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# **FnIO G-Series :**

## **GT-3102**

**GT-3102 (2ch load cell input unit, strain gauge)**

## History

REV.	PAGES	REMARKS	DATE	Editor
1.00	8	New Document	Aug 20, 2020	HongSeok, Kim
1.01	5~10	Add description	Aug 29, 2020	HongSeok, Kim
1.02	Whole	Fix the term, and lists	Nov 25, 2020	HongSeok, Kim

## 1. ENVIRONMENT SPECIFICATION

<b>Environmental specification</b>	
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
<b>General Specification</b>	
Shock Operating	IEC 60068-2-27 : 2008 / 15g, 11ms
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039 : Vibration Class B, 4g
Industrial Emissions	EN 61000-6-4 : 2007 +A1:2011
Industrial Immunity	EN 61000-6-2 : 2005
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL, FCC

## 2. GT-3102(2ch load cell input unit, strain gauge)

### 2.1. GT-3102 Specification

Items	Specification
<b>Resistor bridge input specification</b>	
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
Interanal 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
Weight Value error	Weight Value : < ±0.1% Measuring Range** @ 25°C ambient < ±0.3% Measuring Range @ -40 ~ 60°C ambient
A/D Converter Resolution	24 bits
Resolution	0.1g/kg/ton, 32bit presentation
Conversion time	Max. 700us
Filter	Max. 64 samples filtering, parameterisable
Special features	Open load check, Tare, 5VDC bridge supply
<b>Bridge supply specification (Power)</b>	
Voltage source	5V dc nominal ***
Current rate	Max. 30mA
<b>Digital input specification (Tare input)</b>	
On-state voltage	24V dc nominal
Internal resistance	11.4k ohm
<b>General specification</b>	
Power dissipation	Max. 25mA @ 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. 25mA @ 24Vdc
Single Wiring	I/O Cable Max. 0.75mm <sup>2</sup> (AWG 18)
Weight	63g
Module Size	12mm x 109mm x 70mm
<b>Environment Condition</b>	<b>Refer to 'Environment Specification'</b>

\* Load cell signals have low voltage levels and are very sensitive against the external noise.

EMC protection may be necessary depending on the system environment.

So It's recommended to use the noise filter module of GT-7151/GT-7851 according to the system environment.

\*\* Measuring Range means Rated Output Range

Ex) If Sensor Specification is "Rated Output : 2mV/V, Rated Capacity : 5kgf, VREF : 5V",

the calculated value will be same as below.

- Rated Output Range : -10mV ~ 10mV

( According to the wiring method of Strain Gauge, (-) value will be available. )

- Measuring error : < ±0.02mV

( In case of 0.1% error rate a@ 25°C ambient )

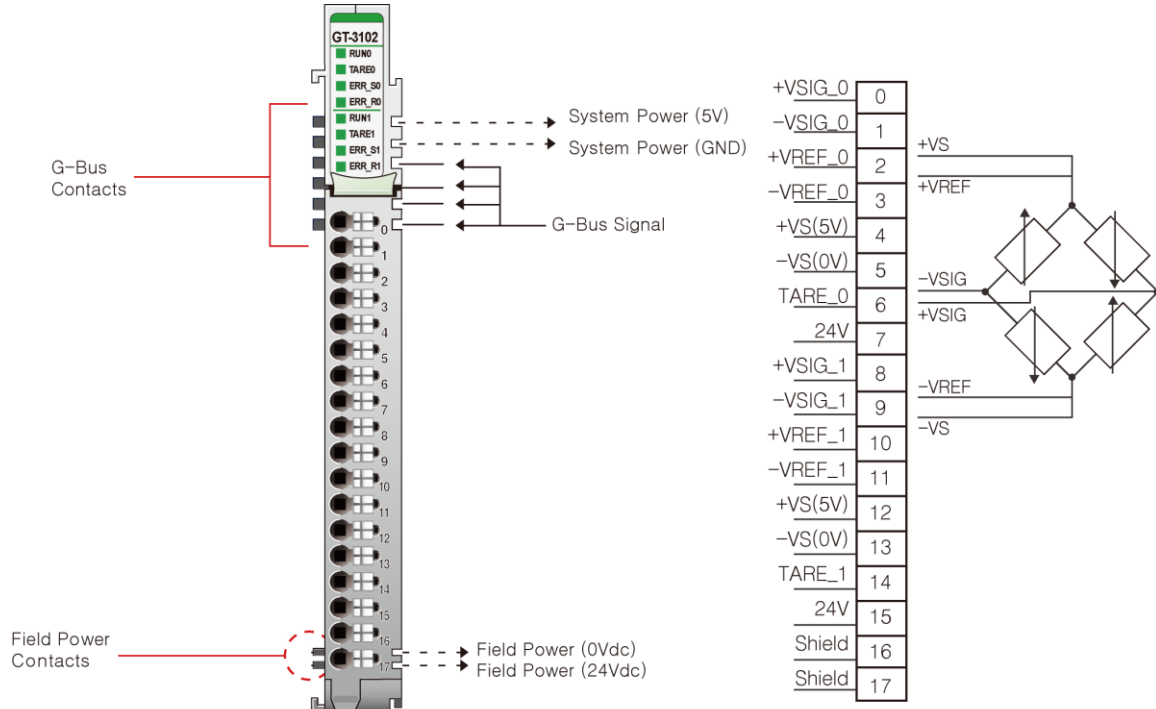
- Measuring Weight error : < ±0.01kg

< ±0.01kg = [ Rated Capacity (5kgf) x Measuring Error ( 0.02mV ) ] / Max. Rated Output Range (10mV)

( 5kgf means that if 10mV is fully used, 5Kg will be measured )

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

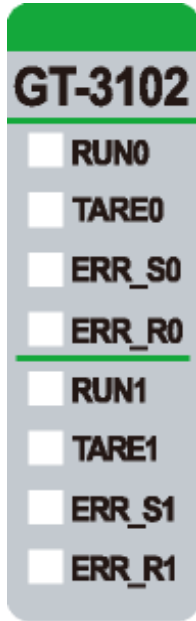
## 2.2. GT-3102 Wiring Diagram



Pin No.	Signal Description
0	VSIG : Bridge signal input voltage + #0
1	VSIG : Bridge signal input voltage - #0
2	VREF : Bridge reference input voltage + #0
3	VREF : Bridge reference input voltage - #0
4	+5V(bridge supply)
5	0V(bridge supply)
6	Tare input(24V) #0
7	Field power(24V)
8	VSIG : Bridge signal input voltage + #1
9	VSIG : Bridge signal input voltage - #1
10	VREF : Bridge reference input voltage + #1
11	VREF : 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-3102 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)
ESV (Error Signal Voltage)	Off	Normal operation
	On	Bridge signal input voltage range over / Open load
ERV (Error Reference Voltage)	Off	Normal operation
	On	Bridge reference input voltage range over

## 2.4. Parameter Data

- Valid Parameter length : 8 Bytes
- Parameter Data ( Hex )

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Channel 0 : Rated Capacity L							
Byte 1	Channel 0 : Rated Capacity H							
Byte 2	Channel 1 : Rated Capacity L							
Byte 3	Channel 1 : Rated Capacity H							
Byte 4	Channel 0 : Basic Mode, Rated Output (mV/V) / SC Mode, Reference Value (Kg)							
Byte 5	Channel 1 : Basic Mode, Rated Output (mV/V) / SC Mode, Reference Value (Kg)							
Byte 6	--							
Byte 7	Mode	--	--	--	--	Sampling filter		

- Sampling filter

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

\* Accuracy increases as the number of sampling increases, but becomes insensitive to changes in values.

- Max. Filtering Time at the first start, 700us x 64sampling = 44.8ms ( It's the first update time. )
- Fixed weight value can be measured more exactly by using the higher sampling filter value.

- Mode :

0 = Basic Mode

( The rated output value of the loadcell sensor specification can be used for general operation. )

1 = Sensor Calibration Mode ( SC Mode )

( Through the exact weight, the rated output value of the loadcell sensor can be figured out. )



## 2.5. Mapping data from the image table

- **Output Image Value - 2Byte**

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	<b>Control Byte - Channel 0</b>							
	--	RV	ZV	SC	--	SWT	Weight Value Unit	
Byte 1	<b>Control Byte - Channel 1</b>							
	--	RV	ZV	SC	--	SWT	Weight Value Unit	

- SWT : S/W Taring bit ( Active Rising Edging On :1 / Off : 0 )
- RV : Reference Value
- ZV : Zero Valence
- SC : Sensor Calibration
- Weight Value Unit : 00 = kg, 01=g, 10=kg, 11=ton

### Example) Sensor Calibration Mode

1. The load cell sensor information will not be used
2. Change the mode bit of the parameter to 1
3. Setting the reference value of the parameter
  - \*Reference Value : Standard Weight
4. Sensor Tare Caribration should be done without any weight on the loadcell sensor.
  - \*SC Value = 1, ZV Value = 1, RV Value = 0
5. After loading the weight of the value set in 'Reference Value' to the load cell sensor, et the RV
  - \*SC Value = 1, ZV Value = 1, RV Value = 1
  - \*Reference value that user want to use any fixed weight, this value should be fill in the parameter area.

( Please refer to the sensor calibration of 2.4 part. )

● **Input Image Value - 10Byte**

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	#0 Weight Value LL							
Byte 1	#0 Weight Value LH							
Byte 2	#0 Weight Value HL							
Byte 3	#0 Weight ValueHH							
Byte 4	#1 Weight Value LL							
Byte 5	#1 Weight Value LH							
Byte 6	#1 Weight Value HL							
Byte 7	#1 Weight Value HH							
Byte 8	<b>Status Byte - Channel 0</b>							
	ESV	ERV	--	TARE	--	SC	Weight Value Unit	
Byte 9	<b>Status Byte - Channel 1</b>							
	ESV	ERV	--	TARE	--	SC	Weight Value Unit	

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

- ESV : Error Signal Voltage ( Please refer to the led status of 2.3.2 part. )
- ERV : Error Reference Voltage ( Please refer to the led status of 2.3.2 part. )
- SC : Sensor Calibration ( Please refer to the sensor calibration of 2.4 part. )
- TARE : Zero Adjustment
- Weight Value Unit : 00 = kg, 01=g,10=kg, 11=ton