

# APPENDICES

## Appendix 1 Processing Time

### Network processing time

The network processing time is the time taken for the network interface module to retrieve a value and store the data in the master station CPU module device.

#### ■CC-Link IE TSN processing time

The processing time of CC-Link IE TSN is configured as follows.

Transmission delay time = SM + LS + Processing time of network interface module

- SM: Sequence scan time of the master station (📖 MELSEC iQ-R CPU Module User's Manual (Application))
- LS: Communication cycle interval (📖 MELSEC iQ-R CC-Link IE TSN User's Manual (Application))
- Processing time of network interface module (📄 Page 312 Processing time of network interface module)

#### ■Processing time of CC-Link IE Field Network

When communications are performed normally in CC-Link IE Field Network, the processing time is configured as follows

Transmission delay time = Sequence scan time + Link scan time + Processing time of network interface module (📄 Page 312 Processing time of network interface module)

#### ■Processing time of CC-Link IE Field Network Basic

The processing time of CC-Link IE Field Network Basic is configured as follows.

Transmission delay time = Sequence scan time + Link scan time + Processing time of network interface module

For details, refer to the following.

📖 CC-Link IE Field Network Basic Reference Manual

### Processing time of network interface module

The processing time of the network interface module is shown below.

#### ■FA3-TH1T16XC, FA3-TH1M16XC

Processing time = Input response time<sup>\*1</sup> + Internal processing time (400μs)

<sup>\*1</sup> If the input response time is 0ms, use 0.4ms for calculation. (📄 Page 55 Input response time setting (0100H))

#### ■FA3-TH1T16Y, FA3-TH1T16YE, FA3-TH1M16Y, FA3-TH1M16YE

Processing time = Output response time + Internal processing time (400μs)

#### ■FA3-AT1T8X, FA3-AT1M8X

Processing time = Conversion speed (1ms) × Number of conversion enabled channels

#### Point

The processing cycle of the connected analog signal converter is 10ms. The input value can be received in as little as 1ms (when only one conversion enabled channel is specified), but only the value is received for 10ms.

#### ■FA3-AT1T8Y, FA3-AT1M8Y

Processing time = Conversion speed (1ms) × Number of conversion enabled channels

#### Point

The processing cycle of the connected analog signal converter is 10ms. The output value can be output in as little as 1ms (when only one conversion enabled channel is specified), but only the most recent value before the processing cycle is output.

# Appendix 2 EMC and Low Voltage Directives

In each country, laws and regulations concerning electromagnetic compatibility (EMC) and electrical safety are enacted. For the products sold in the European countries, compliance with the EU's EMC Directive has been a legal obligation as EMC regulation since 1996, as well as the EU's Low Voltage Directive as electrical safety regulation since 1997.

Manufacturers who recognize their products are compliant with the EMC and Low Voltage Directives are required to attach a "CE marking" on their products in European countries.

In some other countries and regions, the product's manufacturer is also required to issue a declaration of conformity and attach a designated mark on the product (such as UK Conformity Assessed (UKCA) marking in the UK, and Korea Certification (KC) marking in South Korea).

Each country works to make their regulatory requirements consistent across countries based on international standards.

When the requirements are consistent, measures to comply with the EMC and electrical safety regulations become common across countries.

## Requirements to comply with EMC Directive

The EMC Directive specified about both "Emission (electromagnetic interference): Do not emit strong electromagnetic waves to the outside" and "Immunity (electromagnetic sensitivity): Not affected by external electromagnetic waves".

This section summarizes the precautions on compliance with the EMC Directive of the machinery constructed with the network interface module.

These precautions are based on the requirements and the standards of the regulation, however, it does not guarantee that the entire machinery, which was configured according to the descriptions, will comply with above mentioned directives.

The method and judgment for complying with the EMC Directive must be determined by the person who constructs the entire machinery.

### EMC Directive related standards

#### ■Requirements for emission

Specifications: IEC 61131-2:2017

Test item <sup>*1</sup>	Description	Value of standard
CISPR16-2-3 Radiated emission	Radio waves from the product are measured.	<ul style="list-style-type: none"> <li>• 30M to 230MHz QP: 40dB<math>\mu</math>V/m (10m in measurement range)<sup>*2</sup></li> <li>• 230M to 1000MHz QP: 47dB<math>\mu</math>V/m (10m in measurement range)</li> <li>• 1000M to 3000MHz Peak: 76dB<math>\mu</math>V/m (3m in measurement range) Average: 56dB<math>\mu</math>V/m (3m in measurement range)</li> <li>• 3000M to 6000MHz Peak: 80dB<math>\mu</math>V/m (3m in measurement range) Average: 60dB<math>\mu</math>V/m (3m in measurement range)</li> </ul>
CISPR16-2-1, CISPR32 Conducted emission	CISPR16-2-1 Noise from the product to the power line is measured. <sup>*3</sup>	AC power <ul style="list-style-type: none"> <li>• 150k to 500kHz QP: 79dB<math>\mu</math>V Average: 66dB<math>\mu</math>V</li> <li>• 500k to 30MHz QP: 73dB<math>\mu</math>V Average: 60dB<math>\mu</math>V</li> </ul>
	CISPR32 Noise from the product to the communication line is measured.	Ethernet port <ul style="list-style-type: none"> <li>• 150k to 500kHz QP: 97-87dB<math>\mu</math>V Average: 84-74dB<math>\mu</math>V</li> <li>• 500k to 30MHz QP: 87dB<math>\mu</math>V Average: 74dB<math>\mu</math>V</li> </ul>

\*1 The network interface module is an open type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. The tests were conducted with the module installed in a control panel.

\*2 QP (Quasi-Peak): Quasi-peak value

\*3 DC-powered devices are not subject to the test.

## ■Requirements for immunity

Specifications: IEC 61131-2:2017

Test item*1	Description	Value of standard
IEC 61000-4-2*2 Electrostatic discharge immunity	Immunity test in which static electricity is applied to the cabinet of the equipment.	<ul style="list-style-type: none"> <li>• 8kV air discharge</li> <li>• 4kV contact discharge</li> </ul>
IEC 61000-4-3 Radiated, radio-frequency electromagnetic field immunity	Immunity test in which electric fields are irradiated to the product.	<ul style="list-style-type: none"> <li>• 80% AM @1kHz</li> <li>• 80M to 1000MHz: 10V/m</li> <li>• 1.4G to 6.0GHz: 3V/m</li> </ul>
IEC 61000-4-4 Electrical fast transient/burst immunity	Immunity test to apply burst noise to the power cable and signal wire	<ul style="list-style-type: none"> <li>• AC/DC main power, I/O power: 2kV</li> <li>• DC I/O, analog*3, communication cable: 1kV</li> </ul>
IEC 61000-4-5 Surge immunity	Immunity test in which lightning surge is applied to the power line and signal line.	<ul style="list-style-type: none"> <li>• AC power line: 2kV CM, 1kV DM</li> <li>• DC power line, DC I/O power supply: 0.5kV CM, DM</li> <li>• DC I/O, analog*3, communication cable: 1kV</li> </ul>
IEC 61000-4-6 Conducted RF immunity	Immunity test in which high frequency noise is applied to the power line and signal line	<ul style="list-style-type: none"> <li>• 0.15 to 80MHz</li> <li>• 80% AM @1kHz, 10Vrms</li> </ul>
IEC 61000-4-8 Power-frequency magnetic field immunity	Immunity test in which the product is installed in an inductive magnetic field	50/60Hz, 30A/m
IEC 61000-4-11 Voltage dips and interruption immunity*4	Immunity test in which power supply voltage is momentarily interrupted	<ul style="list-style-type: none"> <li>• Apply at 0%, 0.5 cycles, and zero-cross point</li> <li>• 0%, 250/300 cycles (50/60Hz)</li> <li>• 40%, 10/12 cycles (50/60Hz)</li> <li>• 70%, 25/30 cycles (50/60Hz)</li> </ul>

\*1 The network interface module is an open type device (a device designed to be housed in other equipment) and must be installed inside a conductive control panel. The tests were conducted with the module installed in a control panel.

\*2 The application of static electricity may cause a temporary communication disconnection. After the application finishes, communication will be back to normal.

\*3 The accuracy of the FA3-AT can indicate momentary fluctuation within  $\pm 10\%$ .

\*4 DC-powered devices are not subject to the test.

## Installation in a control panel

The network interface module is an open type device and must be installed inside a conductive control panel.

Installing the network interface module in the control panel has a great effect not only for ensuring safety but also for shielding noise generated from the module.

### ■Control panel

- Use a conductive control panel.
- After fixing the top plate and bottom plate of the control panel using bolts, cover the grounding part on the control panel so that the part will not be painted.
- To ensure electrical contact between the inner plate and control panel, take measures such as covering the bolts so that conductivity can be ensured in the largest possible area.
- Ground the control panel with a thick ground cable so as to secure the low impedance even if in the high frequency.
- Use a control panel with a hole less than 10cm in diameter. If the hole is larger than 10cm in diameter, radio waves can leak. Radio waves leak from the gap between the control panel door and the body. Install them with no gaps. If there is a gap, seal the painted surface with the EMI gaskets of the following manufacturer to close the gap and suppress leakage of radio wave.

Manufacturer	Inquiry destination
KITAGAWA INDUSTRIES CO., LTD.	<a href="http://www.kitagawa-ind.com">www.kitagawa-ind.com</a>
Zippertubing (Japan), Ltd.	<a href="http://www.ztj.co.jp">www.ztj.co.jp</a>
SEIWA ELECTRIC MFG. CO., LTD.	<a href="http://www.seiwa.co.jp">www.seiwa.co.jp</a>

### ■Wiring of power cables and ground cables

Provide a ground point to the control panel near the power supply part. Ground the FG terminal with the thickest and shortest possible ground cable (30cm or shorter).

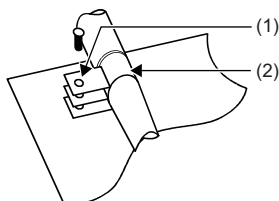
## Cables which are laid outside the control panel

Use shielded cables for the cables which are connected to the module and laid outside the control panel, such as I/O signal wire (included common line) and communication cables.

If a shielded cable is not used or not grounded correctly, the noise immunity will not meet the specified value.

### ■Grounding processing for the shielded cable

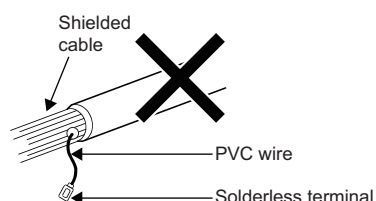
- Ground the shielded cable as close to the network interface module as possible so that the grounded cable is not subject to electromagnetic induction from cables which are not grounded.
- Strip a part of the shielded cable jacket and ground the exposed shield in the largest possible area. It is effective to use a clamp fitting as shown below. In this case, mask the inner wall of the control panel that touch the clamp fitting so that the inner wall will not be painted.



(1) Masked cable  
(2) Clamp fitting

### Point

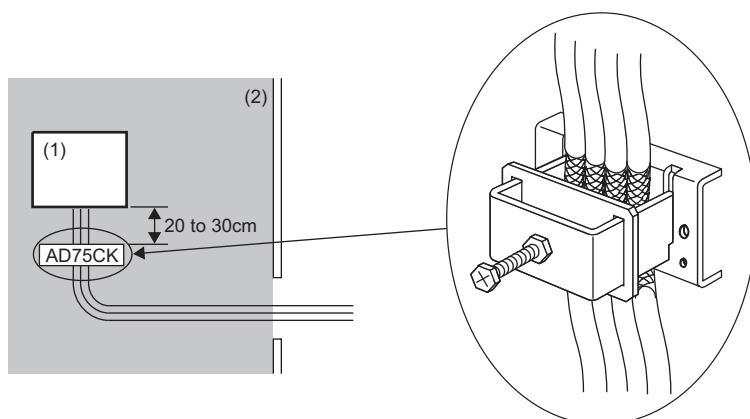
Do not ground the terminal from the PVC wire that is soldered to the shielded cable. Doing so may increase the high frequency impedance and reduce the effect of the shield.



A

### ■Grounding the cable clamp

Use shielded cables for external wiring and ground the shields of the external wiring cables to the control panel with the AD75CK-type cable clamp (Mitsubishi Electric Corporation). (Ground the shield section 20 to 30cm away from the network interface module.)



(1) Network interface module  
(2) In a control panel

For details on the AD75CK, refer to the manual for the AD75CK cable clamp.

## ■External power supply

- Use a CE-marked product for external power supplies of the network interface module power supply and connectable devices, and always ground the FG terminal. (External power supply used for the tests conducted by Mitsubishi: DRJ100-24-1 manufactured by TDK-Lambda Corporation)
- Install the module power supply with a single connection in the control panel where the network interface module is installed and use a power cable of 3m or shorter.

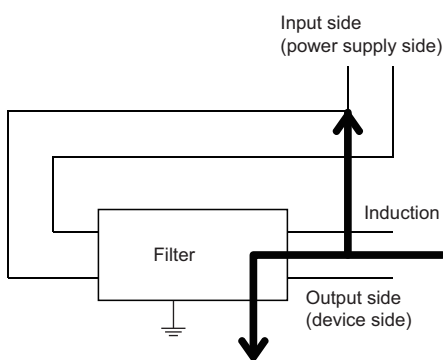
## ■Noise filter (power supply line filter)

A noise filter is a component which has an effect on conducted noise. Attaching the filter can suppress more noise. (The noise filter has the effect of reducing conducted noise of 10MHz or less.)

It is recommended to use a noise filter with the damping characteristics equivalent to those of RSEN-2006 (manufactured by TDK-Lambda Corporation).

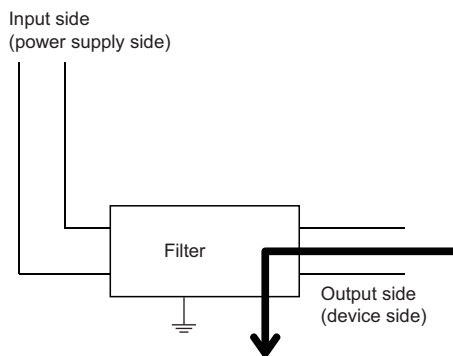
The precautions for attaching a noise filter are described below.

- Do not bundle the cables on the input side and output side of the noise filter. If bundled, the output side noise will be induced into the input side cables from which the noise was filtered.



### ■Faulty wiring

Bundling the cables on the input side and output side of the noise filter will induce the noise.



### ■Good wiring

Keep the cable on the input side away from the cable on the output side.

- Ground the noise filter grounding terminal to the control panel with the shortest cable possible (approx. 10cm).
- Use the cable of 3m or shorter to connect the noise filter to the network interface module.

## ■ Ferrite core

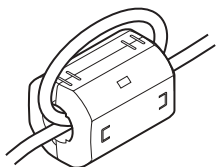
A ferrite core has the effect of reducing radiation noise in the 30MHz to 100MHz band.

It is recommended to attach ferrite cores if shielded cables coming out of the control panel do not provide sufficient shielding effects.

Note that the ferrite cores must be attached at the position closest to the cable hole inside the control panel. If attached elsewhere, the ferrite core will not be effective. In addition, a ferrite core reduces conducted noise.

Ex.

Example



### • FA3-TH

For the power supply terminal on the network interface module and the external power supply terminal on the digital signal converter, attach ferrite cores 4cm away from the modules.

(Ferrite core used for the tests conducted by Mitsubishi: ZCAT3035-1330 manufactured by TDK Corporation)

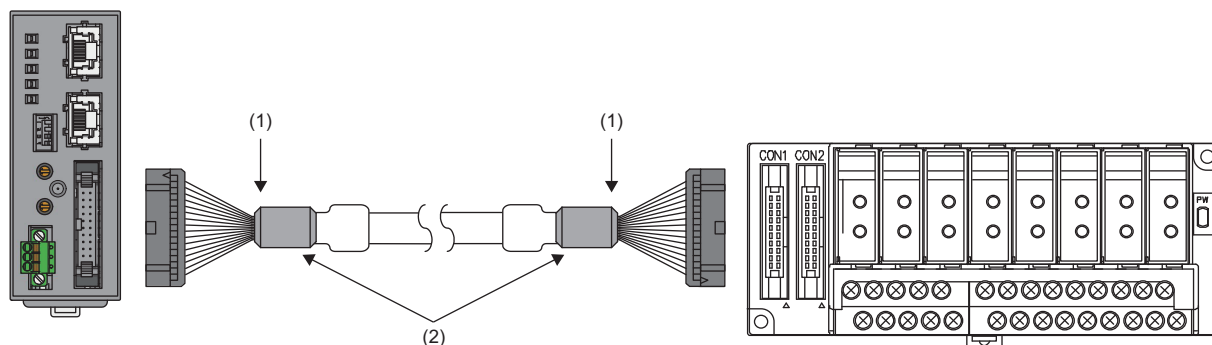
### • FA3-AT

For the power supply terminal on the network interface module, attach a ferrite core 4cm away from the module.

(Ferrite core used for the tests conducted by Mitsubishi: ZCAT3035-1330 manufactured by TDK Corporation)

When using the signal converter connection extension cable, attach ferrite cores on two unshielded parts near the network interface module and the analog signal converter.

(Ferrite core used for the tests conducted by Mitsubishi: ZCAT2436-1330A manufactured by TDK Corporation)



(1) Unshielded part

(2) Ferrite core

A

## Compliance with the UK certification scheme

We declare that this product conforms with the related technical requirements (UK's Electromagnetic Compatibility Regulations 2016) in industrial environments under UK legislation, and affix the UKCA (UK Conformity Assessed) marking<sup>\*1</sup> on the product.

UK  
CA

<sup>\*1</sup> The UKCA marking is used for products sold in the markets of Great Britain (England, Wales, and Scotland) from January 1, 2021 after the departure of the UK from the EU.

## Requirements for compliance with the Low Voltage Directive

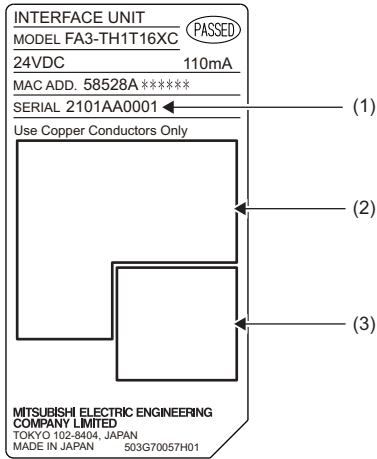
The network interface module operates at the rated voltage of 24VDC.

The Low Voltage Directive is not applied to the modules that operate at a rated voltage of less than 50VAC and 75VDC.

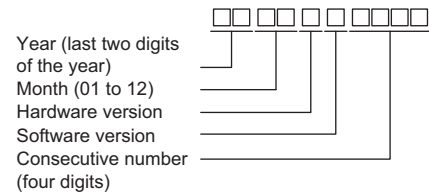
# Appendix 3    How to Check the Production Information

The production information of the network interface module can be checked on the rating plate.

## Rating plate



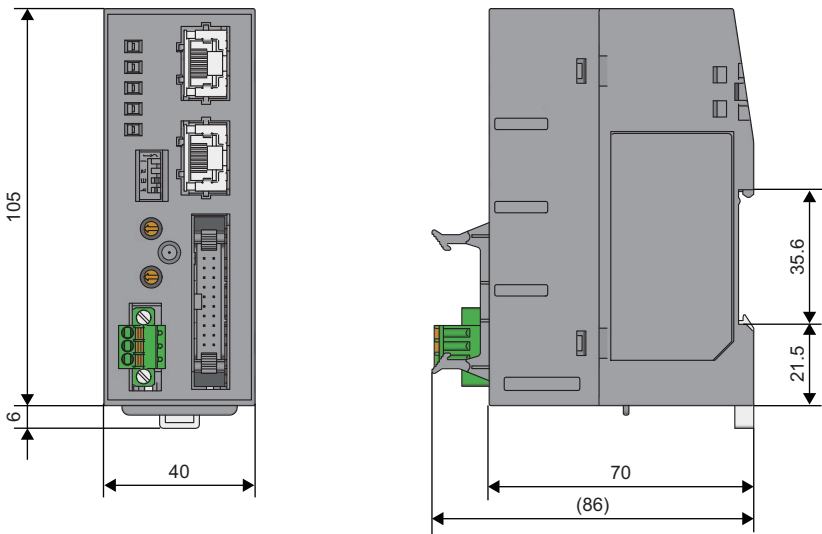
- (1) MAC address
- (2) Production information



- (3) Relevant standard symbol
- (4) QR code

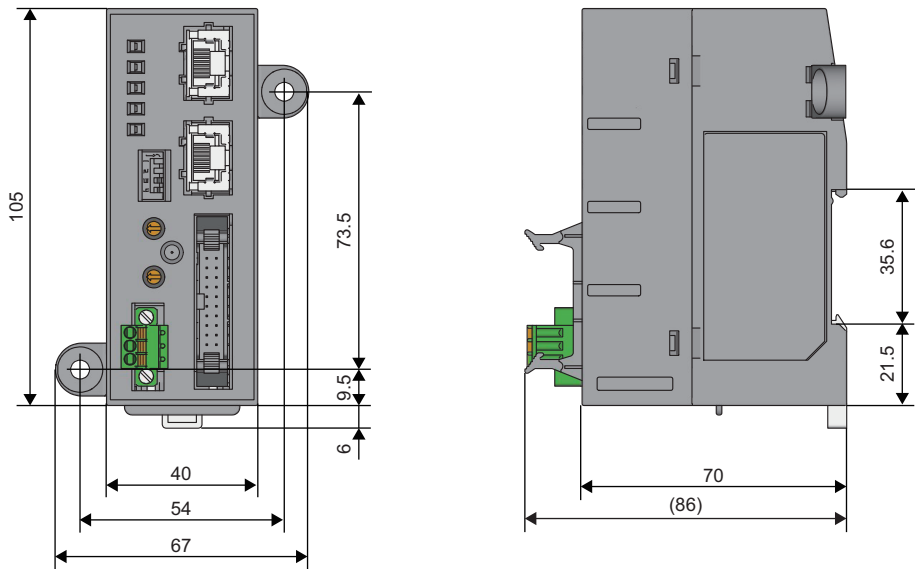
# Appendix 4 External Dimensions

The following figure shows the external dimensions of the network interface module.



Unit: mm

The following figure shows the external dimensions of the CC-Link interface module with mounting brackets.



Unit: mm

A

# REVISIONS

\*The manual number is given on the bottom left of the back cover.

Revision date	*Manual number	Revision
April 2021	50D-FG0531-A	First edition
Mar. 2022	50D-FG0531-B	■Added functions Support for CC-Link IE Field Network, MODBUS/TCP-equipped network interface module ■Added or modified parts INTRODUCTION, GENERIC TERMS AND ABBREVIATIONS, Chapter 1, Section 2.3, 3.2, 3.6, 3.7, 4.1, 5.2, Chapter 7, 10, Section 12.1, 12.3

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Engineering 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.

© 2021 (2022) MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

# WARRANTY

---

Please confirm the following product warranty details prior to product use.

## **1. Gratis Warranty Terms and Gratis Warranty Range**

If any fault or defect (hereinafter referred to as "Failure") attributable to Mitsubishi Electric Engineering Company Limited (hereinafter referred to as "MEE") should occur within the gratis warranty period, MEE shall repair the product free of charge via the distributor from whom you made your purchase.

[Gratis Warranty Period]

The gratis warranty period of this product shall be one (1) year from the date of purchase or delivery to the designated place.

Note that after manufacture and shipment from MEE, the maximum distribution period shall be six (6) months, and the gratis warranty period after manufacturing shall be limited to eighteen (18) months.

In addition, the gratis warranty period for repaired products shall not exceed the gratis warranty period established prior to repair.

[Gratis Warranty Range]

The gratis warranty range shall be limited to normal use based on the usage conditions, methods and environment, etc., defined by the terms and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

## **2. Warranty Period after Discontinuation of Production**

(1) MEE shall offer product repair services (fee applied) for seven (7) years after production of the product has been discontinued.

Discontinuation of production shall be reported via distributors.

(2) Product supply (including spare parts) is not possible after production has been discontinued.

## **3. Exclusion of Opportunity Loss and Secondary Loss from Warranty Liability**

Regardless of the gratis warranty period, MEE shall not be liable for compensation for damages arising from causes not attributable to MEE, opportunity losses or lost profits incurred by the user due to Failures of MEE products, damages or secondary damages arising from special circumstances, whether foreseen or unforeseen by MEE, compensation for accidents, compensation for damages to products other than MEE products, or compensation for other work carried out by the user.

## **4. Changes in Product Specifications**

The specifications given in the catalogs, manuals and technical documents are subject to change without notice.

# TRADEMARKS

---

MELSEC and GX Works are registered trademarks of Mitsubishi Electric Corporation in Japan.

QR Code is either a registered trademark or a trademark of DENSO WAVE INCORPORATED in the United States, Japan, and/or other countries.

The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.

In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

**Duplication Prohibited**

This manual may not be reproduced in any form, in part or in whole, without written permission from Mitsubishi Electric Engineering Company Limited.  
©2021 (2022) MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED ALL RIGHTS RESERVED