
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			2019/12/17	Seokhyun, Jun
1.01	9	Conversion time update	2020/01/20	Seokhyun, Jun
1.02		Release	2020/04/20	Seokhyun, Jun
1.03	5	Measuring Error change	2020/11/09	Hongseok, Kim
1.04	7,10	Edit Typo	2021/05/02	Hongseok, Kim
1.05	1~9	Specification form update	2023/08/02	Hongseok, Kim
1.06	5	Edit System, Field Power Dissipation	2025/05/30	Suna, Hwang

Specification

1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operating Temperature	-40℃~60℃
UL Temperature	-20℃~60℃
Storage Temperature	-40℃~85℃
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN rail
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	IEC 60068-2-6, 4g
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

Specification

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

2.1. GT-3002 Specification

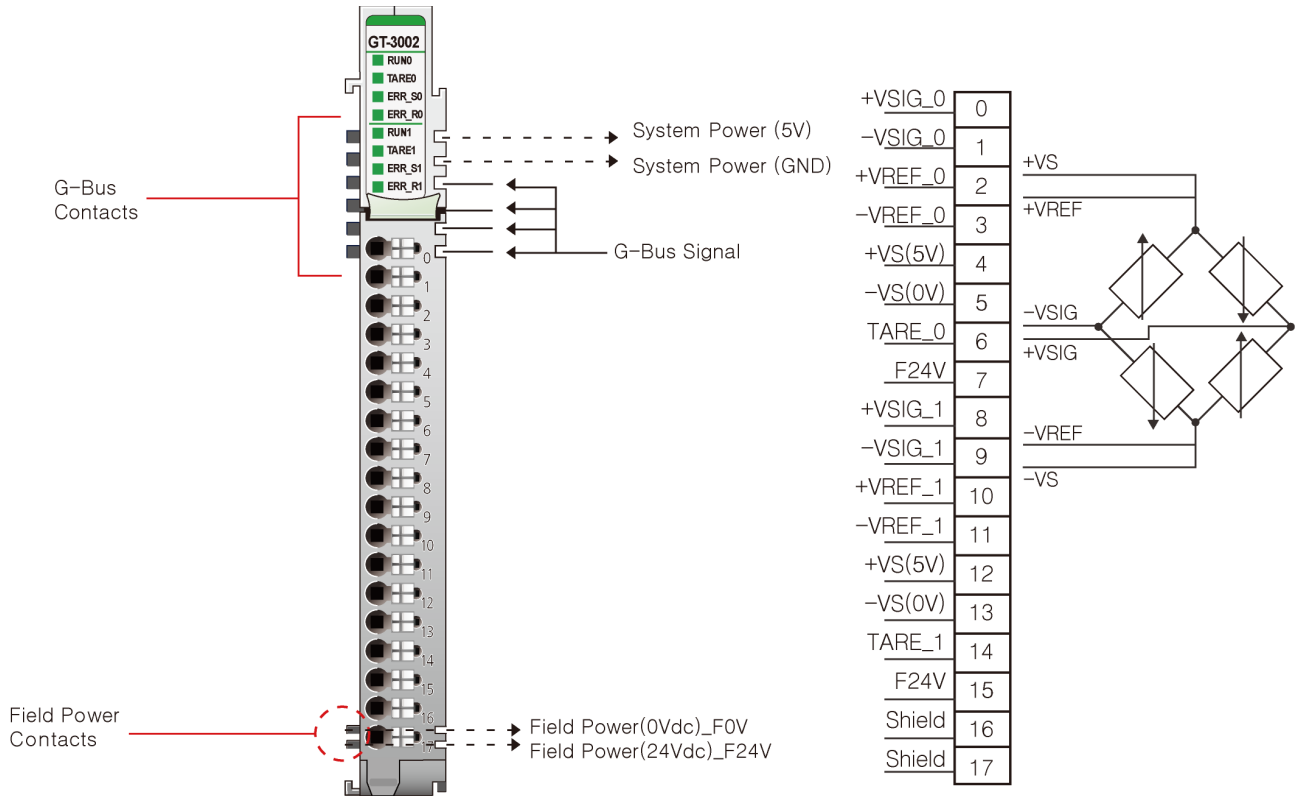
Items	
Resistor bridge input specification	
Number of channels	2 channels, Strain gauge input
Input type	Resistor bridge, Strain gauge
Indicators	Run 0,1 / Tare 0,1 Error_Sig.voltage 0,1 / Error_Ref.voltage 0,1 8 Green LED
Input range VSIG	-150mV ~ +150mV
Input range VREF	0 ~10V
Interanl resistance	> 1 MΩ (VSIG, VREF)
Measuring error	VSIG : < ±0.1% Full Scale @ 25°C ambient < ±0.3% Full Scale @ -40 ~ 60°C ambient VREF : < ±0.05% Full Scale @ 25°C ambient < ±0.3% Full Scale @ -40 ~ 60°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. 30mA @ 5Vdc
Isolation	I/O to Logic : Photocoupler Isolation Field power : Non-Isolation
UL Field Power	Supply Voltage : 24Vdc nominal, Class 2
Field Power	Supply Voltage : 24Vdc nominal Voltage Range : 18~30Vdc Power Dissipation : Max. 30mA @ 24Vdc
Wiring	I/O Cable Max. 0.823mm ² (AWG 18)
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



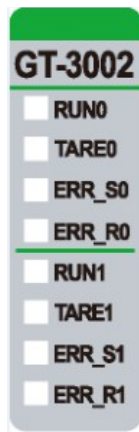
Pin No.	Signal Description
0	Bridge signal input voltage + #0
1	Bridge signal input voltage - #0
2	Bridge reference input voltage + #0
3	Bridge reference input voltage - #0
4	+5V(bridge supply)
5	0V(bridge supply)
6	Tare input(24V) #0
7	Field power(24V)
8	Bridge signal input voltage + #1

Specification

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
	Green	Normal operation
Tare	Off	Taring calibration off (H/W or S/W)
	Green	Taring calibration on (H/W or S/W)
Error signal voltage	Off	Normal operation
	Green	Bridge signal input voltage range over / Open load
Error reference voltage	Off	Normal operation
	Green	Bridge reference input voltage range over

Specification

2.4. Mapping data from the image table

● Input Image Value - 16Byte

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0				#0 Bridge input byte LL				
Byte1				#0 Bridge input byte LH				
Byte2				#0 Bridge input byte HL				
Byte3				#0 Bridge input byte HH				
Byte4				#0 Reference input byte LL				
Byte5				#0 Reference input byte LH				
Byte6				#0 Reference input byte HL				
Byte7				#0 Reference input byte HH				
Byte8				#1 Bridge input byte LL				
Byte9				#1 Bridge input byte LH				
Byte10				#1 Bridge input byte HL				
Byte11				#1 Bridge input byte HH				
Byte12				#1 Reference input byte LL				
Byte13				#1 Reference input byte LH				
Byte14				#1 Reference input byte HL				
Byte15				#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
Byte0	-	-	-	-	-	-	SWT1	SWT0
Byte1	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
Byte0	-	-	-	-	-	Sampling filter		
Byte1	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. Application : Load cell

3.1. Calculating the weight

The sensor receives the analog signal and calculates the weight.

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

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

- Max. V_{SIG} value : 150mV, 0x7FFFFFFF = 8388607 (dec)

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

- Max. V_{REF} value : 10V, 0x7FFFFFFF = 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	Kg
$L_{R.O.}$	Rated output of the load cell	1mV/V

Example

1) Load cell sensor technical data

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

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

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