GRAPHTEC GL7-DCB-UM-151

GL7-DCB

# GL7000
# DC Strain Module

# USER'S MANUAL

Thank you very much for buying this GRAPHTEC product.

This item is a measuring module. Please use it by installing it on the main module .

These directions describe preparations and cautions before measurement.

**For safe use, please make sure to read "4 Regarding Maximum Input Voltage"**

**For the details concerning operation procedures etc., read the User's manual recorded on the CD-ROM.**

You can use in GL7000 firmware (V1.20) and GL-Connection(V1.20) or later.

### Confirmation of the exterior

After opening the package, please confirm that there are no problems (scratches and dirt) on the exterior before use.

### Confirmation of the attached items.

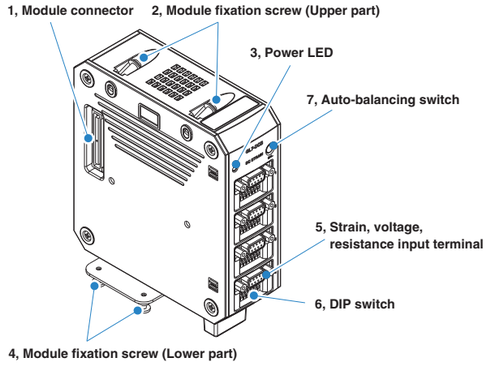
- User's manual (this book): 1
- DSUB (male) connector : 4
- Upgrade CD-ROM: 1

If by any chance faults are found, please contact the store where you bought the item.

*** Please note that items mentioned in this book may change without prior notice.**

## 1 Part Names

**Explanation of the module's part names and functions.**




**1, Module connector.....** Connector for connecting all kinds of modules.

**2, Module fixation screw..... (Upper part)** Fixation screw for the adjoining module. To prevent drop off, do not remove from the module.

**3, Power LED.....** The Power LED will light up green when the power has been turned on and the module has been recognized. However, this LED flashes during auto-balancing.

**4, Module fixation screw..... (Lower part)** Fixation screw for the adjoining module.

**5, Strain, voltage, resistance input terminal..** Terminal for inputting analog measurements.

**6, DIP switch.....** This is used to switch to strain, voltage or resistance.

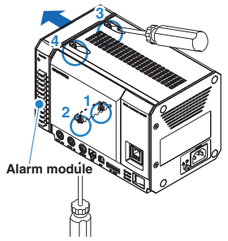
**7, Auto-balancing switch.....** This is used to set the initial value of the strain to 0 (zero).

## 2 How to Install Module

**This explains how to attach the module to the main module.**

**⚠ CAUTION When installing or removing the module, please make sure that the power is off.**

1, Remove the fixation screws (4 places on the upper part and lower parts), place the alarm module parallel to the main module and slide it in the direction of the arrow.




(1) Remove the fixation screws from the 2 places on the lower part.

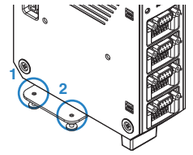
(2) Loosen the drop-off prevention screws on the upper part in 2 places.

(3) Removing the alarm module.

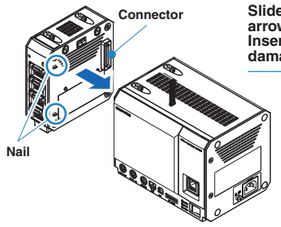
**⚠ CAUTION**

**Slide it in the direction of the arrow. If you pry it at an angle there is a risk of damaging the connector.**

2, Remove the DC strain module's fixation screws (2 places on the lower part).



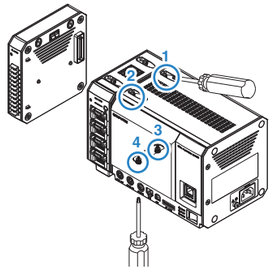

3, Slide the DC strain module parallel to the main module and connect the connector.



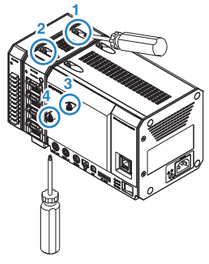

**⚠ CAUTION**

**Slide it in the direction of the arrow.**
**Inserting it at an angle may cause damage to the nails.**

4, Fix the DC strain module and the main module in place with the screws. (4 places on the upper and lower parts)




5, Similarly, install the alarm module on the last part and fix it with screws.

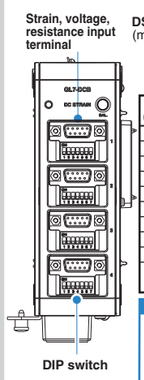


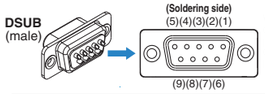

**During installation, a 4kgf.cm screw tightening torque is recommended.**

## 3 How to Connect to Analog Signal Terminal

**This section describes the signal input terminal and how to set the DIP switch.**

**1. Input terminal arrangement and descriptions**

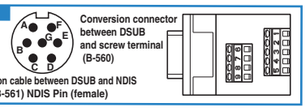



When connecting the connector, please be careful not to over-tighten the screw.
**Recommended tightening torque : 4 kgf-cm or less**

| DSUB Connector No. | Notation | Descriptions | DSUB-NDIS Conversion cable | Conversion connector between DSUB and screw terminal |
|---|---|---|---|---|
| (1) | B– | Excitation voltage (-) | C | 1 |
| (2) | IN– | Input signal (–) | B | 2 |
| (3) | S+ | Sense (+) | — | 3 |
| (4) | T– | TEDS (–) | G | 4 |
| (5) | R+ | Shunt resistance | — | 5 |
| (6) | S– | Sense(–) | — | 6 |
| (7) | IN+ | Input signal (+) | D | 7 |
| (8) | B+ | Excitation voltage (+) | A | 8 |
| (9) | T+ | TEDS(+) | F | 9 |
| Connector chassis | — | Shield | E | FG |

**Options**




**2. Depending on the input method, set the switch (See Table below).**


Table below shows the settings of DIP switch.
For the numbers in the table, 0 (zero) is **OFF** and 1 is **ON**.

| Input method | | Strain gauge 120Ω | | | | | | Strain gauge 350Ω | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Strain input | 2-wire 1/4bridge | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| | 3-wire 1/4bridge | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| | 4-wire 1/4bridge | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| | 3-wire 1/2bridge | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 |
| | 4-wire 1/2bridge | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| | 5-wire 1/2bridge | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| | 4-wire full bridge | 0 | 0 | 0 | 1 | 1 | 1 | 1 | Set the DIP switch as shown in the left table | | | | | | |
| | 6-wire full bridge | 0 | 0 | 1 | 1 | 0 | 1 | 1 | | | | | | | |
| Strain sensor input | 4-wire | 0 | 0 | 0 | 1 | 1 | 1 | 1 | * Voltage and resistance inputs do not affect the strain gauge. | | | | | | |
| | 6-wire | 0 | 0 | 1 | 1 | 0 | 1 | 1 | | | | | | | |
| Voltage input/Resistance input | | 0 | 0 | 0 | 1 | 1 | 1 | 1 | | | | | | | |

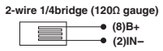
**This explains how to connect the input cable.**

**⚠ WARNING** During wiring, confirm that the signal's supply source is turned OFF to prevent electrical shocks.

### Strain input

**1. When connecting the strain sensor (acceleration, load cell, etc.)**
Connect with either the DSUB (male) Connector supplied as standard or the optional DSUB-Screw terminals conversion cable (B-560).
**(For the settings of DIP switch, refer to the table above.)**

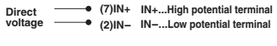
**2. When connecting the strain gauge (Figure below shows an example of 2-wire 1/4bridge (120Ω gauge) connection.),** use the supplied DSUB (male) connector to connect (2) and (8) terminals.




(Set the DIP switch as shown in the right figure.)

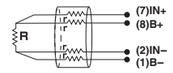

### Voltage and resistance inputs

**1. Voltage input**
Use the supplied DSUB (male) connector to connect to (2) and (7) terminals.




(Set the DIP switch as shown in the right figure.)


**2. Resistance input**
When measuring the resistance, as shown in Figure below, wire using the following 4-wire, or short between (1) and (2) , and (7) and (8).




## 4 Regarding Maximum Input Voltage

**To avoid break-downs or short-circuiting accidents, please make sure to abide by the items written below.**

### ● Maximum input voltage

In case the input voltage exceeds the specifications, the circuit at the input part will break down. Please don't input it.

**<Input terminal (+)/ Input terminal (–) interval>**
Maximum input voltage : DC10Vp-p

**<Input terminal (–)/Input terminal (–) interval>**
Maximum input voltage: 10Vp-p

**<Input terminal (–)/GND terminal interval>**
Maximum input voltage: 60Vp-p Withstand voltage: 1000Vp-p/1minute

## 5 Noise Countermeasures

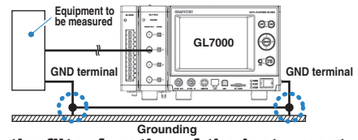
**In case the measured values fluctuate due to exogenous noise, the following measures are recommended. (Depending on the type of noise, the result may change.)**

### ● Make absolutely sure to ground the chassis GND of the measuring object

Absolutely making sure to ground the chassis GND of the measuring object to a favorable ground may have an effect.

### ● Connecting the chassis GNDs of the measuring object and the instrument

Connecting the chassis GND of the measuring object and the GND terminal of the main module with an electrical cable as short and thick as possible, and further gaining potential equalization by grounding it may have an effect.




### ● Using the filter function of the instrument

Setting the filter to anything but OFF on the main body's input settings menu.

**For details, please refer to the User's manual recorded on the CD-ROM.**

## 6 Specifications

**GL7-DCB (DC Strain Module) specifications**

| Item | | Contents |
|---|---|---|
| Input ch number | | 4 ch/1 module |
| Input terminal shape | | DSUB 9-pin (female) |
| Input method | | All ch insulation, simultaneous sampling, balanced input |
| Sampling interval | | 10 µs to1 hour |
| Built-in RAM | | 2,000,000 data |
| Input type | | Strain, voltage, resistance values (including potentiometer) |
| Measurement range | Strain | 400, 500, 800, 1000, 2000, 4000, 5000, 8000, 10000, 20000 µε (µε : $10^{-6}$ Strain)<br>0.2, 0.25, 0.4, 0.5, 1, 2, 2.5, 4, 5, 10 mV/V<br>* The range depends on the bridge voltage. |
| | Voltage | 1, 2, 5, 10, 20, 50, 100, 200, 500 mV, 1, 2, 5 V |
| | Resistance | 1, 2, 5, 10, 20, 50, 100, 200, 500 Ω,<br>1, 2, 5, 10, 20, 50 kΩ |
| Measurement accuracy *1 (23°C±5°C) | Strain | ±(0.2% of F.S. +10µε) |
| | Voltage | ±(0.2% of F.S. +10µV) |
| | Resistance | ±0.5% |
| | | *1 After power-on, more than 30 minutes, sampling 1 sec., filter line, GND |
| A/D converter | | System: sequential comparison system<br>Resolution: 16-bit (Effective Resolution : Approx. ±Range 1/40,000) |
| Gauge factor | | 2.0 constant |
| Sensor supported | Strain | [Strain gauge transducer]<br>4-wire full bridge, 6-wire full bridge (Available for remote sensing)<br>[Strain gauge]<br>4-wire full bridge, 6-wire full bridge (3/4-wire: available for remote sensing)<br>3 or 4 or 5-wire 1/2bridge (4/5-wire: available for remote sensing)<br>4 or 6-wire full bridge (6-wire: available for remote sensing) |
| | Resistance | Potentiometer, resistance |
| Internal gauge resistance | | 50 to 10kΩ<br>(Excitation voltage 1V : 50Ω to 10kΩ, 2V : 100Ω to 10kΩ, 2.5V : 120Ω to 10kΩ, 5V/10V : 350Ω to 10kΩ) |
| Internal gauge resistor | | 1/4bridge or 1/2bridge: (available for 120Ω and 350Ω gauges)<br>* When the internal gauge resistance is 120Ω, the Excitation voltage 1, 2, 2.5 V are available. |
| Excitation voltage | | DC 1, 2, 2.5, 5, 10 V<br>* When the Excitation voltage is 5 V or more, 350Ω or more gauge is available. |
| Constant current bridge power supply | | 0.1 to 20 mA (Voltage supported : Max.10V) |
| Balancing | | Method: Auto-balancing (Range: ±10,000 µε)*Strain input only |
| Remote Sensing | | 3 or 4-wire 1/4bridge, 4 or 5-wire 1/2bridge, and 6-wire full bridge are available. |
| Shunt calibration | | Internal approximate 60kΩ (120Ω gauge), approximate 175kΩ (350Ω gauge) |
| Temperature coefficient | | Gain: ±0.02% of F.S./°C<br>0 point : ±1.2µε/°C |
| Input resistance | | 10 MΩ ±5% |
| Maximum input voltage | | Differential input : DC10V<br>Common-mode voltage : 10VACrms<br>Input terminal(-) /Input terminal (-) interval : 10 Vp-p<br>Input terminal (-)/GND interval : 60Vp-p |
| Withstand voltage | | Input terminal (-)/GND interval : 1000Vp-p 1 minute |
| Insulation resistance | | Input terminal (-)/GND interval : 100MΩ or more (at DC500 V) |
| Common mode rejection ratio | | 80 dB or more (50/60 Hz signal source 300Ω or less) |
| Noise | | 50µε or less (DC2V, 350Ω) |
| Frequency response | | DC to 20 kHz |
| Filter | L.P.F. | OFF, Line (1.5 Hz) 3, 6, 10, 30, 50, 60 Hz, 100, 300, 500 Hz, 1, 3, 5, 10kHz at -30 dB/oct |
| | A.A.F. | OFF/ON (Anti-aliasing filter) |
| TEDS | | Standards: Conforms to IEEE1451.4 Class2 (Template No. 33)<br>Information: Readout and auto-set for sensor data |
| External dimensions [WxDxH] (approximate) | | 49.2 × 136 × 160 mm (not including protruding parts) |
| Weight (approximate) | | 840 g |