

Reassuring to know, Convenient to use

DC Strain Module [GL7-DCB]

Method to take advantage

Signal conditioner for the GL7000 corresponding with the sensor using strain gauge

This is a technical guide for measuring by [GL7-DCB]



DATA PLATFORM GL7000



DC Strain Module
GL7-DCB

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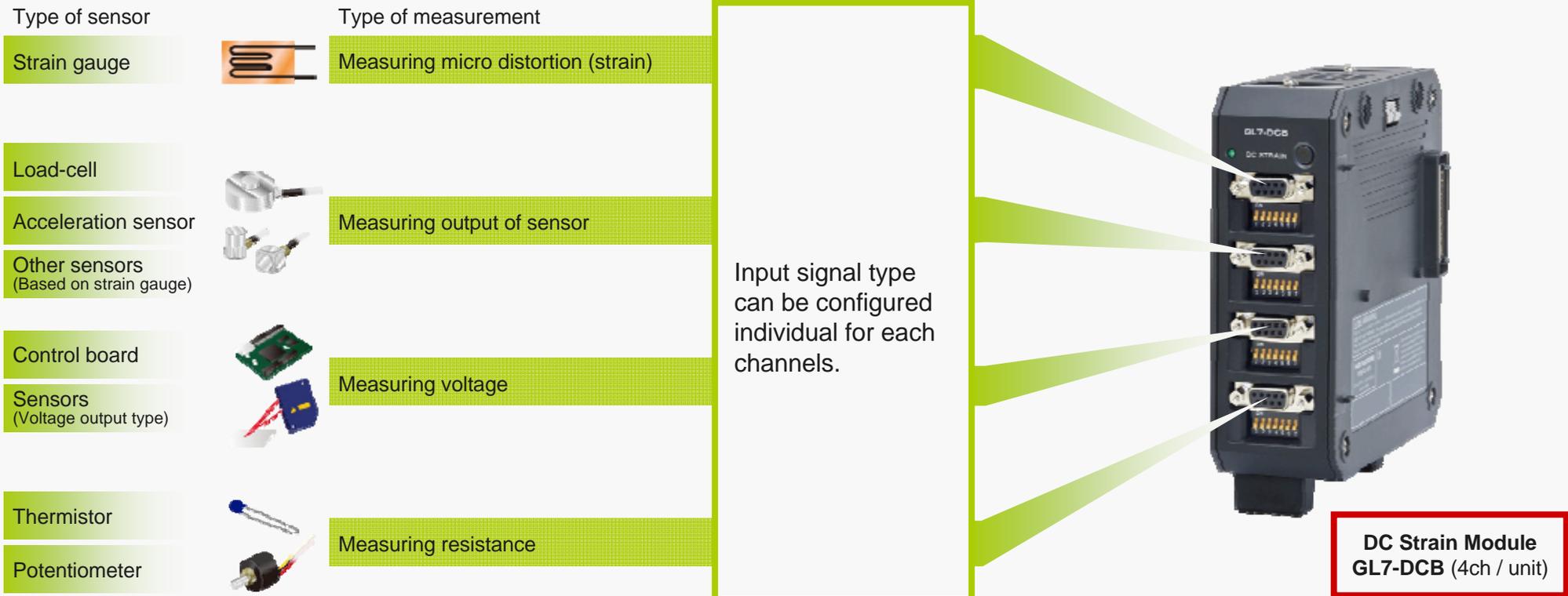


DC Strain module GL7-DCB, Method to take advantage

1. Outline and Connection of GL7-DCB module (1/3)

The DC strain module GL7-DCB is the signal conditioner for the GL7000. It is the isolated 4 channel, correspond with the sensor using the strain gauge, and support the voltage and resistance measurement. Input signal type can be set individually for each channels.

- Incorporates the elements (120/350 ohms) for bridge circuit, easy to measure micro distortion using strain gauge
- Incorporates the source of excitation for the sensor
- Supports the sensor corresponding the TEDS
- Supports precision measurement by reduce noise supporting a low-pass and anti-aliasing filter
- Supports the remote-sensing and the shunt calibration to measure in high accurate





DC Strain module GL7-DCB, Method to take advantage

1. Outline and Connection of GL7-DCB module (2/3)

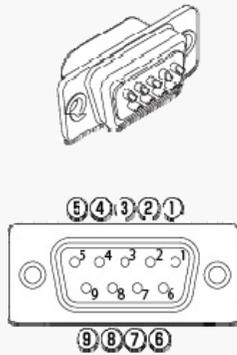
The input terminal of the DC strain module GL7-DCB is the rectangle connector (D-Sub type). An adapter for the circular connector (NDIS type) and screw terminal are available for easy connection. Configuration of wiring varies by the type of signal and sensor.



Input terminal
(for Strain, Voltage, Resistance)
Type: Rectangle connector (D-Sub)

Switch for configure the input
channel
(Signal type, number of gauge, etc.)

Rectangular (D-Sub type)
connector (Plug, Male)



Signal assignment of input connector				
Input connector pin number	Signal symbol	Description	Screw terminal (B-650)	NDIS connector (B-651)
1	B-	Excitation voltage (-)	1	C
2	IN-	Input signal (-)	2	B
3	S+	Sense (+)	3	N/A
4	T-	TEDS (-)	4	G
5	R+	Shunt resistance	5	N/A
6	S-	Sense (-)	6	N/A
7	IN+	Input signal (+)	7	D
8	B+	Excitation voltage (+)	8	A
9	T+	TEDS (+)	9	F
Shell	N/A	Shield	FG	E

Accessory for input terminal

Rectangular connector (D-Sub type)
(Standard accessory)



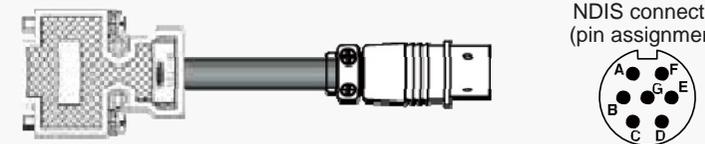
Wires from the sensor are soldered to connector. (Connection diagram varies by the type of sensor.)

Screw terminal adapter
(Option B-650)

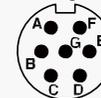


Wires from the sensor are fixed to terminal by screw when this adapter is used. It makes connection easy.

NDIS connector adapter
(Option B-651)



NDIS connector
(pin assignment)



When sensor has cable with the circular connector (NDIS type), it is connected using this adapter.



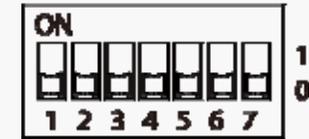
DC Strain module GL7-DCB, Method to take advantage

1. Outline and Connection of GL7-DCB module (3/3)

The input of each channels can be configured by the settings of the switch. The switch needs to be set according to the type of measurement and configuration of the sensor.

Setting of switch to set the input channel configuration															
Type of measurement	Configuration	Used the 120 ohms strain gauge							Used the 350 ohms strain gauge						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7
Measuring micro distortion using strain gauge	Single gauge, 2 wires	1	1	1	1	1	1	1	1	1	1	1	1	0	0
	Single gauge, 3 wires	1	1	0	0	1	1	1	1	1	0	0	1	0	0
	Single gauge, 4 wires	1	1	0	0	1	1	1	1	1	0	0	1	0	0
	Dual gauges, 3 wires	0	1	0	1	1	1	1	0	1	0	1	1	0	0
	Dual gauges, 4 wires	0	1	0	1	0	1	1	0	1	0	1	0	0	0
	Dual gauges, 5 wires	0	1	1	1	0	1	1	0	1	1	1	0	0	0
	4 gauges, 4 wires	0	0	0	1	1	1	1	The 350 ohms strain gauge cannot be used.						
4 gauges, 6 wires	0	0	1	1	0	1	1								
Measuring the output of sensor (based on strain gauge)	4 wires	0	0	0	1	1	1	1	Use setting shown in left side.						
	6 wires	0	0	1	1	0	1	1							
Measuring the voltage or resistance		0	0	0	1	1	1	1	Use setting shown in left side.						

Switch for configuring input channel. (Located on front panel)



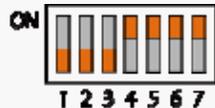
ON: 1
OFF: 0

Measuring micro distortion using strain gauge

When the strain gauge is used, the switches are set according to the type of sensor. The bridge circuit required to use the strain gauge is configured by the settings of switch.

Measuring the voltage or resistance

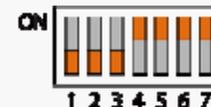
When the voltage or resistance is measured, the switches needs to be set as the following.



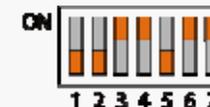
Measuring the output of sensor based on the strain gauge (Load-cell, Acceleration, or other sensors)

When the output of sensor is measured, the switches are set according to the configuration of sensor.

Sensor, 4 wires type



Sensor, 6 wires type





DC Strain module GL7-DCB, Method to take advantage

2. Setting of GL7-DCB module, Sets measurement type

The GL7-DCB module can measure the micro distortion using the strain gauge, signal of the sensor based on the strain gauge, voltage, and the resistance. The input signal type is set on the input settings menu in each channels.

Input setting menu for GL7-DCB

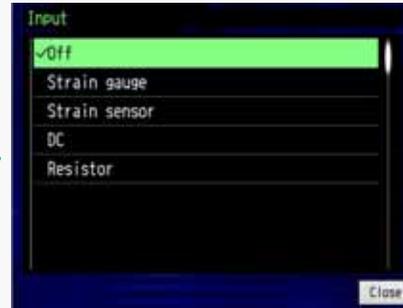


Select the "Input" for setting the type of input signal.

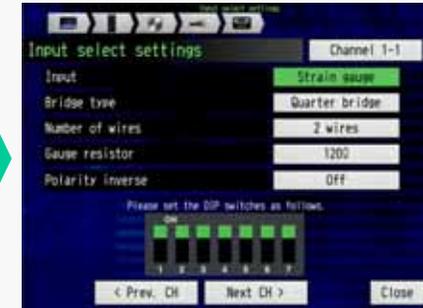
Setting of signal type (selects to the strain gauge)



Select the "Input" for setting the type of input signal.



Select the type of input signal.



Settings of input type is displayed.

Note:

The description of the setting is the following.

Type	Description
Strain gauge	Micro distortion (strain) measurement using the strain gauge
Strain sensor	Sensor output measurement (using strain gauges inside of sensor)
DC	Voltage measurement (DC coupling)
Resistor	Resistance measurement

Note:

When the input type is set to the "Strain gauge", "Strain sensor", and "Resistor", the excitation voltage for the sensor or resistor will be outputted from the input connector. If wire connection of the sensor or equipment is not correct, the equipment or the GL7-DCB module might have a damage.



DC Strain module GL7-DCB, Method to take advantage

3-1. Setting of GL7-DCB module, Uses the Strain Gauge, Configure of gauge (1/2)

When signal is measured using the Strain Gauge, the bridge circuit is required. The element of the bridge circuit is incorporated in the GL7-DCB module. The GL7-DCB module supports the strain gauge configured with the Single gauge (Quarter bridge), Dual gauge (Half bridge), and Four gauge (Full bridge) with multiple type of wiring in the gauge. The incorporated bridge circuit of each channels can be configured by the settings of the switch.

Single gauge configuration (Quarter bridge)

Configuratio n	Connection	Bridge circuit	Used strain gauge	
			120 ohms	350 ohms
2 wires	Remote-sensing: Non (It is affected by temperature, etc.)			
		 E: Excitation voltage, e: Output signal, R: Elements of bridge circuit		
3 wires	Remote-sensing: Yes (It is not affected by temperature, etc.)			
		 Remote-sensing wire E: Excitation voltage, e: Output signal, R: Elements of bridge circuit		
4 wires	Remote-sensing: Yes (It is not affected by temperature, etc.)			
		 Remote-sensing wire E: Excitation voltage, e: Output signal R: Elements of bridge circuit		

Dual gauge configuration (Half bridge)

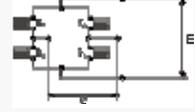
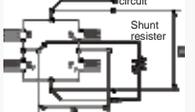
Configuratio n	Connection	Bridge circuit	Used strain gauge	
			120 ohms	350 ohms
3 wires	Remote-sensing: Non (It is affected by temperature, etc.)			
		 E: Excitation voltage, e: Output signal, R: Elements of bridge circuit		
4 wires	Remote-sensing: Yes (It is not affected by temperature, etc.)			
		 Remote-sensing circuit E: Excitation voltage, e: Output signal, R: Elements of bridge circuit		
5 wires	Remote-sensing: Yes (It is not affected by temperature, etc.)			
		 Remote-sensing circuit Shunt resistor E: Excitation voltage, e: Output signal R: Elements of bridge circuit		



DC Strain module GL7-DCB, Method to take advantage

3-1. Setting of GL7-DCB module, Uses the Strain Gauge, Configure of gauge (2/2)

Four (4) gauge configuration (Full bridge)

Configuration	Connection	Bridge circuit	Used strain gauge	
			120 ohms	350 ohms
4 wires	Remote-sensing: Non (It is affected by temperature, etc.)			
	  <p>E: Excitation voltage e: Output signal</p>		N/A	
6 wires	Remote-sensing: Yes (It is not affected by temperature, etc.)			
	  <p>Remote-sensing circuit Shunt resistor</p> <p>E: Excitation voltage e: Output signal</p>		N/A	



DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (1/7)

When the micro distortion is measured using the strain gauge, the bridge circuit needs to be configured. The elements for the bridge circuit is incorporated in the GL7-DCB module. It needs to be configured for the used strain gauge.

Input setting menu for GL7-DCB

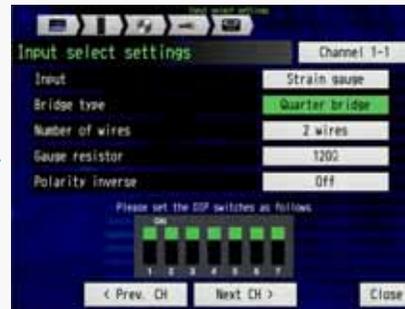


Select the "Input" for setting the type of input signal.

Setting of strain gauge configuration



Set the "Input" to the "Strain gauge".



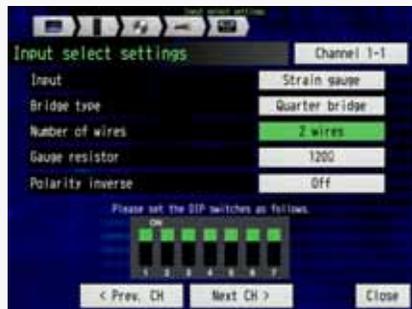
Select the "Bridge type" for setting the used number of strain gauge.



Select the type of bridge.

Note: Type of bridge - Number of gauges
Quarter bridge: using single (1) gauge
Half bridge: using dual (2) gauges
Full bridge: using four (4) gauges

In this example, the micro distortion (strain) is measured using the strain gauge.

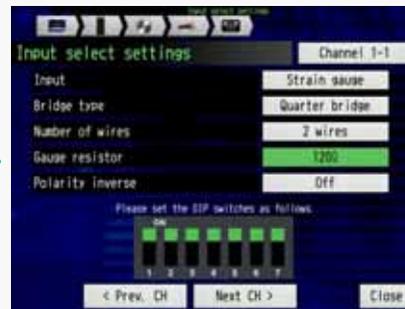


Select the "Number of wires" for setting the type of the gauge.

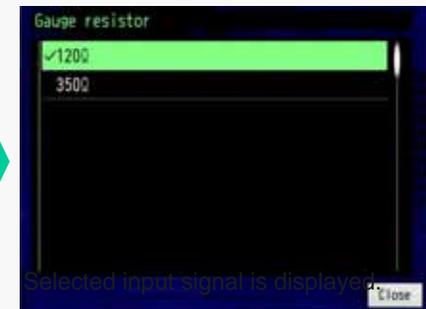


Select the number of wires from the gauge.

Note: Displayed number of wires are varied by setting of Bridge type.



Select the "Gauge resistor" for setting the type of strain gauge.



Select the resistance of the used gauge.

Selected input signal is displayed.



DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (2/7)

The elements for the bridge circuit is incorporated in the GL7-DCB module. It is configured by settings of the switch. The setting pattern will be displayed on the screen after setting parameters are entered.

The excitation power for the bridge circuit needs to be applied. The range of measurement varies by the setting of excitation source.

Setting of excitation for bridge circuit

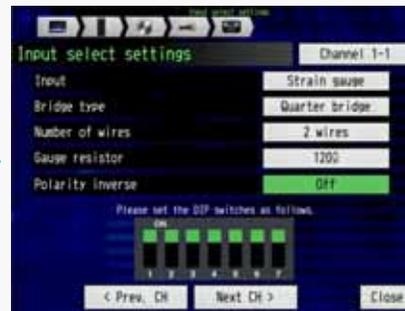


Select the "Polarity inverse" for setting polarity of signal.



Select the ON or OFF.

Note: If polarity of the phenomena and measured signal is not the same, this setting needs to be changed.



Settings of strain gauge are displayed.

Note: Setting pattern of switch for configuring channel is showing. The switch needs to be set in the this pattern.



Select the "Misc" for setting the condition of bridge circuit.



Select the "Sensor setting" for setting the condition of excitation for bridge circuit.



Select the "Bridge power" for setting the type of excitation for bridge circuit.



Select the "Voltage" or "Constant current" for type of excitation.

Note: Usually the Voltage is selected. When lead wire of the gauge is very long, the Constant current is used to avoid the influence of resistance of lead wire.



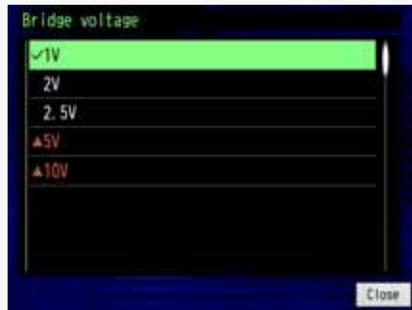
Select the "Bridge voltage" for setting value of excitation.



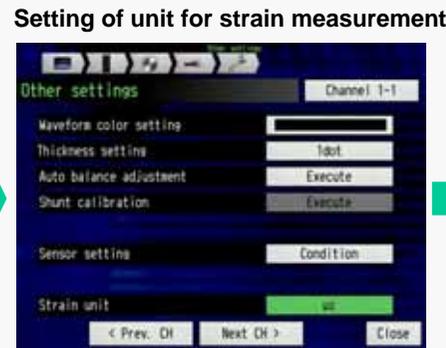
DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (3/7)

The measuring range can be set after all parameters of strain gauge are set. The range of signal to be displayed can be set. The captured signal is limited up to the selected measuring range. The displaying signal range can be set separately from the measuring range.



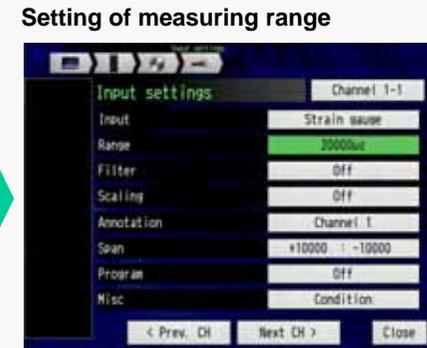
Select the voltage for excitation.
Note: The 50V and 10V can select when the gauge of 350 ohms or higher is used.



Select the "Strain unit" for setting the measurement unit.



Select the "μ" (micro-epsilon) or "mV/V" for the unit of measurement.
Note: When micro distortion is measured, usually the "μ" is used. When the sensor is used, the "mV/V" is used.



Select the "Range" for setting measuring range.



Select the range.
Note: Displayed value of ranges are varied by setting of excitation condition.



Select the "Span" for setting the displaying signal range.



Select the "Upper" or "Lower" for setting display signal range.



Set the value for display signal range.

Note: The span setting affects to range of signal to be displayed. The range of capturing signal is set by the "Range". The captured signal will be saved to specified memory media.



DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (4/7)

The measured signal can be converted to other physical units, and then it is saved and displayed. The scaling function is used for it.



Settings of span are displayed.



Settings of measurement condition are displayed.

The micro distortion (strain) can be measured in this settings. If the measured signal needs to be converted to other unit, it can be done using the Scaling function.

Setting of scaling conditions



Select the "Scaling" for setting the scaling condition.



Select the "Scaling" for setting the scaling condition.



Select the "On" to enable the scaling function.



Select the "Upper" or "Lower" of the "Meas. Value".



Enter the value. If set value is out of limit, the setting of the measuring range needs to be changed.

Note: The signal is converted using four (4) reference points that are two (2) points in measurement value and two (2) points in scaled value. The measuring value is calculated by proportional calculation based on the specified four reference points.

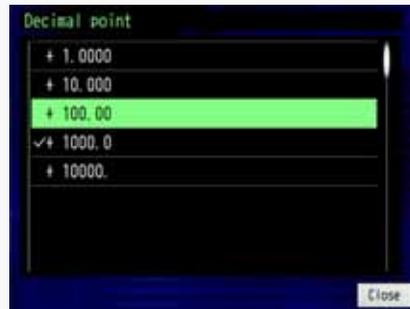


DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (5/7)



Select the "Decimal point" for setting the digits of the scaled value.



Select the number of digits above the decimal point. It is style of the scaled value.



Select the "Upper" or "Lower" of the "Scal. Value". It will be the scaled value corresponding to the measurement value to column of the "Upper" and "Lower" of "Meas. Value".



Enter the value for scaling.



Settings of scaling condition are displayed.

Setting of scaling unit (select from pre-set)



Select the "Select" for setting the type of scaled signal.



Select the type of signal for displaying the unit that has been pre-set.



Select the "Setting" for setting type of the unit.

Note: The unit of scaled value can be selected from the preset or it can be entered directly.



DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (6/7)



Select the unit from preset.



Setting of the unit is displayed.

OR

Setting of scaling unit (direct enter)



Select the "Unit" for setting the unit of scaled value.

Note: If there is not unit in the preset list, unit can be entered directly using keyboard.



Enter the unit using displayed keyboard.

Setting of span (range of signal to be displayed in scaled value/unit)



Settings of measurement condition are displayed.



Select the "Span" for setting display signal range.



Select the "Upper" or "Lower" for setting display signal range.



Set the value for display signal range.

Note: The span setting affects to range of signal to be displayed. The range of capturing signal is set by the "Range". The captured signal will be saved to specified memory media.



DC Strain module GL7-DCB, Method to take advantage

3-2. Setting of GL7-DCB module, Uses the Strain Gauge, Setting of menu (7/7)



Settings of span are displayed.



Settings of measurement condition are displayed.



DC Strain module GL7-DCB, Method to take advantage

3-3. Setting of GL7-DCB module, Uses the Strain Gauge, Shunt calibration (1/1)

The GL7-DCB module has the shunt calibration and remote sensing function. The shunt calibration is available when the input type is selected to the "Strain gauge". It can be executed from the setting menu. The remote sensing function is automatically applied when the input type is selected to the "Strain gauge" or "Strain sensor". Those functions are available in the specific condition.

Input setting menu for GL7-DCB



Select the "Misc" for executing the shunt calibration.

Setting of shunt calibration



Press the "Execute" of the "Shunt calibration" for executing the shunt calibration.

Note: The shunt calibration and the remote sensing function are available in the following configuration of the strain gauge or the strain gauge based sensor.

Type of input	Configuration	Number of wires	Remote sensing	Shunt calibration
Strain gauge	1 gauge (Quarter bridge)	2 wires	N/A	N/A
		3 wires	Available	Available
		4 wires	Available	Available
	2 gauges (Half bridge)	3 wires	N/A	N/A
		4 wires	Available	N/A
		5 wires	Available	Available
4 gauges (Full bridge)	4 wires	N/A	N/A	
	6 wires	Available	N/A	
Strain gauge based sensor	4 wires	N/A	N/A	
	6 wires	Available	N/A	

Note: Shunt calibration

The shunt calibration is executed using the shunt resistor that is incorporated in the GL7-DCB module. The shunt resistor is appended to the bridge circuit for simulating the bridge circuit. The compensation value is found by the shunt calibration. It can provide accurate measurement using the compensation value.

Note: Remote sensing

When longer lead wire of the strain gauge or the strain gauge based sensor is used, lead wire affects to the accuracy of the measurement. The remote sensing function finds the resistance of the lead wire, and then the compensation value for the resistance of wire is created. An accurate measurement is provided using the compensation value. The excitation voltage is required when the signal is measured using the strain gauge or the strain gauge based sensor. If read wire is very long, the actual applied excitation voltage will be smaller by the resistance of the lead wire. It cause an error of measurement.



DC Strain module GL7-DCB, Method to take advantage

4-1. Setting of GL7-DCB module, Uses the Sensor, Configure of sensor (1/1)

Variety of phenomena can be measured using the sensor based on the strain gauge. The strain gauge is used inside of the sensor. When the sensor is used, the excitation power is required. The GL7-DCB can supply the excitation power to the sensor.

For Signal measurement using the Sensor (strain gauge based)

Configuration	Connection	Bridge circuit	Switch setting
4 wires	Remote-sensing: Non (it is affected by temperature.)	N/A	
6 wires	Remote-sensing: Yes (It is not affected by temperature.)	N/A	



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (1/8)

When variety phenomena is measured using the strain gauge based sensor, the input circuit needs to be configured for it. It can be configured by setting of menu and switch in each channels.

In this example, the pressure is measured using the strain gauge based sensor. The sensor has the following characteristics.

- Rated Output: 1.25mV/V
- Rated Capacity: 50kPa
- Excitation Voltage: 1 to 3V
- Output Resistance: 350 ohms

Note:

The rated output value varies by the excitation voltage value. (When excitation voltage is 2V, the rated output is the 2.5mV.)

The rated output value is outputted when the rated capacity is applied to the sensor.

In this case, when the excitation voltage is the 1V and the sensor receives the 50kPa pressure, the sensor outputs the 1.25mV.

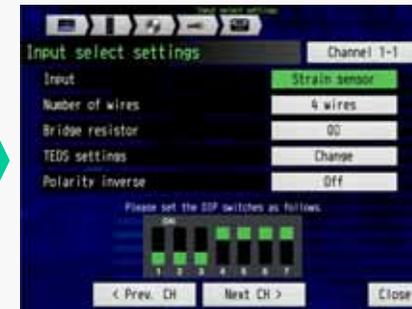
(sensitivity: 50kPa/1.25mV = 40kPa/mV)

Input setting menu for GL7-DCB

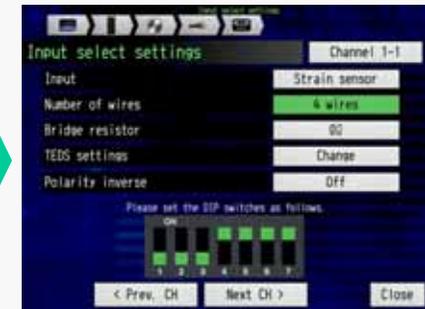


Select the "Input" for setting the type of input signal.

Setting of sensor configuration



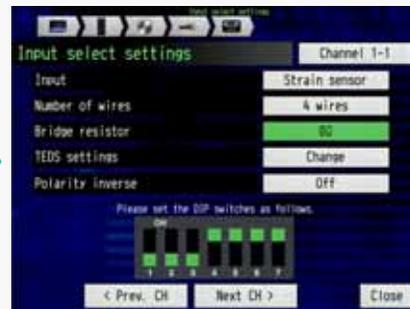
Set the Input to the "Strain sensor".



Select the "Number of wires" for setting the configuration of sensor.



Select the number of wires from the sensor.

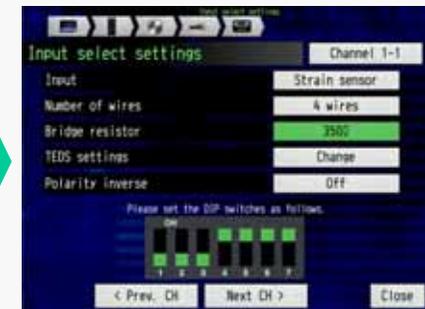


Select the "Bridge resistor" for setting the configuration of sensor.



Set the resistance of the sensor.

Note: The resistance of the sensor is written on the specification sheet of the sensor.



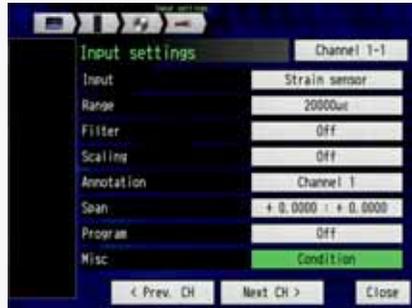
Setting of strain gauge are displayed.

Note: Setting pattern of switch for configuring channel is showing. The switch needs to be set in the this pattern.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (2/8)



Select the "Misc." for setting the sensor characteristics.

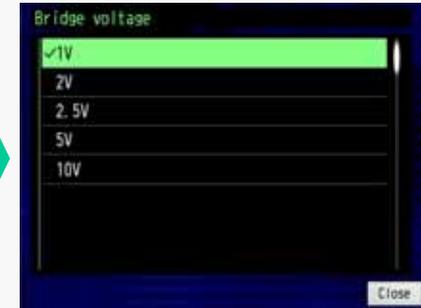


Select the "Sensor setting" for setting the sensor characteristics.

Setting of excitation voltage for sensor



Select the "Bridge voltage" for setting the excitation condition.



Select the voltage of excitation.

Setting of sensor characteristic



Select the "Rated output" for setting the sensor characteristic.



Set the number of rated output value.

Note: The rated output is written in the specification sheet of the sensor. The value entered in this menu is in the μV .
For example, when the rated output in the specification sheet is the 1.25mV/V, the number to be entered in this menu is the "1250".
Rated output;
 $1.25mV/V = 1250 \mu V/V$



Setting of rated output is displayed.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (3/8)

Setting of sensor characteristics (in the measuring unit of the sensor)



Select the "Calibration coefficient" for setting the sensor characteristics.

Note: The measurement is displayed and saved in the measuring unit of the sensor. The measured voltage is converted to it by this setting.



Set the value.

Note: The entered value is the sensitivity of the sensor. The sensitivity is calculated with the rated output and the rated capacity of the sensor. The unit of sensitivity in this menu is the μV .

In this sensor, the sensor outputs the 1.25mV/V (rated output) when the sensor receives the 50kPa (rated capacity). So, sensitivity is the 50kPa per 1.25mV/V.

$$\begin{aligned} \text{Sensitivity: } & 50\text{kPa}/1.25(\text{mV}/\text{V}) \\ & = 40\text{kPa}/(\text{mV}/\text{V}) \\ & = 0.04\text{kPa}/(\mu\text{V}/\text{V}) \end{aligned}$$

The number (0.04) is entered in this menu. The unit (kPa) is entered in the Unit section.



Settings of calibration coefficient (sensitivity of sensor) is displayed.

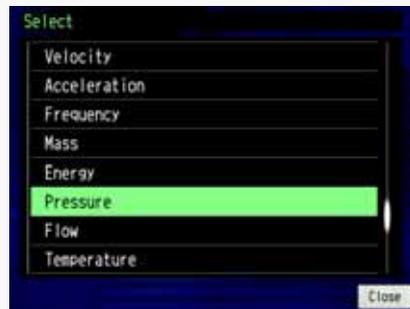
When measurement needs to be displayed in other unit, scaling is required. Go to section 6/8 (page 21).

Setting of measurement unit (select from pre-set)

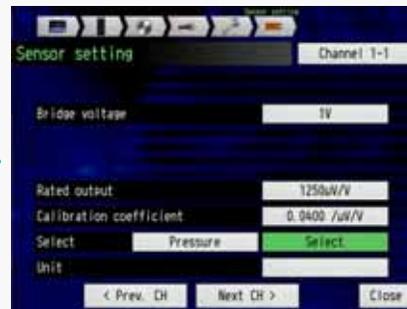


Select the "Select" for setting the type of measurement signal.

Note: The unit of scaled value can be selected from the preset or it can be entered directly.



Select the type of signal for displaying the unit that has been pre-set.



Select the "Select" for setting type of the unit.



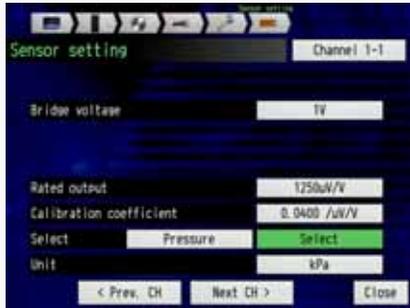
Select the unit from preset.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (4/8)

Setting of measurement unit (direct enter)



Settings of the unit is displayed.



Select the "Unit" for setting the unit of measurement value.

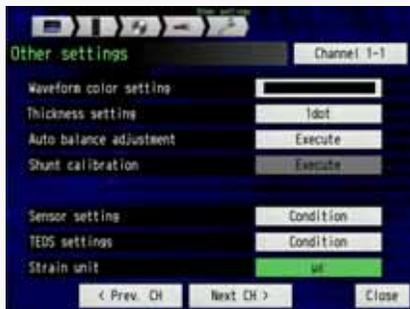
Note: If there is not unit in the preset list, unit can be entered directly using keyboard.



Enter the unit using displayed keyboard.



Settings of the unit is displayed.



Select the "Strain unit" for setting the measurement unit of measuring range.



Select the "mV/V".

Note: When the sensor is used, usually the "mV/V" is used. When micro distortion is measured, usually the "μ " is used.



Settings of unit is displayed.



Settings of measurement condition are displayed.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (5/8)

Setting of measuring range



Select the "Range" for setting the measuring range.



Select the range.

Note: Displayed value of ranges are varied by setting of excitation condition.

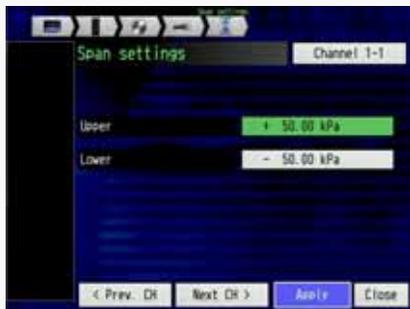


Settings of measuring range is displayed.

Setting of span (range of signal to be displayed)



Select the "Span" for setting display signal range.



Select the "Upper" or "Lower" for setting display signal range.



Set the value for display signal range.



Settings of span are displayed.



Settings of measurement condition are displayed.

Note: The span setting affects to range of signal to be displayed. The range of capturing signal is set by the "Range". The captured signal will be saved to specified memory media.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (6/8)

When the measured value needs to be displayed and saved in the unit other than the unit of the sensor, the number to be entered to the "Calibration coefficient" need to be converted in the used physical units.

Note: The "Scaling" on the input setting menu is not available when the "Strain sensor" is selected. The scaling function needs to be set in the "Calibration coefficient" parameter.

Setting of sensor characteristics (in the unit of other than the sensor)



Select the "Calibration coefficient" for setting the sensor characteristics.

In this example, the pressure is measured using the sensor that is calibrated with the SI unit (kPa). The measured value is displayed in the unit of the "gf/cm²" that is the Physical units used commonly.



Set the value of the sensitivity.

Note: The sensitivity of the sensor is calculated by the rated output and the rated capacity. It needs to be converted to the required unit.

In this sensor, the sensitivity of the sensor is the following.

$$\begin{aligned} \text{Sensitivity: } & 50\text{kPa}/1.25(\text{mV/V}) \\ & = 40\text{kPa}/(\text{mV/V}) \\ & = 0.04\text{kPa}/(\mu\text{V/V}) \end{aligned}$$

The conversion rate between the "kPa" and "kgf/cm²" is the following.

$$1\text{kPa} = 0.0101972\text{kgf/cm}^2 = 10.1972\text{gf/cm}^2$$

So, the sensitivity in the "kgf/cm²" is the following.

$$0.04\text{kPa}/(\mu\text{V/V}) = 0.407888(\text{gf/cm}^2)/(\mu\text{V/V})$$

The number (0.4079) is entered in this menu. The unit (gf/cm²) is entered in the Unit section.



Settings of calibration coefficient is displayed.

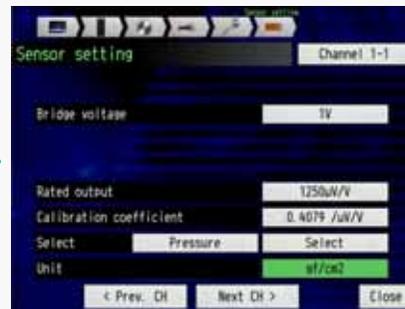
Setting of scaling unit (direct enter)



Select the "Unit" for setting the unit of measurement value.



Enter the unit using displayed keyboard.



Settings of the unit is displayed.

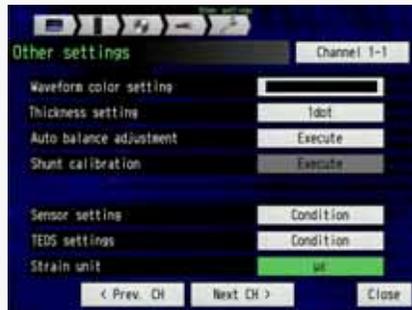


Settings of measurement condition are displayed.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (7/8)



Select the "Strain unit" for setting the measurement unit.



Select the "mV/V".
Note: When the sensor is used, usually the "mV/V" is used.
When micro distortion is measured, usually the " μ " is used.



Settings of strain unit is displayed.

Setting of measuring range



Select the "Range" for setting the measuring range.



Select the range.
Note: Displayed value of ranges are varied by setting of excitation condition.



Settings of range is displayed.

Setting of span (range of signal to be displayed)



Select the "Span" for setting display signal range.



Select the "Upper" or "Lower" for setting display signal range.

Note: The span setting affects to range of signal to be displayed. The range of capturing signal is set by the "Range". The captured signal will be saved to specified memory media.



DC Strain module GL7-DCB, Method to take advantage

4-2. Setting of GL7-DCB module, Uses the Sensor, Setting of menu (8/8)



Set the value for displayed signal range.



Settings of span are displayed.



Settings of measurement condition are displayed.



DC Strain module GL7-DCB, Method to take advantage

4-3. Setting of GL7-DCB module, Uses the Sensor, TEDS of the sensor (1/1)

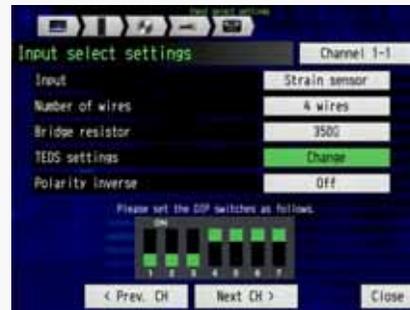
When the sensor corresponds the TEDS (Transducer Electronic Data Sheet), the GL7-DCB module can read settings information from the sensor. The information of the rated capacity, rated output and etc. are included in the TEDS. The sensor sensitivity and other informations are set automatically. The "Range", "Filter", "Scaling" or other setting needs to be set as required after the TEDS is read.

Input setting menu for GL7-DCB



Select the "Input" for setting the type of input signal.

Setting of the TEDS



Select the "TEDS setting" for reading TEDS from the sensor after the "Input" is set to the "Strain sensor".

Note: The TEDS is supported when the strain gauge based sensor is selected. If the Strain gauge is selected, the TEDS setting menu is not available.



Select the "Read TEDS information" for executing the reading of the information from the sensor.

Note: The TEDS in the sensor needs to be compatible to the standard of IEEE1451.4 Template ID33 (Strain gauge based sensor). If the sensor does not support this standard, the TEDS of that sensor cannot be used. The setting condition of the sensor needs to be set manually.

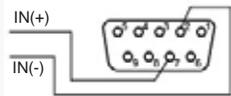


DC Strain module GL7-DCB, Method to take advantage

5-1. Setting of GL7-DCB module, Measuring the Voltage, Configure of input (1/1)

The voltage can be measured using this module. The input section of channel needs to be configured for measurement of voltage. It is done by setting of the switch.

For Voltage measurement

Configuration	Connection	Bridge circuit	Switch setting
2 Wires		N/A	



DC Strain module GL7-DCB, Method to take advantage

5-2. Setting of GL7-DCB module, Measuring the Voltage, Setting of menu (1/4)

Variety of phenomena can be measured using the sensor based on the strain gauge. The strain gauge is used inside of the sensor. When the sensor is used, the excitation power is required. The GL7-DCB can supply the excitation power to the sensor.

Input setting menu for GL7-DCB



Select the "Input" for setting the type of input signal.

Setting of input configuration



Set the Input to the "DC" for measuring the voltage.

Note: Setting pattern of switch for configuring channel is showing. The switch needs to be set in the this pattern.

Setting of measuring range



Select the "Range" for setting the measuring range.



Select the range.

Setting of span (range of signal to be displayed)



Setting of Range is displayed.



Select the "Span" for setting display signal range.

Note: The span setting affects to range of signal to be displayed. The range of capturing signal is set by the "Range". The captured signal will be saved to specified memory media.



Select the "Upper" or "Lower" for setting displayed signal range.



Set the value for displayed signal range.



DC Strain module GL7-DCB, Method to take advantage

5-2. Setting of GL7-DCB module, Measuring the Voltage, Setting of menu (2/4)

When the output voltage of the sensor is measured, the measuring value needs to be displayed and saved in the physical units. The scaling function can make it.



Settings of span are displayed.



Condition settings of measuring are displayed.

The voltage can be measured in this settings.
If the measured signal needs to be converted to other unit, the Scaling function can do it.

Setting of scaling condition



Select the "Scaling" for setting the scaling condition.

In this example, the flow rate is measured using the sensor.
The sensitivity of the sensor is the following.
5mV output at 0.5m³/min



Select the "Scaling" for setting the scaling condition.



Select to "On" to enable the scaling function.

Setting of span (range of signal to be displayed)



Select the "Upper" or "Lower" of the "Meas. Value".



Enter the value. If set value is out of limit, the setting of the measuring range needs to be changed.

Note: The signal is converted using four (4) reference points that are two (2) points in measurement value and two (2) points in scaled value. The measuring value is calculated by proportional calculation based on the specified four reference points.



DC Strain module GL7-DCB, Method to take advantage

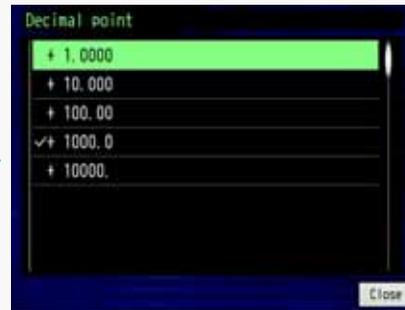
5-2. Setting of GL7-DCB module, Measuring the Voltage, Setting of menu (3/4)



Setting of reference point in measurement is displayed.



Select the "Decimal point" for setting the digits of the scaled value.



Select the number of digits above the decimal point. It is style of the scaled value.



Select the "Upper" or "Lower" of the "Sal. Value". It is the scaled value corresponding to the measurement value to column of the "Upper" and "Lower" of "Meas. Value".



Enter the value for scaling.



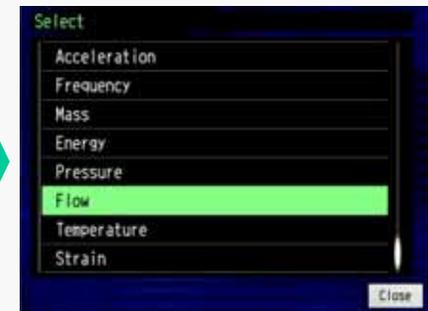
Settings of scaling condition are displayed.

or



Select the "Select" for setting the type of scaled signal.

Note: The unit of scaled value can be selected from the preset or it can be entered directly.



Select the type of signal for displaying the unit that has been pre-set.

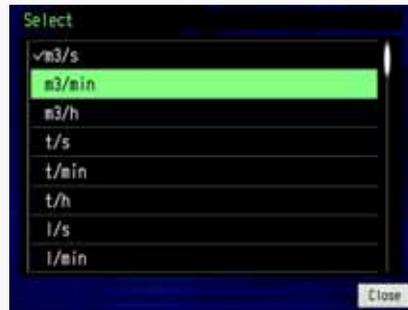


DC Strain module GL7-DCB, Method to take advantage

5-2. Setting of GL7-DCB module, Measuring the Voltage, Setting of menu (4/4)



Select the "Setting" for setting type of the unit.



Select the unit from preset.

Setting of scaling unit (direct enter)



Select the "Unit" for setting the unit of scaled value.



Enter the unit using displayed keyboard.

Note: If there is not unit in the preset list, unit can be entered directly using keyboard.



Setting of unit is displayed.



Settings of measurement condition are displayed.



DC Strain module GL7-DCB, Method to take advantage

6-1. Setting of GL7-DCB module, Measuring the Resistance, Configure of input (1/1)

The resistance can be measured using this module. The input section of channel needs to be configured for measurement of resistance. It is done by setting of the switch.

For Resistance measurement

Configuration	Connection	Bridge circuit	Switch setting
2 Wires		N/A	
4 Wires		N/A	

Note: When resistance is measured using two (2) wires, it is required to connect between the pin #1 and #2, and pin #7 and #8. It is shown in above figure.

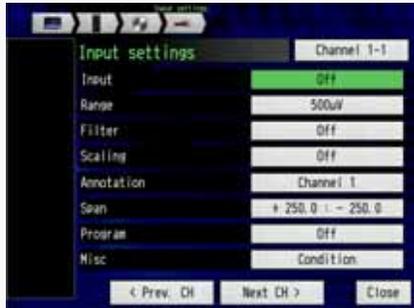


DC Strain module GL7-DCB, Method to take advantage

6-2. Setting of GL7-DCB module, Measuring the Resistance, Setting of menu (1/4)

Variety of phenomena can be measured using the sensor based on the strain gauge. The strain gauge is used inside of the sensor. When the sensor is used, the excitation power is required. The GL7-DCB can supply the excitation power to the sensor.

Input setting menu for GL7-DCB



Select the "Input" for setting the type of input signal.

Setting of input configuration



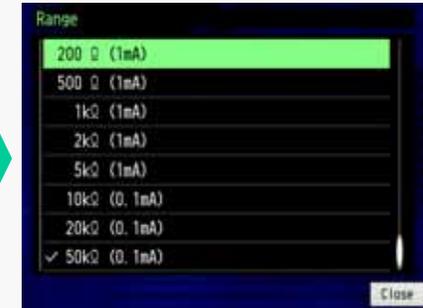
Set the Input to the "Resistor" for measuring the resistance.

Note: Setting pattern of switch for configuring channel is showing. The switch needs to be set in the this pattern.

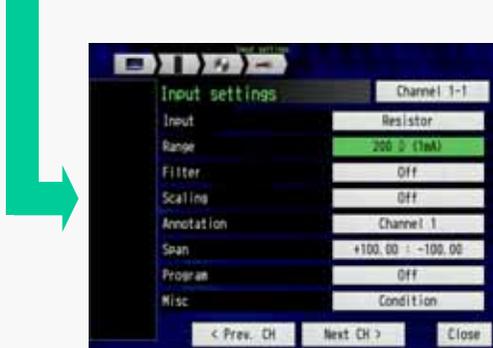
Setting of measuring range



Select the "Range" for setting the measuring range.



Select the range.



Setting is displayed.

Setting of span (range of signal to be displayed)



Select the "Span" for setting display signal range.

Note: The span setting affects to range of signal to be displayed. The range of capturing signal is set by the "Range". The captured signal will be saved to specified memory media.



Select the "Upper" or "Lower" for setting display signal range.



Set the value for display signal range.



DC Strain module GL7-DCB, Method to take advantage

6-2. Setting of GL7-DCB module, Measuring the Resistance, Setting of menu (2/4)

When the output resistance of the sensor is measured, the measuring value needs to be displayed and saved in the physical units. The scaling function can make it.



Settings of span are displayed.



Condition settings of measuring are displayed.

The resistance can be measured in this settings.
If the measured signal needs to be converted to other unit, the Scaling function can do it.

Setting of scaling condition



Select the "Scaling" for setting the scaling condition.

In this example, the displacement is measured using the potentiometer. The sensitivity of the sensor is the following.
200ohms at 10mm, 100ohms at 0mm, 0ohm at -10mm



Select the "Scaling" for setting the scaling condition.



Select to "On" to enable the scaling function.

Setting of span (range of signal to be displayed)



Select the "Upper" or "Lower" of the "Meas. Value".



Enter the value. If set value is out of limit, the setting of the measuring range needs to be changed.

Note: The signal is converted using four (4) reference points that are two (2) points in measurement value and two (2) points in scaled value. The measuring value is calculated by proportional calculation based on the specified four reference points.



DC Strain module GL7-DCB, Method to take advantage

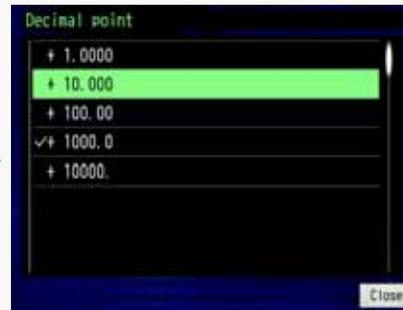
6-2. Setting of GL7-DCB module, Measuring the Resistance, Setting of menu (3/4)



Setting of reference point in measurement is displayed.



Select the "Decimal point" for setting the digits of the scaled value.



Select the number of digits above the decimal point. It is style of the scaled value.



Select the "Upper" or "Lower" of the "Sal. Value". It is the scaled value corresponding to the measurement value to column of the "Upper" and "Lower" of "Meas. Value".



Enter the value for scaling.



Settings of scaling condition are displayed.

or



Select the "Select" for setting the type of scaled signal.

Note: The unit of scaled value can be selected from the preset or it can be entered directly.



Select the type of signal for displaying the unit that has been pre-set.



DC Strain module GL7-DCB, Method to take advantage

6-2. Setting of GL7-DCB module, Measuring the Resistance, Setting of menu (4/4)



Select the "Setting" for setting type of the unit.



Select the unit from preset.

Setting of scaling unit (direct enter)



Select the "Unit" for setting the unit of scaled value.



Enter the unit using displayed keyboard.

Note: If there is not unit in the preset list, unit can be entered directly using keyboard.



Settings of scaling are displayed.



Settings of measurement condition are displayed.