

Mitsubishi Electric Programmable Controller Upgrade Tool

Conversion Adapter

Model
ERNT-2AR64TR
ERNT-2AR64TR1BW

User's Manual

50CM-D180363-A(1811)

MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

HEAD OFFICE: Huli KUDAN BLDG.1-13-5, KUDANKITA CHIYODA-KU, TOKYO 102-0073, JAPAN
 NAGOYA ENGINEERING OFFICE:139 SHIMOHASHIKIHO-SHIMOHASHIKI, KASUGAI, AICHI 486-0906, JAPAN

SAFETY PRECAUTIONS

(Always read these precautions prior to use.)

Before using this product, please read this manual carefully and pay full attention to safety to ensure that the product is used correctly.

The precautions presented in this manual are concerned with this product only. For Programmable Controller system safety precautions, refer to "Safety Guidelines" for MELSEC iQ-R Series Modules.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In this manual, the safety precautions are ranked as "WARNING" and "CAUTION."

- WARNING** Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
- CAUTION** Indicates that incorrect handling may cause hazardous conditions, resulting in medium or minor injury and/or property damage.

Note that failure to observe the CAUTION level instructions may lead to a serious consequence according to the circumstances. Always follow the precautions of both levels because they are important to personal safety.

Please keep this manual in an easy-to-access location for future reference, and be sure to provide the manual to the end user.

Precautions before using

- CAUTION**
- When replacing the MELSEC-AnS Series with the MELSEC iQ-R Series, be sure to refer to the Programmable Controller Module manuals to check the differences in performance, functionality, CPU input/output signals, buffer memory addresses and the like.

Installation Precautions

- CAUTION**
- Use the conversion adapter and conversion adapter anchor base in the environment conditions described in the general specifications in "Safety Guidelines" for MELSEC iQ-R Series Modules. Failure to do so could lead to electric shock, fire, malfunction or product failure or deterioration.
- Do not come in direct contact with the conductive area of the conversion adapter. Doing so could lead to system malfunction or failure.
- Fully secure the conversion adapter and conversion adapter anchor base using the installation screws, and tighten the installation screws securely within the specified torque range. Failure to do so could cause the conversion adapter and anchor base to fall, resulting in conversion adapter and conversion adapter anchor base damage.
- Always check for correct match between MELSEC iQ-R Series and the conversion adapter. Incorrect match can cause damage to the MELSEC iQ-R Series module.

Wiring Precautions

- WARNING**
- Be sure to shut off all phases of the external power supply before performing installation or wiring work. Failure to do so could result in electric shock or product damage.
- If you want to energize and run the unit after completing the installation and wiring work, be sure to close the terminal block cover attached to the MELSEC-AnS series terminal block. Failure to do so could result in electric shock.

- CAUTION**
- Properly wire the conversion adapter after verifying the specifications and terminal layout of the module to be used. Connecting a power supply with a different rating or improper wiring could lead to fire or product failure.
- Securely tighten the conversion adapter installation screws, conversion adapter anchor base installation screws and MELSEC-AnS series terminal block installation screws within the specified torque range. A loose screw may result in a short circuit, fire or malfunction. An excessively tightened screw may result in screw or conversion adapter damage, causing the conversion adapter to fall, a short circuit or product malfunction.
- Do not allow foreign matter such as cuttings or wiring shavings to enter the conversion adapter or module. Doing so could lead to fire, failure or malfunction.

Startup and Maintenance Precautions

- WARNING**
- Do not touch the terminals during energization. Doing so could result in electric shock or malfunction.
- Be sure to shut off all phases of the external power supply before cleaning and retightening the terminal screws. Failure to do so could lead to electric shock. Excessively tightened screws could result in conversion adapter or input/output module damage, causing the conversion adapter to fall, a short circuit or product malfunction.

- CAUTION**
- Do not disassemble or modify the conversion adapter. Doing so could lead to failure, malfunction, injury or fire.
- The conversion adapter case is made of resin. Do not drop or apply excessive impact to the case. Doing so could lead to conversion adapter damage.

Disposal Precautions

- CAUTION**
- When disposing of the product, treat it as industrial waste.

EMC AND LOW VOLTAGE DIRECTIVES

Compliance to the EMC Directive, which is one of the EU Directives, has been a legal obligation for the products sold in European countries since 1996 as well as the Low Voltage Directive since 1997. Manufacturers who recognize their products are compliant to the EMC and Low Voltage Directives are required to declare that print a "CE mark" on their products.

Authorized representative in Europe
 Authorized representative in Europe is shown below.
 Name: Mitsubishi Electric Europe B.V.
 Address: Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

1. Overview

This manual describes the Mitsubishi Electric Programmable Controller Upgrade Tool conversion adapter (ERNT-2AR64TR, ERNT-2AR64TR1BW). The conversion adapter is a product that converts the differences in MELSEC-AnS series and MELSEC iQ-R series pin assignments.

When replacing the MELSEC-AnS Series with the MELSEC iQ-R Series, be sure to refer to the Programmable Controller Module manuals to check the differences in performance, functionality, CPU input/output signals, buffer memory addresses and the like.

Once you have opened the packaging, verify that it contains the following products.

Product	Shape	Quantity	
		ERNT-2AR64TR	ERNT-2AR64TR1BW (*1)
Conversion Adapter (ERNT-2AR64TR)		1	1
Mounting bracket		1	1
Mounting bracket (M3.5x6)		2	2
Terminal block cover		1	1
Disconnection detector connector conversion cable		-	1
Disconnection detector connector conversion cable installation screw (M3x8)		-	2
This manual		1	1

*1: ERNT-2AR64TR1BW is a model (product) name of a set of ERNT-2AR64TR conversion adapter and the disconnection detector connector conversion cable.

2. Specifications

2.1 General Specifications

Item	Specifications
Operating ambient temperature	0 to 55°C (Maximum surrounding air temperature 55°C)
Storage ambient temperature	-25 to 75°C
Operating ambient humidity	5 to 95%RH, non-condensing
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147m/s ² , 3 times each in 3 directions X, Y, Z)
Operating atmosphere	No corrosive gases
Operating altitude *1	0 to 2000m
Installation location	Inside a control panel *2
Overvoltage category *3	II or less
Pollution degree *4	2

- *1: Do not use or store under pressure higher than the atmospheric pressure of altitude 0m.
- *2: The enclosure is suitably designed for those specific environmental conditions, as applicable, and enclosure rate meets IP20 and minimum type 1 of UL 50.
- *3: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises. Category II applies to equipment for which electrical power is supplied from fixed facilities.
- *4: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used. Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.

2.2 Hardware Specifications

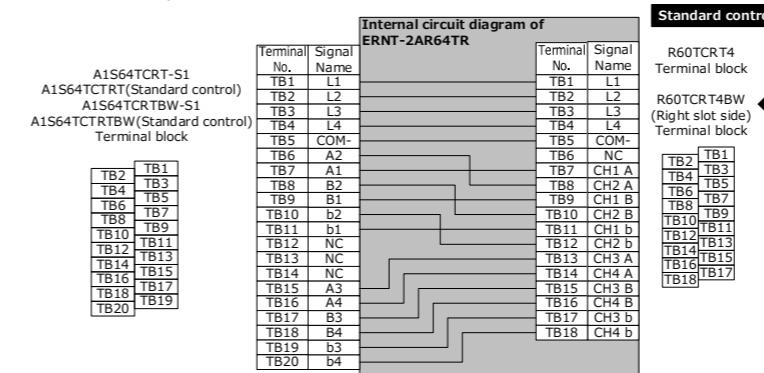
Item	Specifications
Rated voltage / current	24VDC(+25/-20%), 0.1A/Point, 0.4A/Common

3. Product Specifications

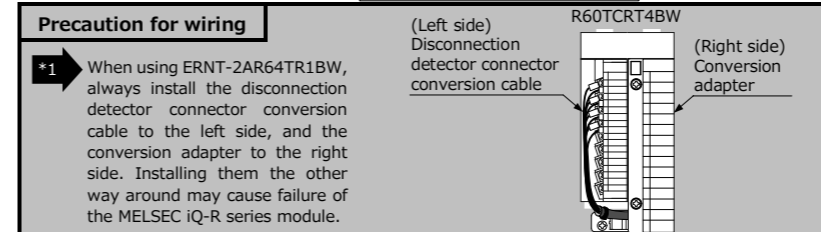
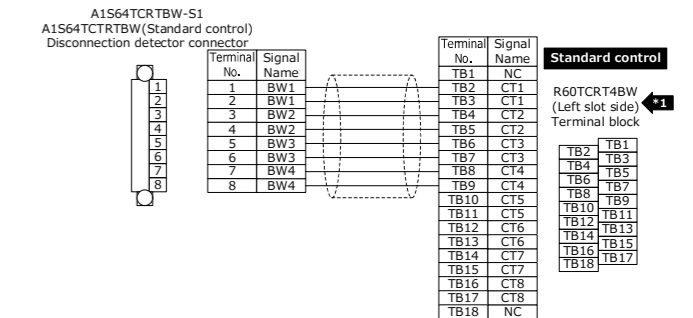
For detail specifications which do not appear in the specification comparison charts contained herein, see the user's manual supplied with the iQ-R Series Module you use. Also, check that the specifications of the connected devices meet the specifications of the iQ-R Series Module.

Conversion Adapter Model	MELSEC-AnS Series Model	No. of channels	MELSEC iQ-R Series Model	Conversion Adapter Weight (g)
ERNT-2AR64TR	A1S64TCRT-S1	4 channels	R60TCRT4	85
	A1S64TCTRT(Standard control, RTD)			
ERNT-2AR64TR1BW	A1S64TCRTBW-S1	4 channels	R60TCRT4BW	180
	A1S64TCTRTBW(Standard control, RTD)			

« Conversion adapter »



«Disconnection detector connector conversion cable»



Precaution for wiring

*1 When using ERNT-2AR64TR1BW, always install the disconnection detector connector conversion cable to the left side, and the conversion adapter to the right side. Installing them the other way around may cause failure of the MELSEC iQ-R series module.

Specification comparison

Specification	MELSEC-AnS Series			MELSEC iQ-R Series	
	A1S64TCRT-S1	A1S64TCTRTBW-S1	A1S64TCTRT (Standard control, RTD)	A1S64TCTRTBW (Standard control, RTD)	R60TCRT4 / R60TCRT4BW
Control output	Transistor output				
Number of temperature input points	4 channels / module				
Supported platinum temperature-measuring resistor	Refer to the table on the back				
Indication accuracy	Ambient temperature 23°C±5°C: Full-scale × (±0.3%) ±1digit		Ambient temperature 25°C±5°C: Full-scale × (±0.3%) ±1digit		Ambient temperature 0 to 55°C: Full-scale × (±0.7%) ±1digit
Sampling cycle	500ms/ 4 channels (constant independently of the number of channels used)		1 to 100s		Switchable between 250ms/ 4 channels and 500ms/ 4 channels
Control output cycle	0.5 to 100.0s				
Sensor current	Approx. 0.25mA		Approx. 0.3mA		-
Allowable input wire resistor effects	20Ω or lower		10Ω or lower		-
Input impedance	-				
Input filter	0 to 100s (0: Input filter OFF)				
Sensor correction value setting	Software version A: -5.00 to 5.00% Software version B or least: -50.00 to 50.00%		-50.00 to 50.00%		When the R mode is used (-: Full scale of input range) to Full scale of input range When the Q compatible mode function is used -50.00 to 50.00%
Operation at sensor input disconnection	Upscale processing				
Operation at sensor input short-circuited	Downscale processing				
Temperature control method	PID ON/OFF pulse or two-position control				
PID constants setting	Can be set by auto tuning		Can be set by auto tuning or self tuning		Can be set by auto tuning
PID constants range	Proportional band (P)		0.0 to 1000.0% (0: Two-position control)		When the R mode is used 0 (0.0) to Full scale of input range (depending on the decimal point position) (0: Two-position control) When the Q compatible mode function is used 0.0 to 1000.0% (0: Two-position control)
	Integral time (I)		1 to 3600s		0 to 3600s (Set 0 for P control and PD control)
	Derivative time (D)		0 to 3600s (0: PI control)		0 to 3600s (Set 0 for P control and PI control)
Set value setting range	Within the temperature range set by the temperature sensor to be used				
Dead band setting range	0.1 to 10.0%		0.0 to 10.0%		When the R mode is used 0 (0.0) to Full scale of input range (depending on the decimal point position) When the Q compatible mode function is used 0.1 to 10.0%
Transistor output	Output signal		ON/OFF pulse		ON/OFF pulse
	Rated load voltage		10.2 to 30VDC		10 to 30VDC
	Max. load current		0.1A/point 0.4A/common		0.4A 10ms
	Max. inrush current		0.1mA or lower		0.1mA or lower
	Leakage current at OFF		1.0VDC(TYP) 0.1A 2.5VDC(MAX) 0.1A		OFF→ON: 2ms or less ON→OFF: 2ms or less
	Max. voltage drop at ON		-		OFF→ON: 2ms or less ON→OFF: 2ms or less
	Response time		-		OFF→ON: 2ms or less ON→OFF: 2ms or less
Insulation method	Between input and grounding: Transformer insulation		Between input terminal and programmable controller power supply: Transformer insulation		Between input channels: Transformer insulation
Heater disconnection detection specifications	Current sensor	-	U.R.D.co.,LTD CTL-12-S36-8 (0.0 to 100.0A) CTL-6-P-(H) (0.00 to 20.00A)	-	U.R.D.co.,LTD CTL-12-S36-10 (0.0 to 100.0A) CTL-12-S56-10 (0.0 to 100.0A) CTL-6-P-H (0.00 to 20.00A) CTL-6-S-H (0.00 to 20.00A) CTL-12L-8 (0.0 to 100.0A)
	Input method	-	Multiplexor method A/D conversion	-	-
	Input accuracy	-	-	-	Full scale × (±1.0%)
	Alarm delay count	-	3 to 255	-	3 to 255
I/O occupied points	20-point terminal block		32 points		16 points
Connection method	20-point terminal block	20-point terminal block and 8-point connector	20-point terminal block	20-point terminal block and 8-point connector	18-point terminal block
Internal current consumption (5VDC)	0.33A	0.42A	0.33A	0.39A	0.28A

Precautions for the program

(1) AnS series module and iQ-R series module differ from each other in the way input/output signals (X, Y) and buffer memory addresses are allocated. Therefore, you need make necessary changes to the sequence program that is used.

POINT

(1) When the measured temperature has a margin of error, the sensor compensation function of R60TCRT4/R60TCRT4BW can compensate the error.

<Specification comparison (continued)>

Supported platinum temperature-measuring resistor

Platinum temperature-measuring resistor type	°C		°F	
	Temperature measurement range	Resolution	Temperature measurement range	Resolution
Pt100	-200.0 to 600.0	0.1	-300 to 1100	1
	-200.0 to 200.0			
	-200.0 to 850.0 *1			
JPt100	-200.0 to 500.0	0.1	-300 to 900	1
	-200.0 to 200.0			
	-200.0 to 640.0 *1			

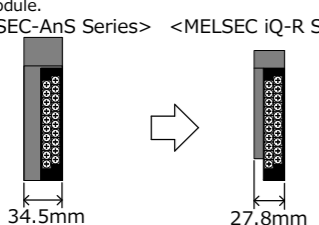

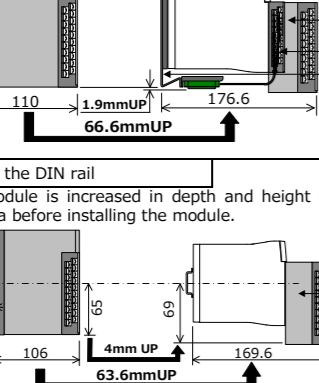
*1: R60TCRT4, R60TCRT4BW only.

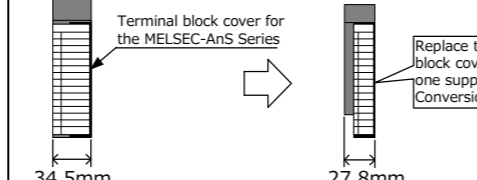
4. Mounting and Installation

4.1 Handling Precautions

- Before attempting to install the Unit or carry out the necessary wiring, make certain that the external power supply, used in the system, is shut off on all three phases. Failure to do so may result in electric shock or damage to the product.
- Do not touch live terminals. There is a danger of electric shock or malfunction.
- Do not modify the Conversion Adapter or take it apart. Doing so will cause failure, malfunction, personal injury, or fire.
- Do not touch the energized part of the Conversion Adaptor directly. Contact will cause malfunction or failure in the system.
- Fasten the Conversion Adapter and the Mounting Bracket securely with retaining screws, and tighten the screws by applying torque within specified limits. Loose screws can lead to the dropping of the Conversion Adapter or Mounting Bracket, possibly causing breakage thereof. Excessive tightness of the screws can lead to breakage of the screws, Converter Adapter, Mounting bracket, or MELSEC iQ-R Series Module, possibly causing the dropping, shorting, and malfunction thereof.
- Use care to prevent foreign materials including cuttings and wiring debris from entering the Conversion Adapter or the MELSEC iQ-R Series Module. These will be cause for fire, failure or malfunction.
- Do not drop the Conversion Adapter and Mounting Bracket or do not give a strong impact to it. This will cause damage.
- Conversion Adapter is intended for indoor use only.

4.2 Use Precautions

Item	Use Precautions
Width dimension of module	Because the module is reduced in width dimension (34.5mm→27.8mm) and thus in area available for wiring, check dimensional data before installing the module. 
Depth and Height dimension	Installation with the Base Adapter Because the module is increased in depth dimension, check dimensional data before installing the module. 
	Installation with the DIN rail Because the module is increased in depth and height dimension, check dimensional data before installing the module. 

Item	Use Precautions
Terminal block cover	The terminal block cover for MELSEC-AnS Series is bigger than the width of the MELSEC iQ-R Series Module. Therefore, it is necessary to replace it with the terminal block cover supplied with the converter adapter. 

4.3 Installation Environment

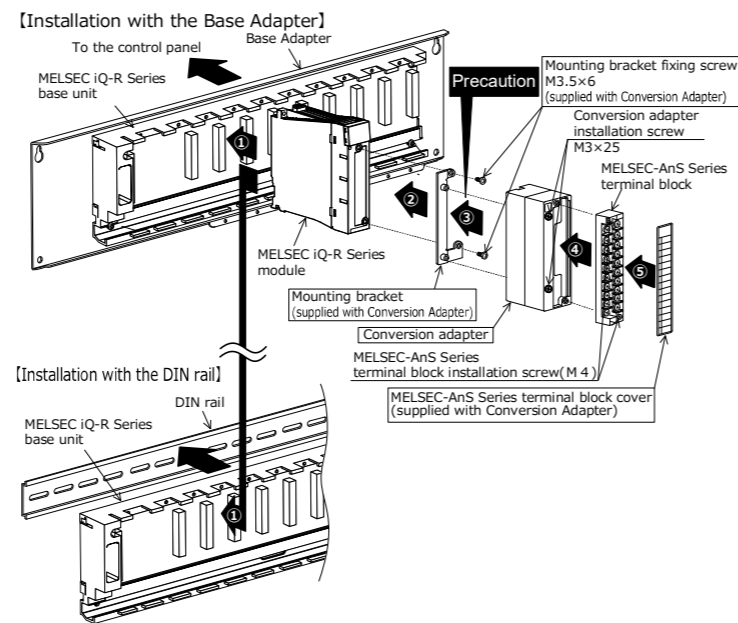
Refer to "Safety Guidelines" for iQ-R Series Modules.

4.4 Wiring module power source

External connection to 24VDC power supply circuit of Conversion Adapter must be powered from approved source that meets of SELV/PELV, Class 2, and limited energy according to UL 61010-2-201.

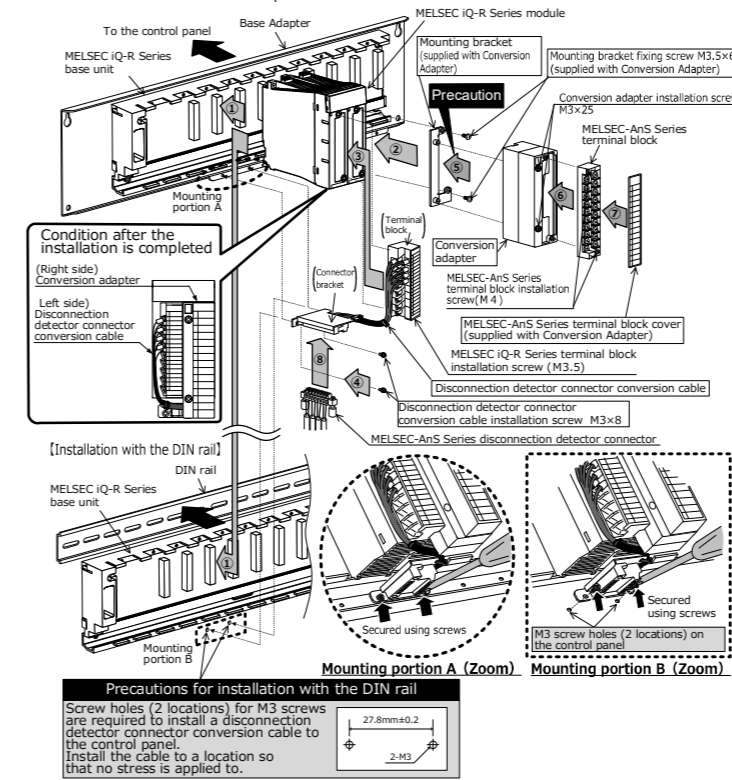
5. Part Names and Installation Method

5.1 ERNT-2AR64TR Installation Procedure



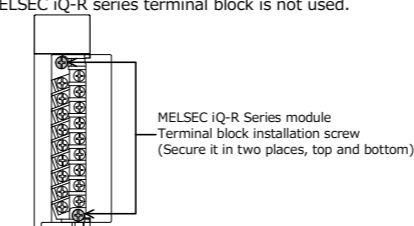
5.2 ERNT-2AR64TR1BW Installation Procedure

[Installation with the Base Adapter]



5.3 Installation Method

Installation with the Base Adapter	Installation with the DIN rail
Mount the MELSEC iQ-R Series Base Unit to the Base Adapter. Refer to the Base Adapter's manual for how to install them to the control panel.	Mount the DIN rail mounting adapter manufactured by Mitsubishi Electric to the MELSEC iQ-R Series Base Unit. For how to install the Base Unit on the DIN rail, refer to the MELSEC iQ-R Module Configuration Manual.

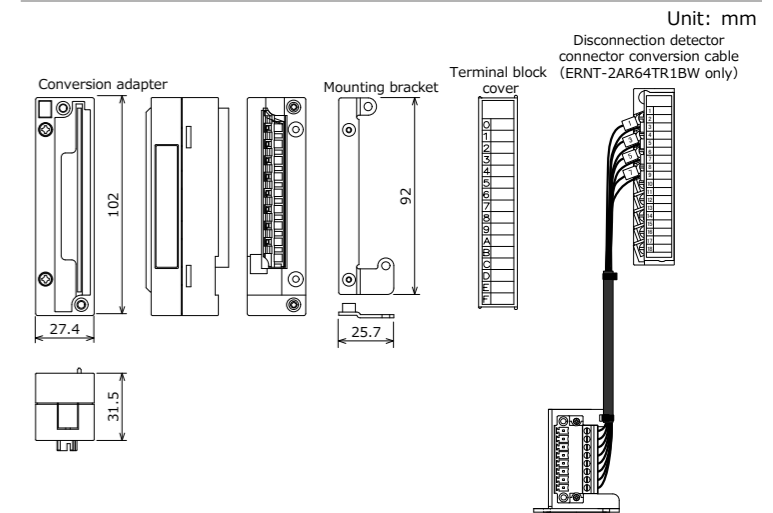
5.1 ERNT-2AR64TR Installation Procedure	5.2 ERNT-2AR64TR1BW Installation Procedure	Description
①	①	Install the MELSEC iQ-R Series module to the MELSEC iQ-R Series Base Unit.
②	②	Remove the terminal block attached with the MELSEC iQ-R Series module after loosening the terminal block installation screws (2 places up and down). (When using R60TCRT4BW, remove the terminal blocks from both right and left slots.) The MELSEC iQ-R series terminal block is not used. 
-	③	Fix the terminal block for the disconnection detector connector conversion cable to the target MELSEC iQ-R series module (left slot) using the MELSEC iQ-R series terminal block installation screws (M3.5). (2 places, top and bottom)
-	④	Fix the connector bracket of the disconnection detector connector conversion cable to the base adapter or the conversion adapter DIN rail mounting bracket (bottom) using the disconnection detector connector conversion cable installation screws (M3 x 8). (2 places)
③	⑤	Install the Conversion Adapter to the mounting bracket, and secure it using the Conversion Adapter installation screws (M3 x 25). (2 places) Precaution Before tightening the installation screws, check that the Conversion Adapter has been securely installed on the MELSEC iQ-R Series module. Tightening the screws in floating-off state or tilting state will damage the Conversion Adapter installation screws and the mounting bracket.
④	⑥	Secure the MELSEC-AnS Series terminal block to the Conversion Adapter with the supplied terminal block installation screw (M4). (2 places, top and bottom.)
⑤	⑦	Remove the terminal block cover from the MELSEC-AnS Series terminal block and fit the terminal block cover supplied with the Conversion Adapter in place.
-	⑧	Connect the MELSEC-AnS series disconnection detector connector to the disconnection detector connector conversion cable.

5.4 Tightening Torque

Tighten the module installation screws to the specified torque below. An inappropriate tightening torque could cause the product to fall or result in a short circuit, product failure or malfunction.

Screw Location	Tightening Torque Range
Mounting bracket fixing screw (M3.5x6)	0.68 to 0.92N·m
Conversion Adapter installation screw (M3x25)	0.43 to 0.57N·m
MELSEC-AnS Series terminal block installation screw (M4)	0.78 to 1.18N·m
MELSEC iQ-R Series terminal block installation screw (M3.5)	0.66 to 0.89N·m
Disconnection detector connector conversion cable installation screw (M3x8)	0.61 to 0.82N·m

6. External Dimensions



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Product Warranty Details

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

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.

Warranty Period after Discontinuation of Production

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

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.

Changes in Product Specifications

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

This document is a new publication, effective November 2018. Specifications are subject to change without notice.