

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
1.00		Specification change	May. 13, 2020	YMKIM
1.01		Remove Description pages of Hot Swap Function, Use in Hazardous Environments and Caution(Before using the unit)	2020/12/09	SJ LIM
1.02	5p	Specification change	2021/03/29	BH, LIM
1.03	5p	Specification change	2021/03/31	BH, LIM
1.04	5p	Specification change	2021/04/01	BH, LIM
1.05	5p	Specification change	2021/05/04	BH, LIM
1.06	4P	Environment Specification Update	2021/11/16	EC KIM
1.07	4,5	Certificate Update and Specification change	2023/06/05	CW SEO

1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operating Temperature	-25 °C ~ 60 °C
UL Temperature	-25 °C ~ 60 °C
Storage Temperature	-40 °C ~ 85 °C
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN Rail
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	IEC 60068-2-6, 4g
Industrial Emissions	EN61000-6-4/All : 2011
Industrial Immunity	EN61000-6-2 : 2019
Installation Position	Vertical and horizontal installation is available
Product Certifications	UL, ATEX, CE, UKCA, ABS, BV, CCS, DNV, KR, LR

Specification

2. M3808 (8 CHANNELS THERMOCOUPLE/MV INPUT)

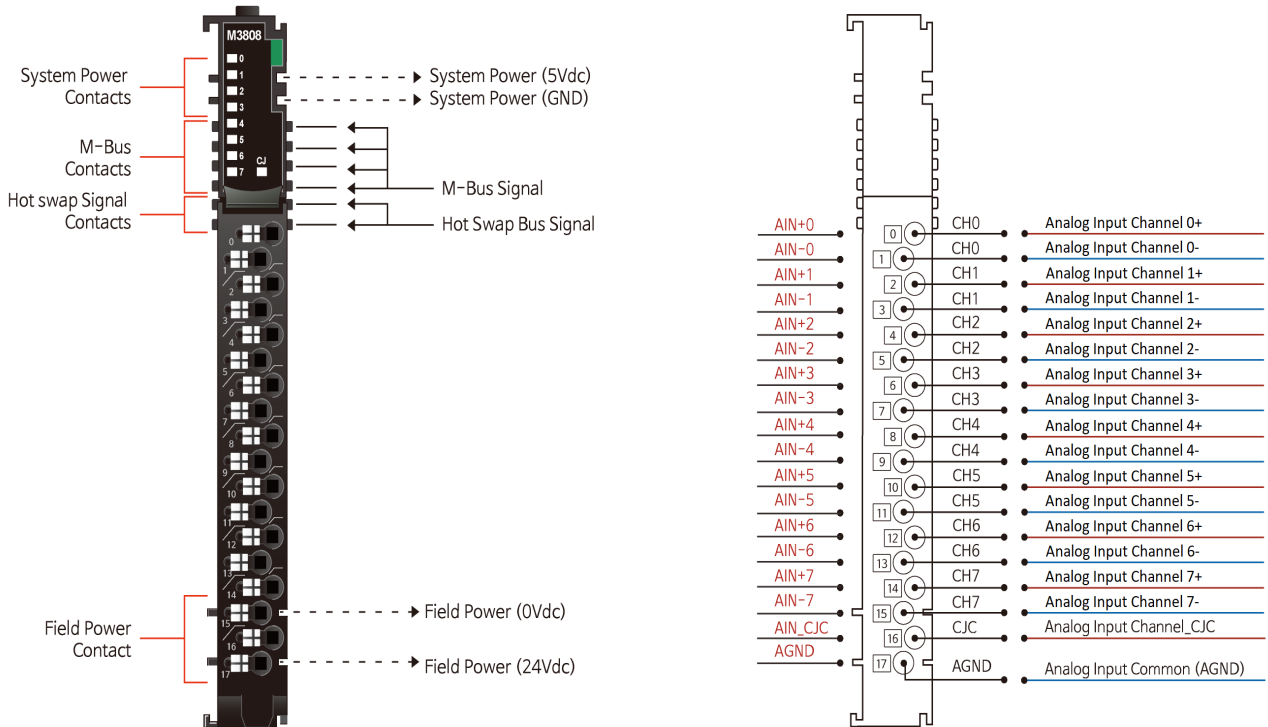
2.1. M3808 Specification

Items	Specification				
Input Specification					
Inputs per module	8 Channels				
Indicators(Logic side)	8 Green Input status , 1 Green Input CJ status				
Sensor Types (Need 20 minute preheating to get enhanced accuracy.)	Thermal Couple Input Range				
	Type	Maximum Input Range	Recommended Input Range	Accuracy (Recommended Input Range)	
				25°C (ambient)	-40°C~60°C (ambient)
	K	-270 ~ 1372°C	-200 ~1200°C	±0.1%	±0.3%
	J	-210 ~ 1200°C	-40 ~ 1100°C	±0.1%	±0.3%
	T	-270 ~ 400°C	-200 ~ 350°C	±0.3%	±0.5%
	B	30 ~ 1820°C	600 ~ 1700°C	±0.4%	±0.5%
	R	-50~1768°C	0 ~ 1600°C	±0.3%	±0.6%
	S	-50 ~ 1768°C	0 ~ 1600°C	±0.2%	±0.6%
	E	-270 ~ 1000°C	-200 ~ 800°C	±0.1%	±0.3%
	N	-270 ~ 1300°C	-200 ~ 1250°C	±0.1%	±0.3%
	L	-200 ~ 900°C	-100 ~ 850°C	±0.1%	±0.3%
	U	-200 ~ 600°C	-100 ~ 550°C	±0.2%	±0.4%
	C	0 ~ 2310°C	100 ~ 2100°C	±0.2%	±0.4%
	D	0 ~ 2490°C	100 ~ 2200°C	±0.2%	±0.4%
	10uV Input	-81.0 ~ 81.0mV, 10uV/ 1 Count		±0.1%	±0.3%
	1uV Input	-32.7 ~ 32.7mV, 1uV/ 1 Count		±0.1%	±0.3%
	2uV Input	-65.5 ~ 65.5mV, 2uV/ 1 Count		±0.1%	±0.3%
	* Negative temperature increases by ±0.1% compared to existing temperature				
Cold Junction Module Accuracy (Need 20 minute preheating to get enhanced accuracy.)	External Cold Junction(PT100) ±1.5°C Recommended Scale @ 25°C ±3.5°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				
Data Format	16bits Integer (2' complement)				
Calibration	Not Required				
Diagnostic					
Power dissipation	Max. 150mA @ 5Vdc				
Isolation	I/O to Logic : Isolation Field power : Not Connected				
UL Field Power	Supply voltage : 24Vdc nominal. Class2				

Specification

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 1b-in)
Weight	72g
Module Size	12mm x 110mm x 75mm
Hot Swap	Possible
Environment Condition	Refer to 'Environment Specification'

2.2. M3808 Wiring Diagram



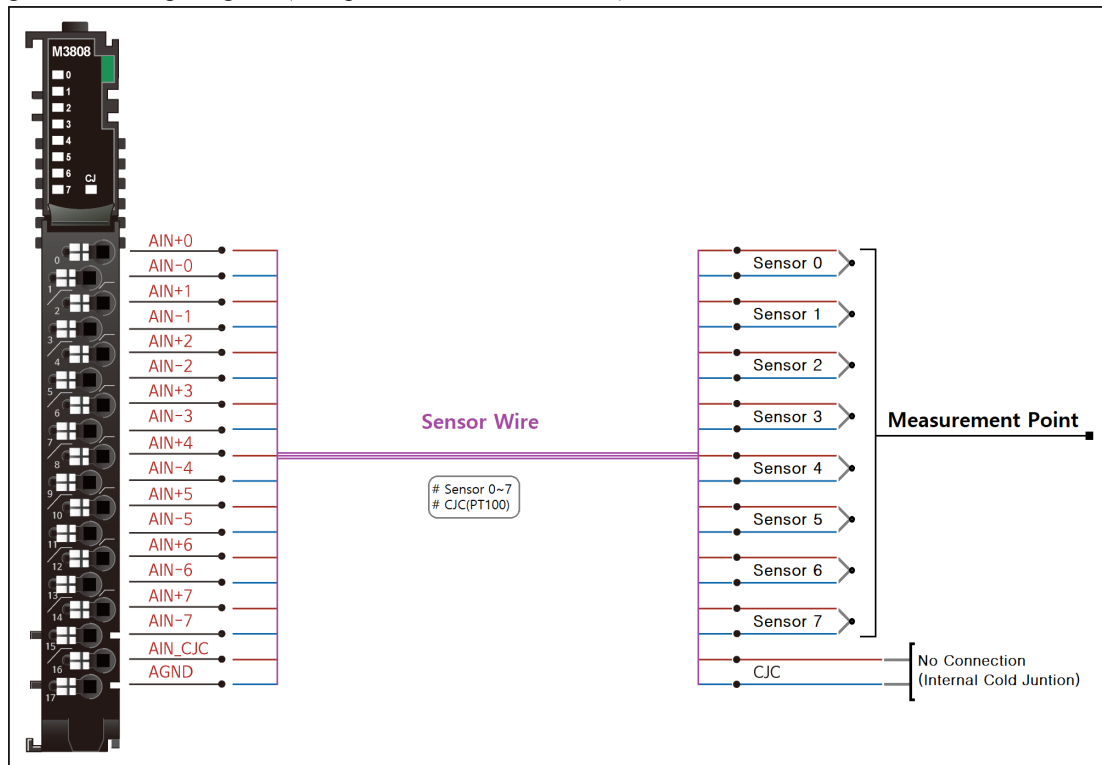
Pin No.	Signal Description
0	TC Input Channel 0+
1	TC Input Channel 0-
2	TC Input Channel 1+
3	TC Input Channel 1-
4	TC Input Channel 2+
5	TC Input Channel 2-
6	TC Input Channel 3+
7	TC Input Channel 3-
8	TC Input Channel 4+
9	TC Input Channel 4-
10	TC Input Channel 5+
11	TC Input Channel 5-
12	TC Input 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≤CTI≤400
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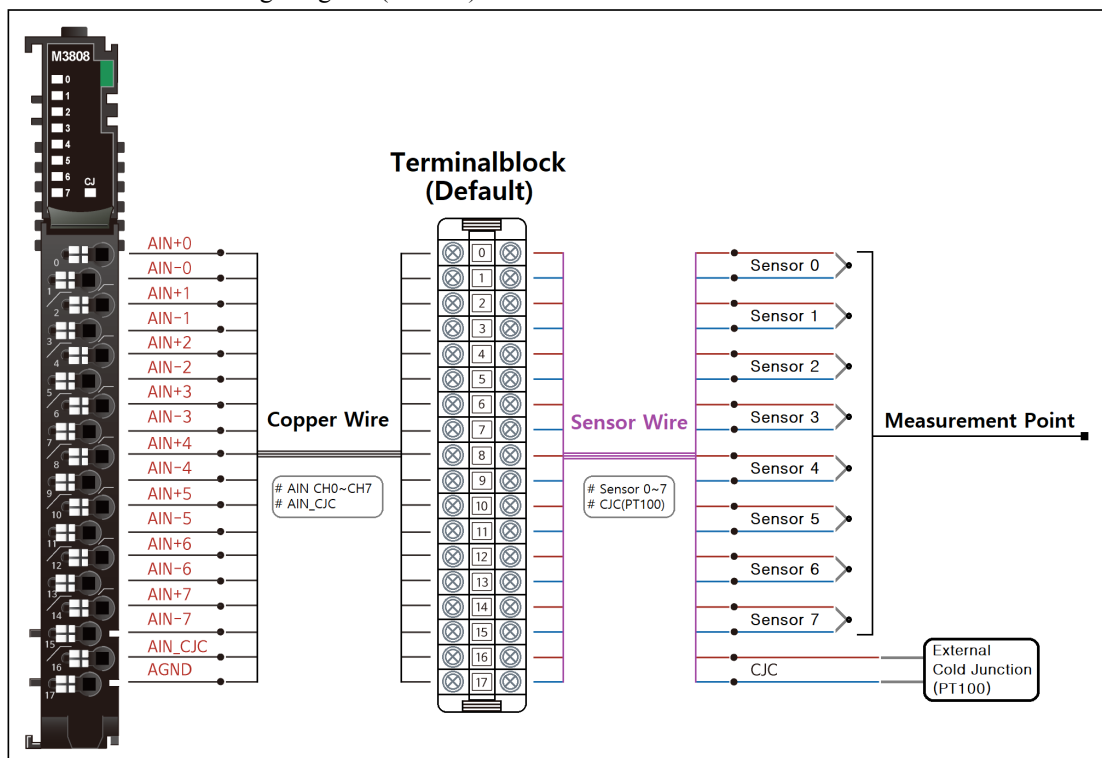
Spacings : The following minimum spacing in inches (millimeters) shall be maintained between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded part including any mounting surface or exposed metal part.

Specification

■ Configuration Wiring Diagram (Except External Cold Junction)

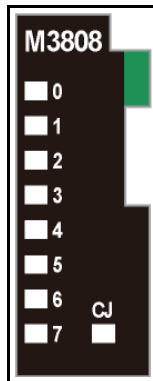


■ External Cold Junction Wiring Diagram (Default)



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 CJC	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)

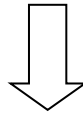
2.3.3. CJC Status LED

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*	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