# FnIO G – Series :

# *GT-3704*

## *GT-3704 (4 Channels, RTD/RESISTANCE INPUT)*

# Table of Contents

## History

| REV. | PAGES | REMARKS | DATE | Editor |
|---|---|---|---|---|
| 1 | 11 | | Mar 19, 2016 | Bae, ju yong |
| 1.01 | 5 | Power dissipation is changed to 130mA. | June 3, 2016 | Hong Jin Hyun |
| 1.02 | 5 | Conversion time is revised. | Oct. 12, 2016 | Hong Jin Hyun |
| 1.03 | 4 | Certifications is updated.(UL add) | Nov. 15, 2016 | Hong, Jin Hyun |
| | | | | |

# 1. ENVIRONMENT SPECIFICATION

| **Environmentalspecification** | |
|---|---|
| Operation Temperature | -40℃ to 70℃ |
| UL Temperature | -20℃ to 60℃ |
| Storage Temperature | -40℃ to 85℃ |
| Relative Humidity | 5% to 95% Non-condensing |
| Operating Altitude | 2,000m |
| Mounting | DIN Rail |
| **General specification** | |
| Shock Operating | IEC 60068-2-27 |
| Vibration Resistance | Based on IEC 60068-2-6<br>Sine Vibration<br>- 5 ~ 25Hz : ±1.6mm<br>- 25 ~ 300Hz : 4g<br>- Sweep Rate : 1 Oct/min, 20 cycles<br>Random Vibration<br>- 10 ~ 40 Hz : 0.0125 $g^2$/Hz<br>- 40 ~ 100 Hz : 0.0125 → 0.002 $g^2$/Hz<br>- 100 ~ 500 Hz : 0.002 $g^2$/Hz<br>- 500 ~ 2000 Hz : 0.002 → 1.3 x 10-4$g^2$/Hz<br>- Test time : 1hrs for each test |
| Industrial Emissions | EN 61000-6-4/A11 : 2011 |
| Industrial Immunity | EN 61000-6-2 : 2005 |
| Installation Position | Vertical and horizontal installation is available. |
| Product Certifications | CE, UL |

# 2. GT-3704 (4 CHANNELS RTD/RESISTANCE INPUT)

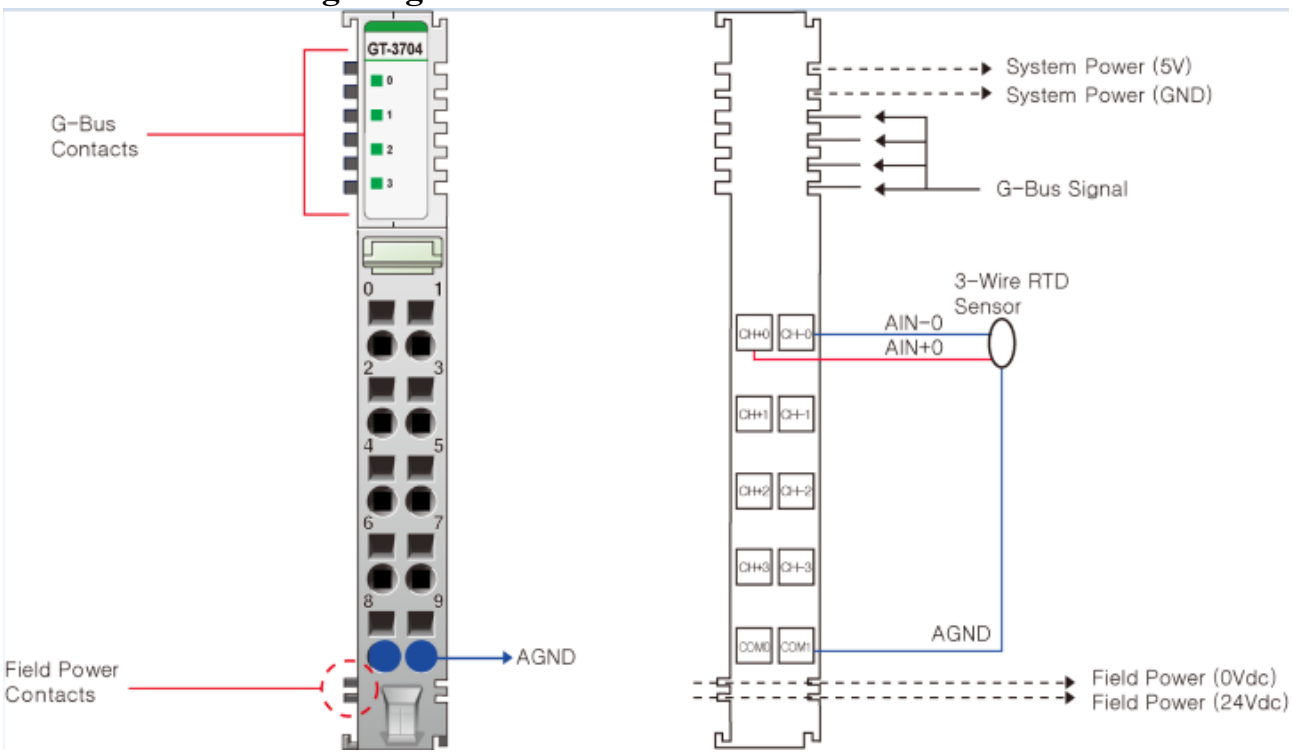
## 2.1. GT-3704 Specification

<table>
<tr><th colspan="2">Items</th></tr>
<tr><td colspan="2">Input Specification</td></tr>
<tr><td>Inputs per module</td><td>4 Channels</td></tr>
<tr><td>Indicators(Logic side )</td><td>4 Green Input status</td></tr>
<tr><td>Sensor Types</td><td>RTD Input Range
<table>
<tr><td>RTD Input</td><td>Input Range</td></tr>
<tr><td>PT100, PT200, PT500, PT50</td><td>-200~850°c</td></tr>
<tr><td>PT1000</td><td>-200~350°c</td></tr>
<tr><td>JPT100, JPT200, JPT500, JPT50</td><td>-200~640°c</td></tr>
<tr><td>JPT1000</td><td>-200~350°c</td></tr>
<tr><td>NI100, NI200, NI500</td><td>-60~250°c</td></tr>
<tr><td>NI1000</td><td>-60~180°c</td></tr>
<tr><td>NI120</td><td>-80~260°c</td></tr>
<tr><td>NI1000LG</td><td>-50~120°c</td></tr>
<tr><td>Resistance Input</td><td>Input Range</td></tr>
<tr><td>100mΩ/bit</td><td>0~2000Ω</td></tr>
<tr><td>10mΩ/bit</td><td>0~327Ω</td></tr>
<tr><td>20mΩ/bit</td><td>0~620Ω</td></tr>
<tr><td>50mΩ/bit</td><td>0~1200Ω</td></tr>
</table></td></tr>
<tr><td>Excitation Current</td><td>About 1mA</td></tr>
<tr><td>Connection Method</td><td>3-Wire</td></tr>
<tr><td>Conversion Time</td><td>< 150ms, All Channel</td></tr>
<tr><td>Data Format</td><td>16bits singed Integer (2' complement )</td></tr>
<tr><td>Module Accuracy</td><td>PT100, PT1000 : ±0.5℃ Full Scale @ 25℃ ambient<br>±0.1% Full Scale @ 25℃ ambient<br>±0.3% Full Scale @ -40,70℃ ambient</td></tr>
<tr><td>Resolution of Data</td><td>RTD Type : ±0.1℃ / F , Resitance Type : 100mΩ, 10mΩ, 20mΩ, 50mΩ</td></tr>
<tr><td>Calibration</td><td>Not Required</td></tr>
<tr><td>Diagnostic</td><td>Sensor open or range over, then conversion data = 0x8000(-32768)</td></tr>
<tr><td colspan="2">General specification</td></tr>
</table>

# Specification

| | |
|---|---|
| Power dissipation | Max. 130mA @ 5.0Vdc |
| Isolation | I/O to Logic : Isolation<br>Field power : Not Connected |
| Field Power | Not used, Field power bypass to next expansion module |
| 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'** |

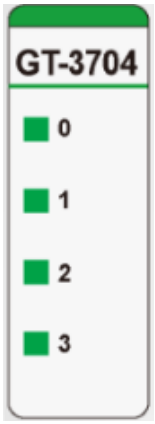
## 2.2. GT-3704 Wiring Diagram




| 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 |

## 2.3. GT-3704 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 |

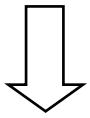
### 2.3.2. Channel Status LED

| Status | LED | To indicate |
|---|---|---|
| Not Signal,<br>Normal Operation | Off | Input Sensor Open or Input Range Over<br>Normal Operation |
| On Signal<br>Normal Operation | Green | Sensor Connected and Input Range Valid<br>Normal Operation |

## 2.4. Mapping data into the image table

- **Input Module Data**

| Analog Input Ch0 |
|---|
| Analog Input Ch1 |
| Analog Input Ch2 |
| Analog Input Ch3 |



- **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 | | | | | | | |

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

## 2.5. Configuration Parameter – 10byte

| Byte | Decimal Bit | Description | Default Value |
|---|---|---|---|
| 0 | 00-07 | The selection Sensor Type<br>=00h:PT100, 0.00385, -200~850°C, 0.1°C /count<br>=01h:PT200, 0.00385, -200~850°C, 0.1°C/count<br>=02h:PT500, 0.00385, -200~850°C, 0.1°C/count<br>=03h:PT1000, 0.00385, -200~350°C, 0.1°C/count<br>=04h:PT50, 0.00385, -200~850°C, 0.1°C/count<br>=10h:JPT100, 0.003916, -200~640°C, 0.1°C/count<br>=11h:JPT200, 0.003916, -200~640°C, 0.1°C/count<br>=12h:JPT500, 0.003916, -200~640°C, 0.1°C/count<br>=13h:JPT1000, 0.003916, -200~350°C, 0.1°C/count<br>=14h:JPT50, 0.003916, -200~640°C, 0.1°C/count<br>=20h:NI100, 0.00618, -60~250°C, 0.1°C/count<br>=21h:NI200, 0.00618, -60~250°C, 0.1°C/count<br>=22h:NI500, 0.00618, -60~250°C, 0.1°C/count<br>=23h:NI1000, 0.00618, -60~180°C, 0.1°C/count<br>=30h:NI120, 0.00672, -80~250°C, 0.1°C/count<br>=53h:NI1000LG, 0.00500, -50~120°C, 0.1°C/count<br>=80h:Resistance Input, 1~2000Ω, 100mΩ /1count<br>=81h:Resistance Input, 1~327Ω, 10mΩ /1count<br>=82h:Resistance Input, 1~620Ω, 20mΩ /1count<br>=83h: Resistance Input, 1~1200Ω, 50mΩ/1count<br>=Others: Reserved | 0: PT100 |
| 1 | 00 | Temperature Type<br>0: Celsius(°C), 1: Fahrenheit(°F) | 0: Celsius(°C) |
| | 01 | Reserved | 0 |
| | 02 | Data Resolution<br>0: 0.1°C, °F/bit, 1: 1°C, °F/bit | 0 |
| | 03 | Reserved | 0 |
| | 04 | Filter Type<br>0: Normal Filter, 1: Enhanced Filter | 0: Normal Filter |
| | 05-07 | Reserved | 0 |
| 2~3 | | CH0 Offset value | 0 |
| 4~5 | | CH1 Offset value | 0 |
| 6~7 | | CH2 Offset value | 0 |
| 8~9 | | CH3 Offset value | 0 |

## 2.6. Data Value

| Resistance Temperature Detector Input Range | |
|---|---|
| **Type** | **Input Range** |
| PT100 | -200 ~ 850 ℃ |
| PT200 | -200 ~ 850 ℃ |
| PT500 | -200 ~ 850 ℃ |
| PT1000 | -200 ~ 350 ℃ |
| PT50 | -200 ~ 850 ℃ |
| JPT100 | -200 ~ 640 ℃ |
| JPT200 | -200 ~ 640 ℃ |
| JPT500 | -200 ~ 640 ℃ |
| JPT1000 | -200 ~ 350 ℃ |
| JPT50 | -200 ~ 640 ℃ |
| NI100 | -60 ~ 250 ℃ |
| NI200 | -60 ~ 250 ℃ |
| NI500 | -60 ~ 250 ℃ |
| NI1000 | -60 ~ 180 ℃ |
| NI120 | -80 ~ 260 ℃ |
| NI1000LG | -50 ~ 120 ℃ |
| **Resistance Input Ragne** | |
| **Type** | **Input Range** |
| 100mΩ/bit | 0~2000Ω |
| 10mΩ/bit | 0~327Ω |
| 20mΩ/bit | 0~620Ω |
| 50mΩ/bit | 0~1200Ω |