

FnIO G-Series :

GT-3002

GT-3002 (2ch load cell input unit, strain gauge)

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History

REV.	PAGES	REMARKS	DATE	Editor
1.00	8	New Document	Dec 17, 2019	Seokhyun, Jun
1.01	9	Conversion time update	Jan 20, 2020	Seokhyun, Jun

1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operating Temperature	-40°C~60°C
UL Temperature	-20°C~60°C
Storage Temperature	-40°C~85°C
Relative Humidity	5%~90% non-condensing
Mounting	DIN rail
General Specification	
Chock 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 cycles Random Vibration 10 ~ 40Hz : 0.0125g ² /Hz 40 ~ 100Hz : 0.0125 → 0.002g ² /Hz 100 ~ 500Hz : 0.002g ² /Hz 500 ~ 2000Hz : 0.002 → 1.3 x 10 ⁻⁴ g ² /Hz Test time : 1hrs for each test
EMC Resistance	EN 61000-6-2 : 2005 EN 61000-6-4 : 2007+A1:2011
Installation Pos./Protect.Class	Variable/IP20
Product Certifications	CE, UL

2. GT-3002(2ch load cell input unit, strain gauge)

2.1. GT-3002 Specification

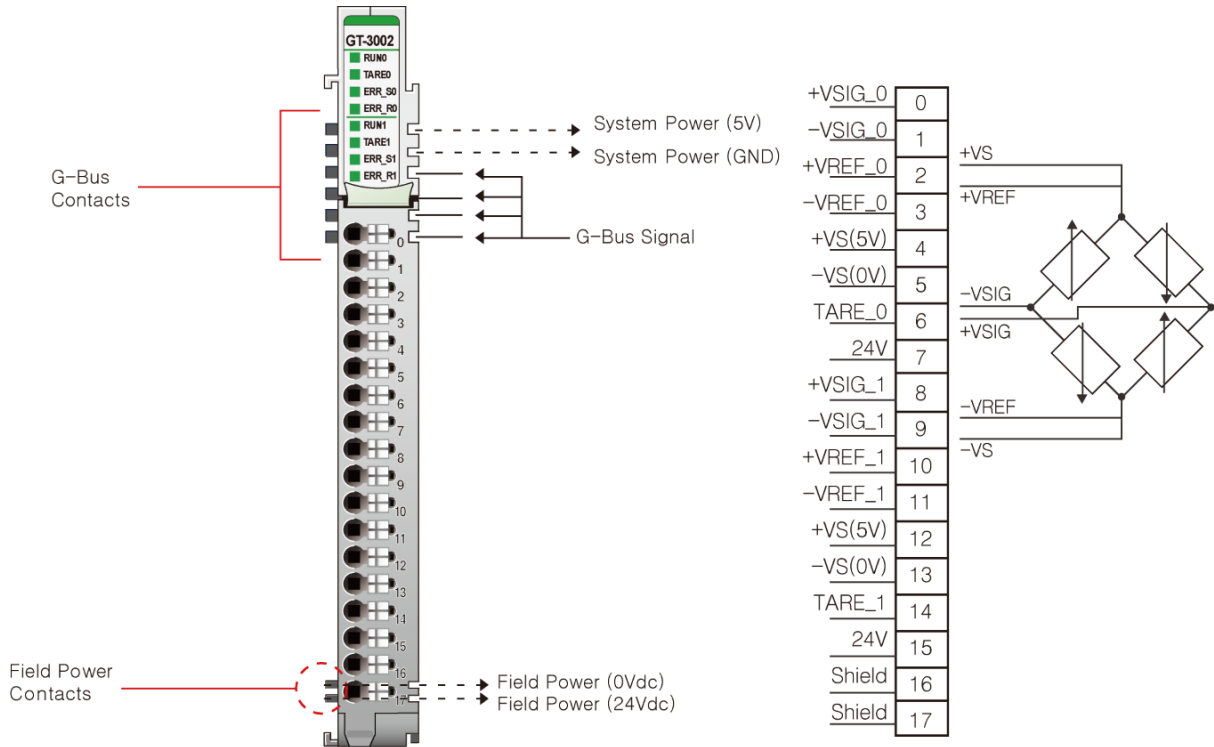
Items	Specification
Resistor bridge input specification	
Number of channels	2 channels, Strain gauge input
Input type	Resistor bridge, Strain gauge
Indicators	Run 0,1 / Tare 0,1 Error_Sig.voltage 0,1 / Error_Ref.voltage 0,1 8 Green LED
Input range V_{SEN}	-150mV ~ +150mV
Input range V_{REF}	0 ~10V
Interanal resistance	> 1 M Ω (V_{SEN} , V_{REF})
Measuring error	< $\pm 0.1\%$ Full Scale @ 25 $^{\circ}$ C ambient < $\pm 0.3\%$ Full Scale @ -40 ~ 60 $^{\circ}$ C ambient
Resolution	24bit, 32bit presentation
Conversion time	Max. 500us
Filter	Max. 64 samples filtering, parameterisable
Special features	Open load check, Tare, 5Vdc bridge supply
Bridge supply specification (Power)	
Voltage source	5V dc nominal **
Current rate	Max. 30mA
Digital input specification (Tare input)	
On-state voltage	24V dc nominal
Internal resistance	11.4k ohm
General specification	
Power dissipation	Max. 25mA @ 5.0Vdc
Isolation	I/O to Logic : Photocoupler Isolation Field power : Non-Isolation
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~32Vdc Power Dissipation : Max. 25mA @ 24Vdc
Wiring	I/O Cable Max. 2.0mm ² (AWG 14)
Weight	63g
Module Size	12mm x 109mm x 70mm
Environment Condition	Refer to 'Environment Specification'

* Load cell signals have low voltage levels and are very sensitive to external noise. Therefore, EMC protection may be necessary depending on the system environment.

- It is recommended to install GT-7151/GT-7851 according to the system environment.

** Voltage drop occurs depending on the specifications of the cable and load of the voltage source.(Max 0.7V)

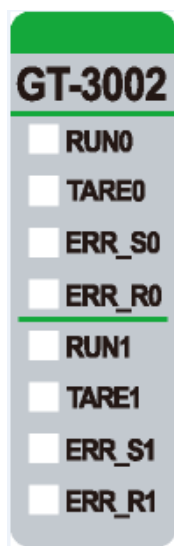
2.2. GT-3002 Wiring Diagram



Pin No.	Signal Description
0	Bridge signal input voltage + #0
1	Bridge signal input voltage - #0
2	Bridge reference input voltage + #0
3	Bridge reference input voltage + #0
4	+5V(bridge supply)
5	0V(bridge supply)
6	Tare input(24V) #0
7	Field power(24V)
8	Bridge signal input voltage + #1
9	Bridge signal input voltage - #1
10	Bridge reference input voltage + #1
11	Bridge reference input voltage + #1
12	+5V(bridge supply)
13	0V(bridge supply)
14	Tare input(24V) #1
15	Field power(24V)
16	Shield
17	Shield

2.3. GT-3002 LED Indicator

2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
0	Run #0	Green
1	Tare #0	Green
2	Error signal voltage #0	Green
3	Error reference voltage #0	Green
4	Run #1	Green
5	Tare #1	Green
6	Error signal voltage #1	Green
7	Error reference voltage #1	Green

2.3.2 Channel Status LED

LED Function	LED	To Indicate
Run	Off	G-bus fault / Not power supply
	On	Normal operation
Tare	Off	Taring calibration off (H/W or S/W)
	On	Taring calibration on (H/W or S/W)
Error signal voltage	Off	Normal operation
	On	Bridge signal input voltage range over / Open load
Error reference voltage	Off	Normal operation
	On	Bridge reference input voltage range over

2.4. Mapping data from the image table

- **Input Image Value - 16Byte**

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	#0 Bridge input byte LL							
Byte 1	#0 Bridge input byte LH							
Byte 2	#0 Bridge input byte HL							
Byte 3	#0 Bridge input byte HH							
Byte 4	#0 Reference input byte LL							
Byte 5	#0 Reference input byte LH							
Byte 6	#0 Reference input byte HL							
Byte 7	#0 Reference input byte HH							
Byte 8	#1 Bridge input byte LL							
Byte 9	#1 Bridge input byte LH							
Byte 10	#1 Bridge input byte HL							
Byte 11	#1 Bridge input byte HH							
Byte 12	#1 Reference input byte LL							
Byte 13	#1 Reference input byte LH							
Byte 14	#1 Reference input byte HL							
Byte 15	#1 Reference input byte HH							

* Field power off(Input data) : FFFF FFFF FFFF FFFF FFFF FFFF FFFF

- **Output Image Value - 2Byte**

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	-	-	-	-	-	-	SWT1	SWT0
Byte 1	Reserved							

- SWT0,1 : S/W Taring bit(#0, #1)

- Reserved : Not used

2.5. Parameter Data

- **Valid Parameter length : 2 Bytes**
- **Parameter Data**

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Sampling filter							
Byte 1	Reserved							

- Sampling filter

000 : 32 sampling(default)	011 : 8 sampling	110 : 64 sampling
001 : 2 sampling	100 : 16 sampling	
010 : 4 sampling	101 : 32 sampling	

3.1. Application : Load cell

3.1.1. Calculating the weight

The sensor receives the analog signal and calculates the weight.

$$G = (U_{SIG} / U_{REF}) * (L_{R.O.} / L_{R.C.}) \quad G : \text{Weight value (kg)}$$

$$U_{SIG} = V_{SIG}(\text{dec}) * (150\text{mV} / 8388607), \text{ Unit : [mV]}$$

- Max. V_{SIG} value : 150mV, 0x7FFFFFF = 8388607 (dec)

$$U_{REF} = V_{REF}(\text{dec}) * (10\text{V} / 8388607), \text{ Unit : [V]}$$

- Max. V_{REF} value : 10V, 0x7FFFFFF = 8388607 (dec)

Symbol	Meaning	Unit
U_{SIG}	Signal voltage from the load cell	mV
U_{REF}	Reference voltage from the load cell	V
V_{SIG}	Bridge signal input voltage	1
V_{REF}	Bridge reference input voltage	1
$L_{R.C.}$	Rated capacity of the load cell	1mV/V
$L_{R.O.}$	Rated output of the load cell	kg

Example

1) Load cell sensor technical data

- Rated capacity : 2mV/V ($L_{R.C.}$)
- Rated output(max load) : 100kg ($L_{R.O.}$)
- Supply voltage : 5V

2) Calculating the weight

- V_{SIG} value : 0x000660AF (dec 417967)

$$U_{SIG} = 417967 * (150\text{mV} / 8388607) = 7.473833\text{mV}$$

- V_{REF} value : 0x003F6E23 (dec 4156963)

$$U_{REF} = 4156963 * (10\text{V} / 8388607) = 4.955486\text{V}$$

- $G = (7.473833\text{mV} / 4.955486\text{V}) * (100\text{kg} / 2\text{mV/V}) = 75.409687\text{kg}$