MITSUBISHI ELECTRIC

E1012

Installation manual

MA00853 2007-09

English

Installation manual for the E1000 series operator panels

Foreword

The E1000 operator panel is developed to satisfy the demands of human-machine communication. Built-in functions such as displaying and controlling text, dynamic indication, time channels, alarm and recipe handling are included.

The operator panel work, for the most part, in an object-oriented way, making it easy to understand and use. The configuration operation of the panel is made in a personal computer, using the configuration tool E-Designer. The project is then transferred and stored in the operator panel.

The operator panel can be connected to many types of automation equipment, such as PLCs, servos or drives. In this manual the expression “the controller“ is used as a general term for the connected equipment.

This manual explains how to install the operator panel. Please refer to the reference manual for further information.

Table of Contents

1 Safety Precautions

Both the installer and the owner and/or operator of the operator panel must read and understand this installation manual.

1.1 UL and cUL Installation

– This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D OR non-hazardous locations only. [Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.]

– Maximum ambient temperature 40 °C when mounted horizontal or 50 °C when mounted vertical.

– WARNING – EXPLOSION HAZARD – Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous.

– For Canada also AVERTISSEMENT – RISQUE D'EXPLOSION – AVANT DE DECONNECTER L'EQUIPEMENT, COUPER LE COURANT OU S'ASSURER QUE L'EMPLACEMENT EST DESIGNE NON DANGEREUX.

– WARNING – EXPLOSION HAZARD - Substitution of components may impair suitability for Class I, Division 2.

– For Canada also AVERTISSEMENT – RISQUE D'EXPLOSION – LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CE MATERIEL INACCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2.

– WARNING – EXPLOSION HAZARD – only the following type of expansion unit are allowed to be connected to the port designated "EXPANSION":
- at the moment there are no such units evaluated or allowed.

– WARNING – EXPLOSION HAZARD - Do not replace expansion unit unless power has been switched off or the area is known to be non-hazardous.

– This product contains battery, this must only be changed in an area known to be non-hazardous. Permitted types are shown in the installation manual.

1.2 General

– Only qualified personnel may install or operate the operator panel.

– The operator panel must be installed according to the installation instructions.

– The operator panel is designed for stationary installation on a plane surface, where the following conditions are fulfilled:
  • no high explosive risks
  • no strong magnetic fields
  • no direct sunlight
  • no large, sudden temperature changes

– Never allow fluids, metal filings or wiring debris to enter any openings in the operator panel. This may cause fire or electrical shock.

– The operator panel fulfills the requirements of article 5 of EMC directive 2004/108/EC.

– Storing the operator panel where the temperature is lower/higher than recommended in this manual can cause the LCD display liquid to congeal/become isotopic.
– The LCD display liquid contains a powerful irritant. In case of skin contact, wash immediately with plenty of water. In case of eye contact, hold the eye open, flush with plenty of water and get medical attention.
– The supplier is not responsible for modified, altered or reconstructed equipment.
– Use only parts and accessories manufactured according to specifications of the supplier.
– Peripheral equipment must be appropriate for the application and location.
– The figures in this manual serves an illustrative purpose. Because of the many variables associated with any particular installation, the supplier cannot assume responsibility for actual use based on the figures.
– The supplier neither guarantees that the operator panel is suitable for your particular application, nor assumes responsibility for your product design, installation or operation.

1.3 During Use

– Keep the operator panel clean.
– Emergency stop and other safety functions may not be controlled from the operator panel.
– Do not use too much force or sharp objects when touching the keys, display etc.

1.4 Service and Maintenance

– Only qualified personnel should carry out repairs.
– The agreed warranty applies.
– Before carrying out any cleaning or maintenance operations, disconnect the equipment from the electrical supply.
– Clean the display and surrounding front cover with a soft cloth and mild detergent.
– Replacing the battery incorrectly may result in explosion. Only use batteries recommended by the supplier.

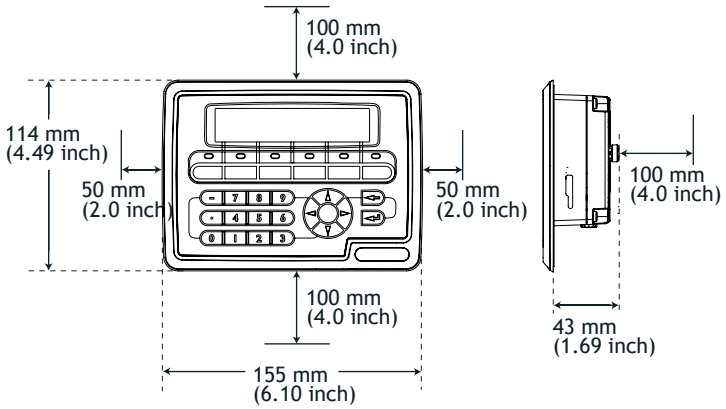
1.5 Dismantling and Scrapping

– The operator panel or parts thereof shall be recycled according to local regulations.
– The following components contain substances that might be hazardous to health and the environment: lithium battery, electrolytic capacitor and display.

2 Installation

2.1 Space Requirements

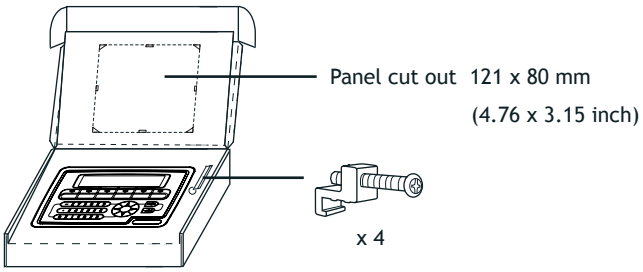
– Installation plate thickness: 7.5 mm (0.29 - inch)
– Space requirements when installing the operator panel:



Caution
The openings on the enclosure are for air convection. Do not cover these openings.

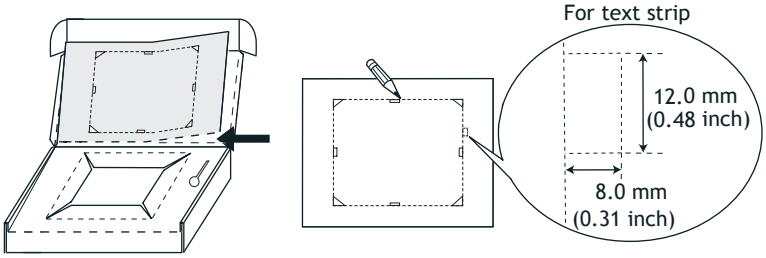
2.2 Installation Process

1. Unpack and check the delivery. If damage is found, notify the supplier.

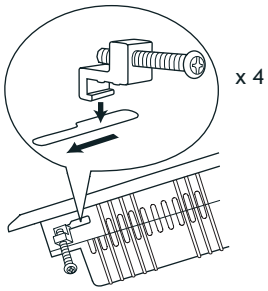


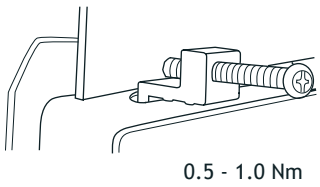
Note:
Place the operator panel on a stable surface during installation.
Dropping it or letting it fall may cause damage.

2. Place the panel cut out where the operator panel is to be situated, draw along the outer sides of the holes and cut according to the markings.



3. Secure the operator panel in position, using all the fastening holes and the provided brackets and screws:





4. Connect the cables in the specified order.

Ⓐ

Caution
Ensure that the operator panel and the controller system have the same electrical grounding (reference voltage level), otherwise errors in communication may occur.

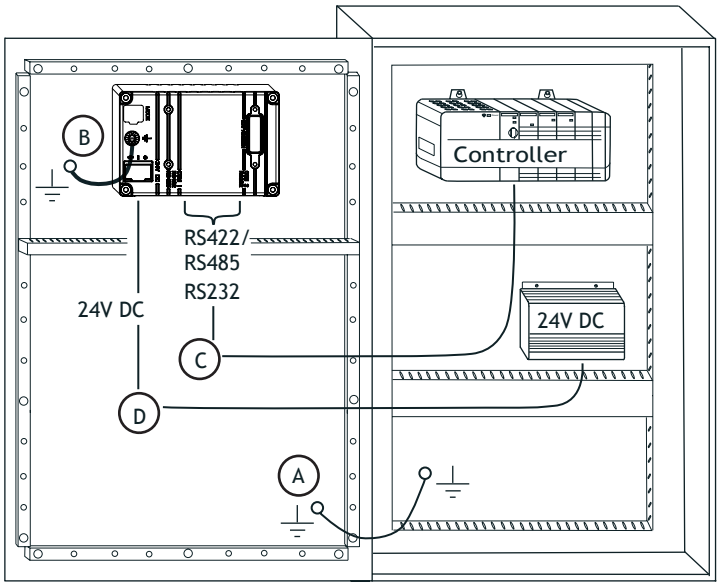
Ⓑ Use an M5 screw and a grounding conductor (as short as possible) with a cross-section of minimum 2.5 mm^2.

Ⓒ

Caution
- Use only shielded communication cables.
- Separate high voltage cables from signal and supply cables.

Ⓓ

Caution
- The operator panel must be brought to ambient temperature before it is started up. If condensation forms, ensure that the operator panel is dry before connecting it to the power outlet.
- Ensure that the voltage and polarity of the power source is correct.

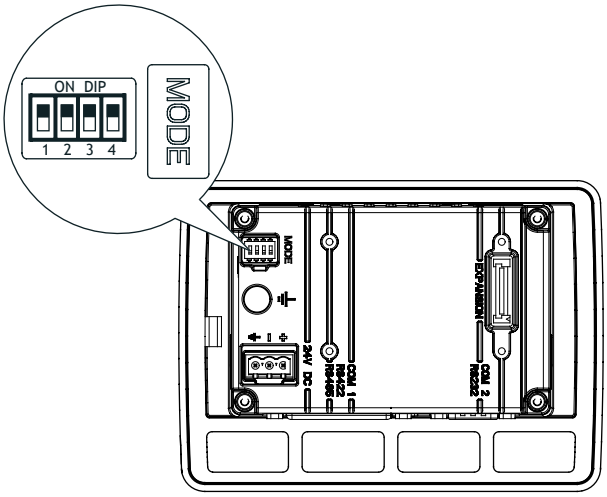


5. Carefully remove the laminated film over the operator panel display, to avoid static electricity that could damage the panel.

2.2.1 Mode Switches

All mode switches must be in OFF position during operator panel use.

The mode switches should not be touched unless by qualified personell.



2.2.2 Connections to the Controller

For information about the cables to be used when connecting the operator panel to the controller, please refer to the help file for the driver in question.

2.2.3 Other Connections and Peripherals

Cables, peripheral equipment and accessories must be suitable for the application and its environment. For further details or recommendations, please refer to the supplier.

3 Technical Data

Parameter	E1012
Front panel, W x H x D	155 x 114 x 6 mm
Mounting depth	43 mm
Front panel seal	IP 66
Rear panel seal	IP 20
Keyboard material	Membrane switch keyboard with metal domes. Overlay film of Autotex F207 * with print on reverse side. 1 million operations.
Reverse side material	Powder-coated aluminum
Weight	0.4 kg
Serial port RS422/ RS485	25-pin D-sub contact, chassis-mounted female with standard locking screws 4-40 UNC.
Serial port RS232C	9-pin D-sub contact, male with standard locking screws 4-40 UNC.
Flash memory for application	512 kb
Real time clock	±20 PPM + error because of ambient temperature and supply voltage. Total maximum error: 1 min/month at 25 °C Temperature coefficient: 0.004 ppm/°C^2
Rechargeable real time clock battery	MS614S (cUL: SII Micro Parts LTD)
Power consumption at rated voltage	Normal: 0.1 A Maximum: 0.3 A
Display	FFSTN-LCD 160 x 32 pixels, monocrome transmissive negative. LED backlight lifetime at the ambient temperature of +25 °C >50.000 h
Active area of display, W x H	89.6 x 17.9 mm
Fuse	Internal DC fuse 1.0 AT, 5x20 mm
Power supply	+24V DC (20 - 30V DC). 3-pin jack connection block. CE: The power supply must conform with the requirements for SELV or PELV according to IEC 950 or IEC 742. UL: The power supply must conform with the requirements for class II power supplies.
Ambient temperature	0 ° to +50 °C
Storage temperature	-20 ° to +70 °C
Relative humidity	5 - 85 % non-condensed
EMC tests on the operator panel	The operator panel conforms with the essential protection requirements in article 5 of the directive 2004/108/EC. Noise tested according to EN61000-6-3 emission and EN61000-6-2 immunity.
UL, cUL approvals (when product or packing is marked)	UL 1604 Class I, Div 2 / UL 508 / UL 50 4x indoor use only
DNV	Yes
NEMA	4x indoor use only

* See section *Chemical Resistance* for more information.

4 Chemical Resistance

4.1 Metal Casing

The frame and casing material is powder-coated aluminum. This powder paint withstands exposure of up to 24 hours duration to the following chemicals without visible change:

Ammonia 25%	Isopropyl alcohol	Nitric acid 3%
De-ionized water	Tap water	Chlorhydric acid 10%
Butanol	Cooling liquid 50%	Washer fluid 33%
Citric acid 10%	Ligroin	Sulphuric acid 20%
Diesel	Cooking oil	Turpentine
Ethanol 99.5% denaturated	Lactic acid 10%	Urea saturated
FAM-Normal petrol	Sodium di-chromate saturated	Hydroperoxide 3%
Alcohol 95%	Caustic soda 5%	Acetic acid 10%
Phosphoric acid 43%	Sodium hypochlorite solution	Alu-cleaner
Glycol	Sodium carbonate 10%	-
Industrial petrol	Sodium chloride 20%	-

4.2 Keyboard and Display

4.2.1 Autotex F157

Autotex F157 covers the membrane keyboard.

Solvent Resistance

Autotex F157 ithstands exposure of more than 24 hours duration under DIN 42 115 Part 2 to the following chemicals without visible change:

Potassium ferrocyanide/ ferricyanide	Sodium hypchlorite <20% (bleach)	1.1.1. Trichloroethane (Genklene)
Cyclohexanol	Acetaldehyde	Ethylacetate
Diacetone alcohol	Aliphatic hydrocarbons	Diethyl ether
Glycol	Toluene	N-Butyl acetate
Isopropanol	Xylene	Amylacetate
Glycerine	White spirit	Butycellosolve
Methanol	Fromic acid <50%	Ether
Triacetin	Acetic acid <50%	MIBK
Dowanol DRM/PM	Phosphoric acid <30%	Cutting oil
Acetone	Hydrochloric acid <36%	Potassium carbonate
Metyl ethyl ketone	Nitric acid <10%	Washing powders
Dioxan	Trichloracetic acid <50%	Fabric conditioner
Cyclohexanone	Sulphuric acid <10%	Ferric chloride
Ethanol	Formaldehyde 37% - 42%	Ferrous chlorid
Isophorone	Potassium hydroxide <30%	Dibutyl Phthalate

Ammonia <40%	Linseed oil	Dioctyl Phthalate
Caustic soda <40%	Paraffin oil	Sodium carbonate
Hydrogen peroxide <25%	Blown castor oil	Petrol
Alkalicarbonate	Silicone oil	Teepol
Bichromate	Turpentine substitute	Water
Diesel oil	Univeral brake fluid	Sea water
Acetonitrile	Decon	-
Sodium bisulphate	Aviation fuel	-

Autotex withstands DIN 42 115 Part 2 exposure of up to 1 hour duration to glacial acetic acid without visible change.

Autotex is not resistant to high pressure steam at over 100 °C or the following chemicals:

Concentrated mineral acids	Benzyl alcohol
Concentrated caustic solution	Mehylene chloride

Autotex withstands 24 hours exposure to the following reagents at 50 °C without visible staining:

Top Job	Grape Juice	Ariel	Ajax
Jet Dry	Milk	Persil	Vim
Gumption	Coffee	Wisk	Domestos
Fantastic	-	Lenor	Vortex
Formula 409	-	Downey	Windex

Very slight discoloration was noted under critical viewing conditions with the following materials:

Tomato juice	Tomato ketchup	Lemon juice	Mustard

Outdoor Use

In common with all polyester based films Autotex F157 is not suitable for use in conditions of long term exposure to direct sunlight.

4.2.2 Display Surface

The display surface on the operator terminal withstands exposure of more than 24 hours duration to the following chemicals without visible change:

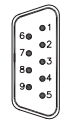
Acetic acid <5%	Dichloromethane	Nitric acid (specific gravity 1.42)
Glacial acetic acid (specific gravity 1.05)	Di-ethylether	Nitric acid <40%
Ethyl acetate	Di-isobutylene	Oleic acid
Acetone	Di-methyl hormamide	Olive oil
Aqueous ammonia (specific gravity 0.9)	Ethyl alcohol <95%	Pure water
Aqueous ammonia <10%	2-ethyl hexoic acid	Seawater
Benzene	Hydrochloric acid <35%	Sodium carbonate <20%

Carbon tetrachloride	Hydrogen peroxide <28%	Sodium hypochlorite <10%
Caustic soda <48%	Isopropyl alcohol	Sulfuric acid (specific gravity 1.84)
Citric acid	Kerosene	Sulfuric acid <30%
Cotton seed oil	Methy alcohol	Toluene

5 Operator Panel Drawings

5.1 Communication Ports

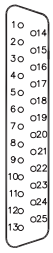
RS-232



D–sub
9–pin Male

Pin no	Signal	Signal Name	Signal direction
1	DCD	Data Carrier Detect	Input
2	RD	Receive Data	Input
3	TD	Transmit Data	Output
4	DTR	Data Terminal Ready	Output
5	SG	Signal Ground	–
6	DSR	Data Set Ready	Input
7	RTS	Request To Send	Output
8	CTS	Clear To Send	Input
9	RI	Ring Indicator	Input

RS-422/485



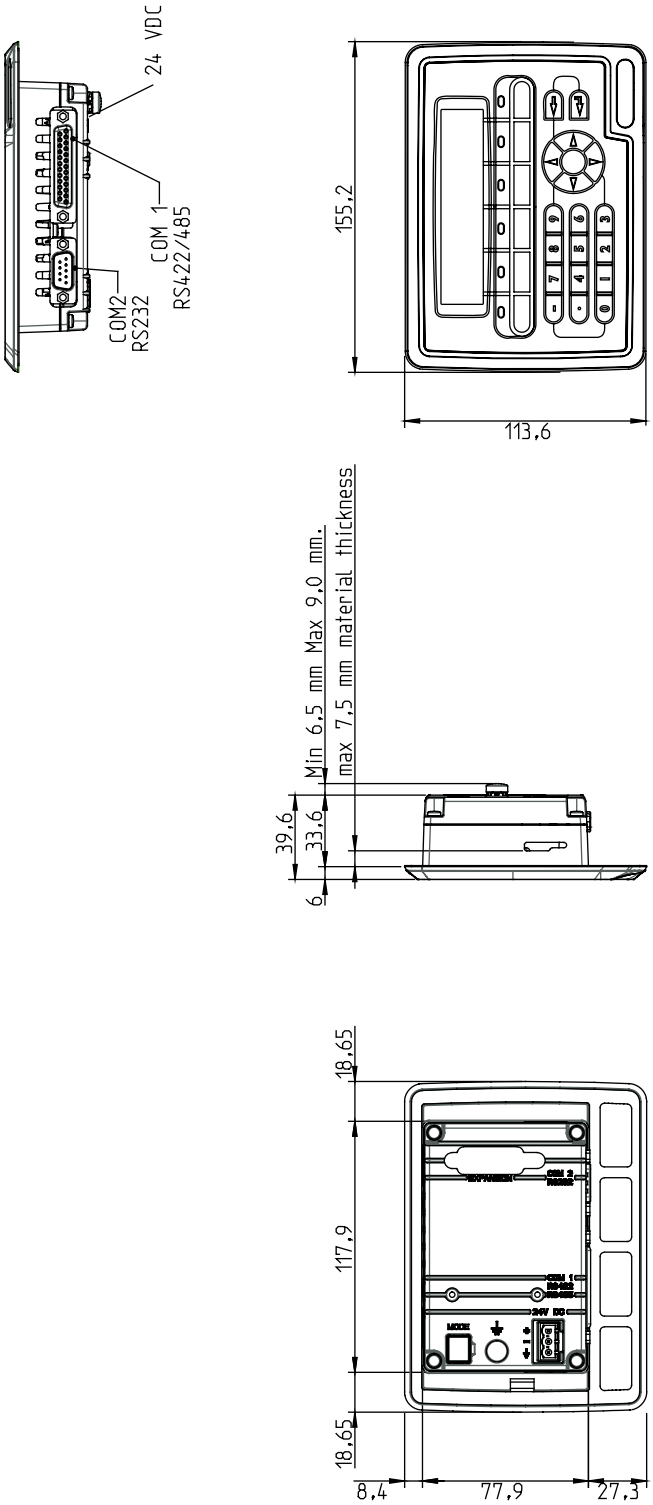
D–sub
25–pin Female

	RS-422		RS-485	
Pin no	Signal	Signal direction	Signal	Signal direction
2	TxD+	Output	Tx/Rx+	In/Output
15	TxD–	Output	Tx/Rx–	In/Outpul
3	RxD+	Input		
16	RxD–	Input		
4	RTS+	Output		
17	RTS–	Output		
5	CTS+	Input		
18	CTS–	Input		
20	1)			
21	1)			
6	Do not use		2) Bus termination	4) Connect to pin no.19 for bus–termination.
19	Do not use		3) Bus termination	See above
7,8	0V		0V	
14	+5V <100mA	Output	+5V <100mA	Output

1) Pin no 20 connected to pin no 21 internal in the terminal
2) Directly connected internaly to pin no. 2 (Tx/Rx+).
3) Connected to pin no. 15 (Tx/Rx–) internaly via a 120ohm 1/4W resistor.
4) NOTE! Only the first and the last unit on the bus should be terminated.

Drawing No. S-05005

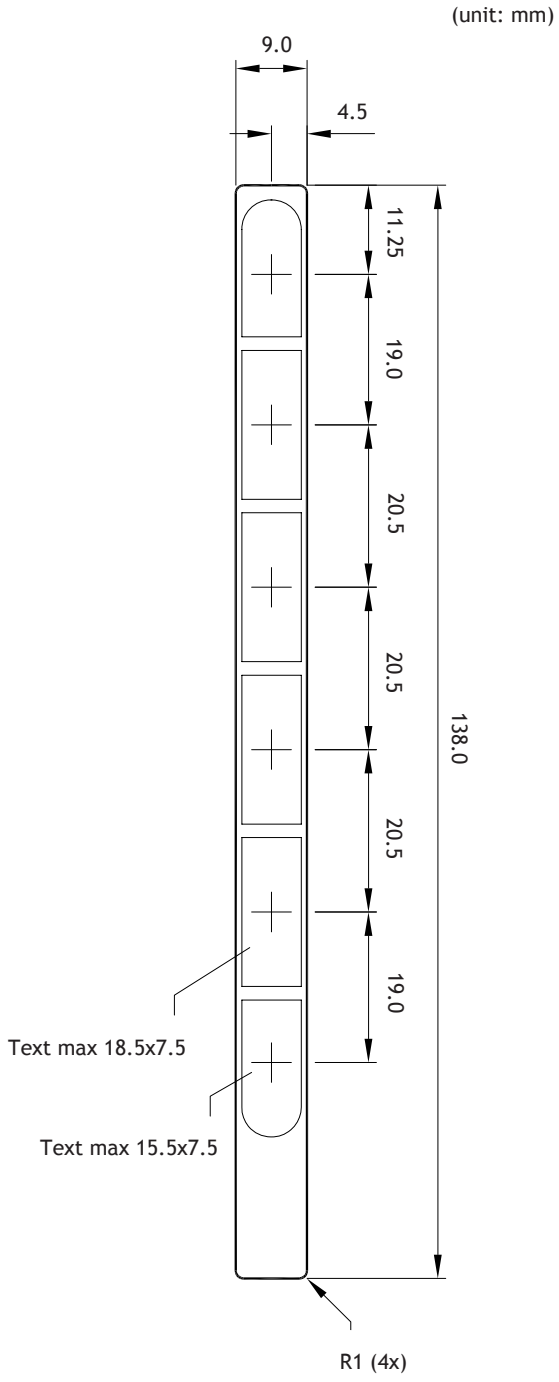
5.2 E1012 Outline



(unit: mm)

Drawing No. S-06820

5.3 E1012 Text Strip



Drawing No. S-06816

MITSUBISHI ELECTRIC

Mitsubishi Electric Automation, Inc.
500 Corporate Woods Parkway
Vernon Hills, IL 60061, USA

Mitsubishi Electric Europe B.V.
Gothaer Strasse 8
D-40880 Ratingen, Germany