MEE

Mitsubishi General-Purpose Programmable Logic Controller Renewal Tool Conversion Adapter

Model

ERNT-AQT616DA

User's Manual

Model	ERNT-AQT616DA
50CM-D180035-A(0810)MEE	

● 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 PLC system safety precautions, refer to the user's manual of the CPU module to be used.

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

⚠ DANGER	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: Prior to Use]

⚠ CAUTION
● When replacing the MELSEC-A series with the MELSEC-Q series, be sure to refer to the various MELSEC-Q series module manuals to check the differences in performance, functionality, CPU input/output signals, buffer memory addresses, and the like. In addition, we recommend that you also refer to the document L(NA)08045-D, "Guidelines: Replacing MELSEC-A/QnA (Large-Size) Series with Q Series (Intelligent Function Module)."

[Installation Precautions]

⚠ CAUTION
● Use the conversion adapter and conversion adapter anchor base in an environment of the general specifications defined in the CPU module user's manual. 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. ● Be sure to confirm that the MELSEC-Q series and conversion adapter combination is correct. Use of a different combination may result in module damage

[Wiring Precautions]

DANGER
● 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-A 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-A 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]

DANGER
● 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 terminal screws. Failure to do so results in the risk of electric shock. Excessively tightened screws could result in conversion adapter and 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.

REVISIONS

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

Print Date	*Manual Number	Revision
October 2008	50CM-D180035-A	First Edition

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1. Overview

This manual describes the Mitsubishi general-purpose PLC renewal tool conversion adapter (ERNT-AQT616DA) and the conversion adapter anchor base (sold separately; ERNT-AQF12/-AQF8/-AQF5/AQF3) that secures the bottom of the conversion adapter. The conversion adapter is a product that converts the differences in MELSEC-A series and MELSEC-Q series pin assignments.

When replacing the MELSEC-A series with the MELSEC-Q series, be sure to refer to the various MELSEC-Q series module manuals to check the differences in performance, functionality, CPU input/output signals, buffer memory addresses, and the like. In addition, we recommend that you also refer to the document L(NA)08045-D, “Guidelines: Replacing MELSEC-A/QnA (Large-Size) Series with Q Series (Intelligent Function Module).”

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

Product	Quantity
Conversion adapter	1
Mounting bracket	1
Mounting bracket fixing screw (M3.5 x 6)	4

2. Conversion Adapter Product Specifications

Conversion Adapter Model	A Series Module Model	No. of analog output Points	Q Series Module Model	Conversion Adapter Weight (g)
ERNT-AQT616DA	A616ADV	16	Q68ADV x 2	280
	A616ADI		Q68ADI x 2	

Module Specification Comparison Chart

<table>
<tr><th colspan="2">Item</th><th>A616DAV</th><th>Q68DAVN</th></tr>
<tr><td colspan="2">Digital input</td><td>16-bit signed binary
(-4096 to 4095)</td><td>16-bit signed binary
(Normal resolution mode: -4096 to 4095,
High resolution mode: -12288 to 12287, -16384 to 16383)</td></tr>
<tr><td colspan="2">Analog output</td><td>When the output voltage setting is 10V: -10 to 0 to 10VDC
(External load resistance value: 2KΩ to 1MΩ)
When the output voltage setting is 5V: -5 to 0 to 5VDC
(External load resistance value: 2KΩ to 1MΩ)</td><td>-10 to 10VDC (External load resistance value: 1KΩ to 1MΩ)</td></tr>
<tr><td colspan="2">Input/Output characteristics</td><td>
<table>
<tr><th rowspan="2">Digital Input</th><th colspan="2">Analog Output</th></tr>
<tr><th>At 5V Setting</th><th>At 10V Setting</th></tr>
<tr><td>4000</td><td>5V</td><td>10V</td></tr>
<tr><td>2000</td><td>2.5V</td><td>5V</td></tr>
<tr><td>0</td><td>0V</td><td>0V</td></tr>
<tr><td>-2000</td><td>-2.5V</td><td>-5V</td></tr>
<tr><td>-4000</td><td>-5V</td><td>-10V</td></tr>
</table>
Maximum resolution: 1/4000
</td><td>
<table>
<tr><th colspan="2" rowspan="2">Analog Output Range</th><th colspan="2">Normal Resolution Mode</th><th colspan="2">High Resolution Mode</th></tr>
<tr><th>Digital Input Value</th><th>Maximum Resolution</th><th>Digital Input Value</th><th>Maximum Resolution</th></tr>
<tr><td rowspan="4">Voltage</td><td>0 to 5V</td><td rowspan="2">0 to 4000</td><td>1.25mV</td><td rowspan="2">0 to 12000</td><td>0.416mV</td></tr>
<tr><td>1 to 5V</td><td>1.0mV</td><td>0.333mV</td></tr>
<tr><td>-10 to 10V</td><td rowspan="2">-4000 to 4000</td><td>2.5mV</td><td>-16000 to 16000</td><td>0.625mV</td></tr>
<tr><td>User range setting</td><td>0.75mV</td><td>-12000 to 12000</td><td>0.333mV</td></tr>
<tr><td rowspan="3">Current</td><td>0 to 20mA</td><td rowspan="2">0 to 4000</td><td>5μA</td><td rowspan="2">0 to 12000</td><td>1.66μA</td></tr>
<tr><td>4 to 20mA</td><td>4μA</td><td>1.33μA</td></tr>
<tr><td>User range setting</td><td>-4000 to 4000</td><td>1.5μA</td><td>-12000 to 12000</td><td>0.83μA</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Overall accuracy</td><td>
<table>
<tr><th>Output Voltage Range Setting</th><th>10V</th><th>5V</th></tr>
<tr><td>Ambient temperature (0 to 55°C)</td><td>±0.6% (±60mV)</td><td>±0.6% (±30mV)</td></tr>
<tr><td>Ambient temperature (25°C)</td><td>±0.3% (±30mV)</td><td>±0.3% (±15mV)</td></tr>
</table>
</td><td>25 ± 5°C ambient temperature: Within ± 0.1%
(Voltage: ± 10mV, Current: ± 20μA)
0 to 55°C ambient temperature: Within ± 0.3%
(Voltage: ± 30mV, Current: ± 60μA)</td></tr>
<tr><td colspan="2">Maximum conversion speed</td><td>0.5ms
(-10V → 10V / 10V → -10V conversion time)</td><td>80μs/channel</td></tr>
<tr><td colspan="2">Absolute maximum output</td><td>15V</td><td>±12V</td></tr>
<tr><td colspan="2">No. of analog output points</td><td>16 channels/module</td><td>8 channels/module</td></tr>
<tr><td rowspan="3">Isolation method</td><td>Between output terminal and PLC power supply</td><td>Photocoupler isolation</td><td>Photocoupler isolation</td></tr>
<tr><td>Between channels</td><td>Non-isolated</td><td>Non-isolated</td></tr>
<tr><td>Between external power supply and analog output</td><td>-</td><td>Transformer isolation</td></tr>
<tr><td colspan="2">No. of occupied points</td><td>32 points</td><td>16 points</td></tr>
<tr><td colspan="2">Connected terminal block</td><td>38-point terminal block</td><td>18-point terminal block</td></tr>
<tr><td colspan="2">Current consumption</td><td>0.38A</td><td>0.39A</td></tr>
<tr><td rowspan="2">External power supply</td><td>Voltage</td><td>15VDC/-15VDC</td><td>24VDC + 20%, - 15%</td></tr>
<tr><td>Current</td><td>15VDC: 0.2A / -15VDC: 0.17A</td><td>0.2A</td></tr>
</table>

<table>
<tr><th colspan="2">Item</th><th>A616DAI</th><th>Q68DAIN</th></tr>
<tr><td colspan="2">Digital input</td><td>16-bit signed binary
(0 to 4095)</td><td>16-bit signed binary
(Normal resolution mode: -4096 to 4095,
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<tr><td colspan="2">Analog output</td><td>0 to 20mA DC
(External load resistance value: 0Ω to 600Ω)</td><td>0 to 20mA DC (External load resistance value: 0Ω to 600Ω)</td></tr>
<tr><td colspan="2">Input/Output characteristics</td><td>
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<tr><th>Digital Input</th><th>Analog Output</th></tr>
<tr><td>4000</td><td>20mA</td></tr>
<tr><td>2000</td><td>12mA</td></tr>
<tr><td>0</td><td>4mA</td></tr>
</table>
Maximum resolution: 1/4000
</td><td>
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<tr><th colspan="2" rowspan="2">Analog Output Range</th><th colspan="2">Normal Resolution Mode</th><th colspan="2">High Resolution Mode</th></tr>
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<tr><td colspan="2">Overall accuracy</td><td>±0.6%
For 25°C ambient temperature: ± 0.3%</td><td>25 ± 5°C ambient temperature: Within ± 0.1%
(Voltage: ± 10mV, Current: ± 20μA)
0 to 55°C ambient temperature: Within ± 0.3%
(Voltage: ± 30mV, Current: ± 60μA)</td></tr>
<tr><td colspan="2">Maximum conversion speed</td><td>0.5ms
(0mA → 20mA, 20mA → 0mA conversion time)</td><td>80μs/channel</td></tr>
<tr><td colspan="2">Absolute maximum output</td><td>-</td><td>21mA</td></tr>
<tr><td colspan="2">No. of analog output points</td><td>16 channels/module</td><td>8 channels/module</td></tr>
<tr><td rowspan="3">Isolation method</td><td>Between output terminal and PLC power supply</td><td>Photocoupler isolation</td><td>Photocoupler isolation</td></tr>
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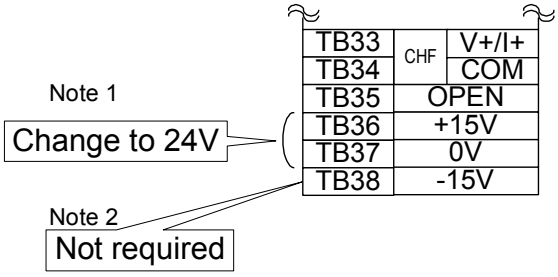
<tr><td rowspan="2">External power supply</td><td>Voltage</td><td>15VDC/-15VDC</td><td>24VDC + 20%, - 15%</td></tr>
<tr><td>Current</td><td>15VDC: 0.53A / -15VDC: 0.125A</td><td>0.27A</td></tr>
</table>

Note:

1. For an external power supply connected to terminal number TB36 or TB37 of the MELSEC-A series side, change the power supply to 24VDC.



2. The –15V connected to terminal number TB38 of the MELSEC-A series side is not required.
3. Program changes (changes to input/output signals and buffer memory addresses) are required.
4. For detailed and general specifications not stated in the Specification Comparison Chart, refer to the user's manual of the module used. In addition, we recommend that you also refer to the document L(NA)08045-D, "Guidelines: Replacing MELSEC-A/QnA (Large-Size) Series with Q Series (Intelligent Function Module)." For those sections in which the MELSEC-A series specifications and MELSEC-Q series specification differ, specification restrictions may apply upon replacement. Check the specifications of the connected devices.

3. Products Required by the Conversion Adapter

(1) Conversion Adapter Anchor Base (Sold Separately)

The conversion adapter anchor base secures the bottom of the conversion adapter and is required for conversion adapter use. One anchor base is required per base.

Conversion Adapter Anchor Base Model	Specifications	
	Type	Weight (g)
ERNT-AQF12	12-slot conversion adapter anchor base	590
ERNT-AQF8	8-slot conversion adapter anchor base	410
ERNT-AQF5	5-slot conversion adapter anchor base	275
ERNT-AQF3	3-slot conversion adapter anchor base	185

(2) Base Adapter (Sold Separately)

The base adapter enables MELSEC-Q series installation using the installation holes of the MELSEC-A series base unit. (Additional hole machining not required)

Base Adapter Model	Specifications			
	MELSEC-A Series Compliant Module	MELSEC-Q Series Compliant Module	Installable Conversion Adapter Anchor Base	Weight (g)
ERNT-AQB38	A38B A38HB	Q312B Q38B	ERNT-AQF12 ERNT-AQF8	970
ERNT-AQB68	A68B	Q612B Q68B		930
ERNT-AQB58	A58B	Q68B	ERNT-AQF8	870
ERNT-AQB35	A35B	Q38B Q35B	ERNT-AQF8 ERNT-AQF5	795
ERNT-AQB65	A65B	Q68B Q65B Q55B		790
ERNT-AQB55	A55B	Q65B Q55B	ERNT-AQF5	655
ERNT-AQB32	A32B	Q33B	ERNT-AQF3	675
ERNT-AQB62	A62B	Q63B Q52B		650
ERNT-AQB52	A52B	Q52B		505

4. Mounting and Installation

4.1 Handling Precautions

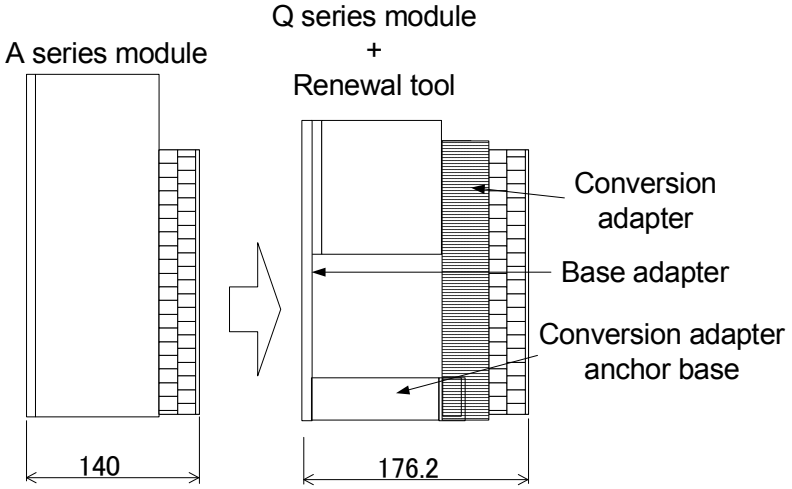
(1) Do not touch the terminals during energization. Doing so could result in electric shock or malfunction.

(2) Do not disassemble or modify the conversion adapter. Doing so could result in failure, malfunction, injury or fire.

(3) Do not come in direct contact with the conductive area of the conversion adapter. Doing so could result in system malfunction or failure.

(4) Fully secure the conversion adapter and conversion adapter anchor base using the installation screws, and securely tighten the screws 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.

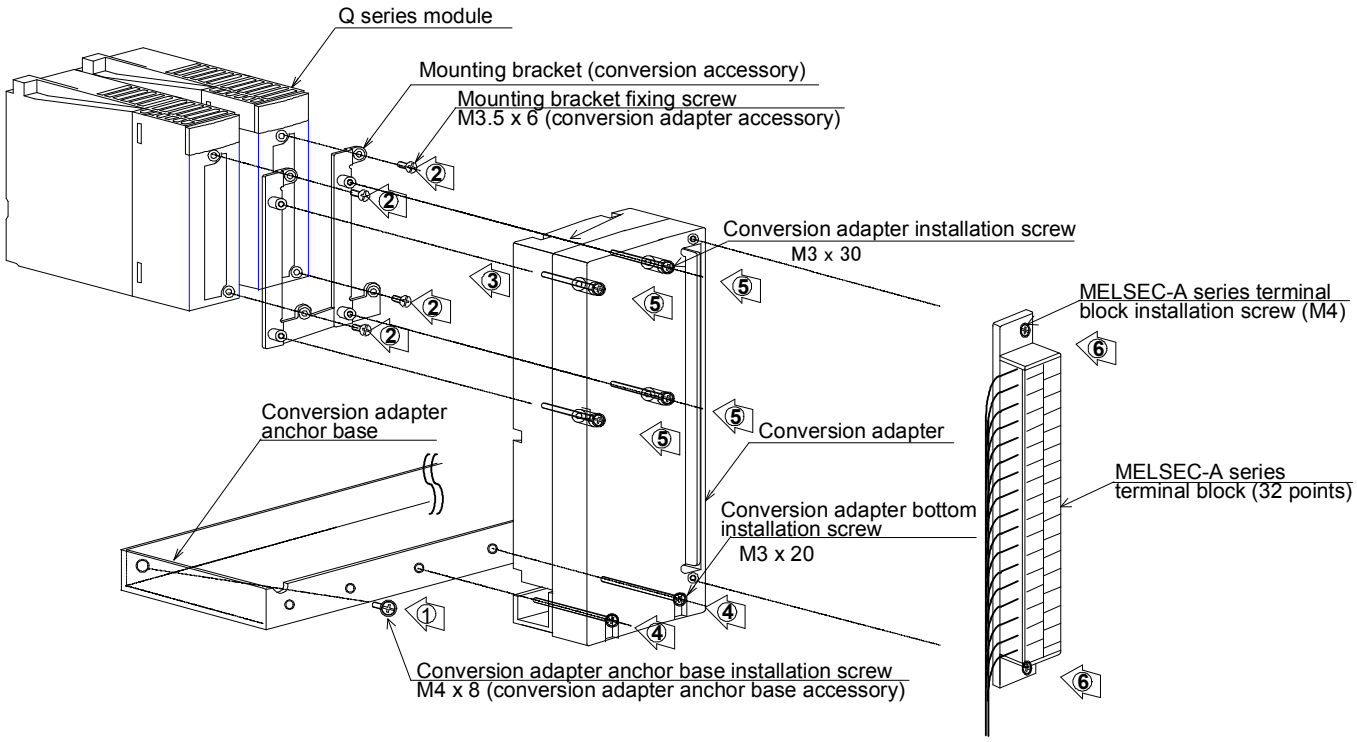
4.2 Use Precautions

Item	Use Precautions
Depth	The depth increases. Verification prior to installation is required.  36.2mmUP(24.4mm) The value in parentheses is the dimension when the base adapter is not used.

4.3 Installation Environment

For details of the installation environment, refer to the user's manual of the CPU module to be used.

5. Part Names and Installation Method



5.1 Installation Method

[1] Secure the conversion adapter anchor base to the base adapter or control panel using the conversion adapter anchor base installation screws (M4 × 8) provided as an accessory. (Two end locations)

[2] Secure the mounting bracket to the Q series module using the mounting bracket fixing screws [M3.5 × 6 (conversion adapter accessory); two upper/lower locations].

[3] Mount the conversion adapter onto the mounting bracket.

[4] Secure the conversion adapter using the conversion adapter bottom installation screw (M3 × 20; 2 location).

[5] Secure the conversion adapter using the conversion adapter installation screws (M3 × 30; 4 locations).

[6] Secure the MELSEC-A series terminal block to the conversion adapter using the terminal block installation screws (M4; two upper/lower locations).

5.2 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
Conversion adapter anchor base installation screw (M4 screw)	139 to 189N·cm
Mounting bracket fixing screw (M3.5 screw)	68 to 92 N·cm
Conversion adapter bottom installation screw (M3 screw)	43 to 57 N·cm
Conversion adapter installation screw (M3 screw)	
MELSEC-A series terminal block installation screw (M4 screw)	102 to 138 N·cm

6. Conversion Adapter Anchor Base Installation Method

To use the conversion adapter, a conversion adapter anchor base (ERNT-AQF12/-AQF8/-AQF5/AQF3) is required.

Q Base Unit / Conversion Adapter Anchor Base	Q312B	Q38B	Q35B	Q33B	Q612B	Q68B	Q65B	Q63B	Q55B	Q52B
ERNT-AQF12	◎	×	×	×	◎	×	×	×	×	×
ERNT-AQF8	○	◎	×	×	○	◎	×	×	×	×
ERNT-AQF5	×	○	◎	×	×	○	◎	×	◎	×
ERNT-AQF3	×	×	×	◎	×	×	×	◎	×	◎

◎: Applicable

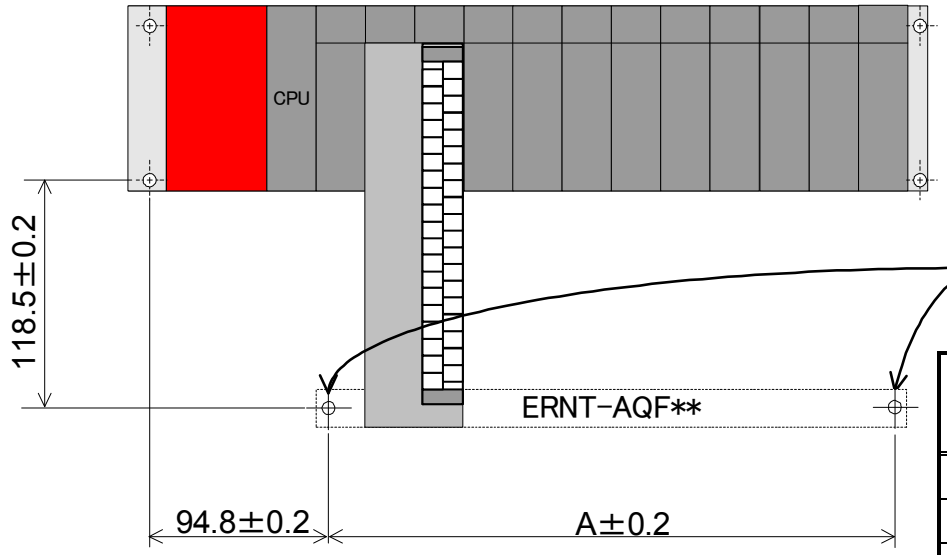
○: Applicable (with some restrictions*1)

×: Not applicable

*1: There are certain slots in which the conversion adapter cannot be installed. For example, the conversion adapter cannot be installed in Slots 8 to 11 (4 slots) of the Q base unit when Q132B (Q base unit) is used with ERNT-AQF8 (conversion adapter anchor base).

The machining of screw holes (M4 × 2 locations) used to install the conversion adapter anchor base, such as described below, is required when a base adapter (sold separately) is not used.

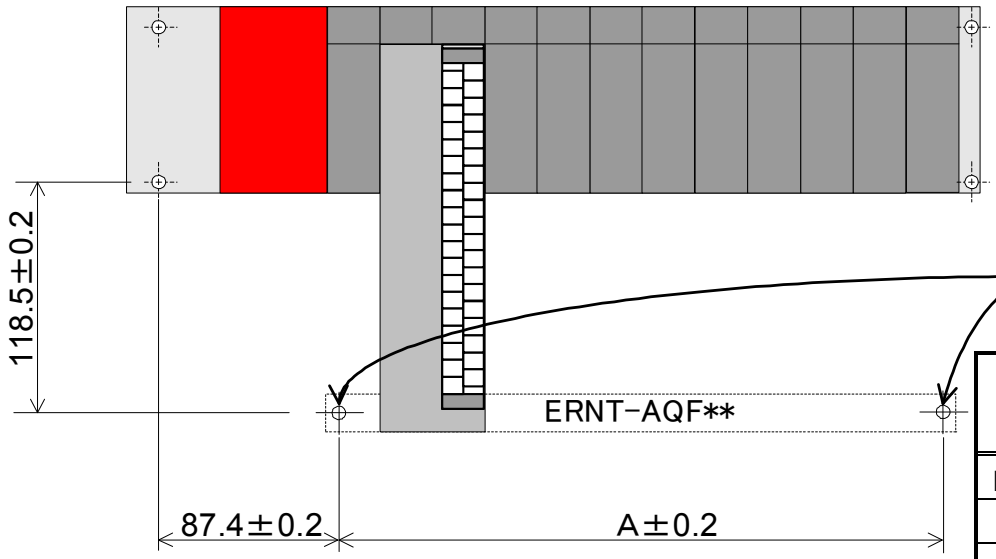
(1) With Main Base Unit Q312B, Q38B, Q35B or Q33B



Machine screw holes (M4 x 2 locations) in these locations for conversion adapter anchor base installation.

Conversion Adapter Anchor Base	A
ERNT-AQF12	321.2
ERNT-AQF8	210
ERNT-AQF5	126.6
ERNT-AQF3	71

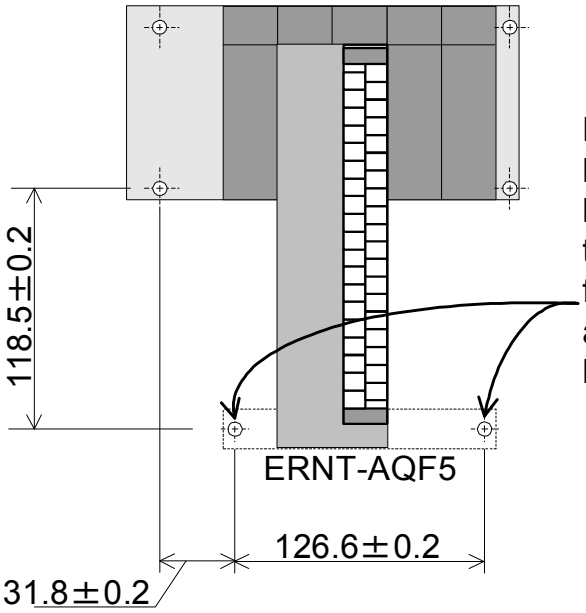
(2) With Extension Base Unit Q612B, Q68B Q65B or Q63B



Machine screw holes (M4 x 2 locations) in these locations for conversion adapter anchor base installation.

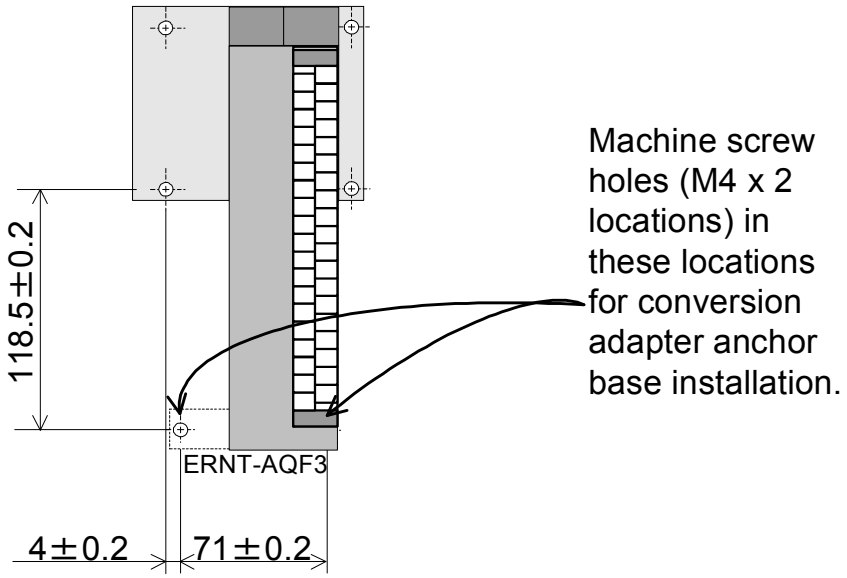
Conversion Adapter Anchor Base	A
ERNT-AQF12	321.2
ERNT-AQF8	210
ERNT-AQF5	126.6
ERNT-AQF3	71

(3) With Extension Base Unit Q55B



Machine screw holes (M4 x 2 locations) in these locations for conversion adapter anchor base installation.

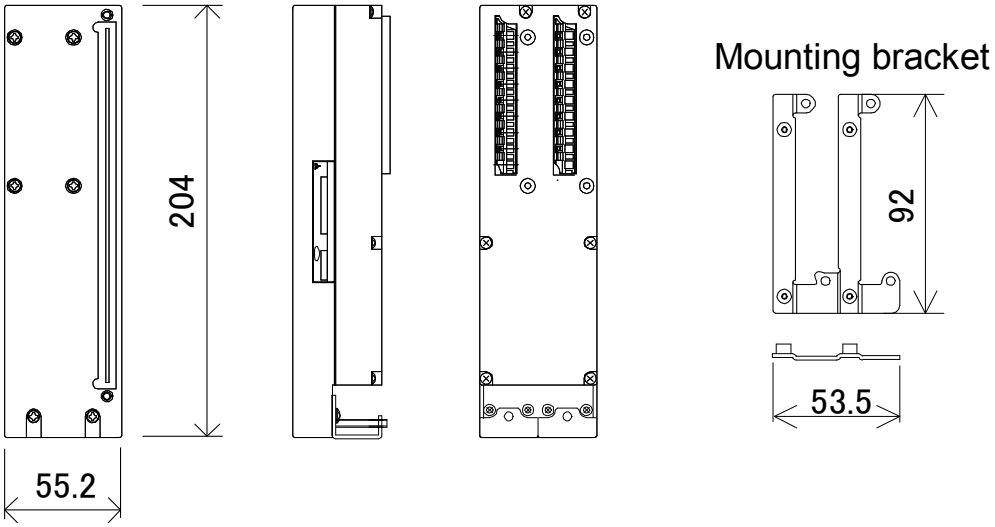
(4) With Extension Base Unit Q52B



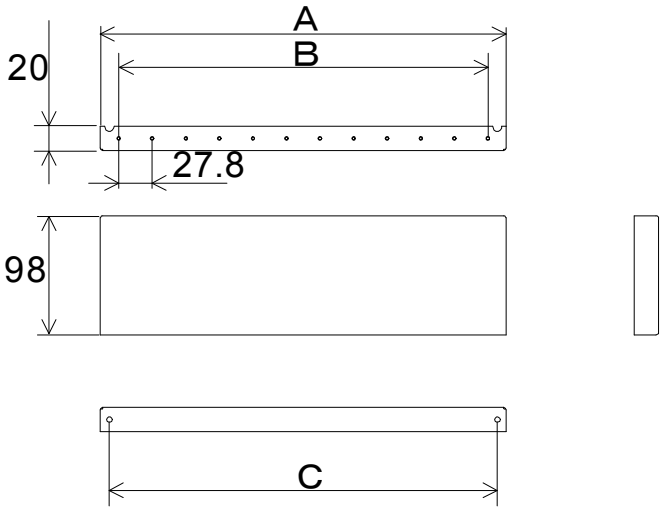
Tips
Use of a base adapter (sold separately) eliminates the need for additional screw hole machining on the control panel. (A base adapter is a product that enables MELSEC-Q series installation using the MELSEC-A series installation holes.)

7. External Dimensions

7.1 Conversion Adapter



7.2 Conversion Adapter Anchor Base



Model	A	B	C
ERNT-AQF12	335.8	305.8	321.2
ERNT-AQF8	224.6	194.6	210
ERNT-AQF5	141.2	111.2	126.6
ERNT-AQF3	85.6	55.6	71

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

(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.

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 October 2008. Specifications are subject to change without notice. The standard price does not include consumption tax. Please note that consumption tax will be added at the time of purchase. This manual was printed on recycled paper.

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