

Analog Input Module (TEMP Controller)

GT-3xxx User Manual



Version 1.0

2018 CREVIS Co.,Ltd

DOCUMENT CHANGE SUMMARY				
REV	PAGE	REMARKS	DATE	EDITOR
1.0	New Document		18/07/30	JY,Hyun

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1. Important Notes

Solid state equipment has operational characteristics differing from those of electromechanical equipment.

Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls describes some important differences between solid state equipment and hard-wired electromechanical devices.

Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will CREVIS be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, CREVIS cannot assume responsibility or liability for actual use based on the examples and diagrams.

Warning!

If you don't follow the directions, it could cause a personal injury, damage to the equipment or explosion

Do not assemble the products and wire with power applied to the system. Else it may cause an electric arc, which can result into unexpected and potentially dangerous action by field devices. Arching is explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before assembling or wiring the modules.

Do not touch any terminal blocks or IO modules when system is running. Else it may cause the unit to an electric shock or malfunction.

Keep away from the strange metallic materials not related to the unit and wiring works should be controlled by the electric expert engineer. Else it may cause the unit to a fire, electric shock or malfunction

Caution!

If you disobey the instructions, there may be possibility of personal injury, damage to equipment or explosion. Please follow below Instructions.

Check the rated voltage and terminal array before wiring. Avoid the circumstances over 50°C of temperature. Avoid placing it directly in the sunlight.

Avoid the place under circumstances over 85% of humidity.

Do not place Modules near by the inflammable material. Else it may cause a fire.



Do not permit any vibration approaching it directly.

Go through module specification carefully, ensure inputs, output connections are made with the specifications. Use standard cables for wiring.


Use Product under pollution degree 2 environment.

1.1. Safety Instruction

1.1.1. Symbols

<p>DANGER</p> 	<p>Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death property damage, or economic loss</p>
<p>IMPORTANT</p>	<p>Identifies information that is critical for successful application and understanding of the product</p>
<p>ATTENTION</p> 	<p>Identifies information about practices or circumstances that can lead to personal injury, property damage, or economic loss.</p> <p>Attentions help you to identify a hazard, avoid a hazard, and recognize the consequences</p>

1.1.2. Safety Notes

<p>DANGER</p> 	<p>The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, G-BUS Pin.</p>
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1.1.3. Certification

c-UL-us UL Listed Industrial Control Equipment, certified for U.S. and Canada

See UL File E235505

CE Certificate

EN 61000-6-2; Industrial Immunity

EN 61000-6-4; Industrial Emissions

Reach, RoHS (EU, CHINA)

2. Analog Input Module List

GT-Number	Description	ID	Production Status
GT-3714	Analog Input 4 Channels, RTD, TEMP. Controller, RTD Input, SSR Output, 20P Connector	3714	Active
GT-3734	Analog Input 4 Channels, RTD, TEMP. Controller, RTD Input, Current Output, 20P Connector	3734	Active
GT-3814	Analog Input 4 Channels, Thermocouple, TEMP. Controller, TC Input, SSR Output, 20P Connector	3814	Active
GT-3834	Analog Input 4 Channels, Thermocouple, TEMP. Controller, TC Input, Current Output, 20P Connector	3834	Active

3. Specification

3.1. GT-3714

3.1.1. Wiring Diagram

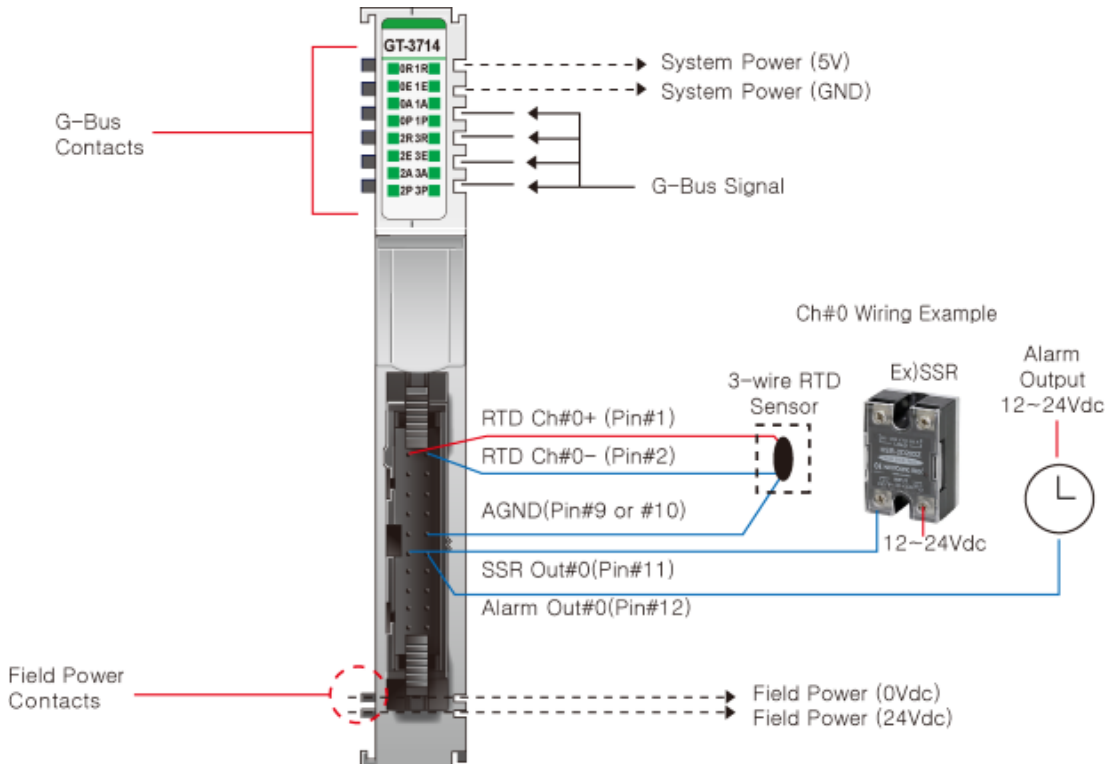
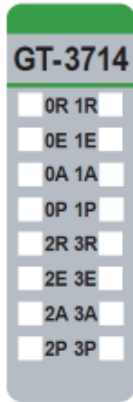


Figure 1. Customer Wiring to Mounting Base

Pin No.	Signal Description	Signal Description	Pin No.
0	RTD Channel 0+	RTD Channel 0-	1
2	RTD Channel 1+	RTD Channel 1-	3
4	RTD Channel 2+	RTD Channel 2-	5
6	RTD Channel 3+	RTD Channel 3-	7
8	AGND	AGND	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

3.1.2. LED Indicator



LED No.	LED Function	LED Color	LED No.	LED Function	LED 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

3.1.3. 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	Normal Operation (When alarm is set)
	Off	Not Setting the Alarm	Making Sure the Alarm Setting
Process Output (P)	Green	Current Output Status	Normal Operation (When Current Output is set)
	Off	Not Setting Current Output	Making Sure Current Output Setting

3.1.4. Environment Specification

Environmental Specification	
Operation Temperature	-20°C ~ 50°C
UL Temperature	-20°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	Based on IEC 60068-2-6 Sine Vibration - 5 ~ 25Hz : ±1.6mm - 25 ~ 300Hz : 4g - Sweep Rate : 1 Oct/min, 20 Sweeps Random Vibration - 10 ~ 40 Hz : 0.0125 g ² /Hz - 40 ~ 100 Hz : 0.0125 → 0.002 g ² /Hz - 100 ~ 500 Hz : 0.002 g ² /Hz - 500 ~ 2000 Hz : 0.002 → 1.3 x 10 ⁻⁴ g ² /Hz - Test time : 1hrs for each test
EMC Resistance Burst/ESD	EN 61000-6-2 : 2005 EN61000-6-4/All : 2011
Protection Class	Variable/IP20
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL

3.1.5. Specification

Items															
Input Specification															
Inputs Per Module	4 Channels														
Indicators	4 Green LEDs / Ch														
Sensor Types	RTD Input Range														
	<table border="1"> <thead> <tr> <th>RTD Input</th> <th>Input Range</th> </tr> </thead> <tbody> <tr> <td>PT100</td> <td>-200~850°C</td> </tr> <tr> <td>PT50</td> <td>-200~850°C</td> </tr> <tr> <td>JPT100</td> <td>-200~640°C</td> </tr> <tr> <td>NI100</td> <td>-60~250°C</td> </tr> <tr> <td>NI120</td> <td>-80~260°C</td> </tr> <tr> <td>CU10</td> <td>320~500°C</td> </tr> </tbody> </table>	RTD Input	Input Range	PT100	-200~850°C	PT50	-200~850°C	JPT100	-200~640°C	NI100	-60~250°C	NI120	-80~260°C	CU10	320~500°C
	RTD Input	Input Range													
	PT100	-200~850°C													
	PT50	-200~850°C													
	JPT100	-200~640°C													
	NI100	-60~250°C													
NI120	-80~260°C														
CU10	320~500°C														
Excitation Current	About 1mA														
Connection Method	3-Wire														
Data Format	16 Bits signed Integer (2' complement)														
Module Accuracy	All Type Input Range ±0.1% Full Scale @ 25°C														
Resolution of Data	RTD Type : ±0.1°C / F														
Calibration	Not Required														
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768)														
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)														
PWM Output Accuracy	±0.3% Full Scale @ Operating Temperature														
Etc Functions	ARW, MR, TEMP. Offset, Hysteresis (On/Off)														
General Specification															
Power Dissipation	Max. 50mA @ 5Vdc														
Isolation	I/O to Logic : Photocoupler Isolation Field power : Non-Isolation														
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~26.4Vdc Power Dissipation : Max. 50mA @ 24Vdc														
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)														
Weight	60g														
Module Size	12mm x 99mm x 70mm														
Environment Condition	Refer to 'Environment Specification'														

3.1.6. 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), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 5								
Byte 6	Ch#1 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 7								
Byte 8	Ch#2 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 9								
Byte 10	Ch#3 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 11								
Byte 12	Ch#0 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 13								
Byte 14	Ch#1 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 15								
Byte 16	Ch#2 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 17								
Byte 18	Ch#3 Temperature(SV,CV), 16 Bits 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)

Input 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)

For 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

3.1.7. TEMP. Channel Object

DeviceNet

Class Code: 81HEX(129DEC)

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 Juntion(Rev = 0.1°C), Ohm(Rev = 0.01)														
0x29(41)	Get/Set	Temp. Offset	INT	Rev = 0.1°C, Range : -100°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"> <thead> <tr> <th>Type</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>PT 100</td> <td>0</td> </tr> <tr> <td>PT 50</td> <td>1</td> </tr> <tr> <td>JPT 100</td> <td>2</td> </tr> <tr> <td>NI 100</td> <td>3</td> </tr> <tr> <td>NI 120</td> <td>4</td> </tr> <tr> <td>CU 10</td> <td>5</td> </tr> </tbody> </table>	Type	Value	PT 100	0	PT 50	1	JPT 100	2	NI 100	3	NI 120	4	CU 10	5
Type	Value																	
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PT 50	1																	
JPT 100	2																	
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NI 120	4																	
CU 10	5																	
0x45(69)	Get/Set	Temp Type	UINT	<table border="1"> <thead> <tr> <th></th> <th>Nomal</th> <th>2X_Filter</th> </tr> </thead> <tbody> <tr> <td>Celsius</td> <td>0x00</td> <td>0x10</td> </tr> <tr> <td>Fahrenheit</td> <td>0x01</td> <td>0x11</td> </tr> </tbody> </table>		Nomal	2X_Filter	Celsius	0x00	0x10	Fahrenheit	0x01	0x11					
	Nomal	2X_Filter																
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3.2. GT-3734

3.2.1. Wiring Diagram

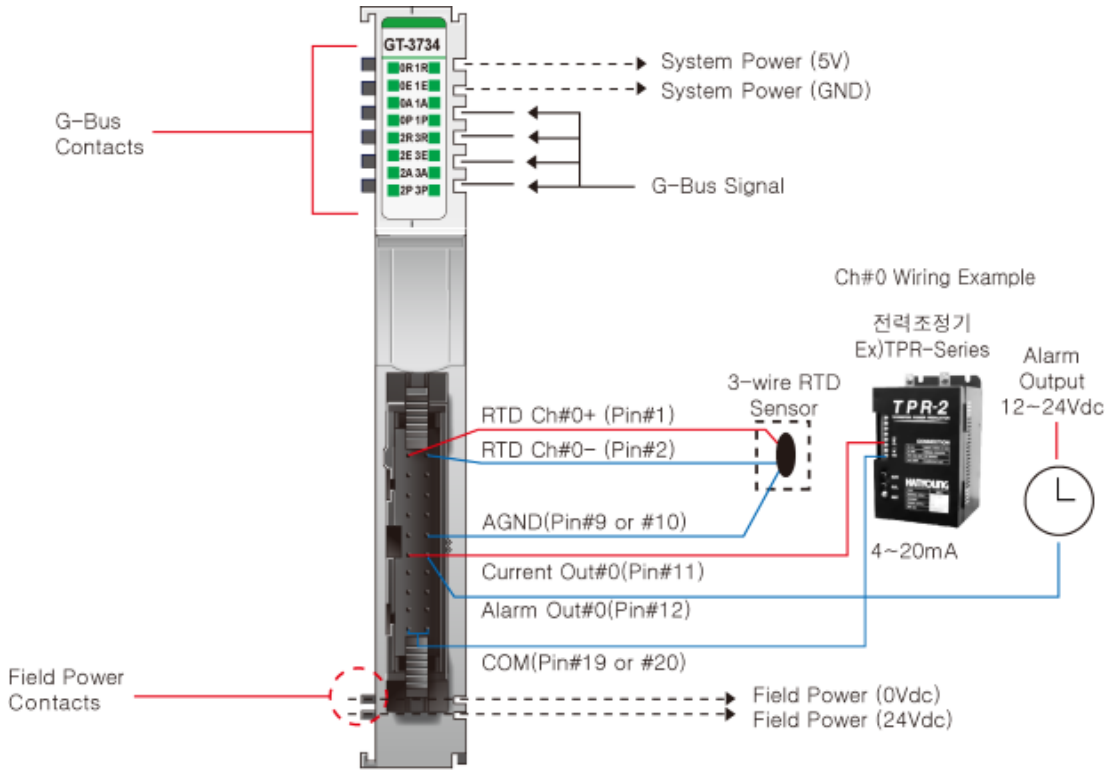
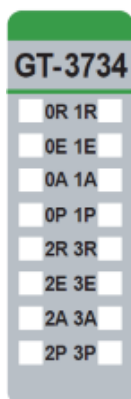


Figure 1. Customer Wiring to Mounting Base

Pin No.	Signal Description	Signal Description	Pin No.
0	RTD Channel 0+	RTD Channel 0-	1
2	RTD Channel 1+	RTD Channel 1-	3
4	RTD Channel 2+	RTD Channel 2-	5
6	RTD Channel 3+	RTD Channel 3-	7
8	AGND	AGND	9
10	Current Out Ch#0	Alarm Out Ch#0	11
12	Current Out Ch#1	Alarm Out Ch#1	13
14	Current Out Ch#2	Alarm Out Ch#2	15
16	Current Out Ch#3	Alarm Out Ch#3	17
18	COM	COM	19

3.2.2. LED Indicator



LED No.	LED Function	LED Color	LED No.	LED Function	LED 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

3.2.3. 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	Normal Operation (When alarm is set)
	Off	Not Setting the Alarm	Making Sure the Alarm Setting
Process Output (P)	Green	Current Output Status	Normal Operation (When Current Output is set)
	Off	Not Setting Current Output	Making Sure Current Output Setting

3.2.4. Environment Specification

Environmental Specification	
Operation Temperature	-20°C ~ 50°C
UL Temperature	-20°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	Based on IEC 60068-2-6 Sine Vibration - 5 ~ 25Hz : ±1.6mm - 25 ~ 300Hz : 4g - Sweep Rate : 1 Oct/min, 20 Sweeps Random Vibration - 10 ~ 40 Hz : 0.0125 g ² /Hz - 40 ~ 100 Hz : 0.0125 → 0.002 g ² /Hz - 100 ~ 500 Hz : 0.002 g ² /Hz - 500 ~ 2000 Hz : 0.002 → 1.3 x 10 ⁻⁴ g ² /Hz - Test time : 1hrs for each test
EMC Resistance Burst/ESD	EN 61000-6-2 : 2005 EN61000-6-4/All : 2011
Protection Class	Variable/IP20
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL

3.2.5. Specification

Items															
Input Specification															
Inputs Per Module	4 Channels														
Indicators	4 Green LEDs / Ch														
Sensor Types	RTD Input Range														
	<table border="1"> <thead> <tr> <th>RTD Input</th> <th>Input Range</th> </tr> </thead> <tbody> <tr> <td>PT100</td> <td>-200~850°C</td> </tr> <tr> <td>PT50</td> <td>-200~850°C</td> </tr> <tr> <td>JPT100</td> <td>-200~640°C</td> </tr> <tr> <td>NI100</td> <td>-60~250°C</td> </tr> <tr> <td>NI120</td> <td>-80~260°C</td> </tr> <tr> <td>CU10</td> <td>320~500°C</td> </tr> </tbody> </table>	RTD Input	Input Range	PT100	-200~850°C	PT50	-200~850°C	JPT100	-200~640°C	NI100	-60~250°C	NI120	-80~260°C	CU10	320~500°C
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	NI100	-60~250°C													
NI120	-80~260°C														
CU10	320~500°C														
Excitation Current	About 1mA														
Connection Method	3-Wire														
Data Format	16 Bits signed Integer (2' complement)														
Module Accuracy	All Type Input Range ±0.1% Full Scale @ 25°C														
Resolution of Data	RTD Type : ±0.1°C / F														
Calibration	Not Required														
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768)														
Control Method	P, PI, PD, PID with Auto tuning (Limit Cycle Method), On/Off (PB=0)														
Control Output	1 Current Output (4~20mA, Control Value 0.1% Resolution) 1 DC-Sink Alarm Output (18~26.4Vdc)														
Current Output Accuracy	±1.0% Full Scale @ Operating Temperature														
Etc Functions	ARW, MR, TEMP. Offset, Hysteresis (On/Off)														
General Specification															
Power Dissipation	Max. 50mA @ 5Vdc														
Isolation	I/O to Logic : Photocoupler Isolation Field power : Non-Isolation														
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~26.4Vdc Power Dissipation : Max. 140mA @ 24Vdc														
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)														
Weight	60g														
Module Size	12mm x 99mm x 70mm														
Environment Condition	Refer to 'Environment Specification'														

3.2.6. 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), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 5								
Byte 6	Ch#1 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 7								
Byte 8	Ch#2 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 9								
Byte 10	Ch#3 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 11								
Byte 12	Ch#0 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 13								
Byte 14	Ch#1 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 15								
Byte 16	Ch#2 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 17								
Byte 18	Ch#3 Temperature(SV,CV), 16 Bits 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)

For 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

3.2.7. TEMP. Channel Object

DeviceNet

Class Code: 81HEX(129DEC)

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)														
0x29(41)	Get/Set	Temp. Offset	INT	Rev = 0.1°C, Range : -100°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"> <thead> <tr> <th>Type</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>PT 100</td> <td>0</td> </tr> <tr> <td>PT 50</td> <td>1</td> </tr> <tr> <td>JPT 100</td> <td>2</td> </tr> <tr> <td>NI 100</td> <td>3</td> </tr> <tr> <td>NI 120</td> <td>4</td> </tr> <tr> <td>CU 10</td> <td>5</td> </tr> </tbody> </table>	Type	Value	PT 100	0	PT 50	1	JPT 100	2	NI 100	3	NI 120	4	CU 10	5
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PT 100	0																	
PT 50	1																	
JPT 100	2																	
NI 100	3																	
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3.3. GT-3814

3.3.1. Wiring Diagram

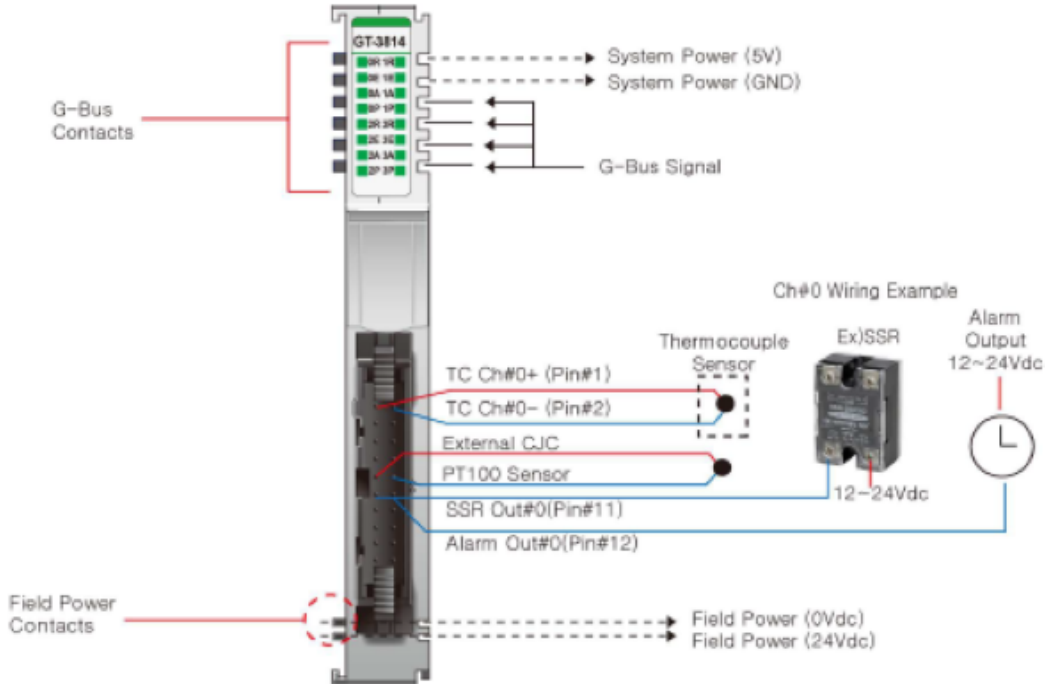
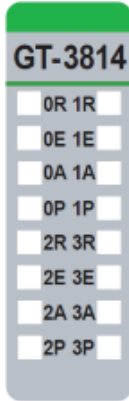


Figure 1. Customer Wiring to Mounting Base

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

3.3.2. LED Indicator



LED No.	LED Function	LED Color	LED No.	LED Function	LED 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

3.3.3. 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	Normal Operation (When alarm is set)
	Off	Not Setting the Alarm	Making Sure the Alarm Setting
Process Output (P)	Green	Current Output Status	Normal Operation (When Current Output is set)
	Off	Not Setting Current Output	Making Sure Current Output Setting

3.3.4. Environment Specification

Environmental Specification	
Operation Temperature	-20°C ~ 50°C
UL Temperature	-20°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	Based on IEC 60068-2-6 Sine Vibration - 5 ~ 25Hz : ±1.6mm - 25 ~ 300Hz : 4g - Sweep Rate : 1 Oct/min, 20 Sweeps Random Vibration - 10 ~ 40 Hz : 0.0125 g ² /Hz - 40 ~ 100 Hz : 0.0125 → 0.002 g ² /Hz - 100 ~ 500 Hz : 0.002 g ² /Hz - 500 ~ 2000 Hz : 0.002 → 1.3 x 10 ⁻⁴ g ² /Hz - Test time : 1hrs for each test
EMC Resistance Burst/ESD	EN 61000-6-2 : 2005 EN61000-6-4/All : 2011
Protection Class	Variable/IP20
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL

3.3.5. Specification

Items	Specification																																							
Input Specification																																								
Inputs Per Module	4 Channels																																							
Indicators	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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C	0 ~ 2310°C	100 ~ 2100°C																																						
D	0 ~ 2490°C	100 ~ 2200°C																																						
Module Accuracy	External CJC Measurement $\pm 3^{\circ}\text{C} @ -20^{\circ}\text{C} \sim 50^{\circ}\text{C}$ (incl. Cold Junction Compensation) Recommend Input Range $\pm 0.1\%$ Recommended Scale @ 25°C ambient $\pm 0.3\%$ Recommended Scale @ -20°C ~ 50°C T/B/R/S/C/D Type Recommend Input Range $\pm 0.3\%$ Recommended Scale @ -20°C ~ 50°C																																							
Connection Method	2-Wire																																							
Data Format	16 Bits Integer (2' complement)																																							
Calibration	Not Required																																							
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768)																																							
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	$\pm 0.3\%$ Full Scale @ Operating Temperature																																							
Etc Functions	ARW, MR, TEMP. Offset, Hysteresis (On/Off)																																							
General Specification																																								
Power Dissipation	Max. 50mA @ 5Vdc																																							
Isolation	I/O to Logic : Photocoupler Isolation Field power : Not Connected																																							

Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~26.4Vdc Power Dissipation : Max. 70mA@ 24Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	60g
Module Size	12mm x 99mm x 70mm
Environment Condition	Refer to 'Environment Specification'

3.3.6. 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), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 5	Ch#0 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 6	Ch#1 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 7	Ch#1 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 8	Ch#2 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 9	Ch#2 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 10	Ch#3 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 11	Ch#3 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 12	Ch#0 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 13	Ch#0 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 14	Ch#1 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 15	Ch#1 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 16	Ch#2 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 17	Ch#2 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 18	Ch#3 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 19	Ch#3 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							

- 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

For 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

3.3.7. TEMP. Channel Object

DeviceNet

Class Code: 81HEX(129DEC)

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 Juntion(Rev = 0.1°C), Ohm(Rev = 0.01)
	0x29(41)	Get/Set	Temp. Offset	INT	Rev = 0.1°C, Range : -100°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

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Celsius	0x00	0x10																													
Fahrenheit	0x01	0x11																													
Without CJC	0x02	0x12																													

3.4. GT-3834

3.4.1. Wiring Diagram

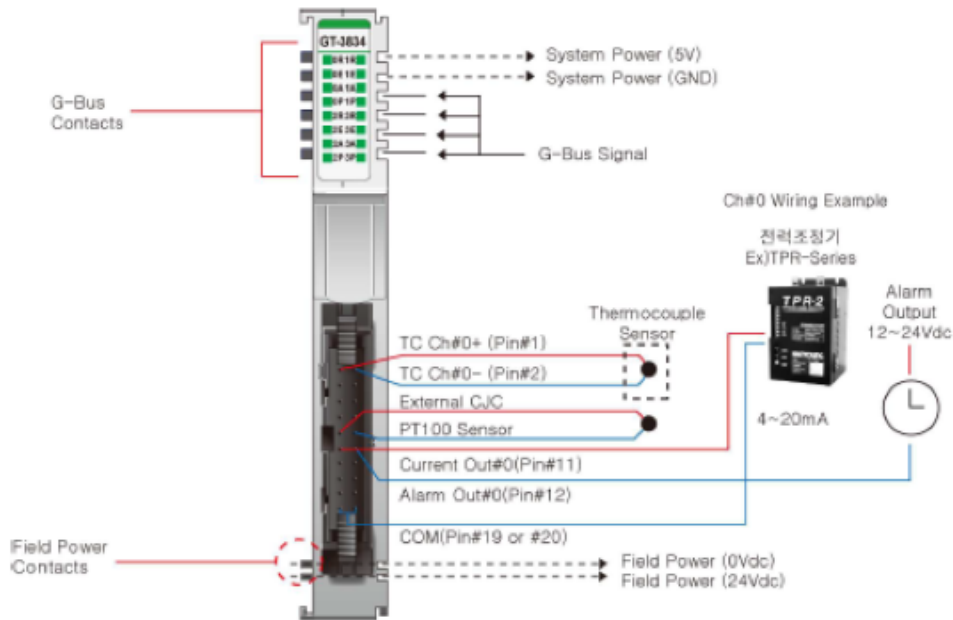
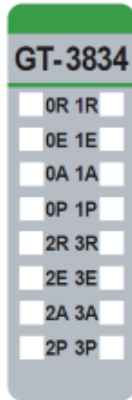


Figure 1. Customer Wiring to Mounting Base

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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	Current Out Ch#0	Alarm Out Ch#0	11
12	Current Out Ch#1	Alarm Out Ch#1	13
14	Current Out Ch#2	Alarm Out Ch#2	15
16	Current Out Ch#3	Alarm Out Ch#3	17
18	COM	COM	19

3.4.2. LED Indicator



LED No.	LED Function	LED Color	LED No.	LED Function	LED 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

3.4.3. 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	Normal Operation (When alarm is set)
	Off	Not Setting the Alarm	Making Sure the Alarm Setting
Process Output (P)	Green	Current Output Status	Normal Operation (When Current Output is set)
	Off	Not Setting Current Output	Making Sure Current Output Setting

3.4.4. Environment Specification

Environmental Specification	
Operation Temperature	-20°C ~ 50°C
UL Temperature	-20°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	Based on IEC 60068-2-6 Sine Vibration - 5 ~ 25Hz : ±1.6mm - 25 ~ 300Hz : 4g - Sweep Rate : 1 Oct/min, 20 Sweeps Random Vibration - 10 ~ 40 Hz : 0.0125 g ² /Hz - 40 ~ 100 Hz : 0.0125 → 0.002 g ² /Hz - 100 ~ 500 Hz : 0.002 g ² /Hz - 500 ~ 2000 Hz : 0.002 → 1.3 x 10 ⁻⁴ g ² /Hz - Test time : 1hrs for each test
EMC Resistance Burst/ESD	EN 61000-6-2 : 2005 EN61000-6-4/All: 2011
Protection Class	Variable/IP20
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL

3.4.5. Specification

Items	Specification																																							
Input Specification																																								
Inputs Per Module	4 Channels																																							
Indicators	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	External CJC Measurement $\pm 3^{\circ}\text{C}$ @ -20°C ~ 50°C (incl. Cold Junction Compensation) Recommend Input Range $\pm 0.1\%$ Recommended Scale @ 25°C ambient $\pm 0.3\%$ Recommended Scale @ -20°C ~ 50°C T/B/R/S/C/D Type Recommend Input Range $\pm 0.3\%$ Recommended Scale @ -20°C ~ 50°C																																							
Connection Method	2-Wire																																							
Data Format	16 Bits Integer (2' complement)																																							
Calibration	Not Required																																							
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768)																																							
Control Method	P, PI, PD, PID with Auto tuning (Limit Cycle Method), On/Off (PB=0)																																							
Control Output	1 Current Output (4~20mA, 12 Bits Resolution) 1 DC-Sink Alarm Output (18~26.4Vdc)																																							
Cold Junction Compensation	External PT100																																							
Current Output Accuracy	$\pm 0.3\%$ Full Scale @ Operating Temperature																																							
Etc Functions	ARW, MR, TEMP. Offset, Hysteresis (On/Off)																																							
General Specification																																								
Power Dissipation	Max. 50mA @ 5Vdc																																							

Isolation	I/O to Logic : Photocoupler Isolation Field power : Not Connected
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~26.4Vdc Power Dissipation : Max. 140mA @ 24Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	60g
Module Size	12mm x 99mm x 70mm
Environment Condition	Refer to 'Environment Specification'

3.4.6. 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), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 5	Ch#0 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 6	Ch#1 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 7	Ch#1 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 8	Ch#2 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 9	Ch#2 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 10	Ch#3 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 11	Ch#3 Temperature(PV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 12	Ch#0 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 13	Ch#0 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 14	Ch#1 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 15	Ch#1 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 16	Ch#2 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 17	Ch#2 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 18	Ch#3 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							
Byte 19	Ch#3 Temperature(SV,CV), 16 Bits signed, Little Endian, Unit=0.1C							

- 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

For 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

3.6.7. TEMP. Channel Object

DeviceNet

Class Code: 81HEX(129DEC)

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

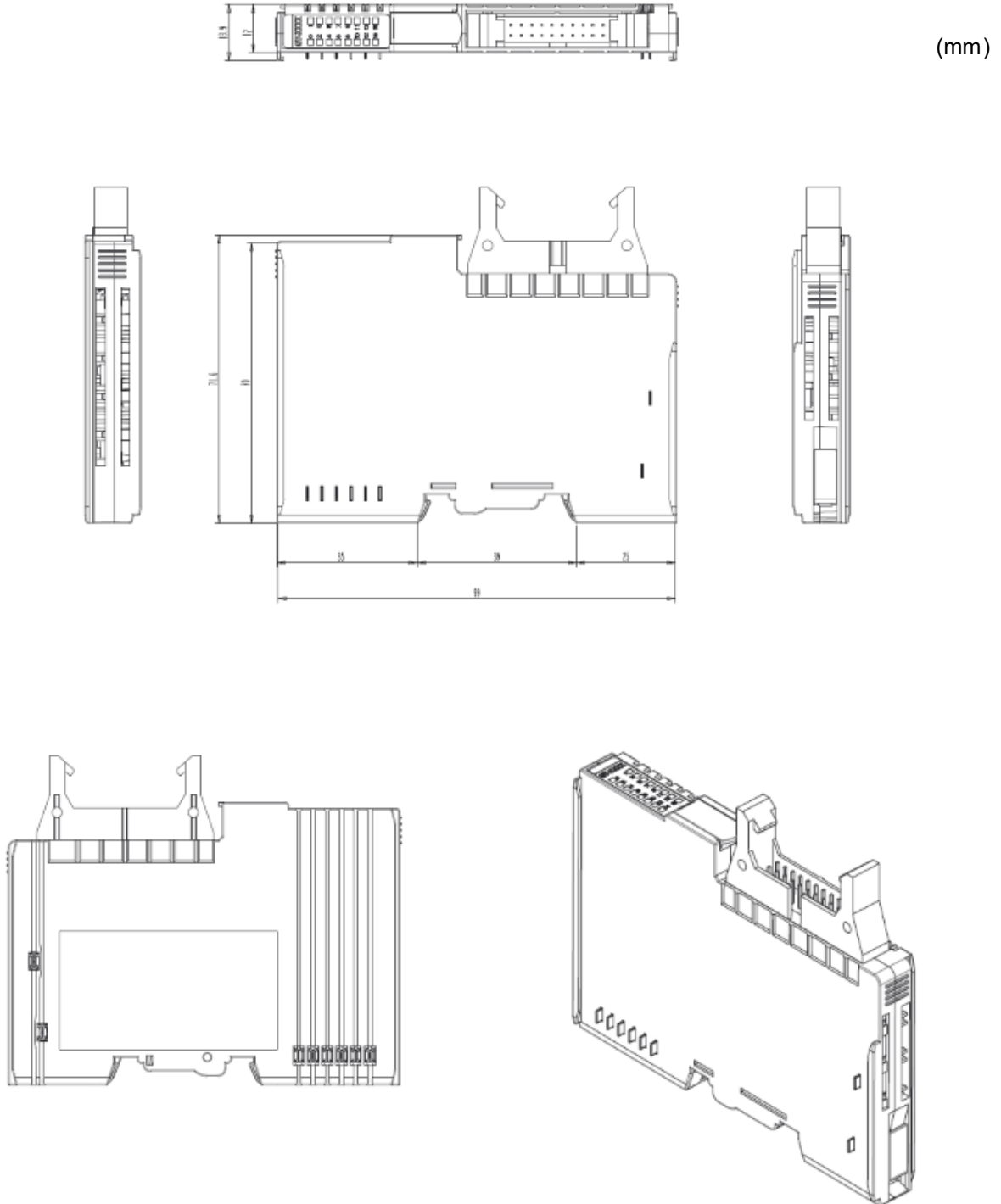
Instance Attribute

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, Alarm 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)
	0x29(41)	Get/Set	Temp. Offset	INT	Rev = 0.1°C, Range : -100°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"> <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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U	9																														
C	10																														
D	11																														
	0x45(69)	Get/Set	Temp Type	UINT	<table border="1"> <thead> <tr> <th></th> <th>Nomal</th> <th>2X_Filter</th> </tr> </thead> <tbody> <tr> <td>Celsius</td> <td>0x00</td> <td>0x10</td> </tr> <tr> <td>Fahrenheit</td> <td>0x01</td> <td>0x11</td> </tr> <tr> <td>Without CJC</td> <td>0x02</td> <td>0x12</td> </tr> </tbody> </table>		Nomal	2X_Filter	Celsius	0x00	0x10	Fahrenheit	0x01	0x11	Without CJC	0x02	0x12														
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Celsius	0x00	0x10																													
Fahrenheit	0x01	0x11																													
Without CJC	0x02	0x12																													

4. Dimension

4.1. GT-3xxF(Connector)(TEMP Controller only)



5. Mounting

Caution!

Hot surface!

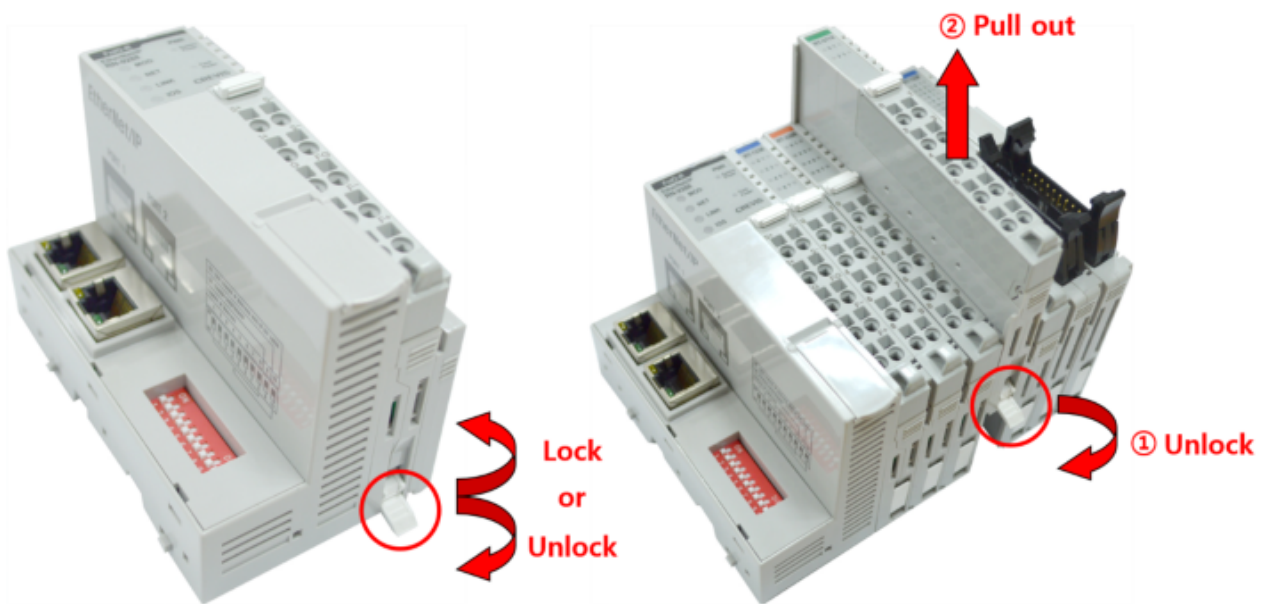
The surface of the housing can become hot during operation. If the device was operated at high ambient temperatures, allow it to be cool before touching it.

Notice!

Perform work on devices only if they are de-energized!

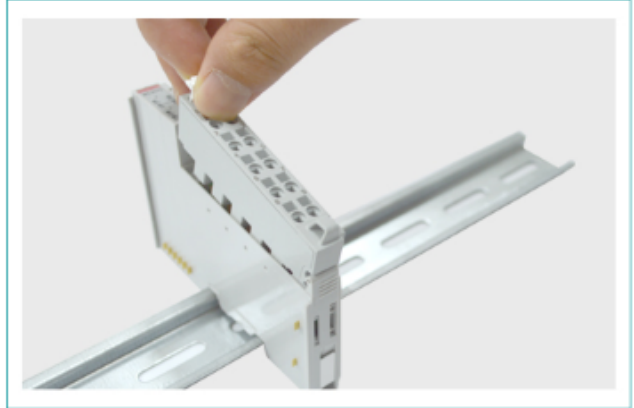
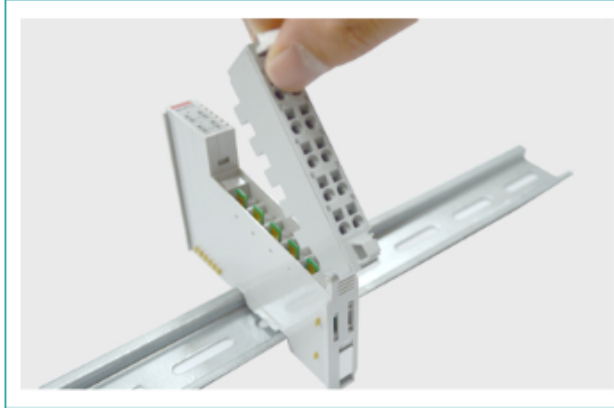
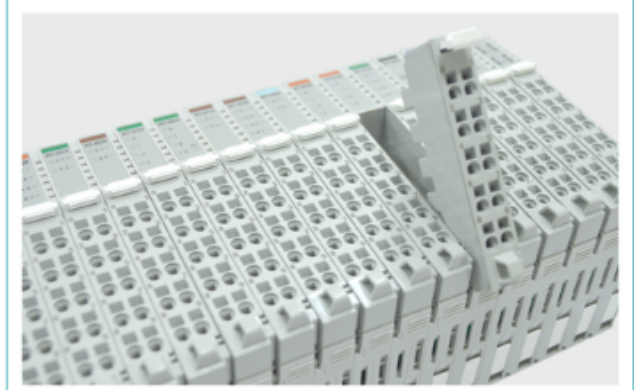
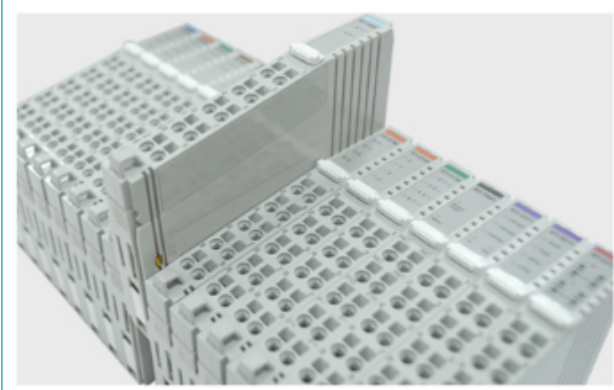
Working on energized devices can damage them. Therefore, turn off the power supply before working on the devices.

5.1. I/O Inserting and Removing Devices



- As above figure in order to safeguard the G-Series module from jamming, it should be fixed onto the DIN rail with locking level. To do so, fold on the upper of the locking lever. To pull out the G-Series module, unfold the locking lever as below figure.

5.2. RTB (Removable Terminal Block)



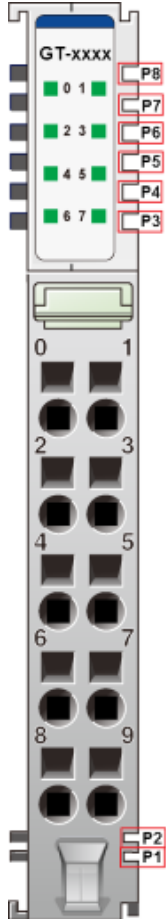
Whole terminal block can be combined and removed for the convenience.

There is a locking switch on the RTB for the easy combination and easy removal.

Easy combination and easy removal for IO modules on the din rail through One Touch Locking Switch.

6. G-Bus Pin Description

Communication between the GN series and the expansion module as well as system / field power supply of the bus modules is carried out via the internal bus. It is comprised of 6 data pin and 2 field power pin.



*Please refer to the table below regarding the pin description from P1 to P8.

No.	Description
P1	Field Power (VCC)
P2	Field Power (GND)
P3	GBUS CLK
P4	GBUS MISO
P5	GBUS MOSI
P6	GBUS Token
P7	System Power (GND)
P8	System Power (VCC)

DANGER



Do not touch data and field power pins in order to avoid soiling and damage by ESD noise.