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# **FnIO G – Series :**

## ***GT-3888***

***GT-3888 (8 Channels, TC/mV INPUT)***

Table of Contents

[Table of Contents.....2](#)

[History.....3](#)

[1.ENVIRONMENT SPECIFICATION.....4](#)

[2.GT-3888 \(8 CHANNELS THERMOCOUPLE/MV INPUT\).....5](#)

[2.1.GT-3888 Specification.....5](#)

[2.2.GT-3888 Wiring Diagram.....7](#)

[2.3.GT-3888 LED Indicator.....8](#)

[2.3.1.LED Indicator.....8](#)

[2.3.2.Channel Status LED .....8](#)

[2.4.Mapping data into the image table.....9](#)

[2.5.Configuration Parameter – 8byte.....10](#)

[2.6.Data Value.....11](#)

History

Rev	Pages	Remarks	Date	Editor
1.00			2022/08/02	Hongseok, Kim
1.01	11	Accuracy Update	2023/05/16	Hongseok, Kim
1.02	6	Power dissipation Update	2023/05/28	Hongseok, Kim
1.03	4,5	Environment Specification added(UL) Certificate Update and Specification change	2023/06/19	Hongseok, Kim
1.04	1~11	Specification form update	2023/08/03	Hongseok, Kim
1.05	5	Edit System Power Dissipation	2025/05/30	Suna, Hwang

# Specification

## 1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operation Temperature	-40°C to 70°C
UL Temperature	-20°C to 60°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	EN 61000-6-2 : 2019
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL, UKCA

## 2. GT-3888 (8 CHANNELS THERMOCOUPLE/MV INPUT)

### 2.1. GT-3888 Specification

Items	Specification																																																			
Input Specification																																																				
Inputs per module	8 Channels																																																			
Indicators	1 Green G-Bus status																																																			
Sensor Types ( Need 20 minute preheating to get enhanced accuracy.)	<div>Thermal Couple Input Range</div> <table><thead><tr><th>Type</th><th>Maximum Input Range</th><th>*Recommended Input Range</th></tr></thead><tbody><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></tbody></table> <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>T,B,R,S,N,D type Recommend Input Range</div> <div><ul style="list-style-type: none"><li>±0.3% Recommended Scale @ 25℃</li><li>±0.5% Recommended Scale @ -40℃~70℃</li></ul></div> <div>All Other types Recommend Input Range</div> <div><ul style="list-style-type: none"><li>±0.1% Recommended Scale @ 25℃</li><li>±0.3% Recommended Scale @ -40℃~70℃</li></ul></div> <div>External Cold Junction(PT100)</div> <div><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 - TMP275AIDGKR : -40℃~125℃ External - PT100 : -45℃~95℃																																																			
Data Format	16bits Integer (2' complement )																																																			
Calibration	Not Required																																																			
General Specification																																																				
Power dissipation	Max. 155mA @ 5Vdc																																																			
Isolation	I/O to Logic : Isolation Field power : Not Connected																																																			
Field Power	Not used, Field power bypass to next expansion module																																																			
Wiring	I/O Cable Max. 0.823mm <sup>2</sup> (AWG 18)																																																			

# Specification

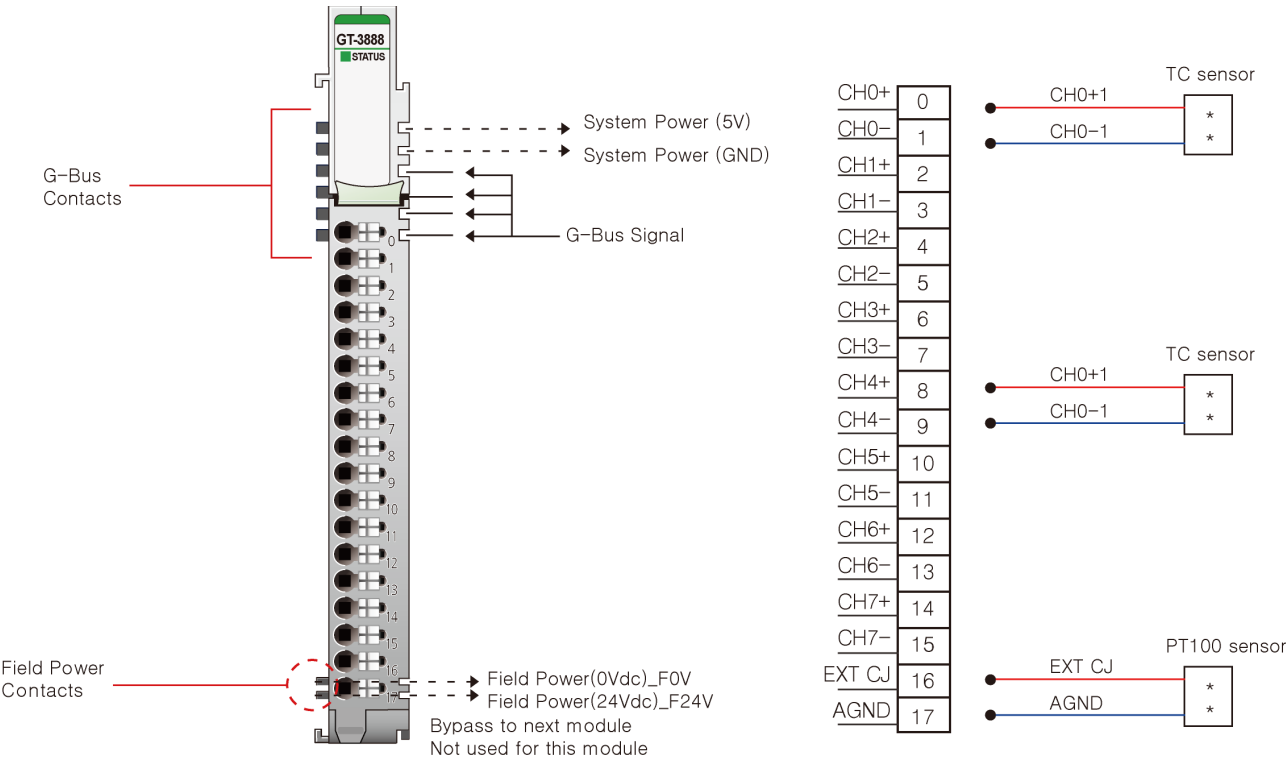
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Weight	60g
Module Size	12mm x 109mm x 70mm
<b>Environment Condition</b>	<b>Refer to 'Environment Specification'</b>

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

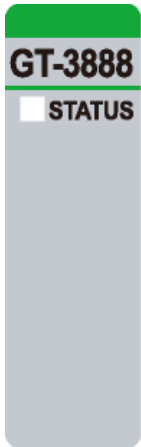
2.2. GT-3888 Wiring Diagram



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	TC Channel 4+	TC Channel 4-	9
10	TC Channel 5+	TC Channel 5-	11
12	TC Channel 6+	TC Channel 6-	13
14	TC Channel 7+	TC Channel 7-	15
16	Cold Junction Sensor	AGND	17

2.3. GT-3888 LED Indicator

2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
Status	G-Bus Status	Green

2.3.2. Channel Status LED

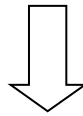
Status	LED	To indicate
G-Bus Status	Off Green	Disconnection Connection



## 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
Byte0								Analog Input Ch0 Low byte
Byte1								Analog Input Ch0 High byte
Byte2								Analog Input Ch1 Low byte
Byte3								Analog Input Ch1 High byte
Byte4								Analog Input Ch2 Low byte
Byte5								Analog Input Ch2 High byte
Byte6								Analog Input Ch3 Low byte
Byte7								Analog Input Ch3 High byte
Byte8								Analog Input Ch4 Low byte
Byte9								Analog Input Ch4 High byte
Byte10								Analog Input Ch5 Low byte
Byte11								Analog Input Ch5 High byte
Byte12								Analog Input Ch6 Low byte
Byte13								Analog Input Ch6 High byte
Byte14								Analog Input Ch7 Low byte
Byte15								Analog Input Ch7 High byte

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

## 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 =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
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