

M2I Corporation

Industrial Remote MIO I/O Module Series

Hardware Manual



Thank you for using Industrial Remote I/O Module of M2I corporation. Please read this manual carefully to know installing, wiring, operating, servicing and inspecting this equipment.





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Chapter 1 Safety Precautions

■ Before using the product





To ensure the safe and efficient use of the product, please read this manual thoroughly and completely before use. The safety precautions must be followed to prevent accidents and hazards. These precautions are divided into "Warning" and "Caution" sections. The meanings of each category are as follows.

 Warning	Violating the instruction may result in serious personal injury or death.
 Caution	Violating the instruction may result in slight personal injury or product damage.
	Be cautious, for danger may be present.
	Be cautious, for there is a possibility of an electric shock.





■ General Precautions **Caution**

-  Do not push hard, or use thick and sharp tools like gimlet, screwdriver, pen, etc.). It can cause a malfunction.
-  Do not use or store the product in highly vibrating environment.
-  Keep the foreign substances (water, liquid, metal powders, etc.) out of the product. These can crack the product or cause an electric shock.
-  Make sure to keep the distance minimum 30cm from product when you use radio or cell phone.
-  Do not use or store the product under direct sunlight.
-  Do not touch the product or adapter with wet hand. It can cause an electric shock.
-  Do not use the product in flammable environment with combustible liquid, gas or dust.
-  When you store the product long term without any use, keep the product out of the direct sunlight and humid condition.

■ Design Precautions **Warning**

-  Install protection circuit on the outside of Products to protect the entire control system when external power supply or Products have problems.
-  As the malfunction & incorrect result of Products could damage the stability of the entire systems and human body, you must install damage preventing interlock circuit such as emergency stop, Protective circuits, positioning upper and lower limit switch and interlock for forward/reverse operation.
-  When computer or other controllers communicate and exchange data with products or change operation mode of products, set up protective sequence program in PC or Controller for protecting system from communication error.
-  The output signal or communication lines should be separated from the power line or high tension wire. They should be installed 100mm (3.94 Inch) or more from each other.

■ Wiring Precautions **Warning**

-  Be sure the wiring is done correctly by checking the product's rated voltage and the terminal layout. Incorrect wiring could result in fire, damage or malfunctions.
-  Tighten the terminal screw with the specified torque. If the screws of terminal are loose, it could result in short circuit, fire, malfunctions.
-  Always use grounding for the FG terminal. Failure to do so may result in malfunction.
-  a. Grounding should be the Class 3 grounding. The cable for grounding should be more than 0.812mm²(20AWG).

- ❗ b. grounding point be closed to the products and make short the distance to the ground cable if possible.

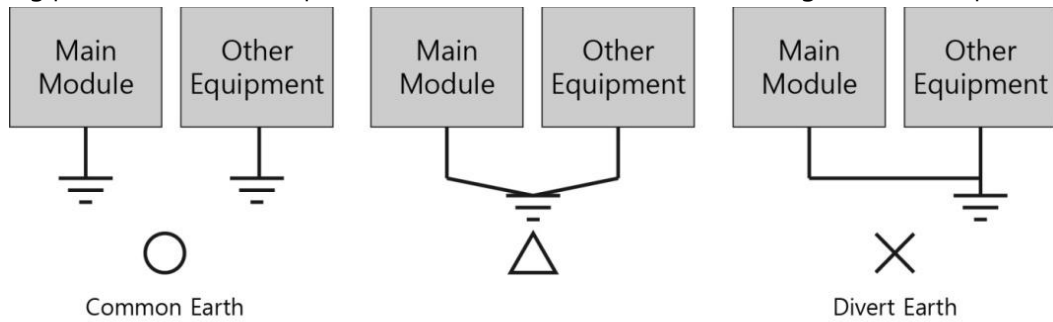


Fig. Grounding Example Diagram

■ Installation Precautions ⚠ Caution

- ⊘ Do not install the location where exceeds allowed temperature. Product can be damaged or shorten the life. Especially Install environment as below should be avoided.
- ⊘ Do not install in locations with the following installation environments.
 - A place where the ambient temperature is within the range of -10 to 50°C
 - The surface of the operating panel where the high-voltage equipment is installed
- ⊘ Do not install to the place where strong shock or vibration continuously have impacted on product.
- ⊘ Use the product under 2000m altitude.
- ⊘ The space between back of product and back of control board must be more than 100mm for maintenance and ventilation. If this product is installed in sealed area, a cooling fan must be installed also.
- ⊘ Use the product Indoor only.
- ⊘ The length of power cable should be 3m(10 feet) or less.

■ Disposal Precaution ⚠ Caution

When you dispose of product, please treat it as industrial waste. It can create poisonous substances or explosion.

■ Wiring connection specifications

Wiring to the product must be from an insulated secondary source of 24 Vdc or less with limited voltage/limited current, output fuse, or from a secondary circuit rated for Class 2.

Chapter 2 Overview

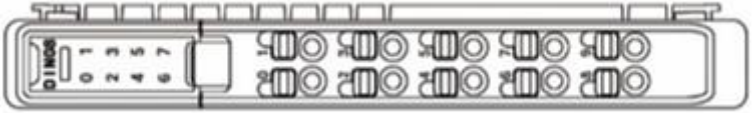
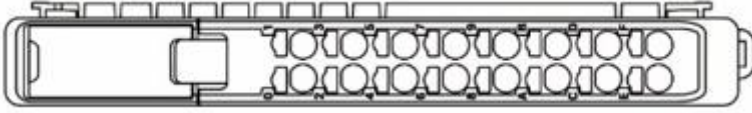

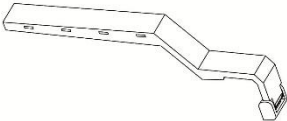
2.1 Product Overview

This industrial remote I/O module is industrial-needed device with high durability. The purposes of this product are controlling analog or digital I/O signals of I/O control devices, and data communicating with Industrial I/O Coupler Module by wired communication.

2.2 Components

Package contents are below.

Make sure that all of components are in the package Series before using.

Components	Figure	Qty
Main Body (MIO-***0*-01)		1
Main Body (MIO-***1*-01)		1
User Manual		1
Accessories		User Option (Separate sale)

2.3 Explanation of Model name

2.3.1 Coupler Module Series

Base Unit	Unit Type	Communication Type	Type
MIO-	C: Coupler unit	MR: MODBUS RTU MT: MODBUS TCP EC: EtherCAT TCP	0A: Basic

2.3.2 I/O Module Series

Base Unit	Data Type	Input / Output	Signal	Point	Type
MIO-	A: Analog D: Digital	I: Input O: Output	N: SINK P: SOURCE R: RTD ^{*1)} , Relay ^{*2)} V: Voltage C: Current	02 04 08 16	-01: Basic

* 1) RTD is only for MIO-A***** units.

* 2) Relay is only for MIO-D***** units.

2.3.3 확장 모듈 시리즈

Base Unit	Functions and Specifications
MIO-	PWR0A: Adding System Power or Field Power PWR0B: Adding Field Power COM0A: Extension of Field Power +24V contacts into 16 COM0B: Extension of Field Power +0V contacts into 16 COM0C: Extension of Field Power +24V / +0V contacts into 8 / 8

Chapter 3 General Specifications

3.1 Electrical Specifications

Input Voltage (Vin)			5VDC, Supplied by Coupler Module	
Power	Consumption	Model	MIO-DIN08-01	Max. 70mA
			MIO-DIP08-01	Max. 70mA
			MIO-DON08-01	Max. 90mA
			MIO-DOP08-01	Max. 90mA
			MIO-DOR04-01	Max. 200mA
			MIO-DIN16-01	Max. 70mA
			MIO-DIP16-01	Max. 70mA
			MIO-DON16-01	Max. 120mA
			MIO-DOP16-01	Max. 120mA
			MIO-AIC04-01	Max. 200mA
			MIO-AIV04-01	Max. 200mA
			MIO-AIR02-01	Max. 70mA
			MIO-AOC04-01	Max. 200mA
			MIO-AOV04-01	Max. 200mA
	Voltage endurance		Upto Coupler Module's Specification	
	Insulation Resistance		Upto Coupler Module's Specification	

3.2 Interface and Functions

Model	Type	Voltage / Current Range	Max. Delay	Resolution	Insulation
MIO-DIN08-01	Digital Input	ON: 10.2Vdc~28.8Vdc / 6mA OFF: 5Vdc or less / 6mA	OFF - ON: 0.1ms ON - OFF: 0.5ms	N/A	PhotoCoupler
MIO-DIP08-01					
MIO-DIN16-01					
MIO-DIP16-01					
MIO-DON08-01	Digital Output	11Vdc~28.8Vdc / 0.5A	OFF - ON: 0.3ms ON - OFF: 0.5ms	N/A	
MIO-DOP08-01					
MIO-DON16-01					
MIO-DOP16-01					
MIO-DOR04-01		24Vdc / 2A	OFF - ON: 3ms ON - OFF: 3ms		Relay
MIO-AIC04-01	Analog Input	0~20mA	N/A	16 bit	Capacitive
MIO-AIV04-01		0 ~ 5 Vdc			
MIO-AIR02-01		PT100 (*-200°C ~ +850°C)		15 bit	
MIO-AOC04-01	Analog Output	0~20mA	N/A	16 bit	
MIO-AOV04-01		0 ~ 5 Vdc			

* Digital Input Module can make noise inflow during operation.

Digital filter is integrated to prevent this noise, and this can cause input delay Max. 0.5ms.

3.3 Environmental Specification

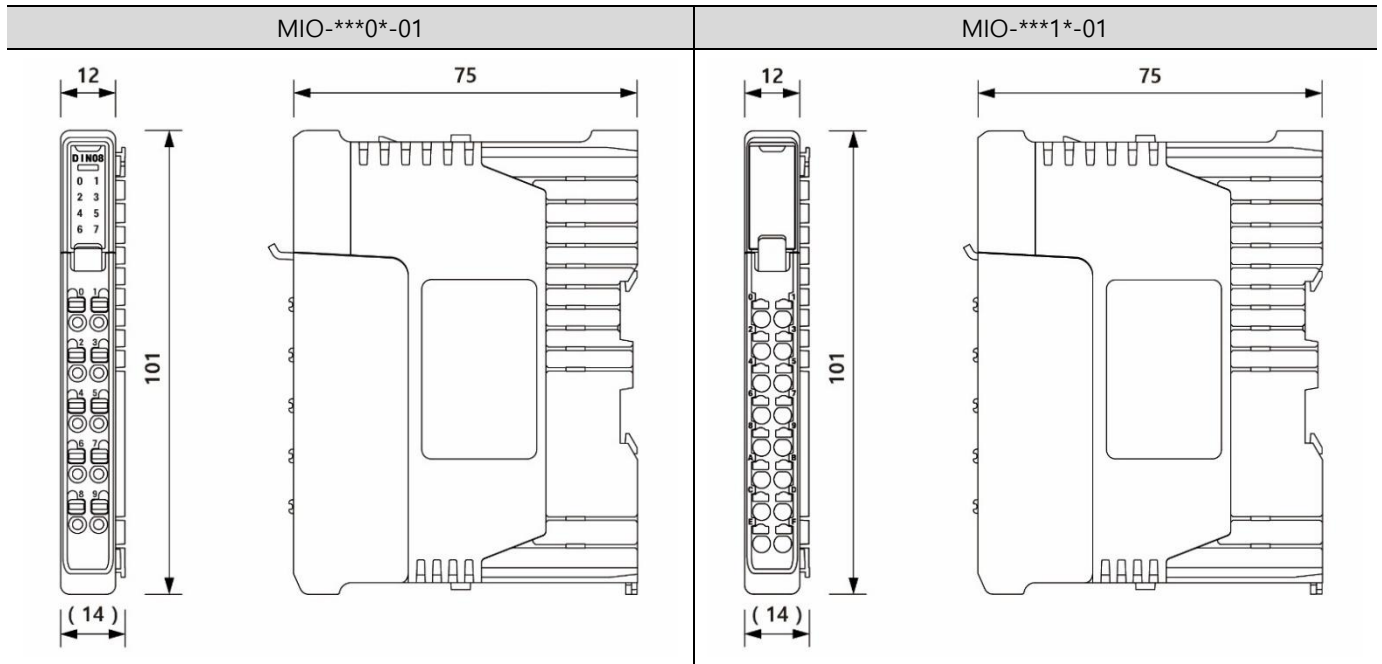
Operation Temperature (°C)	-10 ~ +50
Storage Temperature (°C)	-20 ~ +60
Operation Humidity (%RH)	0 ~ 90 (No dew)
Atmosphere	No corrosive gas
Vibration Endurance	Amplitude: $10 \leq F < 25\text{Hz}$ (2G) X,Y,Z each direction(for 30 minutes)
Noise Immunity	1000Vp-p(Pulse width 1 μ s)
Static Electricity Discharge	Connective discharge from EN61000-4-2: $\pm 4\text{kV}$
Shock Endurance	10G X,Y,Z each direction(for 3 times)
Surge Voltage	500V(Line-Line)
Ground Connection	Class 3(Under 100 Ω)
Protection Classification	IP20

3.4 Structure

Cooling	Natural air circulation
Installation Method	Standard DIN Rail(35mm)
Case Material	PC(Resistance to flame)

Chapter 4 Parts Identification and Specifications

4.1 Remote I/O Module



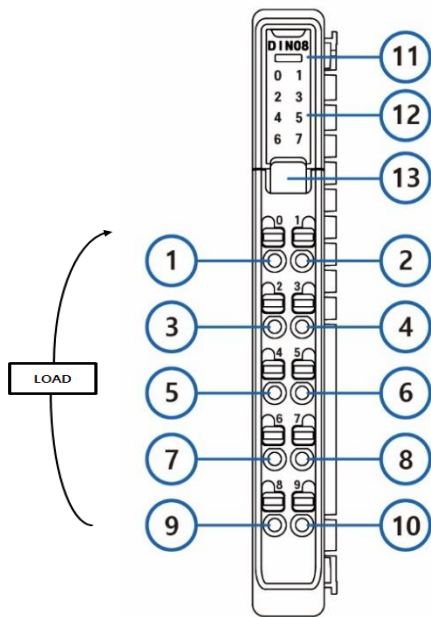
(mm)

Model	W	D	H
MIO-DIN08-01	12	101	75
MIO-DIP08-01			
MIO-DON08-01			
MIO-DOP08-01			
MIO-DOR04-01			
MIO-DIN16-01			
MIO-DIP16-01			
MIO-DON16-01			
MIO-DOP16-01			
MIO-AIC04-01			
MIO-AIV04-01			
MIO-AIR02-01			
MIO-AOC04-01			
MIO-AOV04-01			

4.2 Part Name and Specification

4.2.1 MIO-DIN08-01

- Digital Sink, 24V, Input 8ch

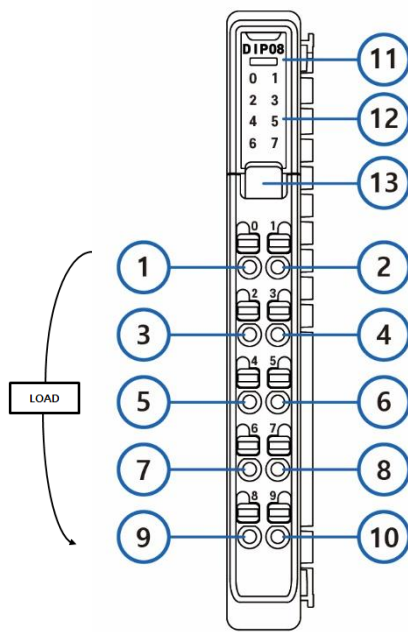


No	Name	Description
1	DIN0	0 Ch Contact Input
2	DIN1	1 Ch Contact Input
3	DIN2	2 Ch Contact Input
4	DIN3	3 Ch Contact Input
5	DIN4	4 Ch Contact Input
6	DIN5	5 Ch Contact Input
7	DIN6	6 Ch Contact Input
8	DIN7	7 Ch Contact Input
9	F24V	Common Terminal
10	F24V	*Filed Power(24Vdc) Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	8 channels Sink Type
Indicators	8 White/Input States, 1 Green/Red Operating State
Input Voltage Range	24Vdc typ. ON-state: Min. 10.2Vdc ~ Max. 28.8Vdc, OFF-state: Max. 5Vdc
Input Current in On State	Max. 6mA/channel@28.8Vdc
Typ. Input Impedance	Typ. 4.7KΩ
Input Signal Delay	OFF to ON: Max. 0.1ms ON to OFF: Max. 0.5ms
Input filter(digital)	0.5ms
Common Type	2COM, 24Vdc
System Power Dissipation	Max. 70mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 10P

4.2.2 MIO-DIP08-01

- Digital Source, 24V, Input 8ch

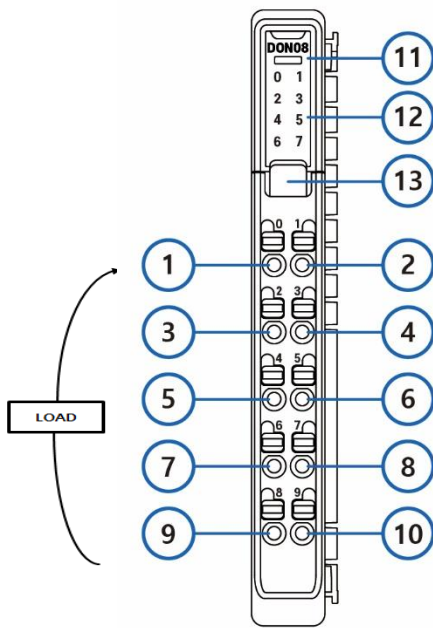


No	Name	Description
1	DIP0	0 Ch Contact Input
2	DIP1	1 Ch Contact Input
3	DIP2	2 Ch Contact Input
4	DIP3	3 Ch Contact Input
5	DIP4	4 Ch Contact Input
6	DIP5	5 Ch Contact Input
7	DIP6	6 Ch Contact Input
8	DIP7	7 Ch Contact Input
9	F24G	Common Terminal
10	F24G	*Filed Power(0V) Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	8 channels Source Type
Indicators	8 White/Input States, 1 Green/Red Operating State
Input Voltage Range	24Vdc typ. ON-state: Min. 10.2Vdc ~ Max. 28.8Vdc OFF-state: Max. 5Vdc
Input Current in On State	Max. 6mA/channel@28.8Vdc
Typ. Input Impedance	Typ. 4.7KΩ
Input Signal Delay	OFF to ON: Max. 0.1ms ON to OFF: Max. 0.5ms
Input filter(digital)	0.5ms
Common Type	2COM, 0V
System Power Dissipation	Max. 70mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 10P

4.2.3 MIO-DON08-01

- Digital Sink, 24V, Output 8ch

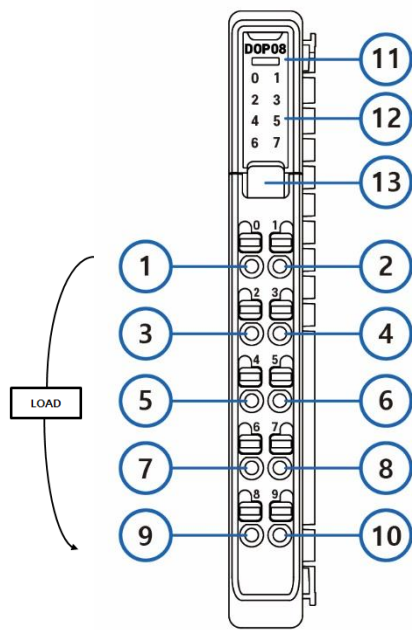


No	Name	Description
1	DON0	0 Ch Contact Output
2	DON1	1 Ch Contact Output
3	DON2	2 Ch Contact Output
4	DON3	3 Ch Contact Output
5	DON4	4 Ch Contact Output
6	DON5	5 Ch Contact Output
7	DON6	6 Ch Contact Output
8	DON7	7 Ch Contact Output
9	F24V	Common Terminal
10	F24V	*Filed Power(24Vdc) Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Outputs	8 channels Sink Type
Indicators	8 White/Output States, 1 Green/Red Operating State
Output Voltage Range	24Vdc typ., Min. 11Vdc ~ Max. 28.8Vdc, ON-state Voltage Drop: Max. 0.3Vdc@25°C OFF-state Leakage Current: Max. 50uA
Output Current in On State	Max. 0.5A /channel @28.8Vdc
Max. On-state Voltage Drop	Max. 0.3Vdc@25°C
OFF-State Leakage Current	Max. 50uA
Output Signal Delay	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.5ms
Common Type	2COM, 24Vdc
System Power Dissipation	Max. 90mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 10P

4.2.4 MIO-DOP08-01

- Digital Source 24V, Output 8ch

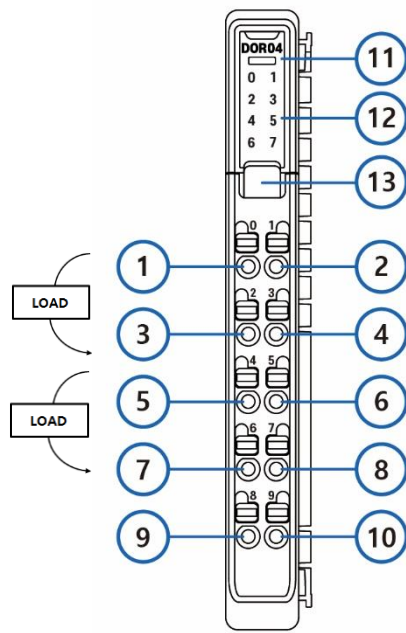


No	Name	Description
1	DOP0	0 Ch Contact Output
2	DOP1	1 Ch Contact Output
3	DOP2	2 Ch Contact Output
4	DOP3	3 Ch Contact Output
5	DOP4	4 Ch Contact Output
6	DOP5	5 Ch Contact Output
7	DOP6	6 Ch Contact Output
8	DOP7	7 Ch Contact Output
9	F24G	Common Terminal
10	F24G	*Filed Power(0V) Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Outputs	8 channels Source Type
Indicators	8 White/Output States, 1 Green/Red Operating State
Output Voltage Range	24Vdc typ., Min. 11Vdc ~ Max. 28.8Vdc, ON-state Voltage Drop: Max. 0.3Vdc@25°C OFF-state Leakage Current: Max. 50uA
Output Current in On State	Max. 0.5A /channel @28.8Vdc
Max. On-state Voltage Drop	Max. 0.3Vdc@25°C
OFF-State Leakage Current	Max. 50uA
Output Signal Delay	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.5ms
Common Type	2COM, 0V
System Power Dissipation	Max. 90mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 10P

4.2.5 MIO-DOR04-01

- Relay 2A / 24Vdc, Output 4ch

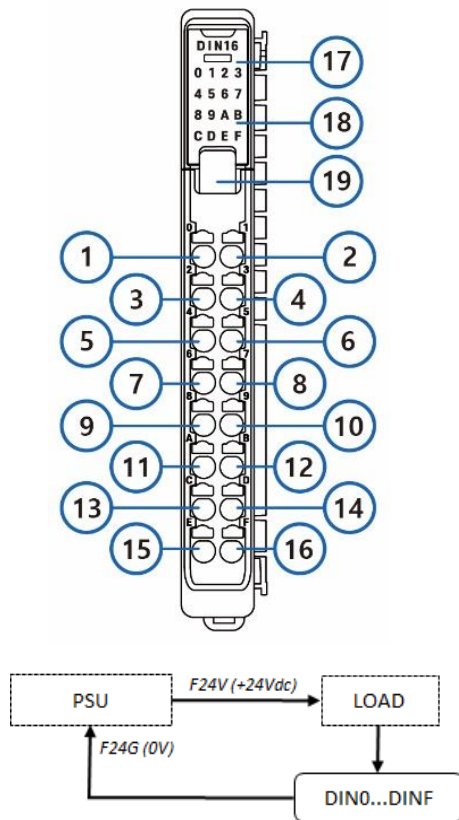


No	Name	Description
1	DOR1	1 Ch Contact Output
2	DOR2	2 Ch Contact Output
3	COM1	1 Ch Common Terminal
4	COM2	2 Ch Common Terminal
5	DOR3	3 Ch Contact Output
6	DOR4	4 Ch Contact Output
7	COM3	3 Ch Common Terminal
8	COM4	4 Ch Common Terminal
9	NC	Not Capable
10	NC	Not Capable
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Outputs	4 channels
Indicators	4 White/Output States, 1 Green/Red Operating State
Output Voltage Range	2A / 24Vdc
Max. On-state Voltage Drop	0.5V@2.0A, Resistive Load, 24Vdc
OFF-State Leakage Current	Max. 1.5mA
Output Signal Delay	OFF to ON: Max. 3ms ON to OFF: Max. 3ms
Common Type	4Channels/4COMs
System Power Dissipation	Max. 200mA@5.0Vdc
Isolation	I/O to Logic: Relay Coil/Contact Isolation
Pin No.	Removable Terminal Block 10P

4.2.6 MIO-DIN16-01

- Digital Sink, 24V, Input 16ch

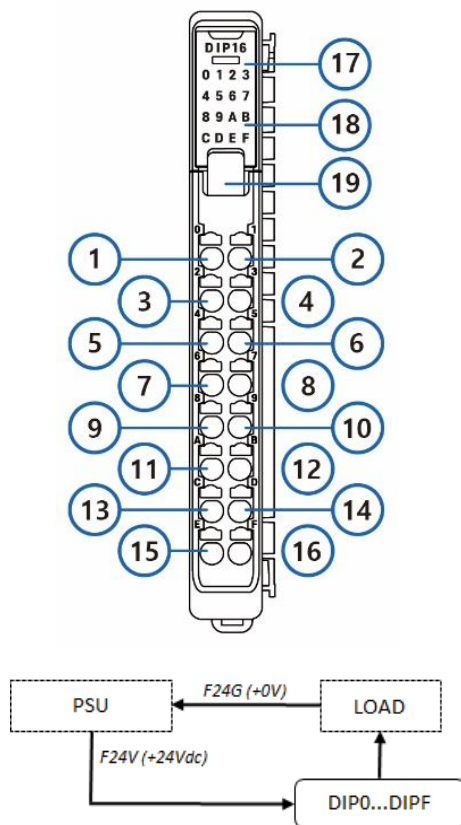


No	Name	Description
1	DIN0	0 Ch Contact Input
2	DIN1	1 Ch Contact Input
3	DIN2	2 Ch Contact Input
4	DIN3	3 Ch Contact Input
5	DIN4	4 Ch Contact Input
6	DIN5	5 Ch Contact Input
7	DIN6	6 Ch Contact Input
8	DIN7	7 Ch Contact Input
9	DIN8	8 Ch Contact Input
10	DIN9	9 Ch Contact Input
11	DINA	A Ch Contact Input
12	DINB	B Ch Contact Input
13	DINC	C Ch Contact Input
14	DIND	D Ch Contact Input
15	DINE	E Ch Contact Input
16	DINF	F Ch Contact Input
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
18	Connection Status LED	Connection Status LED
19	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	16 channels Sink Type
Indicators	16 White/Input States, 1 Green/Red Operating State
Input Voltage Range	24Vdc typ. ON-state: Min. 10.2Vdc ~ Max. 28.8Vdc, OFF-state: Max. 5Vdc
Input Current in On State	Max. 6mA/channel@28.8Vdc
Typ. Input Impedance	Typ. 4.7KΩ
Input Signal Delay	OFF to ON: Max. 0.1ms ON to OFF: Max. 0.5ms
Input filter(digital)	0.5ms
System Power Dissipation	Max. 70mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 16P

4.2.7 MIO-DIP16-01

- Digital Source 24V, Input 16ch

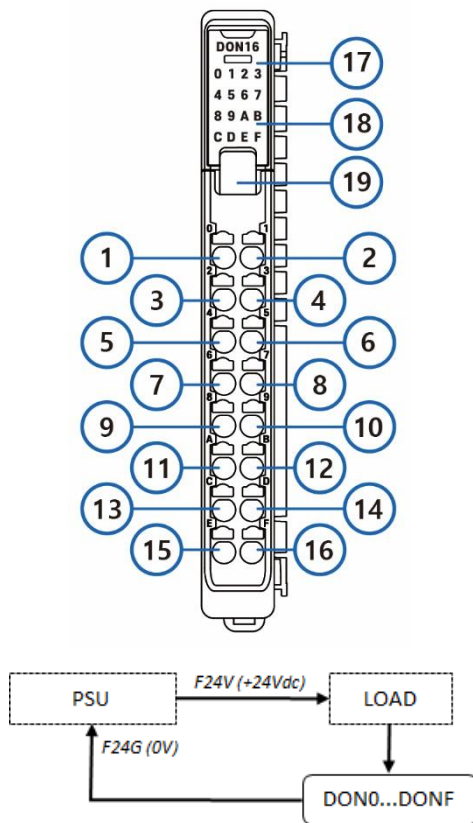


No	Name	Description
1	DIN0	0 Ch Contact Input
2	DIN1	1 Ch Contact Input
3	DIN2	2 Ch Contact Input
4	DIN3	3 Ch Contact Input
5	DIN4	4 Ch Contact Input
6	DIN5	5 Ch Contact Input
7	DIN6	6 Ch Contact Input
8	DIN7	7 Ch Contact Input
9	DIN8	8 Ch Contact Input
10	DIN9	9 Ch Contact Input
11	DINA	A Ch Contact Input
12	DINB	B Ch Contact Input
13	DINC	C Ch Contact Input
14	DIND	D Ch Contact Input
15	DINE	E Ch Contact Input
16	DINF	F Ch Contact Input
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
18	Connection Status LED	Connection Status LED
19	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	16 channels Source Type
Indicators	16 White/Input States, 1 Green/Red Operating State
Input Voltage Range	24Vdc typ. ON-state: Min. 10.2Vdc Max. 28.8Vdc, OFF-state: Max. 5Vdc
Input Current in On State	Max. 6mA/channel@28.8Vdc
Typ. Input Impedance	Typ. 4.7KΩ
Input Signal Delay	OFF to ON: Max. 0.1ms ON to OFF: Max. 0.5ms
Input filter(digital)	0.5ms
System Power Dissipation	Max. 70mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 16P

4.2.8 MIO-DON16-01

- Digital Sink, 24V, Output 16ch

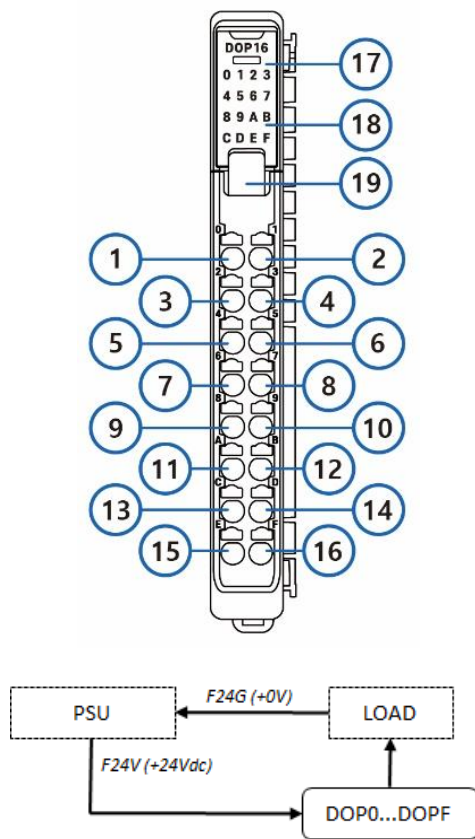


No	Name	Description
1	DON0	0 Ch Contact Output
2	DON1	1 Ch Contact Output
3	DON2	2 Ch Contact Output
4	DON3	3 Ch Contact Output
5	DON4	4 Ch Contact Output
6	DON5	5 Ch Contact Output
7	DON6	6 Ch Contact Output
8	DON7	7 Ch Contact Output
9	DON8	8 Ch Contact Output
10	DON9	9 Ch Contact Output
11	DONA	A Ch Contact Output
12	DONB	B Ch Contact Output
13	DONC	C Ch Contact Output
14	DOND	D Ch Contact Output
15	DONE	E Ch Contact Output
16	DONF	F Ch Contact Output
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
18	Connection Status LED	Connection Status LED
19	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Outputs	16 channels Sink Type
Indicators	16 White/Output States, 1 Green/Red Operating State
Output Voltage Range	24Vdc typ., Min. 11Vdc~Max. 28.8Vdc, ON-state Voltage Drop: Max. 0.3Vdc@25°C OFF-state Leakage Current: Max. 50uA
Output Current in On State	Max. 0.5A /channel @28.8Vdc
Max. On-state Voltage Drop	Max. 0.3Vdc@25°C
OFF-State Leakage Current	Max. 50uA
Output Signal Delay	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.5ms
System Power Dissipation	Max. 120mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 16P

4.2.9 MIO-DOP16-01

- Digital Source 24V, Output 16ch

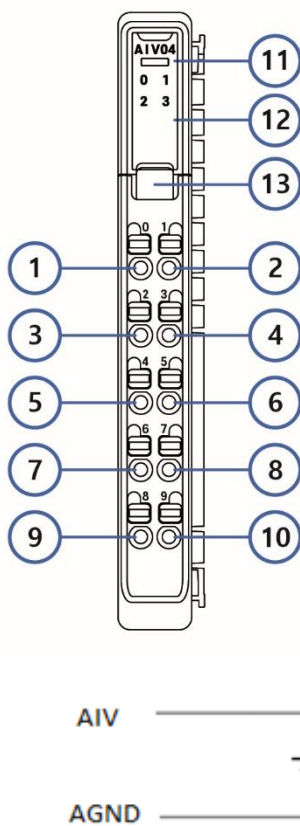


No	Name	Description
1	DOP0	0 Ch Contact Output
2	DOP1	1 Ch Contact Output
3	DOP2	2 Ch Contact Output
4	DOP3	3 Ch Contact Output
5	DOP4	4 Ch Contact Output
6	DOP5	5 Ch Contact Output
7	DOP6	6 Ch Contact Output
8	DOP7	7 Ch Contact Output
9	DOP8	8 Ch Contact Output
10	DOP9	9 Ch Contact Output
11	DOPA	A Ch Contact Output
12	DOPB	B Ch Contact Output
13	DOPC	C Ch Contact Output
14	DOPD	D Ch Contact Output
15	DOPE	E Ch Contact Output
16	DOPF	F Ch Contact Output
17	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
18	Connection Status LED	Connection Status LED
19	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Outputs	16 channels Source Type
Indicators	16 White/Output States, 1 Green/Red Operating State
Output Voltage Range	24Vdc typ., Min. 11Vdc~Max. 28.8Vdc, ON-state Voltage Drop: Max. 0.3Vdc@25°C OFF-state Leakage Current: Max. 50uA
Output Current in On State	Max. 0.5A /channel @28.8Vdc
Max. On-state Voltage Drop	Max. 0.3Vdc@25°C
OFF-State Leakage Current	Max. 50uA
Output Signal Delay	OFF to ON: Max. 0.3ms ON to OFF: Max. 0.5ms
System Power Dissipation	Max. 120mA@5.0Vdc
Isolation	I/O to Logic: Photocoupler isolation
Field Power	Typ. 24Vdc(11~28.8Vdc)
Pin No.	Removable Terminal Block 16P

4.2.10 MIO-AIV04-01

- Analog Voltage, Input 4ch

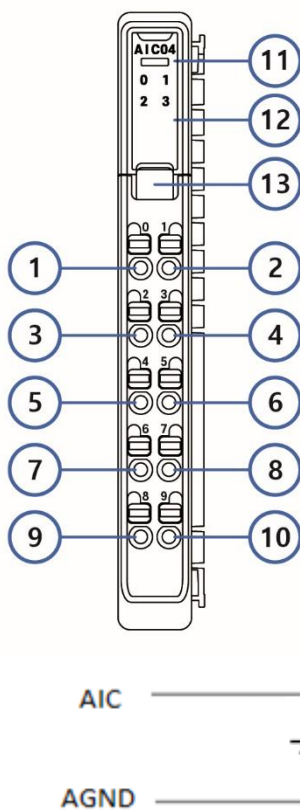


No	Name	Description
1	AIV0	0 Ch Contact Analog Voltage Input
2	AIV1	1 Ch Contact Analog Voltage Input
3	AGND	Analog Ground
4	AGND	Analog Ground
5	AIV2	2 Ch Contact Analog Voltage Input
6	AIV3	3 Ch Contact Analog Voltage Input
7	AGND	Analog Ground
8	AGND	Analog Ground
9	F.G	Ground Terminal
10	F.G	Ground Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	4 channels Analog voltage Type
Indicators	4 White/Input States, 1 Green/Red Operating State
Typ. Input Impedance	Min. 500KΩ
Sensor Type and Input Range	0 ~ 5 Vdc
DATA Format	16bits Integer
Resolution	16bits, 0.076mV/1bit
Conversion Time	4ms/All channel
Module Error	±0.1% Full Scale @25°C, ±0.3% Full Scale @0°C, 60°C
Isolation	Capacitive isolation
Common Type	4COM (Single Common)
System Power Dissipation	Max. 200mA@5.0Vdc
Field power	N/A
Pin No.	Removable Terminal Block 10P

4.2.11 MIO-AIC04-01

- Analog Current, Input 4ch

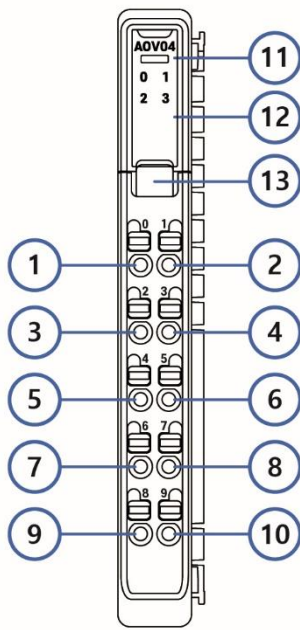


No	Name	Description
1	AIC0	0 Ch Contact Analog Current Input
2	AIC1	1 Ch Contact Analog Current Input
3	AGND	Analog Ground
4	AGND	Analog Ground
5	AIC2	2 Ch Contact Analog Current Input
6	AIC3	3 Ch Contact Analog Current Input
7	AGND	Analog Ground
8	AGND	Analog Ground
9	F.G	Ground Terminal
10	F.G	Ground Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	4 channels Analog current Type
Indicators	4 White/Input States, 1 Green/Red Operating State
Typ. Input Impedance	Max. 250Ω
Sensor Type and Input Range	0~20mA
DATA Format	16bits Integer
Resolution	16bits, 0.3uA/Bit
Conversion Time	4ms / All channel
Module Error	±0.1% Full Scale @25°C, ±0.3% Full Scale @0°C, 60°C
Isolation	Capacitive isolation
Common Type	4COM (Single Common)
System Power Dissipation	Max. 200mA@5.0Vdc
Field power	N/A
Pin No.	Removable Terminal Block 10P

4.2.12 MIO-AOV04-01

- Analog Voltage, Output 4ch

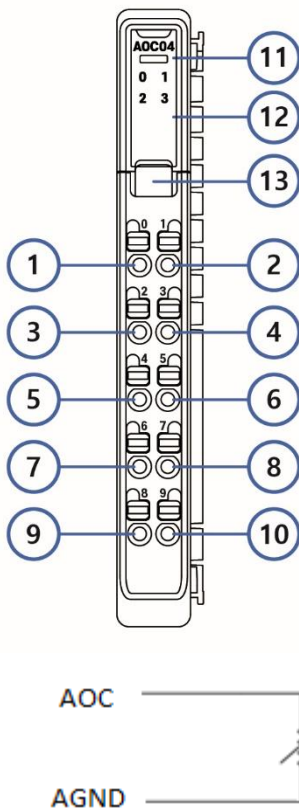


No	Name	Description
1	AOV0	0 Ch Contact Analog Voltage Output
2	AOV1	1 Ch Contact Analog Voltage Output
3	AGND	Analog Ground
4	AGND	Analog Ground
5	AOV2	2 Ch Contact Analog Voltage Output
6	AOV3	3 Ch Contact Analog Voltage Output
7	AGND	Analog Ground
8	AGND	Analog Ground
9	F.G	Ground Terminal
10	F.G	Ground Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	4 channels Analog voltage Type
Indicators	4 White/Input States, 1 Green/Red Operating State
Load	Min. 5K Ω
Sensor Type and Input Range	0 ~ 5 Vdc
DATA Format	16bits Integer
Resolution	16bits, 0.076mV/1bit
Conversion Time	4ms / All channel
Module Error	$\pm 0.1\%$ Full Scale @25°C, $\pm 0.3\%$ Full Scale @0°C, 60°C
Isolation	Capacitive isolation
Common Type	4COM (Single Common)
System Power Dissipation	Max. 200mA@5.0Vdc
Field power	Max. 60mA@24Vdc
Pin No.	Removable Terminal Block 10P

4.2.13 MIO-AOC04-01

- Analog Current, Output 4ch

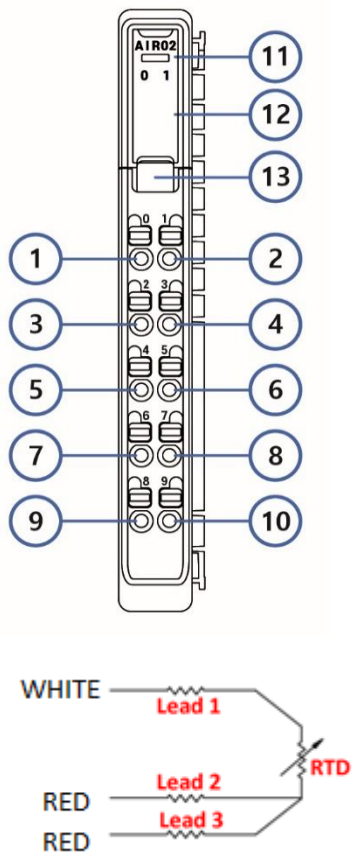


No	Name	Description
1	AOV0	0 Ch Contact Analog Current Output
2	AOV1	1 Ch Contact Analog Current Output
3	AGND	Analog Ground
4	AGND	Analog Ground
5	AOV2	2 Ch Contact Analog Current Output
6	AOV3	3 Ch Contact Analog Current Output
7	AGND	Analog Ground
8	AGND	Analog Ground
9	F.G	Ground Terminal
10	F.G	Ground Terminal
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	4 channels Analog current Type
Indicators	4 White/Input States, 1 Green/Red Operating State
Load	Max. 350Ω
Sensor Type and Input Range	0~20mA
DATA Format	16bits Integer
Resolution	16bits, 0.3uA/Bit
Conversion Time	4ms / All channel
Module Error	±0.1% Full Scale @25°C, ±0.3% Full Scale @0°C, 60°C
Isolation	Capacitive isolation
Common Type	4COM (Single Common)
System Power Dissipation	Max. 200mA@5.0Vdc
Field power	Max. 60mA@24Vdc
Pin No.	Removable Terminal Block 10P

4.2.14 MIO-AIR02-01

- Analog RTD, Input 2ch



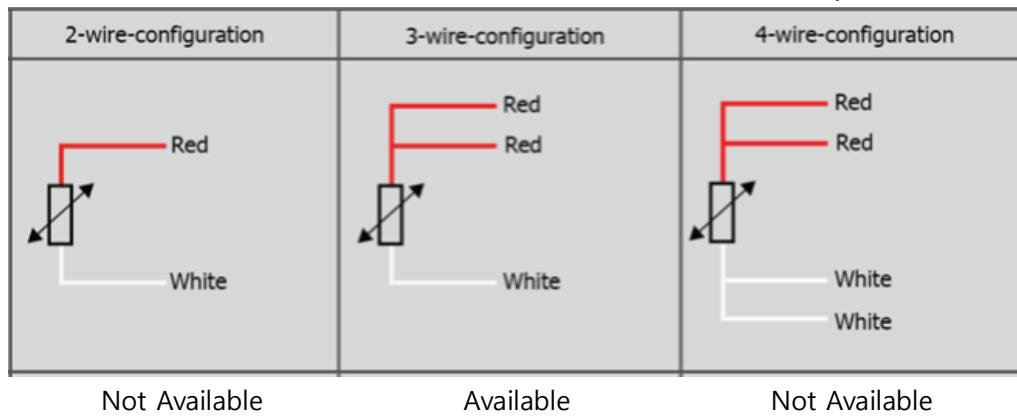
No	Name	Description
1	RTD1A	PT100 0 Ch A Terminal Input (WHITE)
2	RTD2A	PT100 1 Ch A Terminal Input (WHITE)
3	RTD1B	PT100 0 Ch B Terminal Input (RED)
4	RTD2B	PT100 1 Ch B Terminal Input (RED)
5	RTD1B'	PT100 0 Ch B' Terminal Input (RED)
6	RTD2B'	PT100 1 Ch B' Terminal Input (RED)
7	N.C	Not Capable
8	N.C	
9	N.C	
10	N.C	
11	System Status LED	Expansion Module Status LED - GREEN: Normal Operation - RED: Comm. Error or Initialization
12	Connection Status LED	Connection Status LED
13	Detachment Hook	Hook to detach Terminal Block

Name	Description
Number of Inputs	2 channels analog RTD Type
Indicators	2 White/Input States, 1 Green/Red Operating State
Sensor Type and Input Range	PT100 / -200.0 to +850.0°C
DATA Format	15bits Integer
Resolution	0.0312°C/1bit
Conversion Time	Approx. 70ms, All channel @50hz
Module Error	±0.1% Full Scale @25°C, ±0.3% Full Scale @0°C, 60°C
Isolation	Capacitive isolation
Common Type	2COM (1common/1channel)
System Power Dissipation	Max. 70mA@5.0Vdc
Field power	N/A
Pin No.	Removable Terminal Block 10P

* Only for 3 Wire.

** Only for "PT100", not available for "PT1000".

*** Connected lead wire color is defined as IEC 60751-2008 Standard (Inquiry for Industrial Platinum Temperature Sensor) and all wire color is shown as below image.



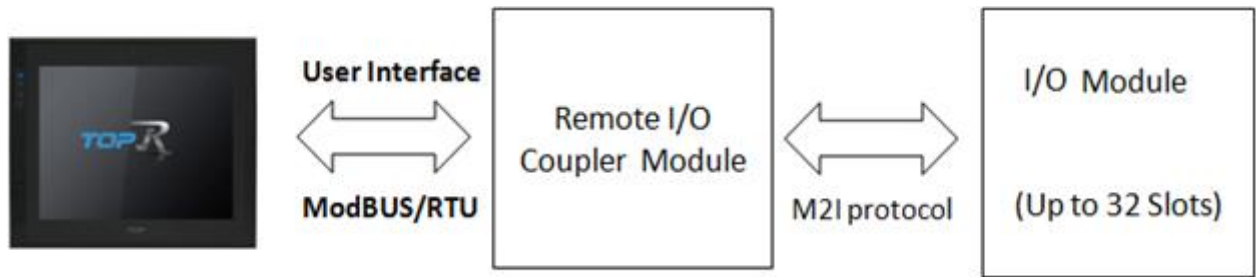
(1) Regular Input Range (°C) and Data Display (DEC) Range

TEMPERATURE (°C)	RTD RESISTANCE (Ω)	RTD DATA REG (01h–02h) (hex)	ADC CODE (dec)	ADC CODE/32-256 (°C)
-200	18.52	0BDAh	1517	-208.59
-175	29.22	12B4h	2394	-181.19
-150	39.72	196Ch	3254	-154.31
-125	50.06	200Ah	4101	-127.84
-100	60.26	2690h	4936	-101.75
-75	70.33	2D04h	5762	-75.94
-50	80.31	3366h	6579	-50.41
-40	84.27	35EEh	6903	-40.28
-30	88.22	3876h	7227	-30.16
-20	92.16	3AFCh	7550	-20.06
-10	96.09	3D7Eh	7871	-10.03
0	100.00	4000h	8192	0.00
10	103.90	4280h	8512	10.00
20	107.79	44FCh	8830	19.94
30	111.67	4778h	9148	29.88
40	115.54	49F2h	9465	39.78
50	119.40	4C6Ah	9781	49.66
60	123.24	4EE0h	10096	59.50
70	127.08	5154h	10410	69.31
80	130.90	53C6h	10723	79.09
90	134.71	5636h	11035	88.84
100	138.51	58A4h	11346	98.56
110	142.29	5B12h	11657	108.28
120	146.07	5D7Ch	11966	117.94
130	149.83	5FE4h	12274	127.56
140	153.58	624Ch	12582	137.19
150	157.33	64B0h	12888	146.75
160	161.05	6714h	13194	156.31
170	164.77	6974h	13498	165.81
180	168.48	6BD4h	13802	175.31
190	172.17	6E30h	14104	184.75
200	175.86	708Ch	14406	194.19
225	185.01	7668h	15156	217.63
250	194.10	7C3Ah	15901	240.91
275	203.11	81FEh	16639	263.97
300	212.05	87B6h	17371	286.84
325	220.92	8D64h	18098	309.56
350	229.72	9304h	18818	332.06
375	238.44	989Ah	19533	354.41
400	247.09	9E24h	20242	376.56
425	255.67	A3A2h	20945	398.53
450	264.18	A914h	21642	420.31
475	272.61	AE7Ah	22333	441.91
500	280.98	B3D4h	23018	463.31
525	289.27	B922h	23697	484.53
550	297.49	BE64h	24370	505.56

Chapter 5 Operation / Settings

5.1. System Configuration

To communicate with the coupler module, you must connect it by referring to the following.



5.2 Connecting Expansion Slot

- (1) A slot number will be registered automatically when you connect the I/O Expansion Module.
- (2) Maximum number of I/O Expansion Module for 1 Coupler should be connected considering current consumption of I/O module and rated current of Coupler module.

I/O Module	Current Consumption	Coupler's Rated Current
MIO-DIN08-01	70mA	1400mA
MIO-DIP08-01	70mA	
MIO-DON08-01	90mA	
MIO-DOP08-01	90mA	
MIO-DOR04-01	200mA	
MIO-DIN16-01	70mA	
MIO-DIP16-01	70mA	
MIO-DON16-01	120mA	
MIO-DOP16-01	120mA	
MIO-AIC04-01	200mA	
MIO-AIV04-01	200mA	
MIO-AOC04-01	200mA	
MIO-AOV04-01	200mA	
MIO-AIR02-01	70mA	

* If you use more than Coupler module's rated current, it can cause fire or malfunction.

** If you need more power supply, "MIO-PWR0A" can be used for a power extension.

Chapter 6 Installation / Wiring Warning

6.1 Location

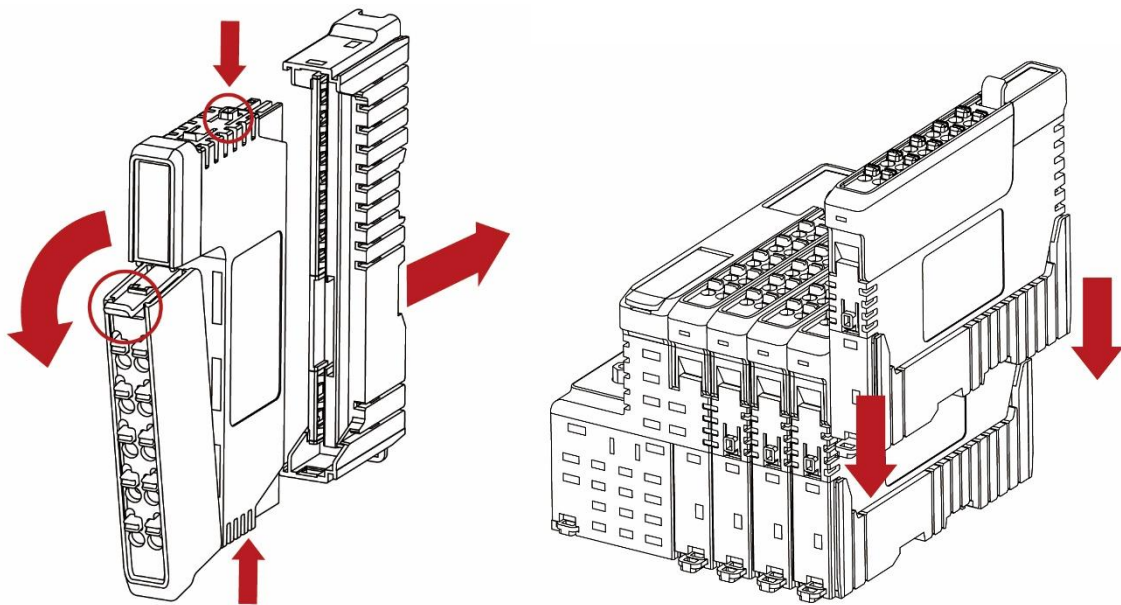
- (1) Keep more than 100mm distance from other devices for safe operation and eliminate mechanical risk factors around.
- (2) Installation environment should be $-10\sim 50^{\circ}\text{C}$ temperature and $10\sim 90\%\text{RH}$ humid.
- (3) If an installation is in sealed condition, cooler fan should be installed.
- (4) Keep power cables away from communication cables. A noise can cause a malfunction.
- (5) Install the product keeping distance from cables which has a lot of noise, and wiring length would be short.

6.2 Outer Protection

Operation of product may not be normal cause of part malfunctions like relay or transistor. Important output signals are recommended to protected by outer protection device or circuits.

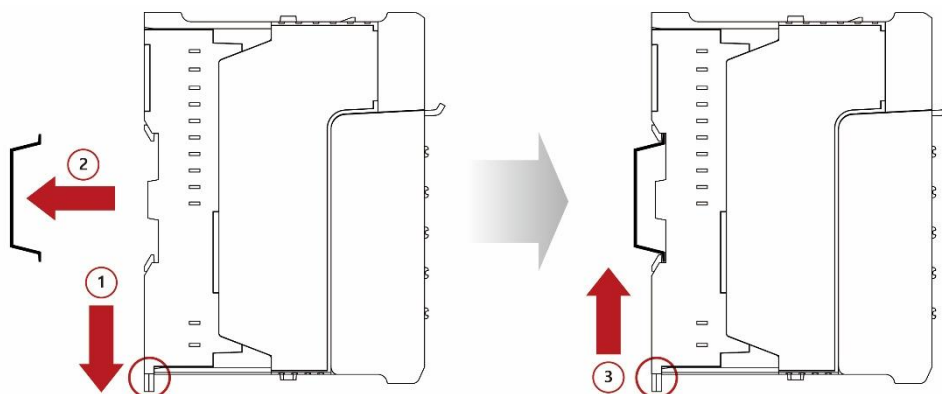
6.3 Module Detachment and Replacement

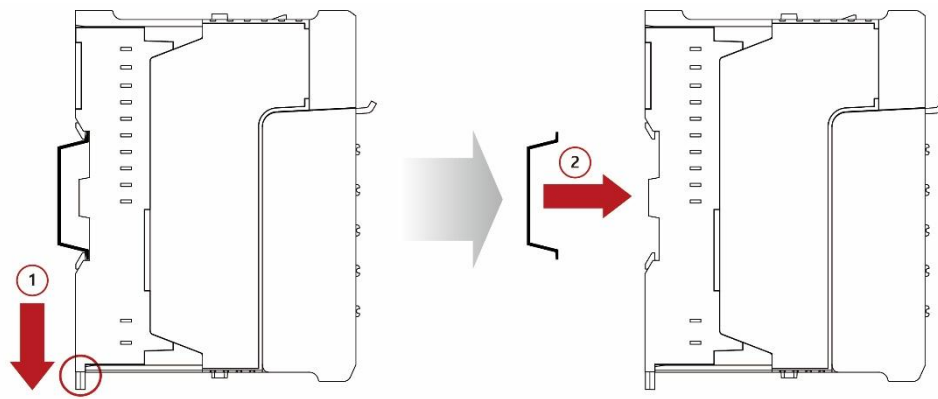
This product supports HOT SWAP function (replacing parts without power off), and each part can be detached as below images.



6.4 DIN RAIL Attachment

This product has DIN RAIL(35mm) Hook as standard.

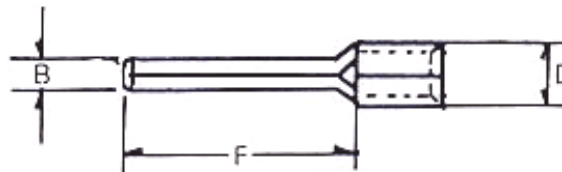




6.5 Power, Ground, Communication Cable Specification

6.5.1 Pin Terminal Attachment

Caution: Using Pin Terminal when wiring power and ground cable is important point for keeping a condition of product's condition. If you do not follow below table's standard of Pin Terminal, it can cause cable's malfunction and electric shock.



Category	B	F	D	AWG Spec.
Available	1.1 ~ 1.5mm	8 ~ 10mm	3mm or less	26 ~ 20
Recommended	1.5mm	10 mm		20

6.6 Ground Wiring Warning

(1) This product has enough anti-noise measure, so except that there are many noises. Specially, the ground is not needed. When doing ground, please refer to the followings.

(2) The ground should be the exclusive ground. The ground should be type 3 ground (ground resistor is less than 100Ω)

(3) When not doing the exclusive ground, do common ground like figure B.

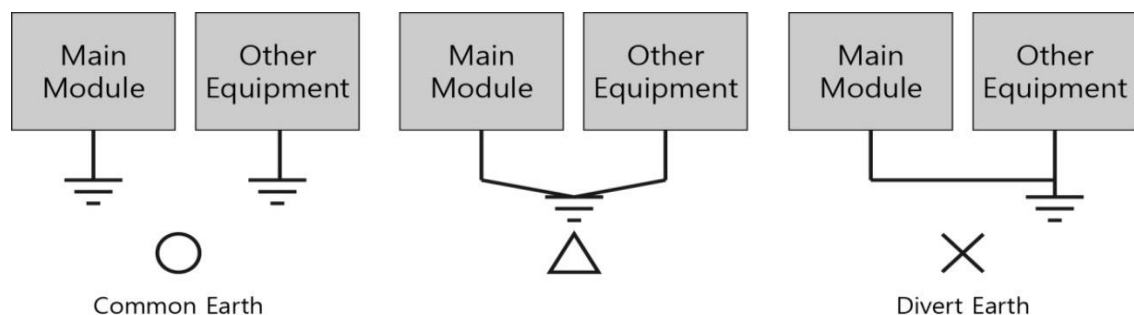


Fig. Grounding Example Diagram

(4) Put the point of the ground near product and shorten a Ground line.

Chapter 7 Maintenance Warning

7.1 Cleaning the Display

When the surface become dirty, spray the cleaning solution onto a soft cloth and wipe the device.

7.2 Periodic Check Points

Check the followings periodically for best condition of the device.

(1) Environment

- 1) Is the operating temperature within the allowable range (-10 ~ 50°C)?
- 2) Is the operating humidity within the allowable range (0 ~ 90%RH)?
- 3) Is the Surrounding pollution no corrosive gas?

(2) Power

- 1) Is the input voltage within the change range?

(3) Related Items

- 1) Check any foreign containments or pollutions on contact points.
- 2) Check the status of assemble after detachm.

7.3 Trouble Guide Warning

- (1) If there is any trouble of product, stop the operation and inform about the trouble to a repair department of M2I Corporation.
- (2) Inspection and Repair is allowed to the people who is authorized or approved from M2I Corporation.
- (3) If the trouble is not cleared in operation field, a product can collect and repaired in M2I Corporation.
- (4) Crashes or Malfunctions from operations or operation conditions beyond the standards of this manual, is not belong to M2I Corporation.

Chapter 8 Products Label



Manufacture (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 14055 , Republic of Korea

Device Type: Industrial Remote I/O Module

Model Name: MIO-*****_**

Operating Temp.: $-10^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$

Power:

- MIO-DIN08-01: 5VDC@70mA
- MIO-DIP08-01: 5VDC@70mA
- MIO-DIN16-01: 5VDC@70mA
- MIO-DIP16-01: 5VDC@70mA
- MIO-DON08-01: 5VDC@90mA
- MIO-DOP08-01: 5VDC@90mA
- MIO-DON16-01: 5VDC@120mA
- MIO-DOP16-01: 5VDC@120mA
- MIO-DOR04-01: 5VDC@200mA
- MIO-AIC04-01: 5VDC@200mA
- MIO-AIV04-01: 5VDC@200mA
- MIO-AOC04-01: 5VDC@200mA
- MIO-AOV04-01: 5VDC@200mA
- MIO-AIR02-01: 5VDC@70mA

KC Certificates No:

Serial No:

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www.m2i.co.kr

- When using M2I equipment, thoroughly read this datasheet and associated manuals introduced in this datasheet, also pay careful attention to safety and handle the module properly.
- Store this datasheet in a safe place so that you can take it out read it whenever necessary.

User Guide
This product has Relevant Assessments for business environment. If this product is used in home environment, there can be an interference.