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# **FnIO G – Series :**

## ***GT-3808***

***GT-3808 (8 Channels, TC/mV INPUT)***

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# Specification

## History

Rev	Pages	Remarks	Date	Editor
1.00		Preliminary	2016/11/15	Jin Hyun, Hong
1.01	5	Module Accuracy is revised.	2017/02/13	Jin Hyun, Hong
1.02		Typo error is revised.	2017/07/18	Jin Hyun, Hong
1.03	10	New feature added	2020/01/31	Hongseok Kim
1.04	10	TXK Type added	2020/09/15	Hongseok Kim
1.05	5	Specification change	2021/12/23	ByungHyun Lim
1.06	5	Certificate Update and Specification change	2023/06/08	Hongseok Kim
1.07	1~11	Specification form update	2023/07/27	Hongseok Kim
1.08	6	Edit System Power Dissipation	2025/05/30	Suna, Hwang

# Specification

## 1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operation Temperature	-40°C to 70°C
Storage Temperature	-40°C to 85°C
Relative Humidity	5% to 90% Non-condensing
Mounting	DIN Rail
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6, 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

## 2. GT-3808 (8 CHANNELS THERMOCOUPLE/MV INPUT)

### 2.1. GT-3808 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.)	<div>Thermal Couple Input Range<table><tr><th>Type</th><th>Maximum Input Range</th><th>*Recommended Input Range</th></tr><tr><td>K</td><td>-270 ~ 1372℃</td><td>-200 ~ 1200℃</td></tr><tr><td>J</td><td>-210 ~ 1200℃</td><td>-40 ~ 1100℃</td></tr><tr><td>T</td><td>-270 ~ 400℃</td><td>-200 ~ 350℃</td></tr><tr><td>B</td><td>30 ~ 1820℃</td><td>600 ~ 1700℃</td></tr><tr><td>R</td><td>-50~1768℃</td><td>0 ~ 1600℃</td></tr><tr><td>S</td><td>-50 ~ 1768℃</td><td>0 ~ 1600℃</td></tr><tr><td>E</td><td>-270 ~ 1000℃</td><td>-200 ~ 800℃</td></tr><tr><td>N</td><td>-270 ~ 1300℃</td><td>-200 ~ 1250℃</td></tr><tr><td>L</td><td>-200 ~ 900℃</td><td>-100 ~ 850℃</td></tr><tr><td>U</td><td>-200 ~ 600℃</td><td>-100 ~ 550℃</td></tr><tr><td>C</td><td>0 ~ 2310℃</td><td>100 ~ 2100℃</td></tr><tr><td>D</td><td>0 ~ 2490℃</td><td>100 ~ 2200℃</td></tr><tr><td>TXK</td><td>-200 ~ 800℃</td><td>-200 ~ 800℃</td></tr><tr><td>10uV Input</td><td colspan="2">-81.0 ~ 81.0mV, 10uV/ 1 Count</td></tr><tr><td>1uV Input</td><td colspan="2">-32.7 ~ 32.7mV, 1uV/ 1 Count</td></tr><tr><td>2uV Input</td><td colspan="2">-65.5 ~ 65.5mV, 2uV/ 1 Count</td></tr></table></div> <div>* Negative temperature increases by ±0.1% compared to existing temperature</div>	Type	Maximum Input Range	*Recommended Input Range	K	-270 ~ 1372℃	-200 ~ 1200℃	J	-210 ~ 1200℃	-40 ~ 1100℃	T	-270 ~ 400℃	-200 ~ 350℃	B	30 ~ 1820℃	600 ~ 1700℃	R	-50~1768℃	0 ~ 1600℃	S	-50 ~ 1768℃	0 ~ 1600℃	E	-270 ~ 1000℃	-200 ~ 800℃	N	-270 ~ 1300℃	-200 ~ 1250℃	L	-200 ~ 900℃	-100 ~ 850℃	U	-200 ~ 600℃	-100 ~ 550℃	C	0 ~ 2310℃	100 ~ 2100℃	D	0 ~ 2490℃	100 ~ 2200℃	TXK	-200 ~ 800℃	-200 ~ 800℃	10uV Input	-81.0 ~ 81.0mV, 10uV/ 1 Count		1uV Input	-32.7 ~ 32.7mV, 1uV/ 1 Count		2uV Input	-65.5 ~ 65.5mV, 2uV/ 1 Count	
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Cold Junction Module Accuracy ( Need 20 minute preheating to get enhanced accuracy.)	<div>Recommend Input Range<ul style="list-style-type: none"><li>±0.1% Recommended Scale @ 25℃</li><li>±0.3% Recommended Scale @ -40℃~70℃</li></ul></div> <div>T,B,R,S,L,U,D type Recommend Input Range<ul style="list-style-type: none"><li>±0.3% Recommended Scale @ 25℃</li><li>±0.5% Recommended Scale @ -40℃~70℃</li></ul></div> <div>External Cold Junction(PT100)<ul style="list-style-type: none"><li>±3℃ Recommended Scale @ -40℃~60℃</li></ul></div>																																																			
Connection Method	2-Wire																																																			
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768) ** Connected External CJ : CJ LED On. Not Connected External CJ : CJ LED Off.																																																			
Conversion Time	Average Conversion time < 50 ms																																																			
Cold junction temperature	Internal <ul style="list-style-type: none"><li>TMP275AIDGKR : -40℃~125℃</li></ul> External <ul style="list-style-type: none"><li>PT100 : -45℃~95℃</li></ul>																																																			

# Specification

Data Format	16bits Integer (2' complement )
Calibration	Not Required
<b>General specification</b>	
Power dissipation	Max. 185mA @ 5Vdc
Isolation	I/O to Logic : Isolation Field power : Not Connected
Field Power	Not used, Field power bypass to next expansion module
Wiring	Connector Type, up to AWG22 Module Connector :HIF3BA-20D-2.54DSA
Weight	60g
Module Size	12mm x 99mm x 70mm
<b>Environment Condition</b>	<b>Refer to 'Environment Specification'</b>

\* When more than five modules are used together, the error rate may increase in the input range of about -200 to -100 degrees.

\*\* To increase precision of measurement, the connection between GT-3808 and compensation reference sensor is recommended using by terminal block.

## 2.2. GT-3808 Wiring Diagram

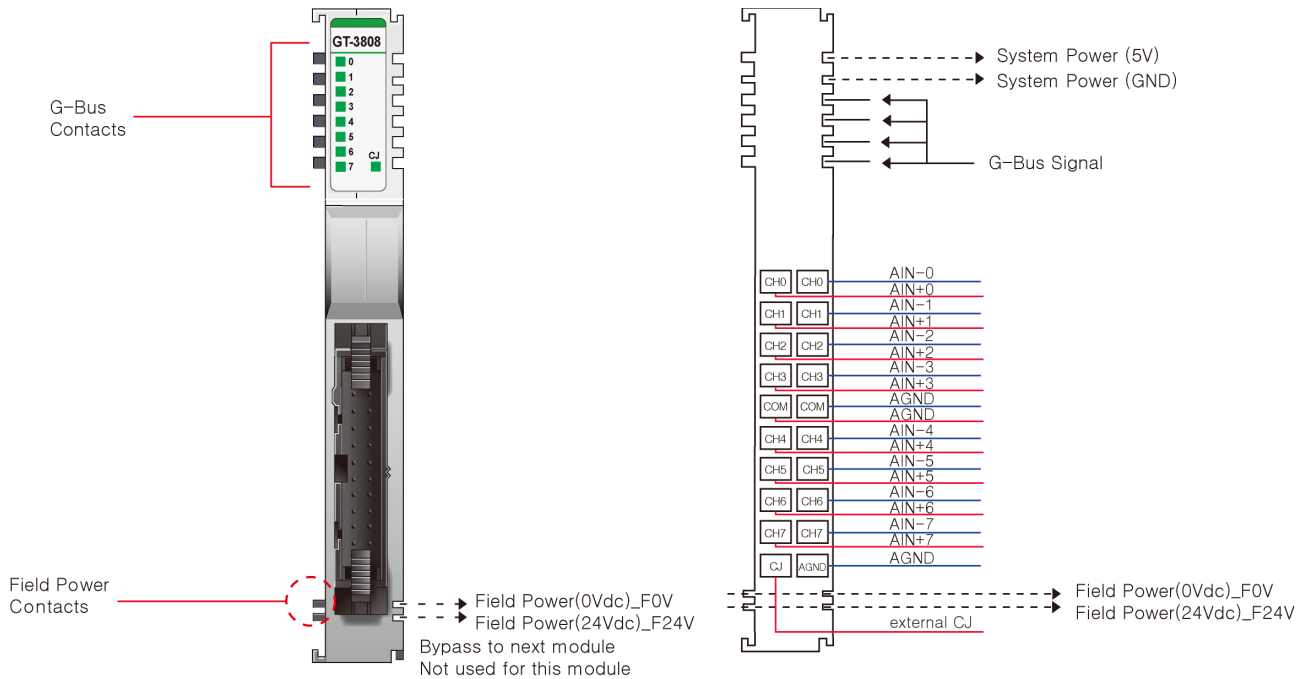


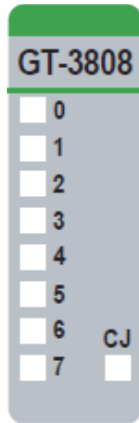
Figure 1. Customer Wiring to Mounting Base

Pin No.	Signal Description	Signal Description	Pin No.
0	TC Channel 0+	TC Channel 0-	1
2	TC Channel 1+	TC Channel 1-	3
4	TC Channel 2+	TC Channel 2-	5
6	TC Channel 3+	TC Channel 3-	7
8	AGND	AGND	9
10	TC Channel 4+	TC Channel 4-	11
12	TC Channel 5+	TC Channel 5-	13
14	TC Channel 6+	TC Channel 6-	15
16	TC Channel 7+	TC Channel 7-	17
18	Cold Junction Sensor	AGND	19



## 2.3. GT-3808 LED Indicator

### 2.3.1. LED Indicator



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

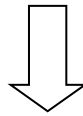
### 2.3.2. Channel Status LED

Status	LED	To indicate
No Signal	Off	Input Sensor Open or Input Range Over
On Signal	Green	Sensor Connected and Input Range Valid

## 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 <b>Sensor Type</b> =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 =0Ch: Type TXK, 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: Nomal 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
Type TXK	-200 ~ 800 °C	-200 ~ 800 °C
Voltage Input Range		
Type	Input Range	
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