

# **FnIO G – Series :**

## ***GT-3814***

### ***GT-3814***

***(4 Channels, TEMP. Controller, TC Input, SSR Output)***

Date: 2019. 12. 05.

# Specification

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# Specification

## History

REV.	PAGES	REMARKS	DATE	Editor
Preliminary		Preliminary	July 28, 2016	Hong, Jin Hyun
1.01	5	Module Accuracy is revised.	Feb 3, 2017	Hong, Jin Hyun
1.02	4	External CJC Accuracy is added	Mar 14, 2017	Hong, Jin Hyun
1.03		Typo error is revised.	July 18, 2017	Hong, Jin Hyun
1.04	10	Add Command Format	Oct 15,2019	Kim Hong Seok
1.05	6	Add descripton	Dec 05,2019	Kim Hong Seok

# Specification

## 1. ENVIRONMENT SPECIFICATION

<b>Environmental specification</b>	
Operation Temperature	-20°C to 50°C
Storage Temperature	-40°C to 85°C
Relative Humidity	5% to 95% Non-condensing
Operating Altitude	2,000m
Mounting	DIN Rail
<b>General specification</b>	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6 Sine Vibration <ul style="list-style-type: none"> <li>- 5 ~ 25Hz : ±1.6mm</li> <li>- 25 ~ 300Hz : 4g</li> <li>- Sweep Rate : 1 Oct/min, 20 Sweeps</li> </ul> Random Vibration <ul style="list-style-type: none"> <li>- 10 ~ 40 Hz : 0.0125 g<sup>2</sup>/Hz</li> <li>- 40 ~ 100 Hz : 0.0125 → 0.002 g<sup>2</sup>/Hz</li> <li>- 100 ~ 500 Hz : 0.002 g<sup>2</sup>/Hz</li> <li>- 500 ~ 2000 Hz : 0.002 → 1.3 x 10<sup>-4</sup>g<sup>2</sup>/Hz</li> <li>- Test time : 1hrs for each test</li> </ul>
Industrial Emissions	EN 61000-6-4/A11 : 2011
Industrial Immunity	EN 61000-6-2 : 2005
Installation Pos. / Protect. Class	Variable/IP20
Product Certifications	CE

# Specification

## 2. GT-3814 (4 Channels, TEMP. Controller, TC Input, SSR Output )

### 2.1. GT-3814 Specification

Items	Specification																																							
<b>Input Out Specification</b>																																								
Inputs per module	4 Channels																																							
Indicators(Logic side )	4 Green LEDs/ch																																							
Sensor Types	Thermal Couple Input Range <table border="1"> <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°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>	Type	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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Module Accuracy ( Need 20 minute preheating to get enhanced accuracy. )	Recommend Input Range <ul style="list-style-type: none"> <li>±0.1% Recommended Scale @ 25°C ambient</li> <li>±0.3% Recommended Scale @ -20°C~50°C</li> </ul> T,B,R,S,C,D type Recommend Input Range <ul style="list-style-type: none"> <li>±0.3% Recommended Scale @ -20°C~50°C</li> </ul> External CJC Measurement <ul style="list-style-type: none"> <li>±3°C@ -20 ~ 50°C (incl. Cold junction compensation)</li> </ul>																																							
Connection Method	2-Wire																																							
Data Format	16bits Integer (2' complement )																																							
Control Method	P, PI, PD, PID with Auto tuning (Limit Cycle Method), On/Off (PB=0)																																							
Control Output	1 DC-Sink PWM Output for SSR control (18~26.4Vdc) 1 DC-Sink Alarm Output (18~26.4Vdc)																																							
Cold Junction Compensation	External PT100																																							
PWM Output Accuracy	±0.3% FS @ Operating Temperature																																							
Calibration	Not Required																																							
Etc Functions	ARW, MR, Temp. Offset, Hysteresis (On/Off)																																							

# Specification

Items	Specification
<b>General specification</b>	
Power dissipation	Max. 50mA @ 5.0Vdc
Isolation	I/O to Logic : Isolation Field power : Non - Isolation
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~26.4VDC Power Dissipation : 70mA @24VDC
Wiring	I/O Cable Max. 2.0mm <sup>2</sup> (AWG 14)
Weight	60g
Module Size	12mm x 99mm x 70mm
<b>Environment Condition</b>	<b>Refer to 'Environment Specification'</b>

\*GT-3714,3734,3814, 3834, can be connected up to 16 slots per network adapter module.

# Specification

## 2.2. GT-3814 Wiring Diagram

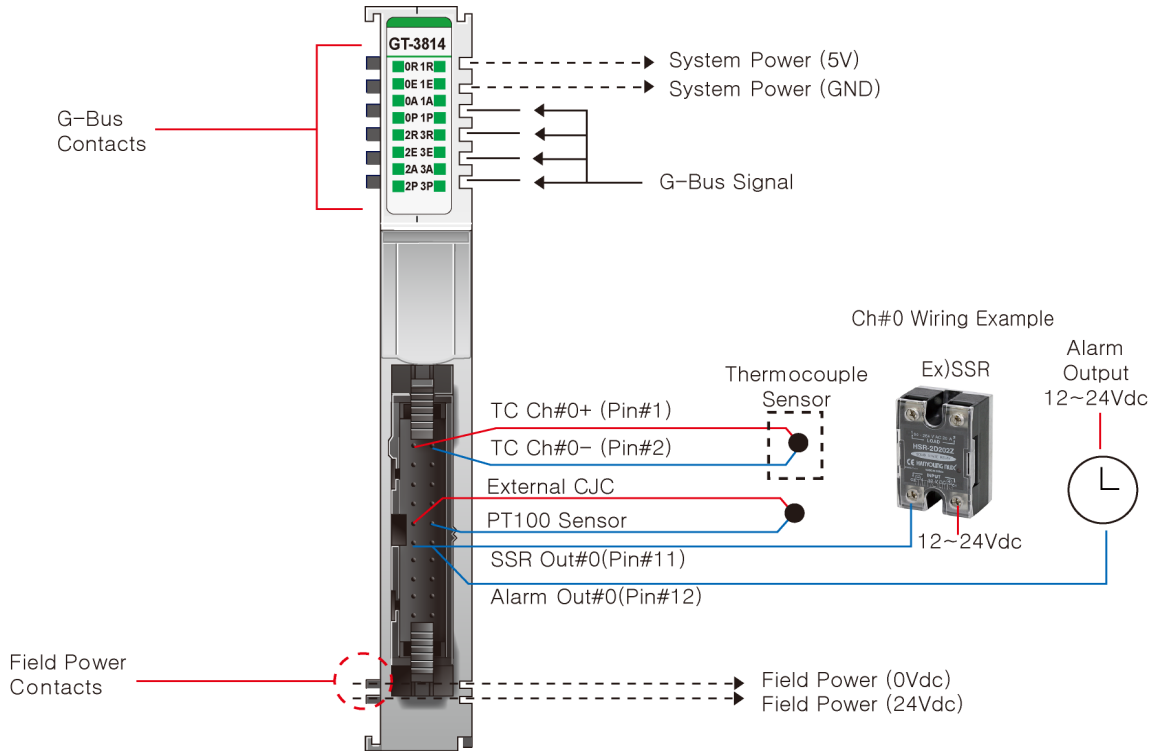


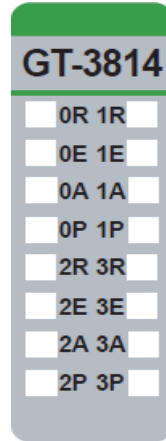
Figure 1. Customer Wiring to Mounting Base

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	Cold Junction Sensor	Cold Junction Sensor	9
10	SSR Out Ch#0	Alarm Out Ch#0	11
12	SSR Out Ch#1	Alarm Out Ch#1	13
14	SSR Out Ch#2	Alarm Out Ch#2	15
16	SSR Out Ch#3	Alarm Out Ch#3	17
18	COM	COM	19

# Specification

## 2.3. GT-3814 LED Indicator

### 2.3.1. LED Indicator



LED No.	LED Function / Description	Color	LED No.	LED Function / Description	Color
0	Ch#0 Ready	Green	8	Ch#1 Ready	Green
1	Ch#0 Error	Green	9	Ch#1 Error	Green
2	Ch#0 Alarm	Green	10	Ch#1 Alarm	Green
3	Ch#0 Output	Green	11	Ch#1 Output	Green
4	Ch#2 Ready	Green	12	Ch#3 Ready	Green
5	Ch#2 Error	Green	13	Ch#3 Error	Green
6	Ch#2 Alarm	Green	14	Ch#3 Alarm	Green
7	Ch#2 Output	Green	15	Ch#3 Output	Green

### 2.3.2. Channel Status LED

Status	LED	Cause	To indicate
Ready (R)	Green	Module Ready	Normal Operation
	Flashing Green	Auto Tuning in progress	Searching PID Gain
	Off	Not connection	Checking the connection
Error (E)	Green	Module Error.	Sensor open or error occurred.
	Off	Normal status.	Normal Operation
Alarm Output (A)	Green	Output status when alarm is set	Normal Operation (when the alarm is set)
	Off	Not setting the alarm	Make sure the alarm setting
Process Output (P)	Green	Current output state	Normal Operation (when the current output is set)
	Off	Not setting the current output	Make sure the current output state



# Specification

## 2.4. Mapping data into the image table

### ● Input Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	0	0	0	Ch#0 Auto Tuning	Ch#0 Process Out(P)	Ch#0 Alarm (A)	Ch#0 Sensor Err (E)	Ch#0 Ready (R)
Byte 1	0	0	0	Ch#1 Auto Tuning	Ch#1 Process Out(P)	Ch#1 Alarm (A)	Ch#1 Sensor Err (E)	Ch#1 Ready (R)
Byte 2	0	0	0	Ch#2 Auto Tuning	Ch#2 Process Out(P)	Ch#2 Alarm (A)	Ch#2 Sensor Err (E)	Ch#2 Ready (R)
Byte 3	0	0	0	Ch#3 Auto Tuning	Ch#3 Process Out(P)	Ch#3 Alarm (A)	Ch#3 Sensor Err (E)	Ch#3 Ready (R)
Byte 4	Ch#0 Temperature(PV), 16bit signed, Little Endian, Unit=0.1C							
Byte 5								
Byte 6	Ch#1 Temperature(PV), 16bit signed, Little Endian, Unit=0.1C							
Byte 7								
Byte 8	Ch#2 Temperature(PV), 16bit signed, Little Endian, Unit=0.1C							
Byte 9								
Byte 10	Ch#3 Temperature(PV), 16bit signed, Little Endian, Unit=0.1C							
Byte 11								
Byte 12	Ch#0 Temperature(SV,CV), 16bit signed, Little Endian, Unit=0.1C							
Byte 13								
Byte 14	Ch#1 Temperature(SV,CV), 16bit signed, Little Endian, Unit=0.1C							
Byte 15								
Byte 16	Ch#2 Temperature(SV,CV), 16bit signed, Little Endian, Unit=0.1C							
Byte 17								
Byte 18	Ch#3 Temperature(SV,CV), 16bit signed, Little Endian, Unit=0.1C							
Byte 19								

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

### ● Output Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Ch#0 Command							
Byte 1	Ch#1 Command							
Byte 2	Ch#2 Command							
Byte 3	Ch#3 Command							
Byte 4	Ch#0 Value for update							
Byte 5								
Byte 6	Ch#1 Value for update							
Byte 7								
Byte 8	Ch#2 Value for update							
Byte 9								
Byte 10	Ch#3 Value for update							
Byte 11								

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

# Specification

## CH#0,1,2,3 COMMAND FORMAT

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
	=00 : WRITE RELEASE		-----	=OTHER : PV(READ ONLY)				
	=01 : READ			=0_0001 : SV(READ/WRITE)				
	=10 : WRITE			=0_0002 : CV(READ ONLY)				

Example) Update Ch#0's SV = 150°C, then Ch#0's SV=250°C

IO Output Data = 00 00 00 00 00 00 00 00 00 00 00 00

IO Output Data = 81 00 00 00 DC 05 00 00 00 00 00 00 //Ch#0's SV=150°C, 0x05DC=1500d

IO Output Data = 00 00 00 00 C4 09 00 00 00 00 00 00 //Write Command Release

IO Output Data = 81 00 00 00 C4 09 00 00 00 00 00 00 //Ch#0's SV=250°C, 0x09C4=2500d

Example) Read ch#0's CV Data

IO Output Data = 42 00 00 00 00 00 00 00 00 00 00 //Ch#0's Read CV Data

\* 12 ~ 13byte data of input image is changed from SV data to CV data.

## 2.5. Temp. Channel Object

### ► DeviceNet

- Class Code: 81HEX(129<sub>DEC</sub>)
  - Common Service

Service Code	Implemented for		Service Name
	Class	Instance	
0x0E	Yes	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

- Class Attribute

Instance ID	Attribute ID	Access Rule	Name	Data Type	Value
0	0	Get	Object Revision	UINT Array	
	1	Get/Set	Sv,Set Value	INT Array	0.1°C

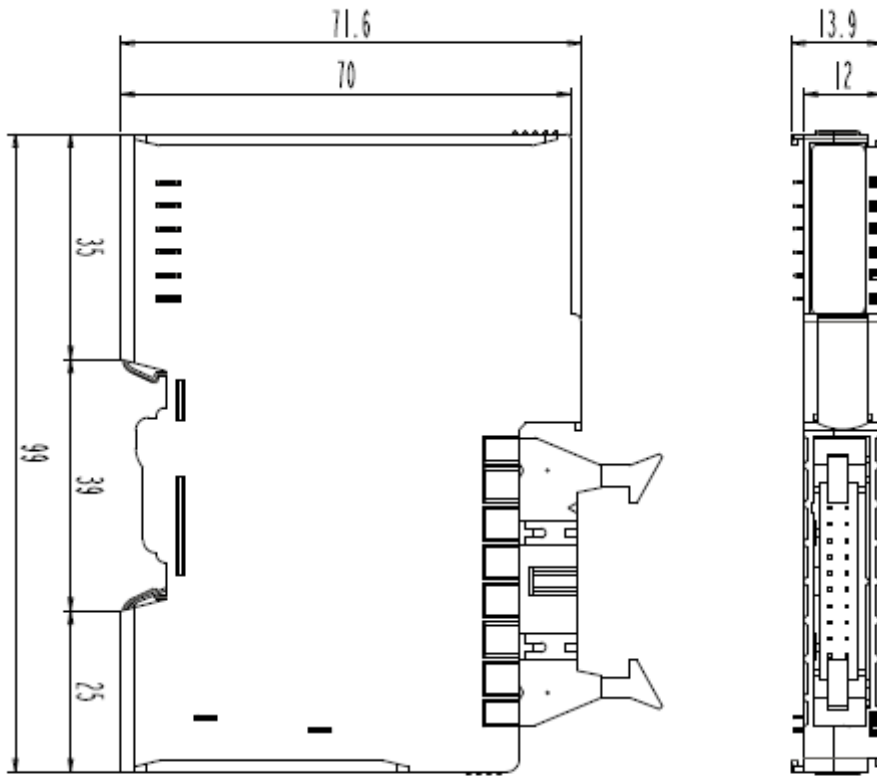
- Instance Attribute

Instance ID	Attribute ID	Access Rule	Name	Data Type	Value
0	0x00(0)	Get	Object Revision	UINT	
	0x01(1)	Get/Set	SV, Set Value	INT	Rev = 0.1°C, Range : 0°C ~ 2500.0°C
	0x02(2)	Get/Set	PB, Proportional Band	INT	Rev = 0.1, Range : 0°C ~ 1000.0°C
	0x03(3)	Get/Set	Ti, Integral Time	INT	Rev = 1sec, Range : 0 ~ 3600sec
	0x04(4)	Get/Set	Td, Derivative Time	INT	Rev = 1sec, Range : 0 ~ 3600sec
	0x05(5)	Get/Set	Tc, Control Cycle time	UINT	Rev = 1sec, Range : 1 ~ 60sec
	0x07(7)	Get/Set	MR, Manual Reset	INT	Rev = 0.1% Range = 0.0~100.0%
	0x08(8)	Get/Set	HYST, Hysteresis	UINT	Rev = 0.1, Range : 1.0°C ~ 1000.0°C
	0x09(9)	Get/Set	Alarm Low	INT	Rev = 0.1, Range : 0°C ~ 1300.0°C
	0x0A(10)	Get/Set	Alarm High	INT	Rev = 0.1, Range : 0°C ~ 1300.0°C
	0x0B(11)	Get/Set	Alarm Deviation	UINT	Rev = 0.1°C, Range : 0°C ~ 100.0°C
	0x0C(12)	Get/Set	Alarm Function	UINT	Various Functions (Value : 0~13)
	0x0D(13)	Get/Set	Alarm Option	UINT	Various Functions (Value : 0~3, 128~131)
	0x10(16)	Get/Set	All Parameter	INT*7	SV,PB,Ti,Td,Tc,MR,HYST
	0x11(17)	Get/Set	All Alarm	INT*6	Alarm Low, Alarm High, Alram Dev, Alarm Function, Alarm Option
	0x20(32)	Get	Status	UINT	Same as Channel's Status 1 Byte
	0x21(33)	Get	PV, Present Value	INT	Rev = 0.1, Range : -3276.7°C ~ 3276.7°C
	0x22(34)	Get	CV, Control Value	INT	Rev = 0.1% Range = 0.0~100.0%
	0x23(35)	Get	Status, PV	INT*2	Status, PV
	0x24(36)	Get	Alarm	UINT	Single Channel Alarm Status( ON/OFF )
0x27(39)	Get	PV, CV	INT*2	Rev = 0.01°C	
0x28(40)	Get	Cold Junction	INT*2	Cold Junction(Rev = 0.1°C), Ohm( Rev = 0.01)	

# Specification

0x29(41)	Get/Set	Temp. Offset	INT	Rev = 0.1°C, Range : -100.0°C ~ 100.0°C																											
0x30(48)	Get	All Status	INT*4	Status, PV, CV, 0x0000																											
0x31(49)	Get	SV, PV, CV, Status	INT*4	SV, PV, CV, Status																											
0x40(64)	Get/Set	Auto Tuning	Bool	0: Stop Auto Tuning 1: Run Auto Tuning																											
0x41(65)	Get/Set	Select Auto Tuning Point	UINT	0 : SV's 100%, 1: SV's 80%																											
0x42(66)	Get/Set	Select Auto Tuning PID	UINT	0 : PID, 1 : P, 2 : PI, 3 : PD																											
0x44(68)	Get/Set	Sensor Type	UINT	<table border="1" style="width: 100%;"> <thead> <tr> <th>Type</th> <th>Value</th> </tr> </thead> <tbody> <tr><td>K</td><td>0</td></tr> <tr><td>J</td><td>1</td></tr> <tr><td>T</td><td>2</td></tr> <tr><td>B</td><td>3</td></tr> <tr><td>R</td><td>4</td></tr> <tr><td>S</td><td>5</td></tr> <tr><td>E</td><td>6</td></tr> <tr><td>N</td><td>7</td></tr> <tr><td>L</td><td>8</td></tr> <tr><td>U</td><td>9</td></tr> <tr><td>C</td><td>10</td></tr> <tr><td>D</td><td>11</td></tr> </tbody> </table>		Type	Value	K	0	J	1	T	2	B	3	R	4	S	5	E	6	N	7	L	8	U	9	C	10	D	11
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## 3. Dimension



(unit : mm)