GRAPHTEC

DATA PLATFORM ON THE GO

Acceleration/Charge Module [**GL7-CHA**]

Supplemental User Guide

Signal conditioning device for the GL7000 amplifier using Piezoelectric sensors

This is a technical guide for measuring using the [GL7-CHA] module.

DATA PLATFORM GL7000

**Charge Module
GL7-CHA**

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1. Overview for the GL7-CHA module (1/2)

The charge/acceleration module GL7-CHA is the signal conditioner for the GL7000. It carries a isolated 4 channel input, and corresponds to sensors using Piezoelectric element (either the charge signal output type and IEPE type), and supports voltage measurement. Input signal type can be set individually for each channels.

- Supports charge output type sensor, IEPE sensor, and also voltage input
- Supports sensor corresponding to TEDS
- High precision module by reduced noise suppression through a low-pass, high-pass, and anti-aliasing filter

Input for the charge signal output type sensor

Miniature type connector (screw size: #10-32 UNF)

Signal cable of sensor (miniature connector, plug)

When using the charge output type sensor, connect the sensor to the miniature connector.

Usable acceleration sensor: 0.01pC/(m/s^2) to 999.9pC/(m/s^2)

Input for IEPE type sensor and voltage

BNC connector, female

Signal cable of sensor (BNC connector, plug)
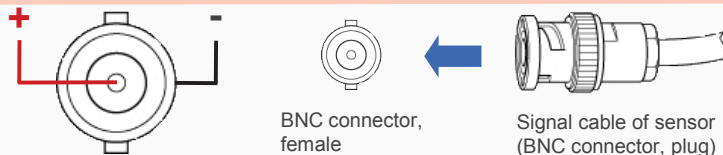
When measuring voltage or using the IEPE sensor, connect the sensor to the BNC connector.

Usable acceleration sensor: 0.01mV/(m/s^2) to 999.9mV/(m/s^2)

GL7-CHA

CHARGE

Charge Module GL7-CHA (4ch / unit)

GL7-CHA can be used with the piezoelectric type acceleration sensors as well as other sensors listed below.

| Sensor type			Example of sensor sensibity (Unit of output signal)
Piezoelectric element type sensor	Charge output type	Acceleration sensor	pC/(m/s^2), pC/(9.8m/s^2), pC/g, pC/G
		Pressure sensor	pC/kPa, pC/bar, pC/(kg/cm^2), pC/psi
		Force or Load sensor	pC/N, pC/kgf, pC/kg, pC/lb
	IEPE type	Acceleration sensor	mV/(m/s^2), mV/(9.8m/s^2), mV/g, mV/G
		Pressure sensor	mV/kPa, mV/bar, mV/(kg/cm^2), mV/psi
		Force or Load sensor	mV/N, mV/kgf, mV/kg, mV/lb

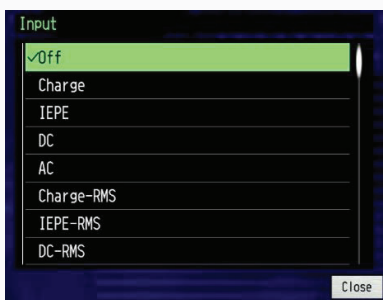# Charge module GL7-CHA, Method to take advantage

1. Overview of the GL7-CHA module (2/2)

The GL7-CHA module can measure the signal of the piezoelectric type sensors and voltage. The input signal type is set on the input settings menu.

Input setting menu for GL7-CHA
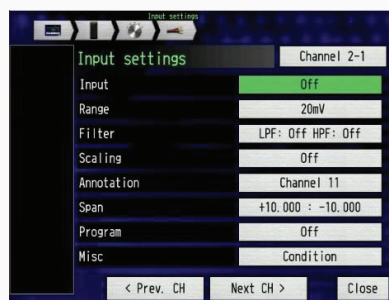
Select the "Input" for setting the type of input signal.

Select the type of input signal.

Type	Description
Charge	Sensor of the Charge output type
IEPE	Sensor of the IEPE type
DC	Voltage measurement (DC coupling)
AC	Voltage measurement (AC coupling)
Charge-RMS	RMS measurement in charge output type sensor
IEPE-RMS	RMS measurement in IEPE type sensor
DC-RMS	RMS measurement in Voltage (DC coupling)
AC-RMS	RMS measurement in Voltage (AC coupling)

Note:
When the input type is set to the "IEPE" or "IEPE-RMS", the excitation current for the sensor will be given out from the input connector.

Note:
When the input type is set to the "Charge", "Charge-RMS", "IEPE" or "IEPE-RMS", the available measuring range is automatically set shown in the following table.

| Rabge	Charge signal output type sensor, Sensitivity (unit: pC/(m/s²))										IEPE type sensor, Sensitivity (unit: mV/(m/s²))													
	0.0100 to 0.5000	0.5001 to 2.0000	2.0001 to 5.0000	5.0001 to 10.0000	10.0001 to 20.0000	20.0001 to 50.0000	50.0001 to 100.0000	100.0001 to 200.0000	200.0001 to 500.0000	500.0001 to 999.9999	0.0100 to 0.0200	0.0201 to 0.0500	0.0501 to 0.2000	0.2001 to 0.5000	0.5000 to 1.0000	1.0001 to 2.0000	2.0001 to 5.0000	5.0001 to 10.0000	10.0001 to 20.0000	20.0001 to 50.0000	50.0001 to 100.0000	100.0001 to 200.0000	200.0001 to 500.0000	500.0001 to 999.9999
1 m/s²	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X
2 m/s²	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X
5 m/s²	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X
10 m/s²	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X
20 m/s²	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A
50 m/s²	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	N/A	N/A
100 m/s²	N/A	N/A	X	X	X	X	X	X	X	X	N/A	N/A	N/A	X	X	X	X	X	X	X	X	N/A	N/A	N/A
200 m/s²	N/A	N/A	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A
500 m/s²	N/A	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A
1000 m/s²	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A
2000 m/s²	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A
5000 m/s²	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10000 m/s²	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20000 m/s²	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
50000 m/s²	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Charge module GL7-CHA, Method to take advantage

2-1. Setting the GL7-CHA module, Using IEPE type acceleration sensor (1/2)

When IEPE type acceleration sensor is used, the sensor excitation current and sensor sensitivity need to be set for measuring acceleration signal. The excitation current is required to drive the IEPE sensor. The sensor output is converted to the accelerometer signal using the sensor sensitivity. The default setting of the unit on this module is set to the "m/s^2" which is the unit of measurement certified by the International System of Units (SI unit) for acceleration.

When sensors other than the acceleration are used, scaling function will need to be used. If the accelerometers are scaled in other format than "m/s^2", such as "g" (for gravity), scaling function will need to be used. Please refer to section 2.4 for more detail on this.

Input setting menu for GL7-CHA

Select the "Misc" for setting the condition of the sensor.

In this example, the IEPE type acceleration sensor that has sensitivity of 10.00mV/(m/s^2) is used.

Note: The sensitivity of sensor is written on the data sheet of the sensor. The value is entered to the GL7-CHA setting menu.

Setting the sensor excitation

Select the "Applied current" for setting the condition.

Select "4mA" or "8mA".

Excitation current will be displayed on the "Other settings" menu.

Setting sensor sensitivity

Select the "Sensor sensitivity" for setting condition on sensitivity.

Enter the value of the sensitivity.

Sensitivity is displayed on the "Other settings" menu.

Charge module GL7-CHA, Method to take advantage

2-1. Setting the GL7-CHA module, Using IEPE type acceleration sensor (2/2)

Note: The signal is measured within the selected range. If "50m/s²" is selected, the signal can be measured from -50m/s² to +50m/s².
The available measuring range is automatically displayed that will be relative to the setting of the sensor sensitivity.

Note: The measured signal is displayed on the screen within the span setting. The range of signal to be measured is set by the "Range".

Setting of measuring range

Setting of display range of signal (span)
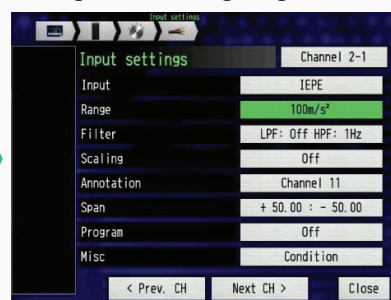
Select the "Range" for setting the measuring range.
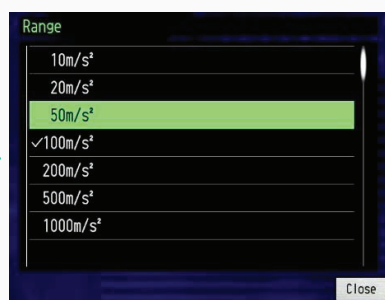
Select the signal measuring range from displayed settings.
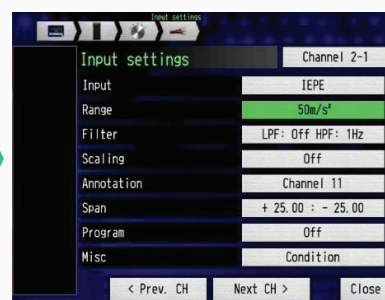
Selected range is displayed.
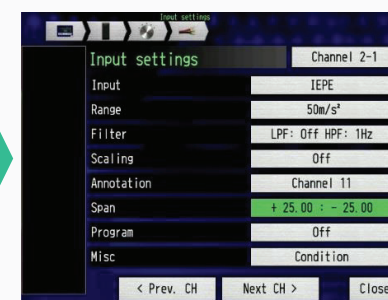
Select the "Span" for setting the displayed range of signal.
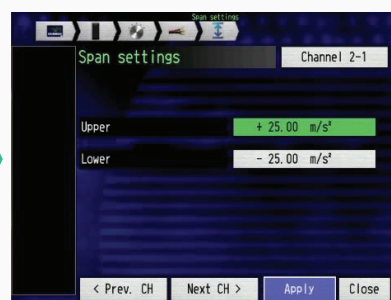
Select the "Upper" or "Lower" values for setting the signal display range.
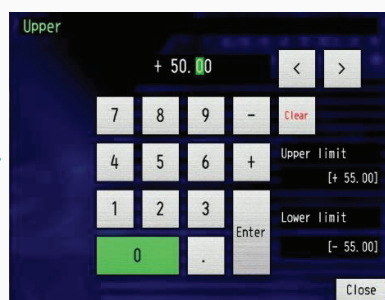
Enter the value for the signal display range.
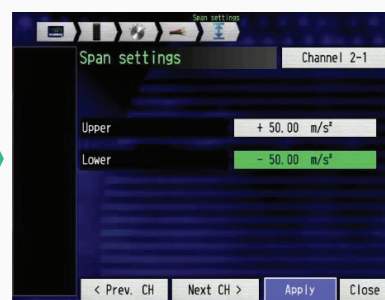
Confirm the setting value of upper (Max.) and lower (Min.) signal display range.
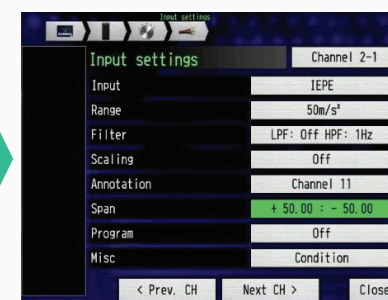
Entered value for the signal display range (span) is displayed.

2-2. Convert the measurement unit using the scaling function (1/2)

When the measured acceleration signal needs to be displayed with units other than "m/s²" even if the IEPE type sensor is scaled in th "m/s²", the scaling function can convert the measured signal to a different unit of measurement.

Input setting menu for GL7-CHA

Select "Scaling" for setting the condition.

Setting of scaling value

Enable Scaling.

Select the "Upper" or "Lower" values for the "Meas. Value". This is the original measurement value which will be converted to the scaled value.

Enter the value. If set value is out of limit, change the setting of the measuring range.

In this example, the sensor scaled in the "m/s²" unit is used to measure acceleration, and then the measured signal is displayed and saved in unit measurement, "g" (gravitational acceleration).

The conversion rate between the "m/s²" and "g" is as follows.
  1 m/s² = 0.10197 g
  1 g = 9.80665 m/s²

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

Select number of digits above the decimal point. This will be how the scaled values will be displayed.

Select the "Upper" or "Lower" values for the "Scal. Value". This is the scaled value corresponding to the measurement value for "Upper" and "Lower" values from the "Meas. Value".

2-2. Convert the measurement units using the scaling function (2/2)

Note: The unit of scaling can be entered directly or it can be selected from the preset unit.
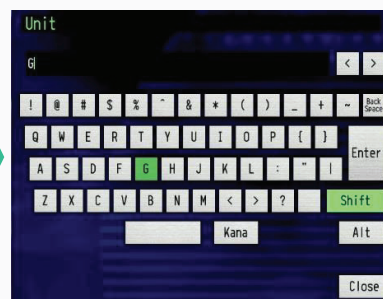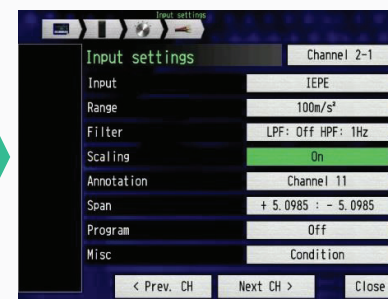
Setting for scaling unit
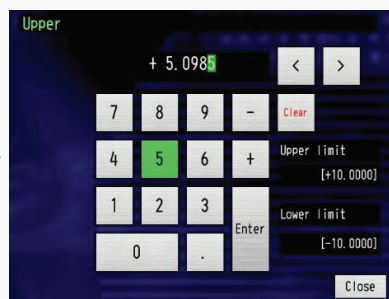
Enter the value for scaling.
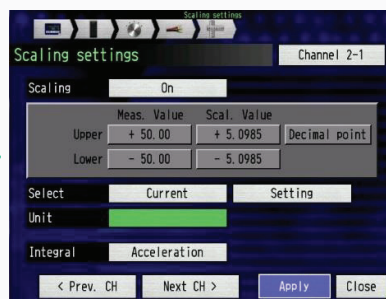
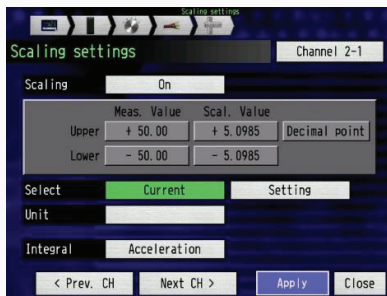Select the "Unit" for entering the unit of scaled value.
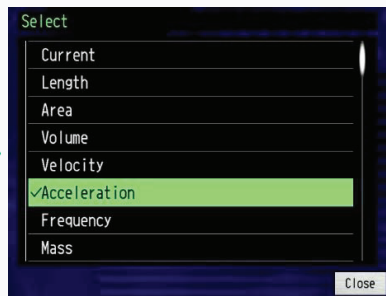

Enter the unit using displayed keyboard.
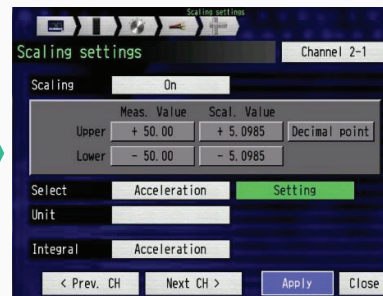

Scaled value is displayed.
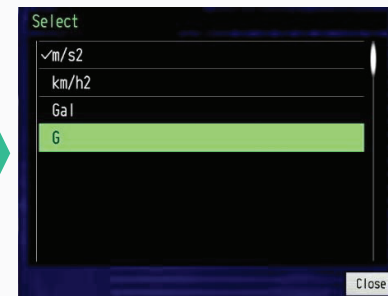
Setting the scaling unit (select from pre-set)

Press the "Select" for selecting type of scaled signal.

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

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

Select the unit from preset.

2-3. Setting the GL7-CHA module, Using Charge output type sensor

When Charge output type acceleration sensor is used, sensor sensitivity need to be set for measuring acceleration signals. With the charge type sensors, the excitation current is not required to drive the sensor. The sensor output is converted from the acceleration signal using the sensor sensitivity. "Range", "Scaling", "Span" and other settings will need to be defined. Please refer to the page for IEPE type sensor for securing these settings.

When sensors other than accelerometers are used, scaled measurements needs to be set. If the acceleration sensor is scaled in other than units in "m/s^2", such as "g" (for gravity), you will need to define your scaled measured. Please refer to the next page on section 2.4 (page 8).

Input setting menu for GL7-CHA

Select the "Misc" for setting the condition of the sensor.

Setting of sensor sensitivity

Select the "Sensor sensitivity" for setting the condition.

Enter the value of the sensitivity.

Entered sensitivity will be displayed.

In this example, the Charge output type acceleration sensor has a sensitivity of 10.00pC/(m/s²).

Note: The sensitivity of sensor is written on the data sheet for the sensor.

Setting the measuring range

Setting the scaling

Setting the span (display range of signal)