BT12-K	5
QS0J65BTB2-12DT	5

QS0J65BTB2-12DT-K	5
QS0J65BTS2-4T	5
QS0J65BTS2-8D	5
QS0J71GF11-T2	5

The conformity of the above mentioned products with the regulations of the directive 2006/42/EC for machinery is shown by the application of a Technical Construction File. This is supported by selected product tests to the following standards directly and indirectly (when Generic standards are used).

Note: The mentioned products must be used as directed by the associated documentation in order to provide full compliance.

Harmonized European Standards

Reference No.	Date of Issue
EN ISO13849-1	2008

Modules marked with a mark 5 have been tested to EN ISO13849-1(2008)

This declaration is based on the conformity assessment of following Notified Body:

TUV RHEINLAND INDUSTRIE SERVICE GMBH - TUV Rheinland Group Am Grauen Stein D-51105 Köln Germany Phone : +49:221:8060 Fax : +49:221:806114 Email : is@de.tuv.com Website : http://www.tuv.com EC Type-Examination Certificate	NB 0035 01/205/5201.01/13
---	--

Signature



Mitsushiro Fujishima
Manager, Safety Products Strategy planning group
FA Systems Dept.2

Revision record

B	30 March 2011	QS0J71GF11-T2 added to the list.
C	12 June 2013	EC Type-Examination Certificate has been updated.
D	20 December 2013	EC Type-Examination Certificate has been updated.

BCN-P9999-0618-D

WARRANTY

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

1. Limited Warranty and Product Support.

- a. Mitsubishi Electric Company ("MELCO") warrants that for a period of eighteen (18) months after date of delivery from the point of manufacture or one year from date of Customer's purchase, whichever is less, Mitsubishi MELSEC Safety programmable logic controllers (the "Products") will be free from defects in material and 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 be given within the warranty 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 onsite or at the premises where they are installed or used; and
 - (3) If MELCO requests, 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.
 - (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 re-commissioning, 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 systems into which they are incorporated.
- c. Customer acknowledges that qualified and 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;
 - (4) integrated or used in connection with improperly designed, incompatible or defective hardware or software;
 - (5) that fails because consumable parts such as batteries, backlights, or fuses were not tested, serviced or replaced;
 - (6) operated or used with equipment, production lines or systems that do not meet applicable and commensurate legal, safety and industry-accepted standards;
 - (7) operated or used in abnormal applications;
 - (8) 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;
 - (9) used with obsolete technologies or technologies not fully tested and widely accepted and in use at the time of the Product's manufacture;
 - (10) subjected to excessive heat or moisture, abnormal voltages, shock, excessive vibration, physical damage or other improper environment; or
 - (11) 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.
- f. 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.

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.
- b. Although MELCO has obtained the certification for Product's compliance to the international safety standards IEC61508 and EN954-1/ISO13849-1 from TUV Rheinland, this fact does not guarantee that Product will be free from any malfunction 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.
- d. 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.
- e. 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.
- f. 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.
- g. Each of the limitations on remedies and damages set forth in these terms is 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 be enforced in any court of competent jurisdiction.

6. Arbitration.

Any controversy or claim arising 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 7.9 shall be the CPR.

Country/Region Sales office/Tel	Country/Region Sales office/Tel
U.S.A Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, U.S.A. Tel : +1-847-478-2100	China Mitsubishi Electric Automation (China) Ltd. 4/F Zhi Fu Plaza, No.80 Xin Chang Road, Shanghai 200003, China Tel : +86-21-6120-0808
Brazil 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	Taiwan Setsuyo Enterprise Co., Ltd. 6F No.105 Wu-Kung 3rd.Rd, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
Germany Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0	Korea Mitsubishi Electric Automation Korea Co., Ltd. 1480-6, Gayang-dong, Gangseo-ku Seoul 157-200, Korea Tel : +82-2-3660-9552
U.K Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire., AL10 8XB, U.K. Tel : +44-1707-276100	Singapore Mitsubishi Electric Asia Pte, Ltd. 307 Alexandra Road #05-01/02, Mitsubishi Electric Building, Singapore 159943 Tel : +65-6470-2480
Italy Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, I-20041 Agrate Brianza., Milano, Italy Tel : +39-039-60531	Thailand 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
Spain Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80, E-08190 Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131	Indonesia 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 Tel : +62-21-6630833
France Mitsubishi Electric Europe B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France Tel : +33-1-5568-5568	India Messung Systems Pvt, Ltd. Electronic Sadan NO:III Unit No15, M.I.D.C Bhosari, Pune-411026, India Tel : +91-20-2712-3130
South Africa Circuit Breaker Industries Ltd. Private Bag 2016, ZA-1600 Isando, South Africa Tel : +27-11-928-2000	Australia Mitsubishi Electric Australia Pty. Ltd. 348 Victoria Road, Rydalmere, N.S.W 2116, Australia Tel : +61-2-9684-7777

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA, JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.