

FnIO M – Series :

M3808

M3808 (8 Channels, TC/mV INPUT)

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Specification

History

REV.	PAGES	REMARKS	DATE	Editor
Preliminary		Preliminary	May. 13, 2020	BS, HA BH, LIM

Specification

1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operating Temperature	-25℃~60℃
UL Temperature	-20℃~60℃
Storage Temperature	-40℃~85℃
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN Rail
General specification	
Shock Operating	IEC 60068-2-27 : 2008 / 15g, 11ms
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039 : Vibration Class B, 4g
Industrial Emissions	EN61000-6-4/All : 2011
Industrial Immunity	EN61000-6-2 : 2005
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL, FCC, ATEX

Specification

2. M3808 (8 CHANNELS THERMOCOUPLE/MV INPUT)

2.1. M3808 Specification

Items	Specification																																								
Input Specification																																									
Inputs per module	8 Channels																																								
Indicators(Logic side)	8 Green Input status , 1 Green Input CJ status																																								
Sensor Types	Thermal Couple Input Range																																								
		<table border="1"> <thead> <tr> <th>Tvne</th> <th>Maximum Input Range</th> <th>Recommended Input Range</th> </tr> </thead> <tbody> <tr> <td>K</td> <td>-270 ~ 1372°C</td> <td>-200 ~ 1200°C</td> </tr> <tr> <td>J</td> <td>-210 ~ 1200°C</td> <td>-40 ~ 1100°C</td> </tr> <tr> <td>T</td> <td>-270 ~ 400°C</td> <td>-200 ~ 350°C</td> </tr> <tr> <td>B</td> <td>30 ~ 1820°C</td> <td>600 ~ 1700°C</td> </tr> <tr> <td>R</td> <td>-50~1768°C</td> <td>0 ~ 1600°C</td> </tr> <tr> <td>S</td> <td>-50 ~ 1768°C</td> <td>0 ~ 1600°C</td> </tr> <tr> <td>E</td> <td>-270 ~ 1000°C</td> <td>-200 ~ 800°C</td> </tr> <tr> <td>N</td> <td>-270 ~ 1300°C</td> <td>-200 ~ 1250°C</td> </tr> <tr> <td>L</td> <td>-200 ~ 900°C</td> <td>-100 ~ 850°C</td> </tr> <tr> <td>U</td> <td>-200 ~ 600°C</td> <td>-100 ~ 550°C</td> </tr> <tr> <td>C</td> <td>0 ~ 2310°C</td> <td>100 ~ 2100°C</td> </tr> <tr> <td>D</td> <td>0 ~ 2490°C</td> <td>100 ~ 2200°C</td> </tr> </tbody> </table>	Tvne	Maximum Input Range	Recommended Input Range	K	-270 ~ 1372°C	-200 ~ 1200°C	J	-210 ~ 1200°C	-40 ~ 1100°C	T	-270 ~ 400°C	-200 ~ 350°C	B	30 ~ 1820°C	600 ~ 1700°C	R	-50~1768°C	0 ~ 1600°C	S	-50 ~ 1768°C	0 ~ 1600°C	E	-270 ~ 1000°C	-200 ~ 800°C	N	-270 ~ 1300°C	-200 ~ 1250°C	L	-200 ~ 900°C	-100 ~ 850°C	U	-200 ~ 600°C	-100 ~ 550°C	C	0 ~ 2310°C	100 ~ 2100°C	D	0 ~ 2490°C	100 ~ 2200°C
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1uV Input	-32.7 ~ 32.7mV, 1uV/ 1 Count																																								
2uV Input	-65.5 ~ 65.5mV, 2uV/ 1 Count																																								
Module Accuracy (Need 20 minute preheating to get enhanced accuracy.)	Except Cold Junction	Recommend Input Range (TBD) <ul style="list-style-type: none"> ±0.1% Recommended Scale @ 25°C ambient ±0.3% Recommended Scale @ -40°C~60°C T,B,R,S,C,D type Recommend Input Range (TBD) <ul style="list-style-type: none"> ±0.3% Recommended Scale @ -40°C~60°C 																																							
	Cold Junction	Internal Cold Junction(TMP275AIDGKR) (TBD) <ul style="list-style-type: none"> ±3.5°C Recommended Scale @ -40°C~60°C External Cold Junction(PT100) (TBD) <ul style="list-style-type: none"> ±2°C Recommended Scale @ -40°C~60°C 																																							
Connection Method	2-Wire																																								
Conversion Time	Average Conversion time < 50 ms																																								
Cold junction temperature	Internal - TMP275AIDGKR : -40°C~125°C External - PT100 : -45°C~95°C																																								

Specification

Data Format	16bits Integer (2' complement)
Calibration	Not Required
Diagnostic	
Power dissipation	Max. 150mA @ 5Vdc (TBD)
Isolation	I/O to Logic : Isolation Field power : Not Connected
UL Field Power	Supply voltage : 24Vdc nominal, Class2
Field Power	Not used, Field power bypass to next expansion module
Single Wire	0.205mm ² - 1.3mm ² (24-16 AWG)
Torque	0.8Nm(7 lb-in)
Weight	72g
Module Size	12mm x 110mm x 75mm
Hot Swap	Possible
Environment Condition	Refer to 'Environment Specification'

* Class 2, adjacent to voltage rating (30Vmax)

2.2. M3808 Wiring Diagram

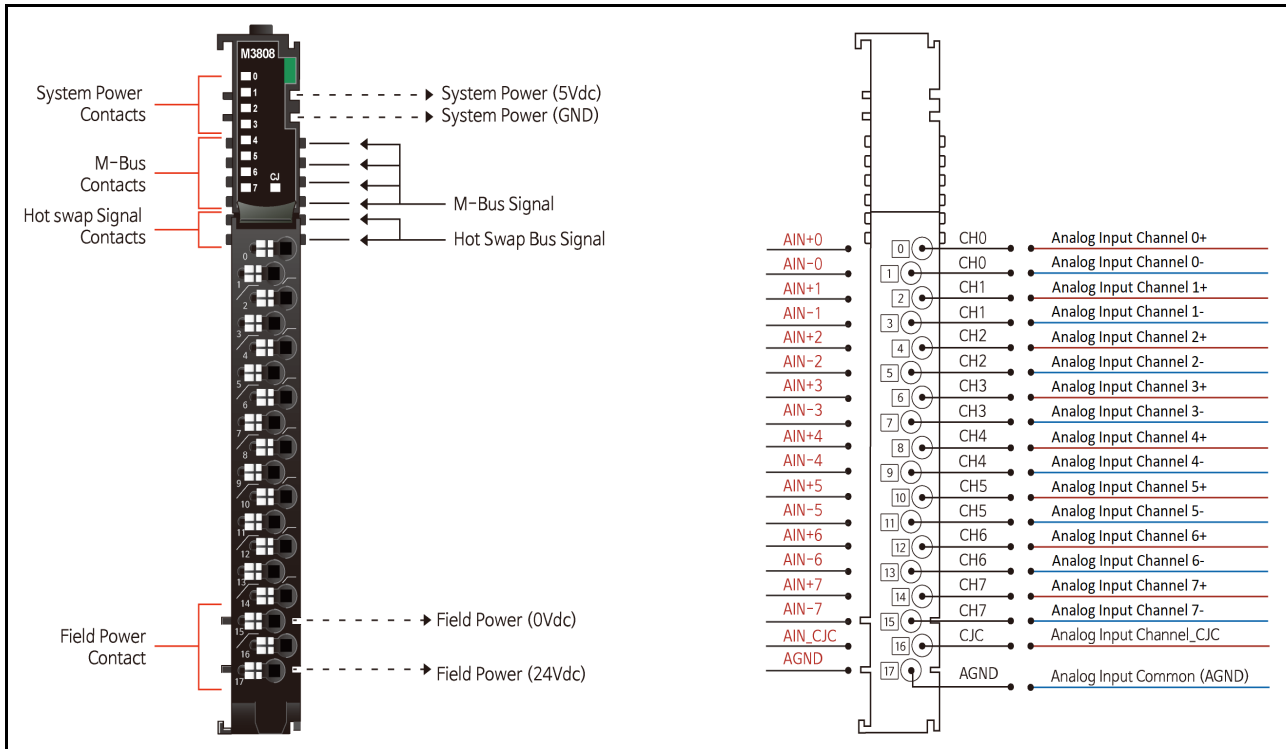


Figure 1. Customer Wiring to Mounting Base

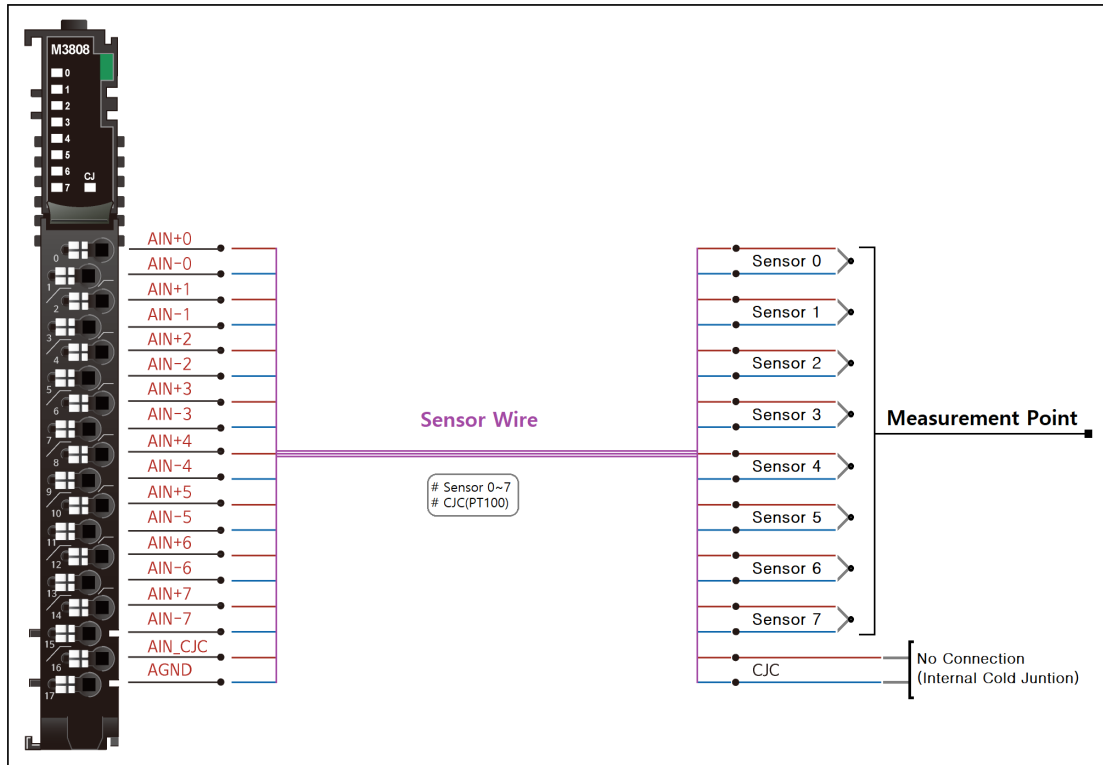
Pin No.	Signal Description
0	TC Input Channel 0+
1	TC Input Channel 0-
2	TC Input Channel 1+
3	TC Input Channel 1-
4	TC Input Channel 2+
5	TC Input Channel 2-
6	TC Input Channel 3+
7	TC Input Channel 3-
8	TC Input Channel 4+
9	TC Input Channel 4-
10	TC Input Channel 5+
11	TC Input Channel 5-
12	TC Input Channel 6+
13	TC Input Channel 6-
14	TC Input Channel 7+
15	TC Input Channel 7-
16	TC Input Channel CJC
17	Analog Ground

RTB18C	1.5mm	1.5mm	175≤CTK≤400
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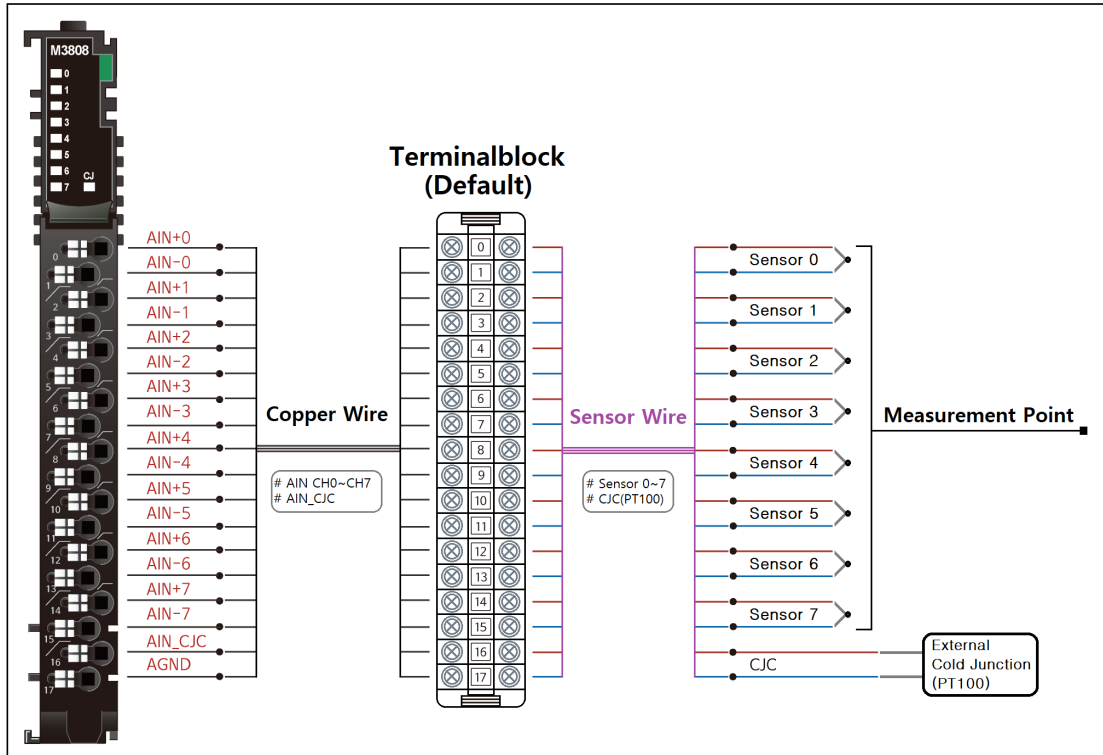
Spacings : The following minimum spacing in inches (millimeters) shall be maintained between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded part including any mounting surface or exposed metal part.

Specification

■ Configuration Wiring Diagram (Except External Cold Junction)



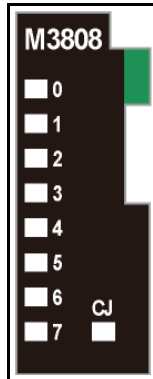
■ External Cold Junction Wiring Diagram (Default)



Specification

2.3. M3808 LED Indicator

2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
0	TC Input Channel Status 0	Green
1	TC Input Channel Status 1	Green
2	TC Input Channel Status 2	Green
3	TC Input Channel Status 3	Green
4	TC Input Channel Status 4	Green
5	TC Input Channel Status 5	Green
6	TC Input Channel Status 6	Green
7	TC Input Channel Status 7	Green
CJ	TC Input Channel Status CJ	Green

2.3.2. Channel Status LED

Status	LED	To Indicate
No Signal	Off	Input Sensor Open or Input Range Over (Normal Operation)
On Signal	On	Sensor Connected and Input Range Valid (Normal Operation)

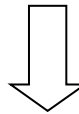
2.3.3. CJC Status LED

Status	LED	To Indicate
Connected External CJC	On	External CJC Connected.
	Off	External CJC Not Connected.

2.4. Mapping data into the image table

● Input Module Data

Analog Input Ch0
Analog Input Ch1
Analog Input Ch2
Analog Input Ch3
Analog Input Ch4
Analog Input Ch5
Analog Input Ch6
Analog Input Ch7



● Input Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Input Ch0 Low byte							
Byte 1	Analog Input Ch0 High byte							
Byte 2	Analog Input Ch1 Low byte							
Byte 3	Analog Input Ch1 High byte							
Byte 4	Analog Input Ch2 Low byte							
Byte 5	Analog Input Ch2 High byte							
Byte 6	Analog Input Ch3 Low byte							
Byte 7	Analog Input Ch3 High byte							
Byte 8	Analog Input Ch4 Low byte							
Byte 9	Analog Input Ch4 High byte							
Byte 10	Analog Input Ch5 Low byte							
Byte 11	Analog Input Ch5 High byte							
Byte 12	Analog Input Ch6 Low byte							
Byte 13	Analog Input Ch6 High byte							
Byte 14	Analog Input Ch7 Low byte							
Byte 15	Analog Input Ch7 High byte							

- If the input of channel is open or over-ranged, its conversion data will be 0x8000(-32678)

Specification

2.5. Configuration Parameter – 8byte

Byte	Decimal Bit	Description	Default Value
0	00-07	The selection Sensor Type =00h: Type K, 0.1°C/count =01h: Type J, 0.1°C/count =02h: Type T, 0.1°C/count =03h: Type B, 0.1°C/count =04h: Type R, 0.1°C/count =05h: Type S, 0.1°C/count =06h: Type E, 0.1°C/count =07h: Type N, 0.1°C/count =08h: Type L, 0.1°C/count =09h: Type U, 0.1°C/count =0Ah: Type C, 0.1°C/count =0Bh: Type D, 0.1°C/count =80h: 10uV Input, -81.0~81.0mV, 10uV / 1count =81h: 1uV Input, -32.7~32.7mV, 1uV / 1count =82h: 2uV Input, -65.5~65.5mV, 2uV / 1count =Others: Reserved	00 : Type K
1	00	Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F)	00 : Celsius(°C) Cold Junction Compensation 0.1°C Normal Filter
	01*	Cold Junction Compensation 0: Cold Junction Compensation 1: Disable Cold Junction Compensation	
	02	Data Resolution 0: 0.1°C, °F/bit, 1: 1°C, °F/bit	
	03	Reserved	
	04	Filter Type 0: Normal Filter, 1: Enhanced Filter	
	05-06	SW Filter 0: Normal Filter(Filter Time = 20) 1: *Fast Filter(Filter Time = 3) 2: Enhanced Filter(Filter Time = 40) 3: More Enhanced Filter(Filter Time = 80)	
	07	Reserved	
2	00-07	Internal Cold Junction[1] Offset Data Low Byte	0000
3	00-07	Internal Cold Junction[1] Offset Data High Byte	
4	00-07	Internal Cold Junction[2] Offset Data Low Byte	0000
5	00-07	Internal Cold Junction[2] Offset Data High Byte	
6	00-07	External Cold Junction Offset Data Low Byte	0000
7	00-07	External Cold Junction Offset Data High Byte	

- Unit of Cold Junction Temperature is 0.1°C/°F. Value 254 means 25.4°C or 25.4°F

- *0: Compensation Cold Junction Temperature = Cold Junction Temperature – Cold Junction Temperature Offset

- *1: Compensation Cold Junction Temperature = Cold Junction Temperature Offset

- *If you set a fast filter, the specification accuracy may not be met.

Specification

2.6. Data Value

Thermocouple Input Range		
Type	Maximum Input Range	Recommended Input Range
Type K	-270 ~ 1372 °C	-200 ~ 1200 °C
Type J	-210 ~ 1200 °C	-40 ~ 1100 °C
Type T	-270 ~ 400 °C	-200 ~ 350 °C
Type B	30 ~ 1820 °C	600 ~ 1700 °C
Type R	-50 ~ 1768 °C	0 ~ 1600 °C
Type S	-50 ~ 1768 °C	0 ~ 1600 °C
Type E	-270 ~ 1000 °C	-200 ~ 800 °C
Type N	-270 ~ 1300 °C	-200 ~ 1250 °C
Type L	-200 ~ 900 °C	-100 ~ 850 °C
Type U	-200 ~ 600 °C	-100 ~ 550 °C
Type C	0 ~ 2310 °C	100 ~ 2100 °C
Type D	0 ~ 2490 °C	100 ~ 2200 °C
10uV	-81.0 ~ 81.0mV, 10uV/ 1 Count	
1uV	-32.7 ~ 32.7mV, 1uV/ 1 Count	
2uV	-65.5 ~ 65.5mV, 2uV/ 1 Count	

– °F = 1.8°C+32

3. FnIO M-Series Caution(Before using the unit)

■ We appreciate you for purchasing CREVIS Products. To use the units more effectively, please read this quick guide and refer to the respective user manual for further details.

Cautions for your Safety

If you don't follow the directions, it could cause a personal injury, damage to the equipment or explosion. **Warning !**

Do not assemble the products and wire with power applied to the system. Else it may cause an electric arc, which can result into unexpected and potentially dangerous action by field devices. Arching is explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before assembling or wiring the modules.

Do not touch any terminal blocks or IO modules when system is running. Else it may cause the unit to an electric shock or malfunction. Keep away from the strange metallic materials not related tot the unit and wiring works should be controlled by the electric expert engineer. Else it may cause the unit to a fire, electric shock or malfunction.

If you disobey the instructions, there may be possibility of personal injury, damage to equipment or explosion. Please follow below instructions. **Caution !**

Check the rated voltage and terminal array before wiring.

Do not place Modules near by the inflammable material. Else it may cause a fire.

Do not permit any vibration approaching it directly.

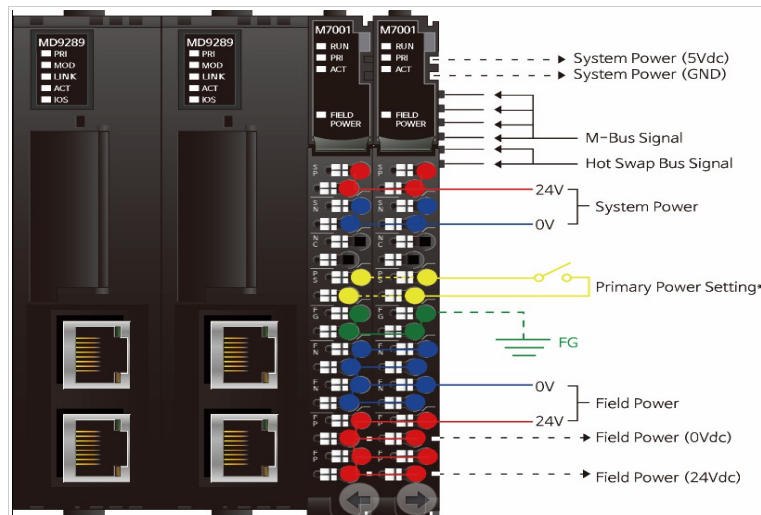
Go through module specification carefully, ensure inputs, output connections are made with the specifications. Use standard cables for wiring.

Use Product under pollution degree 2 environment.

These devices are open type devices which have to be installed in an enclosure with door or cover which is tool accessible only suitable for use in Class I, Zone 2 / Zone 22, Groups A,B,C and D hazardous locations, or non-hazardous location only.

3.1. How to wire communication & Power

3.1.1. Wiring of communication & System power line for Ethernet.



Notice for Wiring of communication and Field power

1. The communication power and Field power respectively are supplied to each network adapter.

1) Communication Power : Power for System and MODBUS TCP connection.

2) Field Power : Power for I/O Connection

2. Field power and separated by System power must be used.

3. To avoid a short circuit, tape the un-shield wire.

4. Do not insert any other devices such as converter in to the connecter besides products.

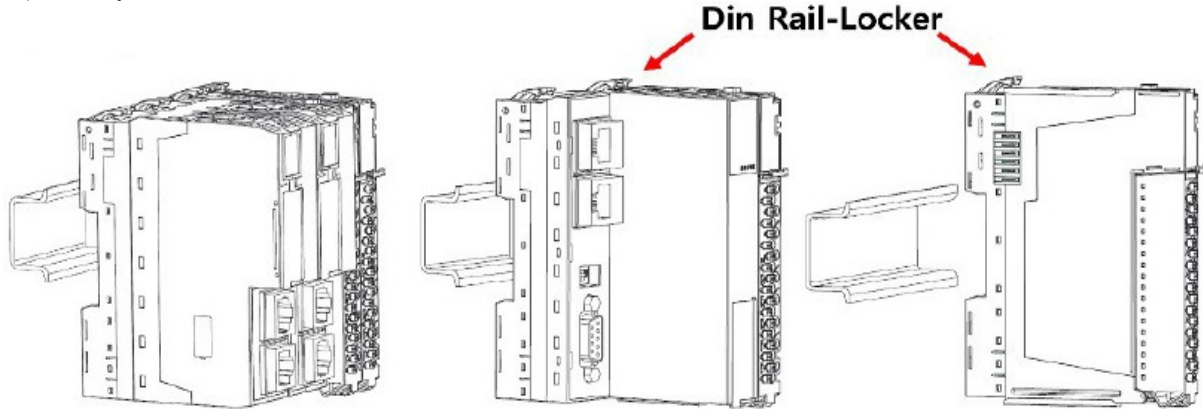
■ M7&** is used with M9*** (Single Network), MD9*** (Dual type Network) and I/O as power module.

Specification

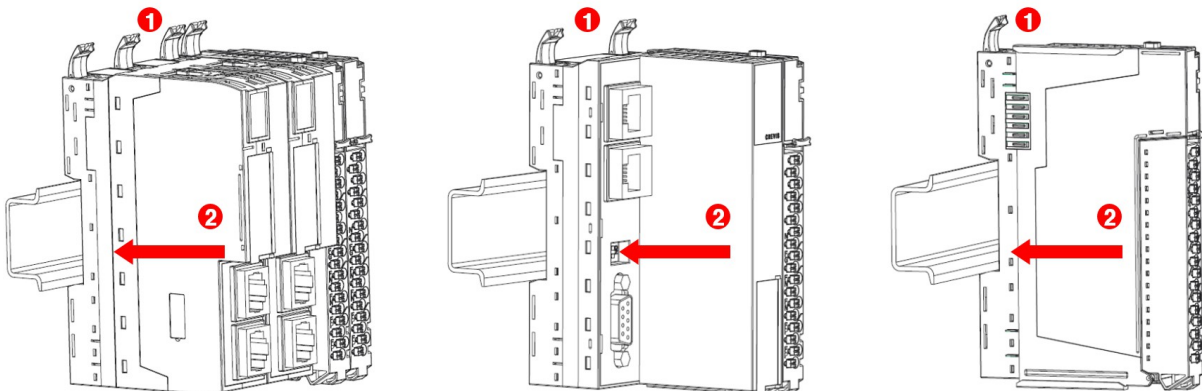
3.2. Module Mounting

3.2.1. How to mount & dismount M-Series Modules on Din-Rail

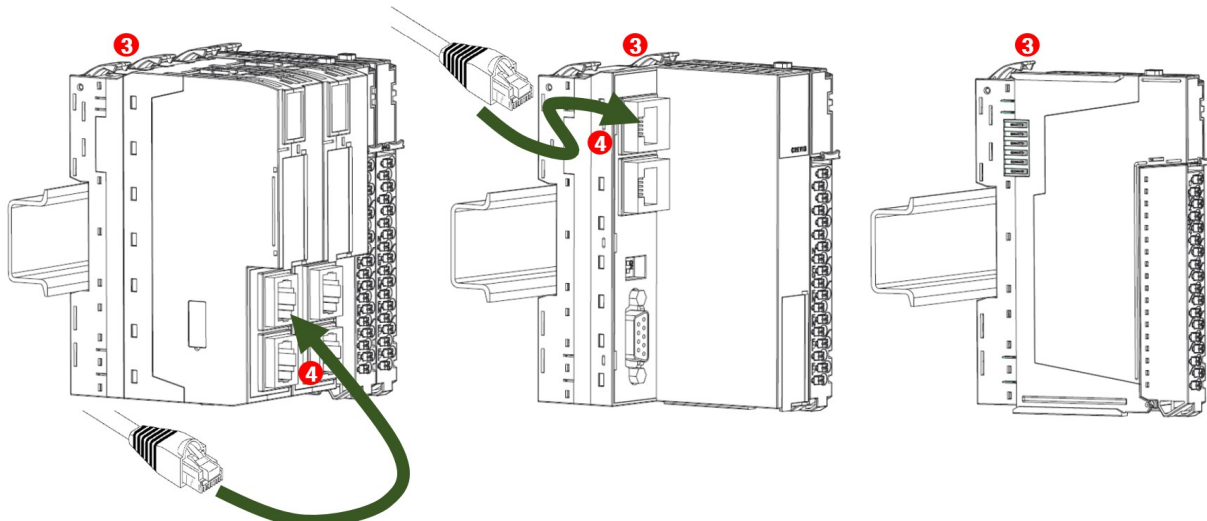
1) Ready



- 2) Unlock the 'Din Rail-Locker' like Number (1).
- 3) Push the module to the din-rail.



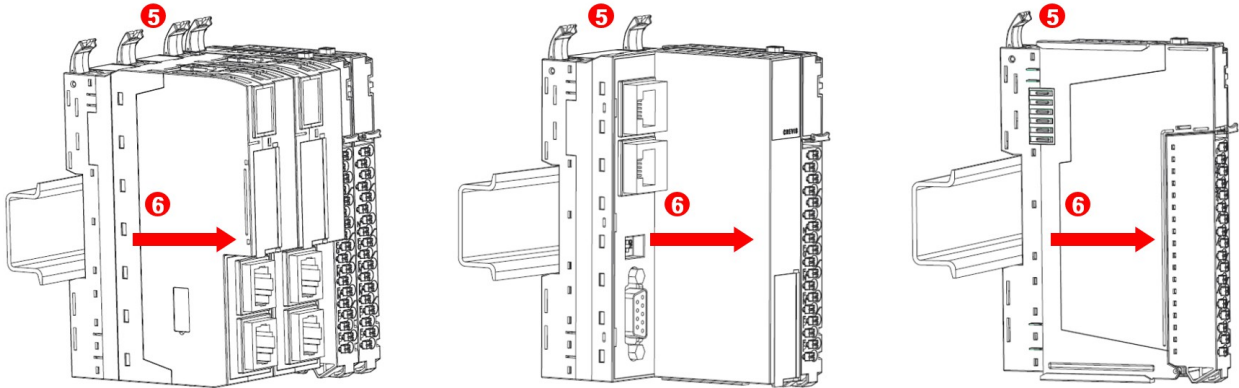
- 4) Lock the 'Din Rail-Locker' like Number (3) to fix the module on the din rail.
- 5) Connect the communication cable after locking the 'Din Rail-Locker'.



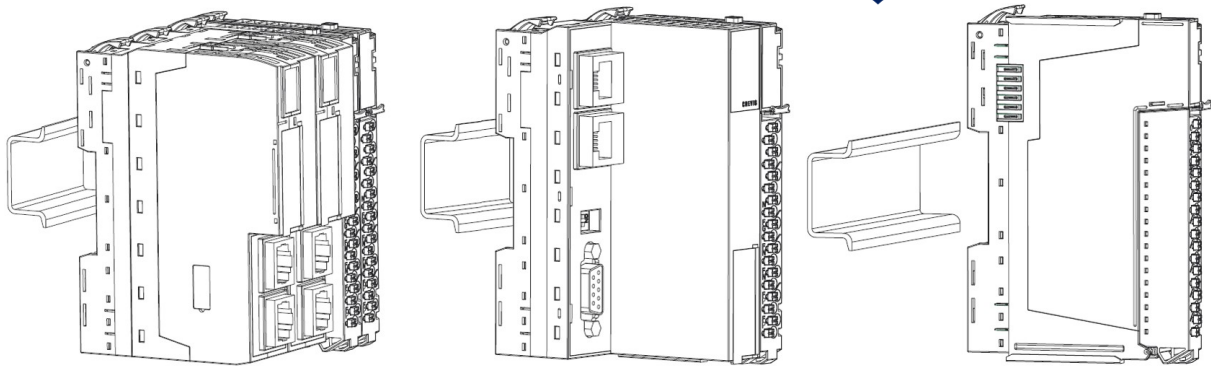
6) To remove the module on the din-rail, first unlock the 'Din-Rail Locker' like Number (5).

Specification

7) Pull the module against the din-rail.



8) End



ATEX Zone2 Information
II 3 G Ex ec IIC T4 Gc
 Number : DEMKO19 ATEX 2223X

1. Certification string : **Ex ec IIC T4 Gc**
2. Ambient range (-20°C ≤ Tamb ≤ +60°C)
3. Certification string :
4. Standards covered (EN60079-0 and EN60079-7)
5. The conditions of safe usage :
 - a) The equipment shall be mounted in an enclosure with a minimum ingress protection rating of at least IP54 in accordance with IEC/EN 60079-7 and used in an environment of not more than Pollution Degree 2 (as defined in IEC/EN 60664-1).
 - b) Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140%.
 - c) The equipment shall be installed in an enclosure with tool removable door or cover.
 - d) Earthing is accomplished through mounting of modules on rail.
 - e) Field wiring conductor temperature rating must be 85°C or higher

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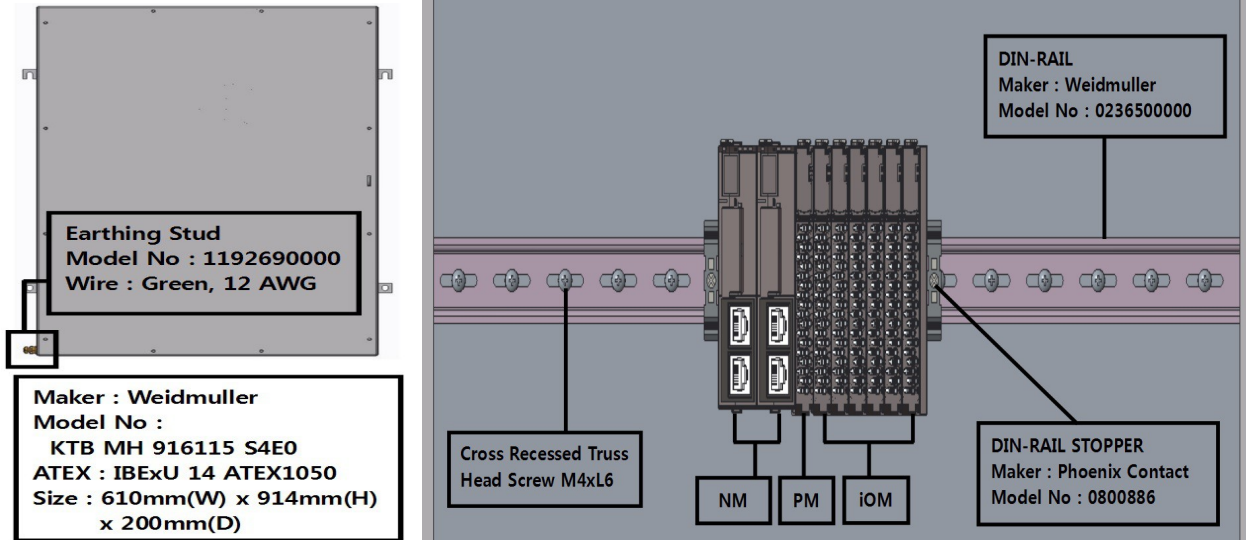


MODBUS TCP/IP
EtherNet IP
MODBUS RTU

*Specifications and designs may be changed without advance Notice.

Specification

ATEX Zone22 Information



1. Certification number : **DEMKO 20 ATEX 2373**
2. Ambient range (-25°C ≤ Tamb ≤ +60°C)
3. Certification string :

Ex II 3 D Ex tc IIIC T80°C Dc
 Ambient temperature range : -25°C to +60°C
 Electrical Ratings : 24Vdc, 300mA / 5Vdc, 2.0A

*Note :

- a) This device can be installed with maximum one network module (MD9 or M9) and six IO modules (M1 to M7). The total output current rating shall not exceed 2A. For suitable use, refer to the electrical rating part in each manual of the modules.
- b) Field wiring conductor temperature rating must be 85°C or higher
- c) Enclosure entry for the field wiring, refer to attached weidmuller's instruction.

Nomenclature :
 Programmable controllers FnIO-M Series, model FnIO-M followed by NM, followed by PM, followed by iOM consists of maximum 6 extension modules;

- FnIO-M NM – PM – iOM**
 I II III
- I. NM : MD9 or M9
 - A. MD9 – Model MD9***
 - B. M9 – Model M9***
 - II. PM : M7
 - A. M7 – Model M7&**
 - III. iOM : M1, M2, M3, M4, M5 or M7
 (Consists of maximum 6 extension modules)
 - A. M1 – Model M1#**
 - B. M2 – Model M2@**
 - C. M3 – Model M3***
 - D. M4 – Model M4***
 - E. M5 – Model M5***
 - F. M7 – Model M7&**

Note :
 "****" may be any alphanumeric code
 "***" may be any alphanumeric code
 "#" may be any numerical number except for 8 and 9
 "@" may be any numerical number except for 7 and 8
 "&" may be any numerical number except for 2

