

GRAPHTEC

General Purpose Data Acquisition System

Modular Data Acquisition PLATFORM

DATA PLATFORM GL7000

Next Generation Data Acquisition Unit with Touch Panel Control
On-Demand Signal Acquisition
Embedded Monitoring and Datalogging Solution

Relaunches With New Enhancements!



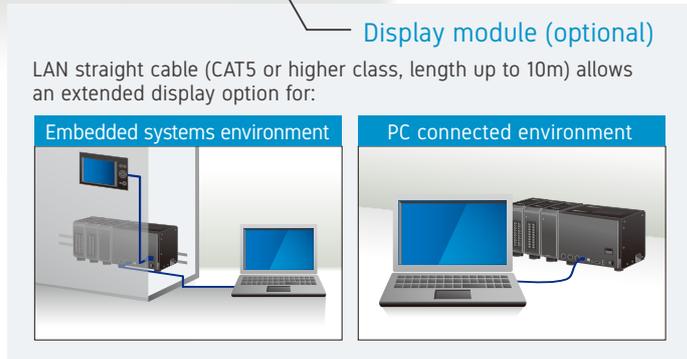
- ✓ **Attach up to 10 input/output modules in a mixed condition environment**
- ✓ **Corresponds to various measurement types (physical, mechanical, and electrical)**
- ✓ **Supports a variety of storage media including a SSD module with a capacity of 128GB**

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New Generation Data Acquisition Platform - GL7000 - Display module allows a stand-alone operation or an embedded systems environment with touch-panel control

Input/output module has capacity to attach up to 10 units with mixed signals (temp, high voltage, high speed, strain, vibration, etc.)

Allows up to 112 channels in one main unit by attaching up to 10 units of the input/output modules.*1
Detachable display module enables the GL7000 to be used in a stand-alone platform or to be embedded into the acquisition system.
Control and monitoring via the PC or display module may be done independently or in conjunction with one another.

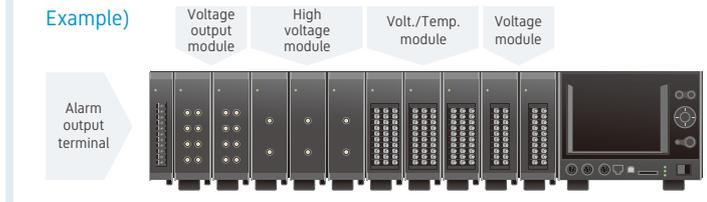


MODULE OPTIONS (8 TOTAL) - Compatible with various electrical, mechanical, and physical measurement needs.

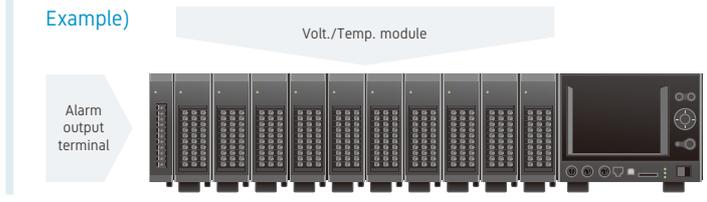
Voltage Module GL7-V	Volt./Temp. Module GL7-M	High-speed Voltage Module GL7-HSV	High Voltage Module GL7-HV
DC Strain Module GL7-DCB	Charge Module GL7-CHA	Voltage Output Module GL7-DCO	Logic/Pulse Module GL7-L/P

Maintains the maximum sampling speed even when the number of input/output modules are increased *1

- Each of the 10 units can include a different input/output module *2

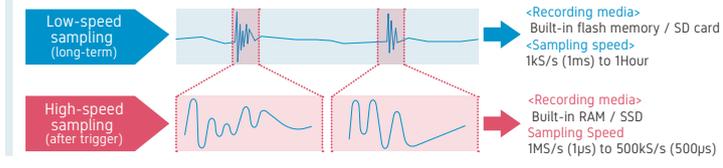


- Up to 10 input/output modules of the same kind can be attached to one main unit *2



Dual-Sampling Feature (Firmware version 2.0 or later)

Dual sampling speed can now be configured at the same time. While recording long intervals on the slow sampling speed, trigger set can start recording dynamic transient signals at a fast sampling speed.



Up to 10 input/output modules can be attached to one main unit *2

Example)

Using Volt/Temp Module

10 ch being used,
Max. sampling speed
100S/s
(10ms interval)

20 ch being used,
Max. sampling speed
100S/s
(10ms interval)

40 ch being used,
Max. sampling speed
100S/s
(10ms interval)

Maintains high speed with expanded Channels.

*1. Maximum sampling speed will depend on the data destination. (RAM and optional SSD module is the fastest, Flash memory, SD Card will be slower.)
*2. If different types of modules are attached, the effective sampling speed of the system is up to the fastest sampling speed among the installed modules. When the maximum sampling speed of the module is slower than the maximum sampling speed of the fastest amplifier, signal will be sampled with maximum sampling speed of the module. The same data is saved with the system sampling speed until new data is captured on the slower units.
• The number of modules that can be attached is limited by the type of module.
Up to 10 modules (maximum 112ch with 7 GL7-L/P module, max 100ch with GL7-V or GL7-M module).
For Logic/Pulse module (GL7-L/P):
Maximum 7 units allowed using logic option (112ch).
Maximum 2 units allowed using pulse option (32ch). (The mode for logic or pulse can be set for each unit.)
For Strain module (GL7-DCB):
Maximum 8 units allowed with additional two other amplifier units. (Number of channels is limited to 112ch.)
• For the logic/pulse module, the number of channels can be limited by the selected sampling speed when the module is attached together with other amplifier modules.
1µs sampling interval : up to 8 channels
2µs sampling interval : up to 16 channels (If two modules are attached, channel #1 to #8 in each unit can be used.)
When pulse mode is used, the maximum sampling speed is the 100µs. The data will be updated every 100µs.

The display unit incorporates a touch panel system to provide convenient on-site operation

The display unit incorporates a touch panel system to provide convenient on-site operation

- Touch the icon, move to the next setting menu screen.



- The display waveform is able to expand or shrink.



Function menu icons (Firmware version 2.0 or later)

The display unit can be separated from the main unit with a LAN cable



LAN cable (CAT5 or higher, straight connection), up to 10m

Four Different Display Methods

Each of the 10 units can include a different input/output module *2

Y-T display



Stored recording can be displayed in double-screen mode even while the current recording is on-going.

- * Available when the destination of data file is the Built-in flash memory / SD memory card / SSD unit (optional).
- * Sampling interval should be the 100ms or longer.

Digital display



Both digital and statistical values can be displayed at the same time.

- * Select two functions from the Ave. / Max. / Min. / Peak value and Off.
- * Sampling interval should be 100ms or longer.

XY display



FFT display



Supports multiple types of storage, 128GB SSD is available as an option

1 Built-in RAM

RAM is built into each of the amplifier modules to allow savings of up to 2 million samples. Increasing the number of channels does not decrease the data capture duration.

3 SD memory card

SD card slot (supports SDHC, up to 32GB) is standard on the main module. Captured data can be saved directly on the SD card when sampling speed is slower than 1ms (sampling speed: 1 k Samples/s). Supports hot-swap where SD memory card can be replaced during recording without any data loss.* The captured data can be transferred easily to the PC during offline condition.

* The hot-swap is possible when the sampling is slower than 100ms.

2 Built-in Flash memory

4GB of Flash memory is built into the main module. Captured data can be saved directly to the flash memory when sampling speed is less than 1ms (1k Samples/s). Non-volatile memory (saved data is retained even if the power is turned off).

* The storage capacity might differ by its production date.

4 SSD module (128GB)

Option

Allows multiple recording of large amount of data to be saved when optional SSD module is used. It has a high vibration resistance and the captured data can be saved directly to the SSD when sampling is not faster than 1μs.*



SSD module needs to be set next to the main module.

Advantage of SSD • Retain the data even when power is off • High vibration resistance • High-speed access

* The number of modules are limited. * The storage capacity might differ by its production date.

Maximum sampling speed and the data capturing time *1

Input Module	Storage Device	Number of units, Max. sampling speed (interval)			Capturing time when single module is attached (when 10 modules are attached)				
		Attached to 1 or 2 modules	Attached to 3 or 4 modules	Attached to 5 to 10 modules	1MS/s (1μs)	100KS/s (10μs)	1KS/s (1ms)	100S/s (10ms)	1S/s (1s)
High-speed Voltage Module	Built-in RAM (2Msamples)				2sec. (2sec.)	20sec. (20sec.)	33min. (33min.)	5hrs. (5hrs.)	23days (23days)
	Built-in Flash memory (4GB)		1KS/s (1ms)		N/A	N/A	72hrs. (10hrs.)	32days (4days)	3269days (440days)
	SD memory card (32GB)*2						83hrs. (11hrs.)	34days (4days)	3495days (470days)
	SSD (128GB)*2	1MS/s (1μs)	500KS/s (2μs)	200KS/s (5μs)	4min. (N/A)	44min. (6min.)			
High Voltage Module	Built-in RAM (2Msamples)		1MS/s (1μs)		2sec. (2sec.)	20sec. (20sec.)	33min. (33min.)	5hrs. (5hrs.)	23days (23days)
	Built-in Flash memory (4GB)				N/A	N/A	109hrs. (17hrs.)	45days (7days)	4577days (715days)
	SD memory card (32GB)*2						117hrs. (18hrs.)	48days (7days)	4893days (764days)
	SSD (128GB)*2	1MS/s (1μs)	500KS/s (2μs)	200KS/s (5μs)	4min. (N/A)	44min. (11min.)			
DCStrain*3 & Charge Module	Built-in RAM (2Msamples)		100KS/s (10μs)			20sec. (20sec.)	33min. (33min.)	5hrs. (5hrs.)	23days (23days)
	Built-in Flash memory (4GB)				N/A	N/A	72hrs. (13hrs.)	32days (5days)	3269days (544days)
	SD memory card (3GB)*2						83hrs. (13hrs.)	34days (5days)	3495days (582days)
	SSD (128GB)*2		100KS/s (10μs)		44min. (6min.)				
Voltage Module	Built-in RAM (2M samples)						33min. (33min.)	5hrs. (5hrs.)	23days (23days)
	Built-in Flashmemory (4GB)				N/A	N/A	42hrs. (4hrs.)	17days (2days)	1760days (204days)
	SD memory card (32GB)*2						45hrs. (5hrs.)	18days (2days)	1882days (218days)
	SSD (128GB)*2								
Volt./Temp. Module	Built-in RAM (2Msamples)							5hrs. (5hrs.)	23days (23days)
	Built-in Flash memory (4GB)				N/A	N/A		17days (2days)	1760days (204days)
	SD memory card (32GB)*2		100S/s (10ms)		N/A	N/A			
	SSD (128GB)*2							18days (2days)	1882days (218days)

*1 Capturing time values are approximately. Data is saved as GBD format files. When data is saved in CSV format, maximum sampling speed will be 10ms regardless of the captured destination and module type. Value of the capturing time is also different from above. (Data cannot be saved to built-in RAM using the CSV format.)

*2 The file size of the captured data is limited up to 4GB on firmware version 2.0 or later, 2GB on firmware version 1.6 or before.

*3 Reference recording time is for up to 8 modules. (max GL7-DCB and GL7-CHA modules is 8.)

Useful functions for data saving and replay

- SD memory card exchange
- Ring capture
- Relay capture

- Data search
- Movement by cursor
- Statistical calculation with cursor

The SD card can be replaced during recording when the sampling interval is 100ms or slower.

When data capturing stops, the most recent data is stored in the memory.

Creates data file up to 4GB continuously without losing any recording. (Firmware version 2.0 or later : up to 4GB, Firmware version 1.6 or before : 2GB)

* In firmware version 2.0 or later, data capacity or capturing time can be set flexibly by users.

Specific value (measured value, alarm point) of a particular channel in the recorded data can be searched and found automatically.

The cursor can be moved automatically to a specified time in the recorded data.

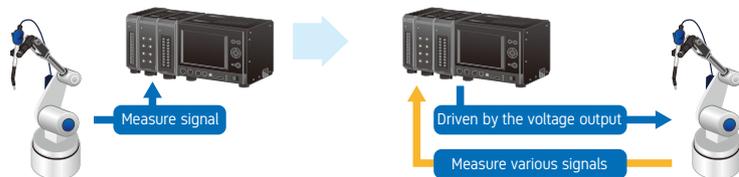
The statistical calculation (average, max, min, P-P, effective value) can be determined in between the recorded data specified by the cursor.

Supports measurement and simulation testing using the voltage output module (GL7-DCO)

Allows a simulation testing by outputting the measured data from signals recorded from various input modules and outputs the data through the voltage output module (GL7-DCO).

1 Captures the abnormal signal

2 Outputs the saved data for driving equipment, and the signal of various points are measured simultaneously



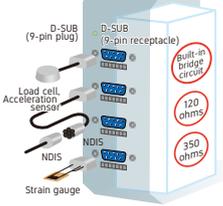
* Signals that are being captured may not be output at the same time. The output current is max 10mA for each channel. Total output current of the unit is 40mA. If the target object needs to be driven by external power, than a power amplifier may be needed.

DC Strain Module GL7-DCB



Setting sensor calibration value is unnecessary!

Supports TEDS



Main features

- Easily measure strain gauges using built-in bridge circuit for both 120 and 350 ohm gauges
- Supports excitation power for bridge circuit in constant voltage or current
- Supports TEDS sensors
- Supports a low-pass and anti-aliasing filter
- Enable high-precision measurement in remote sensing and shunt calibration function

Strain. Voltage. Res. 4ch/unit	Strain gauge. TEDS sensor	Max. 100kS/s (10µs)
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Supported sensor

- Strain gauge : 1 gauge in 2-wire, 3-wire, or 4-wire
 2 gauges in 3-wire, 4-wire, or 5-wire
 4 gauges in 4-wire, or 6-wire
- Strain type sensor : 4-wire or 6-wire

Connector for input

Standard accessory

D-SUB type connector (standard accessory : 4pcs)



Option

Screw terminal adapter (B-560A)



* It can be used without connector cover by using included terminal hold bracket. The terminal holding bracket can be purchased for replacement as option B-560AP.

Standard accessory

Input cable with NDIS type connector (B-561)



Option

Extension cable for B-560 / B-560A (B-560-05)

Compensations for High-precision measurement

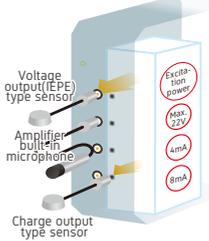
- Remote Sense : Eliminates the influence from the lead wire resistance
- Shunt calibration : Gain compensation of strain measurement

Charge Module GL7-CHA



Setting sensor calibration value is unnecessary!

Supports TEDS



Main features

- Supports charge and voltage output type sensors
- Now compatible with microphones (Firmware version 2.0 or later)
- Supports TEDS sensors
- Wide variety of filter functions allows high-precision measurements
- Support RMS (effective value) measurement

Charge. Voltage. 4ch/unit	Charge. IEPE sensor	Max. 100kS/s (10µs)
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Sensors and input connector type

There are various types of the charge or IEPE type sensors which can be measured by setting the sensor sensitivity and an engineering scaling function.

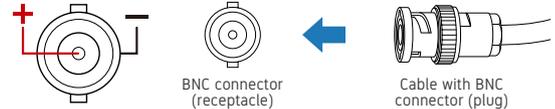
Charge output type sensor

Supported acceleration sensor : 0.01pC/(m/s²) to 999.9pC/(m/s²)



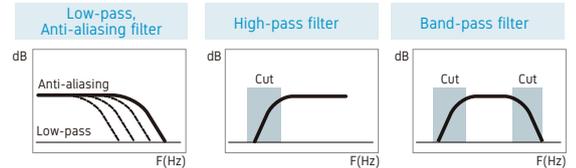
Voltage output (IEPE) type sensor

Supported acceleration sensor : 0.01mV/(m/s²) to 999.9mV/(m/s²)
 Supported microphone sensor : 0.2mV/Pa to 100mV/Pa



High-precision measurement using various filters

High-precision signal is able to be captured by the high-pass, low-pass, and anti-aliasing filter.



Voltage Output Module GL7-DCO



Main features

- Recorded measurement data can be output as an analog voltage, and reproduce the measured anomalies and recorded data (Temperature, humidity, logic/pulse data is excluded.)
- The reference signal for the test created by the GL-Wave Editor (EXCEL macro) can be output into an analog voltage (Signal: Sine wave, pulse wave (any duty ratio), ramp, triangle wave, simple arbitrary waveform, DC.)
- Output voltage: Max. 10V (Output current: Max ±10mA/ch or ±40mA/unit.)

Output voltage 8ch/unit	Max. 100kS/s (10µs)	Captured data. Arbitrary waveform
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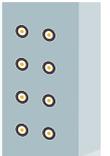
Output terminal and conversion cable

Option

Output cable with BNC connector (B-562)



Output terminal : SMA (SubMiniature version A) connector



Method of analog voltage output

* GL-Connection and GL-Wave Editor software are standard accessories.
 * GBD is an abbreviation for Graphtec Binary Data.

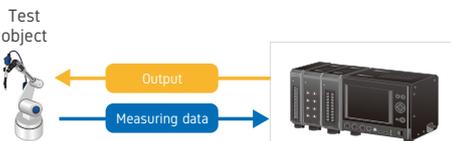
Three functions 1 Outputs the stored measuring data 2 Outputs the generated signal 3 Outputs the edited measuring data

Case 1

Outputs a signal without a PC

* The GL7000 cannot generate arbitrary data by itself.

Data : Saved measurement data
 Waveform : Sine, pulse, ramp, triangle, or DC

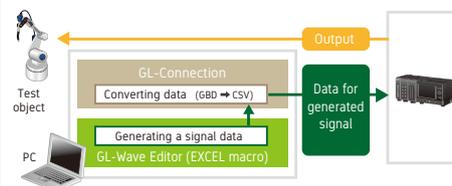


* Data that is currently recording cannot be output to the DCO module.

Case 2

Outputs a signal using the module and the PC software

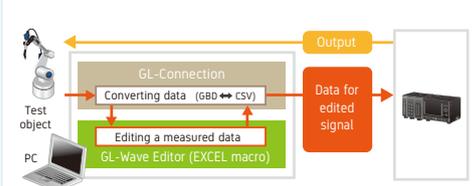
Data : Arbitrary data generated by the software
 Waveform : Sine, pulse, ramp, triangle, or DC



Case 3

Outputs an edited signal using the module and the PC software

Data : Edited measuring data
 Waveform : Sine, pulse, ramp, triangle, or DC



High Voltage Module GL7-HV

Main features

- High input voltage (Maximum: 1000V)
- Input coupling of DC and AC
- Real-time RMS measurement

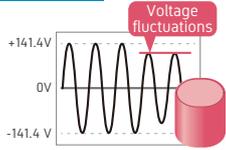
Voltage
2ch/unit

Max. 1000V
input

Max. 1MS/s
(1 μ s)

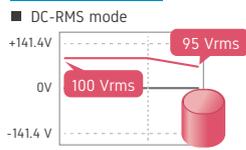
Measuring in RMS (effective value)

Normal mode



Volume of data to be recorded becomes large because the sampling speed needs to be fast to recognize the waveform.

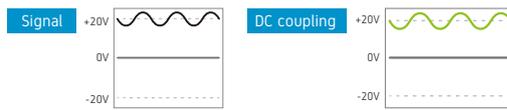
RMS measurement



Volume of data recorded becomes small because the sampling speed does not need to be as fast recording the RMS value.

DC- or AC-coupling

By using the DC and AC coupling feature, the voltage signal of a small signal superimposed on the input signals or the absolute voltage value can be recorded.



Small AC component is superimposed on the DC component.

Measures the accumulated value of the DC and AC components. (Absolute voltage of signal.)

AC coupling

It is possible to remove the superimposed DC components from the coupled AC signal allowing only the small AC components to be measured.



High Speed Voltage Module GL7-HSV

Main features

- All isolated input channels (4ch/unit)
- 1MS/s high speed simultaneous sampling
- Maximum input voltage 100V
- Supports low-pass filter

High speed voltage
4ch/unit

Max. 1MS/s
(1 μ s)

Simultaneous sampling
Isolated



Voltage Module GL7-V

Main features

- All isolated input channels (10ch/unit)
- 1kS/s Simultaneous sampling
- Maximum input voltage 100V
- Supports low-pass filter

Voltage
10ch/unit

Max. 1kS/s
(1ms)

Simultaneous sampling
Isolated



Voltage/Temperature Module GL7-M

Main features

- All isolated input channels (10ch/unit)
- Supports multiple input types (4-20mA current loop using 250 ohms shunt)
- Voltage : max. 50V
- Temperature : Thermocouple and RTD
- Humidity : optional sensor (B-530)

Voltage /Temp.
10ch/unit

Max. 100S/s
(10ms)



Supports one humidity sensor per module (B-530). Additional humidity sensors require an external power supply for the sensors.

Logic/Pulse Module GL7-L/P

Main features

- Switching mode between logic or pulse 16ch/unit
- Logic mode: 1MS/s sampling, Pulse mode: 10kS/s sampling
- Available dedicated cabling

Logic /Pulse
16ch/unit

In Logic, Max. 1MS/s
(1 μ s)

In Pulse, Max. 10kS/s
(100 μ s)

Option Probe set for Logic input (RIC-10A)

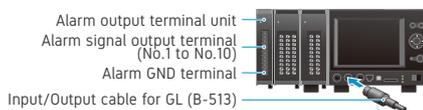


Attachable number of modules: up to 7 modules using Logic mode, up to 2 modules using Pulse mode. In the Pulse mode, there is a limitation of the sampling speed by the number of channels used.

Reliable measurement with useful functions

External I / O (Input/Output) and Alarm output

Output module is used for triggering, external sampling, start/stop, and auto-balance for input and output using the Input/Output cable for GL (B-513 optional). The signals related to the status of alarms are output from the terminal on the alarm output module.



Alarm output signal specifications

- Open collector output (pull-up resistance 10K Ω)
- < Rating of the output element >
- Max. voltage: 50V
- Max. current: 2.0 A
- Max. dissipation: 0.6W

- Input** • Start/Stop control (1ch) • External trigger (1ch)
• External sampling (1ch) • Executing auto balance (1ch)
- Output** • Trigger status (1ch)

WEB and FTP server for remote control and data transfer / Direct USB connection to the main unit

WEB server Web browser function allows remote control and remote monitoring of waveform analysis.

FTP server Data can be transferred between the server and GL7000.

USB drive mode The USB drive mode function enables data to be transferred to the PC from the main module built-in flash memory, SD card memory, or the SSD by drag & drop feature. You can then easily delete the files from the file explorer.

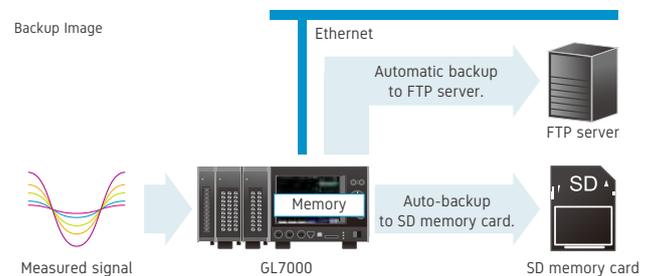
* While using the FTP server or the USB drive mode, data files that are being recorded cannot be transferred to the PC.

- WEB, FTP server function
- USB drive mode



Backup settings

The GL7000 has a function that periodically backs up recording data (refer to the chart below). Here, the user can set the conditions for data backup.



Destination of data	Backup destination			Backup intervals	Backup destination
	SD card	SSD	FTP		
Built-in flash memory	Yes	Yes	Yes	Off, 1, 2, 6, 12, 24 hour(s)	SD memory card, SSD, FTP
SD memory card	No	Yes	Yes		
SSD	Yes	No	Yes		

* You can not specify the same location as the backup destination and recording destination.
* When the recording format is "CSV", the backup function is not available.
* When Ring recording is set to on, the backup function is not available.

NTP client function

The clock on the GL7000 is periodically synchronized with the NTP server.

DHCP client function

The IP address of the GL7000 is automatically obtained from the DHCP server.

High performance and useful software GL-Connection It is able to display in the format that cannot be displayed in the GL7000

Recording safety measures include backing up the data on to the PC

Application software allows a real time saving of the data while the data is being captured on to the memory of the GL7000.



Built-in memory

Storage on GL7000

Transferred data to the PC

Built-in RAM

Captured data is transferred and saved to the PC after the completion of the measurement. During the measurement, free-running mode allows the display of the real time data but not the recording. (Real-time recording is not available using the built-in RAM as the recording destination.)

Built-in flash memory /SD memory card

Captured data is stored to the media and also transferred to the PC simultaneously. Max sampling speed: 1ms/unit when it is saved in the GBD format, 1ms/unit when it is in the CSV format.

SSD

Captured data is transferred and saved to the PC after the completion of the measurement. During the measurement, free-running mode allows the display of the real time data but not the recording. (Real-time recording is not available using the built-in RAM as the recording destination.)

* Real time recording on the PC can be saved as a CSV file while the data is saved as a GBD file on the main GL7000. Maximum sampling speed for this feature is 1ms.

Display options

Allows YT waveform, XY waveform, digital monitoring and FFT measurement (same as the main GL7000 unit)



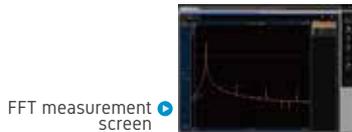
Y-T waveform monitor screen



Digital monitoring screen



XY waveform monitor screen



FFT measurement screen

Customized screens for Data Acquisition Professionals

Various control and setting screens for simplified operation



Setup screen

It is easily recognize the unit to be connected by graphical image on the display.



Setting menu screen

Setting menu on the GL Connection software is similar to the setup screen on the GL7000.



GL-Wave Editor (Excel macro)

Setting menu for the voltage output module

Setup for the output function using the GL7-DCO module is set on the GL-Wave Editor (EXCEL macro) with customized data platform for specified measurement.

Data analysis with
Oscope/Oscope2 (ONO SOKKI)

※ GL7000 GBD data can be imported directly to Oscope.

Multiple window option allows waveforms to be displayed in various forms

* It is required version 2.20

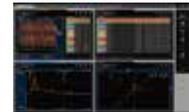
Splits up to 4 windows and each window can display different format (Y-T, XY, FFT, and digits).



Dual windows



Quad windows



Quad windows displaying mixed format

Cursor Synchronization* :

When displaying multiple windows, the cursor positions can be synced.

Module Settings List* :

Settings of multiple modules can be displayed simultaneously, and setting conditions can now be saved as CSV data.

Disable saving data to PC* :

selection for enabling or disabling data recording on the PC and only to the main unit GL7000.

Remote Lock On/Off Feature* :

Setting operation is available on GL7000 under control of GL-Connection.

Useful functions for GL-Connection Software

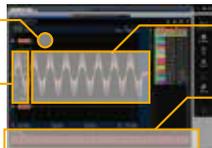
Supports a user-friendly mouse movement that enables changes in the setting and the related display waveform

Display size of the waveform can be changed using a drag feature on the dotted line with the PC controlled mouse.

The position of the waveform can be shifted up or down using the mouse.

The scale of the waveform can be changed using the mouse wheel operation.

Time division can be shifted using the mouse wheel operation.



Large-scale channel measurements

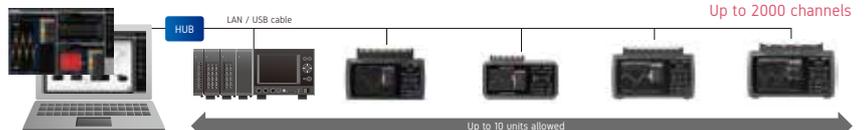
Up to 1120 channels can be recording using the PC platform
10 units of the GL7000 can be connected through 1 PC software using the LAN or the USB hub.

Up to 5 units of the GL7000 can be fully synchronized using the sync. cable

The start/stop trigger, and sampling can be synchronized in the GL7000 when they are connected by a sync cable. The master and slave units are automatically identified. Data is stored in each main unit individually.

Allows connections of Graphtec's midi LOGGER series Maximum channel is up to 2000 when 10 units of GL840 is connected midi LOGGER series

- GL2000, GL980, GL900-4 and GL900-8, GL840, GL820, GL240, GL220 - can all be viewed in real time.



SDK (Software Development Kit) is offered for free

Software Development Kit (SDK) is available for real time data transfer and beyond for custom application developed for your need.

- USB driver
- Manual (Main unit controls, data communication, data file, etc.)
- Sample program (in Visual C++, Visual Basic, .NET framework)
- Key commands have been set as modules for simpler implementation with LabVIEW. (Connection, Waveform Display, Digital Indicator, CSV conversion, file acquisition)

Coming soon / Higher module has added

Input / Output Module Specifications

Voltage Module Specifications		Voltage	High Speed Voltage
Model number		GL7-V	GL7-HSV
Number of input channels		10 channels	4 channels
Input method		All channels isolated unbalanced input, Simultaneous sampling, Screw terminal (M3 screw)	All channels isolated unbalanced input, Simultaneous sampling, BNC connector
Sampling speed (interval)		1k Samples/s to 1 Sample/h (1 ms to 1 hr.)	1M Samples/s to 1 Sample/h (1µs to 1 hr.)
Built in RAM		2 million samples for each channel	
Measurement range		100, 200, 500 mV, 1, 2, 5, 10, 20, 50, 100 V, and 1-5 V Full Scale	
Measurement accuracy (*1)		±0.25% of Full Scale	
A/D converter		Successive approximation type, 16 bits (effective resolution: 1/40000 of the measuring full range)	
Input impedance		1 MΩ ±5%	
Maximum input voltage	Between (+)/(-) terminal	100 mV to 1 V range: 60 Vp-p, 2 V to 100 V range: 100 Vp-p	
	Between channels (-) terminals	60 Vp-p	
	Between channel/GND	60 Vp-p	
Max. voltage (withstand)	Between channels	1000 Vp-p (1 minute)	
	Between channel/GND	1000 Vp-p (1 minute)	
Isolation	Between input/GND	Min. 50 MΩ (at 500 V DC)	
Common-mode rejection ratio		Min. 90 dB (50/60 Hz, Signal source impedance: Max. 300 Ω)	
Frequency response		DC to 1 kHz (+/-3 dB)	DC to 200 kHz (+/-3 dB)
Filter	Low pass	Off, Line(1.5 Hz), 5, 50, 500 Hz (at -3 dB, 6dB/oct)	Off, Line(1.5 Hz), 5, 50, 500, 5k, 50k Hz (at -3 dB, 6dB/oct)
External dimensions (WxDxH)		Approx. 49 x 136 x 160 mm (Excluding projections)	Approx. 740 g
Weight		Approx. 840 g	

Voltage/Temperature Input Module Specifications		Temperature	
Model number		GL7-M	
Number of input channels		10 channels	
Input method		All channels isolated balanced input, Scans channels for sampling, Screw terminal (M3 screw)	
Sampling speed (interval)		100 Samples/s at 10ch to 1 Sample/h (10 ms at 10ch to 1 hr.)	
Built in RAM		2 million samples for each channel	
Measurement range	Voltage	20, 50, 100, 200, 500 mV, 1, 2, 5, 10, 20, 50 V, and 1-5 V Full Scale	
	Temperature	Thermocouple: K, J, E, T, R, S, B, N, and W (WRεS-26) RTD: Pt100, JPt100 (JIS), Pt1000 (IEC751)	
Measurement accuracy (*3)	Humidity (*2)	0 to 100 % RH, using optional humidity sensor (B-530)	
	Voltage	±0.1% of Full Scale	
	Temperature	Measurement range	Measurement accuracy
		R/S	0 ≤ TS ≤ 100°C ± 5.2°C -100 < TS ≤ 300°C ± 3.0°C R: 300 < TS ≤ 1600°C ± (0.05% of reading + 2.0°C) S: 300 < TS ≤ 1760°C ± (0.05% of reading + 2.0°C) B: 300 < TS ≤ 600°C ± 3.5°C 600 < TS ≤ 1820°C ± (0.05% of reading + 2.0°C) K: -200 < TS ≤ -100°C ± (0.05% of reading + 2.0°C) -100 < TS ≤ 1370°C ± (0.05% of reading + 1.0°C) E: -200 < TS ≤ -100°C ± (0.05% of reading + 2.0°C) -100 < TS ≤ 800°C ± (0.05% of reading + 1.0°C) T: -200 < TS ≤ -100°C ± (0.1% of reading + 1.5°C) -100 < TS ≤ 400°C ± (0.1% of reading + 0.5°C) J: -200 < TS ≤ -100°C ± 2.7°C -100 < TS ≤ 100°C ± 1.7°C 100 < TS ≤ 1100°C ± (0.05% of reading + 1.0°C) N: -200 < TS < 0°C ± (0.1% of reading + 2.0°C) 0 ≤ TS ≤ 1300°C ± (0.1% of reading + 1.0°C) W: 0 ≤ TS ≤ 2000°C ± (0.1% of reading + 1.5°C)

Reference Junction Compensation (R.J.C.) accuracy: ±0.5°C
 * Wire size of thermocouple used is 0.32 mm diameter in the T type and 0.65 mm diameter in other types.

RTD	Measurement range	Driving current	Accuracy
Pt100	-200 to 850°C (F.S. = 1050°C)	1 mA	±1.0°C
JPt100	-200 to 500°C (F.S. = 700°C)	1 mA	+0.8°C
Pt1000	-200 to 500°C (F.S. = 700°C)	0.2 mA	+0.8°C

R.J. Compensation		Select internal or external
A/D converter		Sigma-Delta type, 16 bits (effective resolution: 1/40000 of the measuring full range)
Input impedance		1 MΩ ±5%
Maximum input voltage	Between (+)/(-) terminal	60 Vp-p
	Between channels (-) terminals	60 Vp-p
	Between channel/GND	60 Vp-p
Max. voltage (withstand)	Between channels	350 Vp-p (1 minute)
	Between channel/GND	350 Vp-p (1 minute)
Isolation	Between input/GND	Min. 50 MΩ (at 500 V DC)
Common-mode rejection ratio		Min. 90 dB (50/60 Hz, Signal source impedance: Max. 300 Ω)
Filter	Moving average	Off, 2, 5, 10, 20, 40 (Moving average in selected number. When the sample is longer than 5 seconds, the data sampled in the sub-sample (5 seconds) will be used for creating the average value.)
5 V output		Driving the humidity (*2) sensor B-530, 1 channel
External dimensions (WxDxH)		Approx. 49 x 136 x 160 mm (Excluding projections)
Weight		Approx. 770 g

High Voltage Input Module Specifications		DC-AC	
Model number		GL7-HV	
Number of input channels		2 channels	
Input method		All channels isolated unbalanced input, Simultaneous sampling, Isolated BNC connector	
Sampling speed (interval)		1 M Samples/s to 1 Sample/h (1 µs to 1 hr.)	
Built in RAM		2 million samples for each channel	
Input coupling and measurement		AC, DC, AC-RMS, DC-RMS	
Measurement range	DC, AC	2, 5, 10, 20, 50, 100, 200, 500, 1000 V Full Scale	
	DC-RMS, AC-RMS	1, 2, 5, 10, 20, 50, 100, 200, 500 Vrms Full Scale (Crest Factor: up to 4 in 1 to 200 Vrms range, up to 2 in 500 Vrms range)	
Measurement accuracy (*4)	DC, AC	±0.25% of Full Scale	
	DC-RMS	Sine wave measurement ±0.5% of Full Scale (at 20 Hz ≤ F ≤ 1 kHz) ±1.5% of Full Scale (at 1 kHz < F ≤ 20 kHz) Response time: 500ms (Crest Factor is up to 4)	
	AC-RMS	Sine wave measurement ±0.5% of Full Scale (at 100 Hz ≤ F ≤ 1 kHz) ±1.5% of Full Scale (at 1 kHz < F ≤ 20 kHz) Response time: 500 ms (Crest Factor is up to 4)	
A/D converter		Successive Approximation type, 16 bits (effective resolution: 1/40000 of the measuring full range in the DC and AC coupling, 1/20000 of the measuring full range in the DC-RMS, AC-RMS coupling)	
Input impedance		1 MΩ ±5%	
Maximum input voltage	Between (+)/(-) terminal	1000 Vp-p	
	Between channels (-) terminals	300 Vrms AC	
	Between channel/GND	300 Vrms AC	
Max. voltage (withstand)	Between channels	2300 Vrms AC (1 minute)	
	Between channel/GND	2300 Vrms AC (1 minute)	
Isolation	Between input/GND	Min. 50 MΩ (at 500 V DC)	
Common-mode rejection ratio		Min. 90 dB (50/60 Hz, Signal source impedance: Max. 300 Ω)	
Frequency response		DC Coupling: DC to 200 kHz (+/-3 dB) AC Coupling: 4Hz to 200 kHz (+/-4.5 dB)	
Filter	Low pass	Off, Line (1.5 Hz), 5, 50, 500, 5k, 50k Hz (at -3 dB, 6dB/oct)	
External dimensions (WxDxH)		Approx. 49 x 136 x 160mm (Excluding projections)	
Weight		Approx. 740 g	

(*1)	Subject to the conditions: • Room temperature is 23 °C ± 5 °C. • When 30 minutes or more have elapsed after power was turned on. • Filter is set to LINE. • Sampling rate is set to 1 second. • GND terminal is connected to ground.
(*2)	Using optional humidity sensor (B-530)
(*3)	Subject to the conditions: • Room temperature is 23 °C ± 5 °C. • When 30 minutes or more have elapsed after power was turned on. • Filter is set to 10. • Sampling rate is set to 1 second. • GND terminal is connected to ground.
(*4)	Subject to the conditions: • Room temperature is 23 °C ± 5 °C. • When 30 minutes or more have elapsed after power was turned on. • Filter is set to 10. • GND terminal is connected to ground. • Measurement accuracy of RMS is effective for input voltage of 5 to 100% in each measurement range.
(*5)	Available ranges vary by the excitation power for the bridge.
(*6)	Remote sensing is not available when a NDIS connector is used. • When a bridge box is used, the connection needs to be 4- or 6- wire full bridge. • When connecting with a Half bridge (Opposite side), an additional bridge box is required. • Bridge excitation: Constant current drives a strain gauge type sensor or a 4-wire full bridge. • The shunt calibration is available only when the connection is using a 3-wire, 4-wire quarter bridge, 5-wire full bridge, or 6-wire full bridge.
(*7)	When the built-in resistor 120Ω is used for bridge, the available excitation voltage is 1V, 2V, or 2.5V. The gauge type and used built-in resistor for bridge can be set by a DIP-SW which is located on the front panel of the module.
(*8)	It is required firmware version 2.0 or later.
(*9)	It is required to create the CSV file that is the source for the arbitrary data using the GL-Wave Editor (Excel macro).
(*10)	The Microsoft Excel 2003 (Office 2003) or later edition is required to use the GL-Wave Editor.
(*11)	Subject to the conditions: • Room temperature is 23 °C ± 5 °C. Input probe (RIC-10A) is required to connect signals. The measuring mode is set in each module (16 channels). In Logic mode, up to 7 modules (Up to 112ch.) can be attached to one main module. In Pulse mode, up to 2 modules (Up to 32ch.) can be attached to one main modules.
(*12)	The maximum number of module and channels are limited to up to 10 units with a mixed condition and 112 channels.

DC Strain Input Module Specifications		GL7-DCB	
Model number		GL7-DCB	
Number of input channels		4 channels	
Input method		All channels isolated unbalanced input, Simultaneous sampling, D-SUB type connector (9 pins, receptacle)	
Sampling speed (interval)		100 k Samples/s to 1 Sample/h (10 µs to 1 hr.)	
Built in RAM		2 million samples for each channel	
Input type		Strain, Voltage, Resistance value (including potentiometer)	
Measurement range	Strain (*5)	500, 1000, 2000, 5000, 10000, 20000 µε (µε: 10-6 strain) 0.2, 0.5, 1, 2, 2.5, 4, 5, 10 mV/V	
	Voltage	1, 2, 5, 10, 20, 50, 100, 200, 500 mV, 1, 2, 5 V Full Scale	
	Resistance	1, 2, 5, 10, 20, 50, 100, 200, 500 Ω, 1, 2, 5, 10, 20, 50 kΩ Full Scale	
Measurement accuracy (*4)	Strain	±(0.2% of Full Scale + 10 µε)	
	Voltage	±(0.2% of Full Scale + 10 µV)	
	Resistance	±0.5% of Full Scale (More than 1 hour elapsed after power-on)	
A/D converter		Successive Approximation type, 16 bits (effective resolution: 1/40000 of the measuring full range)	
Gauge ratio		2.0 constant	
Supported sensor	Strain (*6)	Strain gauge Quarter bridge (single gauge) in 2-, 3- or 4-wire (supports remote sensing in 3- or 4-wire) Half bridge (dual gauge) in 3-, 4-, 5-wire (supports remote sensing in 4- or 5-wire) Full bridge (quad gauge) in 4- or 6-wire (supports remote sensing in 6-wire) Transducer/sensor based on a strain gauge Full bridge type in 4-wire, Full bridge type in 6-wire (supports remote sensing)	
Bridge resistance		50 Ω to 10 kΩ * Available excitation power varies by selection of element.	
Built-in element of the bridge (*7)		120 or 350 Ω for the quarter- and half-bridge	
Excitation power	Voltage mode	1, 2, 2.5, 5, 10 V DC * Excitation voltage 5 and 10 V is available when bridge resistance is the 350 Ω or higher. Constant current: 0.1 to 20 mA (supported voltage is up to 10 V.)	
	Current mode	Fully automatic (via push button or setting the condition menu)	
Zero Adjust for Strain gauge	Method	±10,000µε (µε: 10-6 Strain)	
Remote sensing	Max. Range	3- or 4-wire in quarter bridge, 4- or 5-wire in half bridge, 6-wire full bridge	
Shunt Calibration		Approx. 60 kΩ (120 Ω gauge), Approx. 175 kΩ (350 Ω gauge)	
Maximum input voltage	Between (+) / (-) terminal	10 V, Common-mode voltage: 10 Vrms AC	
	Between channels (-) terminals	10 Vp-p	
	Between channel / GND	60 Vp-p	
Max. voltage (withstand)	Between channels	1000 Vp-p (1 minute)	
	Between channel / GND	1000 Vp-p (1 minute)	
Isolation	Between channel / GND	Min. 100 MΩ (at 500 V DC)	
Common-mode rejection ratio		Min. 80 dB (50/60 Hz, Signal source impedance: Max. 300 Ω)	
Frequency response		DC to 20 kHz	
Filter	Low pass	Off, Line (1.5 Hz), 3, 6, 10, 30, 50, 60, 100, 300, 500 Hz, 1k, 3k, 5k, 10k Hz (in -30dB/oct)	
	Anti-aliasing	Off, On	
Support	Standard	IEEE 1451.4 Class2 (Temperate No.33)	
TEDS	Support	Reading information from the sensor and setting it to module	
External dimensions (W x D x H)		Approx. 49 x 136 x 160mm (Excluding Protection)	
Weight		Approx. 840 g	

Charge Input Module Specifications		GL7-CHA	
Model number		GL7-CHA	
Number of input channels		4 channels	
Input method		All channels isolated unbalanced input, Simultaneous sampling, BNC and Miniature connector (#10-32UNF)	
Sampling speed (interval)		100 k Samples/s to 1 sample/h (10 µs to 1 hr.)	
Built in RAM		2 million samples for each channel	
Input type		Sensor in charge output type, Sensor in IEPE type, Voltage, Microphone(*8)	
Input coupling		Sensor: Charge-RMS, IEPE-RMS Voltage: DC, AC, DC-RMS, AC-RMS	
Measurement range	Acceleration sensor input	1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000 m/s ²	
	Microphone(*8)	200, 400, 500mPa, 1, 2, 4, 5, 10, 20, 40, 50, 100, 400, 500Pa	
	Voltage input	DC, AC coupling: 50, 100, 200, 500 mV, 1, 2, 5, 10 V RMS measurement: 20, 50, 100, 200, 500 mVrms, 1, 2, 5 Vrms (Crest Factor in RMS measurement: up to 4 in 20 mVrms to 2 Vrms range, up to 2 in 5 Vrms range)	
Supported sensor sensitivity	Charge output type	0.01 pC/(m/s ²) to 999 pC/(m/s ²) Effective range of measurement range varies depending on sensor sensitivity.	
	IEPE type	0.01 mV/(m/s ²) to 999.9 mV/(m/s ²) Effective range of measurement range varies depending on sensor sensitivity.	
	Microphone(*8)	0.2mV/Pa to 100mV/Pa	
Measurement accuracy (*4)	Charge output type	±0.9% of Full Scale (Sensor sensitivity) × [setting range] ± 20 pC	
	IEPE type	±0.25% of Full Scale (Sensor sensitivity) × [setting range] ± 200 mV	
A/D converter		Successive approximation type, 16 bits (effective resolution: 1/40000 of the measuring full range)	
Input impedance		100 kΩ ±5%	
Excitation power		4 or 8 mA (supported voltage: 22 V ±10%)	
Maximum input charge signal		Max. 50000 pC	
Maximum input voltage	Between (+) / (-) terminal	25 Vp-p	
	Between channels (-) terminals	25 Vp-p	
	Between channel / GND	25 Vp-p	
Max. voltage (withstand)	Between channels	300 Vp-p (1 minute)	
	Between channel / GND	300 Vp-p (1 minute)	
Isolation	Between input / GND	Min. 50 MΩ (at 500 V DC)	
Common-mode rejection ratio		Min. 80 dB (50/60 Hz, Signal source impedance: Max. 300 Ω)	
Frequency response	Charge type	1.5 Hz to 45 kHz	
	IEPE type	1 Hz to 45 kHz	
Filter	Hi pass	Off, 0.15, 1, 10 Hz (It depends on input conditions.)	
	Low pass	Off, Line (1.5 Hz), 3, 6, 10, 30, 50, 60, 100, 300, 500 Hz, 1k, 3k, 5k, 10k Hz (in -30dB/oct)	
	Anti-aliasing	Off, On	
Support	Standard	IEEE 1451.4 Class1 (Temperate No.25 for sensor, Temperate No.27 for microphone)	
TEDS	Support	Reading information from the sensor and setting it to module	
Calculation function		Integration (convert measurement to velocity), Double Integration (convert measurement to displacement)	
External dimensions (W x D x H)		Approx. 49 x 136 x 160mm (Excluding projections)	
Weight		Approx. 850 g	

Voltage Output Module Specification		GL7-DCO	
Model number		GL7-DCO	
Number of output channels		8 channels	
Output method		All channels common ground, SMA (Sub-miniature version A) connector	
Sampling speed (interval)		Up to 100 k Samples/s (10 µs)	
Output condition	Source of data	Measurement data, Edited measurement data, Generated arbitrary data(*9), Generated simple waveform (DC voltage and sine, triangle, ramp, pulse waveform)	
	Source of measurement data	Module of Voltage (GL7-V), Voltage/Temperature (GL7-M), High speed voltage (GL7-HSV), High voltage (GL7-HV), DC strain (GL7-DCB), and Charge (GL7-CHA)	
	Output condition	Signal can be measured by the input module even while the signal is output from the DCO module. Measurement data except the temperature, humidity and logic/pulse are able to output.	
Output range	Voltage	± 1, 2, 5, 10 V Full Scale	
	Current	Up to ± 10 mA in each channel (total output current of unit is up to 40 mA.)	
Output impedance		Max. 1 Ω	
D/A signal accuracy (*10)		±0.25% of Full Scale	
Output converter		Resolution 16 bits (effective resolution: 1/20000 of the output full range)	
Filter	Low pass	OFF, Line(1.5 Hz), 5, 50, 500, 5k, 50k Hz * This filter is the smoothing filter to remove the noise on output of the D/A converter.	
External dimensions (W x D x H)		Approx. 49 x 136 x 160mm (Excluding projections)	
Weight		Approx. 770g	

Logic/Pulse Input Module specifications		GL7-L/P	
Model number		GL7-L/P	
Number of input channels		16 channels	
Input method		All channels common ground, Simultaneous sampling, Circular connector (4ch/connector)(*11)	
Sampling speed (interval)	Logic mode	1 M Samples/s to 1 Sample/h (1 µs to 1 hr.)	
	Pulse mode	10 k Samples/s to 1 Sample/h (100 µs to 1 hr.)	
Built-in RAM		2 million samples for each channels	
Measurement mode		Logic input mode or Pulse input mode (*12)	
Input type		Rotation count (RPM), Accumulating count, Instant count	
Rotation count (RPM)	Function	Counting the number of pulses per sampling interval and then it is converted to RPM	
	Span	50, 500, 5000, 50 k, 500 k, 5 M, 50 M, 500 M rpm Full Scale	
Accumulating count	Function	Accumulating the number of pulses from the start of measurement	
	Span	50, 500, 5000, 50 k, 500 k, 5 M, 50 M, 500 M counts Full Scale	
Instant count	Function	Counting the number of pulses per sampling interval (count is reset at each sampling)	
	Span	50, 500, 5000, 50 k, 500 k, 5 M, 50 M, 500 M counts Full Scale	
Maximum number of count		15 M counts (24 bits counter is used)	
Input signal	Voltage range	0 to 24 V (common ground)	
	Signal type	Contact (Relay), Open collector, Voltage	
	Threshold	Approx. 2.5 V	
	Hysteresis	Approx. 0.5 V (2.5 V to 3 V)	
Filter		Off or On (-3 dB at 50 Hz)	
External dimensions (WxDxH)		Approx. 49 x 136 x 160 mm (Excluding projections)	
Weight		Approx. 700 g	

GL7000 specifications		Description
Item		
Number of module		Attached to up to 10 modules (*1), Max. 112 channels in 1 of GL7000
External Input/Output signals (*2)	Input	Start/Stop, External trigger, External sampling, Auto balance (*3) Signal type: Contact (relay), Open collector, Voltage
	Output	Trigger, Busy (*3), Alarm (10 channels) (*4) Signal type: Open collector (pulled-up by resistor 10 kΩ)
Trigger, Alarm function	Trigger action	Start or Stop capturing data by the trigger
	Trigger repeat	Enabled (ON): Automatically re-armed for the next data capture function Disabled (OFF): Data capture is completed in a single trigger (Hold off repeat action in specified period: Previous start to next start, previous stop to next start)
	Trigger source	Start: Off, Measured signal, Alarm, External signal, Clock, Week or Time Stop: Off, Measured signal, Alarm, External signal, Clock, Week or Time
	Trigger determination conditions for measured signal	Combination: OR or AND condition at the level of signal or edge of signal Analog: Higher/Rising, Lower/Falling, Window-in, Window-out Logic (*5): Higher/Rising, Lower/Falling Pulse (*5): Higher/Rising, Lower/Falling Pulse (*5): Higher/Rising, Lower/Falling, Window-in, Window-out
	Alarm determination condition (*6)	Combination: OR or AND condition at the level of signal or edge of signal Analog: Higher/Rising, Lower/Falling, Window-in, Window-out Logic (*5): Higher/Rising, Lower/Falling Pulse (*5): Higher/Rising, Lower/Falling, Window-in, Window-out
	Alarm output	10 channels
	Pre-trigger (*7)	Number of data before trigger: Up to specified number of captured data
Calculation function	Between channels	Addition, Subtraction, Multiplication and Division for two analog inputs (Sampling speed is limited up to 10 Samples/s (100 ms interval). Available arithmetic element and the output destination is the analog input channel 1 to 100.)
	Statistical	Select two calculations from Average, Peak, Max., Min. in real time and replay (*8)
Move function of the display range		Beginning, center or end of the data, Trigger point, Specific time (absolute, relative), Call cursor
Search function		Search for analog signal levels, logic signal pattern, pulse signal levels or alarm point in captured data
Annotation function		Comment can be set in each channel (up to 31 alphanumeric characters)
Message / Marker functions		Message: The registered messages or entered message is able to be recorded for any timing. Up to 8 messages can be pre-registered. Marker: Marker is able to record for occurring alarm or power failure.
Resume		Resume automatically in the same condition after power is recovered as when the power failure occurred during data capture (*9)
FFT analysis function (Firmware ver. 1.20 or later)	Analyzing frequency range	0.08, 0.2, 0.4, 0.8, 1.6, 3.2, 4, 8, 20, 40, 80, 200, 400, 800 Hz, 2, 4, 8, 20, 40, 80, 200, 400 kHz
	Number of points	500, 1000, 2000, 4000, 10000
	Window function	Rectangular, Hanning, Hamming, Blackman, Flat-top, Exponential
	Averaging	Averaging average, Exponential average, Peak hold
	Channels	4 channels
	Functions	Y-T, Linear, Power, PSD, Cross, Transfer function, Coherence, COP
	Display mode	Single display, Dual display, Nyquist
Interface to PC		Ethernet (10 BASE-T/100 BASE-TX), USB 2.0 (High speed)
Network function		WEB server, FTP server, FTP client, NTP client, DHCP client
USB drive mode		Emulate the USB memory device (*10)
Storage device	Built-in	RAM (2 million samples, built-in amplifier module), Flash memory (4 GB, built-in the main module) (*11)
	External (*12)	SD card (Support SDHC, up to 32GB) slot, SSD (Approx. 128GB (*11)) The file for capturing data is limited up to 4GB. (*13)
Data saving function	Sampling speed (interval)	1 MS/5 (1 million samples per second) to 15 s (1 sample per hour), and synchronized with external sampling signal (Interval: 1, 2, 5, 10, 20, 50, 100, 200, 500 μs, 1, 2, 5, 10, 20, 50, 100, 200, 500 ms, 1, 2, 5, 10, 20, 30, 1, 2, 5, 10, 20, 30 min, 1 hour) * The maximum sampling speed (minimum sampling interval) is different depending on the type of module. * Sampling can be set up to the fastest speed among multiple type connected modules. * The maximum sampling speed (minimum sampling interval) varies depending on the specified recording destination.
	Built-in RAM: up to 1 MS/s (1 μs interval)	
	SSD module: up to 500 kS/s (2 μs interval) at 1 or 2 modules installed, up to 200 kS/s (5 μs interval) at 3 or 4 modules installed, up to 1 kS/s (1 ms interval) at 5 or 10 modules installed	
	Built-in Flash memory: up to 1 MS/s (1 μs interval)	
	External SD Flash memory: up to 1 kS/s (1 ms interval)	
	Captured data (*12)	Built-in RAM, Built-in Flash, SD memory card, SSD (Data is saved directly to it.)
	Data in built-in RAM	Specified number of data up to 2 million samples in increments of 1
	Auto save (*12)	Available for the built-in RAM Enabled (ON): Data in the RAM is saved automatically to the built-in Flash, SD memory card, SSD Disabled (OFF): Data in the RAM is not maintained after power is turned off
	Capturing mode (*12)	Mode: Off, Normal, Ring, Relay Ring (*14): Saved most recent data (Number of capturing data: 1000 to 2000000 points, Destination of data: Built-in RAM, Built-in Flash, SD memory card, SSD) Relay (*13, *15): Saved data to multiple file without losing data until capturing data is stopped (Destination of data: Built-in Flash, SD memory card, SSD)
	During data capture (*17)	Displaying information in two windows, Hot-switching the SD memory card, Saving data in between cursors.
	Backup (*12)	Backup Interval: Off, 1, 2, 6, 12, 24 hrs. Data destination: SD memory card, SSD, FTP server Data destination for backup cannot be specified to the same storage for destination of capturing data. It enables to record signal with two sampling speed, while the signal is recorded with low speed sampling for long term recording, the transient part is recorded with high speed sampling after the trigger occurs. Current (Low-speed) Recording media : Built-in flash memory or SD card Sampling interval : 1, 2, 5, 10, 20, 50, 100, 225, 200, 250, 500ms, 1, 2, 5, 10, 20, 30s, 1, 2, 5, 10, 20, 30min, 1h Trigger timer feature: Starting time, Stopping time, Repeat recording Event (High-speed) Recording media : Built-in RAM or SSD (optional) Sampling interval : 1, 2, 5, 10, 20, 50, 100, 200, 500μs
Engineering scale function		Measured value can be converted to the engineering unit Analog voltage: Converts by four reference points (gain, offset) Temperature: Converts by two reference points (offset) Pulse count: Converts by two reference points (gain)
Synchronization between units		Start and Trigger (*16)
Operating environment		0 to 40°C, 5 to 85% RH (non condensed)
Power source		100 to 240 V AC, 50 to 60Hz
Power consumption		100VA
Standard accessories		Quick guide, CD-ROM, AC power cable
External dimensions (W x D x H)		Main module: Approx. 193 x 161 x 160 mm (Excluding Projection), Alarm output terminal: Approx. 30 x 136 x 145 mm (Excluding projection)
Weight		Main module: Approx. 2.2 kg, Alarm output terminal: Approx. 350 g

(*1) Excluding the function module as the Display module or SSD module. In case of the DC Strain module (GL7-DCB): up to 8 modules. In case of the Logic/Pulse module (GL7-L/P): input mode is selected in the logic or pulse for each module, up to 7 modules when the module is used in the logic mode, up to 2 modules when the module is used in the pulse mode.

(*2) The Input/Output cable (B-513) is required for connecting the signal. The Auto balance signal input and the Busy signal output are available in the DC Strain module (GL7-DCB).

(*3) It is available on the DC strain module (GL7-DCB).

(*4) The alarm signals are outputted on the terminal block attached to the main module as standard accessory.

(*5) It is available on the Logic/Pulse (GL7-L/P) module.

(*6) Method of detection
Volt./Temp. module:
The alarm is detected every 5 seconds when the sampling interval is longer than 5 seconds and reported.
The alarm is detected in the sampling interval when the sampling interval is shorter than 5 seconds and reported.
Other modules:
The alarm is detected every 1 ms when the sampling interval is shorter than 1ms. The alarm is detected in the sampling interval when the sampling interval is set between 2 ms to 5 seconds and reported. The alarm is detected every 5 seconds when the sampling interval is longer than 5 seconds and reported.

(*7) It is available when the captured data is saved to the built-in RAM.
The pre-trigger function may not be available in combination with the trigger settings.

(*8) The result of real time calculation is displayed in the digital display mode.
Available sampling speed is 10 samples/s (100 ms interval).

(*9) When the captured data destination is set to the built-in RAM, the captured data is not maintained after a power failure is occurred. When destination is set to the built-in Flash or the SD memory card, it may have a problem by a power failure if it is being accessed to write data. If the memory device is not damaged, the closed data file is maintained. The file is closed every minute while data is being captured. This function is not available when the FFT mode or the Voltage Output module (GL7-DCO) is used.

(*10) The USB drive mode is started by setting of the switch on the main module. It can be also started when the power is turned on while pressing the START/STOP key on the display module.

(*11) Capacity of memory device may be smaller depending on time of production.

(*12) The SD memory card is not included as a standard accessory. Compatible SD card type: SD, SDHC Speed class 4 or faster. The SSD module (GL7-SSD) is an option.

(*13) The file for recording data is limited up to 4GB on firmware version 2.0 or later, 2GB on firmware version 1.6 or before.

(*14) The capacity for saving the data is set to one third of available memory when the captured data destination is set to a device other than the built-in RAM. Available sampling speed is up to 10 samples/s (100ms interval).

(*15) When the captured data destination is set to the built-in Flash or the SD memory card, sampling speed is limited up to 100 samples/s (10 ms interval). In case of using the SSD module (GL7-SSD), sampling speed is limited up to 50 thousand samples/s (20 μs interval) when 1 or 2 modules are attached.

(*16) The Sync cable (B-559) is required when this function is used. The synchronizing function is available only with GL-Connection.

(*17) This function is able to be available when sampling speed is set up to 10 samples/s (100 ms interval).

(*18) Both slow and high speed capturing can only be recorded in GBD format.
When Event (high-speed) capturing destination is extended SSD unit, it takes a few seconds for event capturing.
Following actions are not available:
• External sampling • Ring / Relay recording • Back up feature • Dual screen feature (playback while recording)
• XY / FFT function • Synchronization operating with multiple GL7000
• Configuring with only Voltage module (GL7-V) or Voltage/Temperature module (GL7-M)

(*19) When data destination is set to the built-in Flash or SSD on the GL7000, the captured data can not be saved on the PC in real-time. The data in the RAM or SSD on the GL7000 can be saved to the PC after the data capturing is completed.

(*20) Supports only GL7000 with firmware version 2.0 or later & GL-Connection version 2.2 or later.

(*21) Most operations can be selected by both the touch panel and the cursor keys.

(*22) When the display module is mounted at an angle using the bracket, the display module is connected to the main module by a LAN cable that is attached to the display module as a standard accessory.

Software specifications		
Model name		GL-Connection
Supported OS		Windows 10 / 8.1 / 8 / 7 (32/64-bit edition)
Function		Control GL7000, Real-time data capture, Replay data, Data format conversion
Controlled unit		Up to 10 units with GL7000, GL2000, GL980, GL900, GL840, GL820, GL240, GL220 GL7000 only: max. 1120 channels Mixing with GL series: max. 2000 channels
GL7000 Settings control		Input settings, Memory settings, Trigger and Alarm settings, Other settings
Captured data (*19)		* Built-in RAM (Binary format), Built-in Flash memory (Binary, CSV format), SD memory card (Binary, CSV format), SSD (Binary, CSV format) The sampling speed is limited by the number of channels used when data is saved in the CSV format. (1 ms per channel. When 10 channels are set, sampling is limited to 10 ms.) * When captured data is saved to the built-in RAM or SSD, data cannot be saved on the PC in real time.
Displayed information		Analog waveform, Logic waveform, Pulse waveform, Digital values
Display mode		Y-T waveform with digital values, XY graph in real time/replay saved data (ver. 1.20 or later), FFT measurement (ver. 1.20 or later), Cursor information, Capture condition, Alarm information Measuring condition setting list (*20)
		Content: channel number, line color, annotation, input type, measuring range, filter, unit, span, scaling Function: Output in CSV format, Link to detailed setting
File operation		Converts binary data to the CSV data (specific period, all data in one file, multiple files), Creates a new file with compression or by consolidating multiple files.
Warning Function		Send e-mail to the specified address when the alarms occur
Statistical calculation		Capturing data: Maximum, Minimum, Peak or Average Replaying data: Maximum, Minimum, Peak, Average or RMS in between cursors
Search function		Search specified signal level point, alarm point, and time
Cursor synchronization (*20)		Synchronizing cursor position on multiple screens displaying different data file From the beginning: Synchronize the cursor position from the beginning of each screen Position from present: Synchronize from the current cursor position of each screen It allows to make setting operation using control panel on GL7000 even when GL7000 is under the control of software.
Release of remote lock of GL7000 (*20)		Operation lock can be locked (It is unlocked with a password.)
FFT analysis function (Firmware ver. 1.20 or later)	Analyzing frequency range	0.08, 0.2, 0.4, 0.8, 1.6, 3.2, 4, 8, 20, 40, 80, 200, 400, 800 Hz, 2, 4, 8, 20, 40, 80, 200, 400 kHz
	Number of points	500, 1000, 2000, 4000, 10000
	Window function	Rectangular, Hanning, Hamming, Blackman, Flat-top, Exponential
	Averaging	Summation average, Exponential average, Peak hold
	Channels	4 channels
	Functions	Y-T, Linear, Power, PSD, Cross, Transfer function, Coherence, COP
	Display mode	Single display, Dual display, Nyquist
Data recording destination selection (*20)		Selecting to record data to GL7000 only or PC together with GL7000
Creating output data function (Version 1.40 or later)		Saved data file (GBD/CSV format) in the PC, Saved data file (GBD format) in the GL7000, Generated simple waveform (DC voltage and sine, triangle, ramp, pulse waveform) * This function is available when the analog voltage output module (GL7-DCO) is attached to the GL7000. The signal is output from the GL7-DCO module.
Display module GL7-DISP (option) specification		
Model number		GL7-DISP
Display device		5.7-inch TFT color LCD monitor (VGA: 640 x 480 dots)
Operation		Touch panel and Cursor keys (*21)
Displayed language		English, French, German, Chinese, Korean, Japanese
Screen saver		Turns off back-light by 10, 30 sec., 1, 2, 5, 10, 30, 60 min.
Displayed information		Waveform in Y-T with digital values, Waveform only, Digital value, Waveform in XY
Connection cable		LAN cable (CAT5 class, Straight connection, Up to 10 m) (*22)
Standard accessories		Bracket for slanted mount, Connection cable (40 cm), Ground cable, Screws
External dimensions (W x D x H)		Approx. 187 x 34.5 x 119 mm (Excluding projection)
Weight		Approx. 530 g
SSD module GL7-SSD (option) specification		
Model number		GL7-SSD
Storage device		Solid state disk (SSD)
Capacity (*23)		Approx. 128GB (The file size of the recorded data is limited up to 4GB.)
Sampling speed	Attached to 1 or 2 modules	Max. 1 M Sample/s (1 μs)
(*24)*(*25)	Attached to 3 or 4 modules	Max. 500 k Sample/s (2 μs)
	Attached to 5 to 10 modules	Max. 200 k Sample/s (5 μs)
External dimensions (W x D x H)		Approx. 49 x 136 x 180 mm (Excluding projection)
Weight		Approx. 770 g
Options and accessories		
Item	Model number	Remarks
Sync. Cable	B-559	1 m long, Synchronizing between GL7000
Carrying tool	B-585	Can carry GL7000 with up to 3 modules attached.
Storage case	B-586	Can store GL7000 with up to 3 modules. Not for transferring. The case can work only on smooth surface.
Probe set for Logic input	RIC-10A	For Logic/Pulse module (GL7-L/P), 4 channels, Cable with Alligator clip and IC clip
Input cable, Safe probe - BNC	RIC-141A	Insulated, 1.2 m long, 300 V DC, CAT II
Input cable, BNC - BNC	RIC-142	Insulated, 1.5 m long, 1000 V DC, CAT II
Input cable, Banana - BNC	RIC-143	Insulated, 1.6 m long, 600 V DC, CAT II
Input cable, Banana - BNC	RIC-147	Insulated, 1.6 m long, 1000 V DC, CAT II
Clip, Alligator (small size) (*26)	RIC-144A	For RIC-143, Aperture 11 mm, 300 V DC, CAT II, Max. 15 A
Clip, Alligator (middle size) (*26)	RIC-145	For RIC-143/RIC-147, Aperture 20 mm, 1000 V DC, CAT II, Max. 32 A
Clip, Grabber (*26)	RIC-146	For RIC-143/RIC-147, Aperture 5 mm, 1000 V DC, CAT III, Max. 1 A
Input/Output cable for GL	B-513	2 m long, Bare wire for signal connection - Connector for GL series
Humidity sensor (*27)	B-530	3 m cables for signal and power
Shunt resistance	B-551	250 ohms (Converts signal from "4-20mA" to "1-5V")
Input connector, screw terminal	B-560A	For DC Strain module (GL7-DCB), Screw terminal for sensor - D-SUB (rectangular connector) for GL7-DCB module * Terminal holding bracket B-560AP included
Terminal holding bracket	B-560AP	For replacement use for B-560/B-560A
Extension cable	B-560-05	For B-560/B-560A, 500 mm long
Input cable, NDIS - D-SUB	B-561	For DC Strain module (GL7-DCB), NDIS (round connector) for sensor - D-SUB (rectangular connector) for GL7-DCB module
Output cable, BNC - SMA	B-562	For Voltage Output module (GL7-DCO), 2 m long, BNC (plug) for output - SMA (plug) for GL7-DCO module

(*23) Capacity of memory device may be smaller than above depending on time of production. The file for recording data is limited up to 4GB on firmware version 2.0 or later, 2GB on firmware version 1.6 or before.

(*24) The sampling speed in the GL7000 is limited to the faster sampling speed of attached input module. When the selected sampling speed in the GL7000 is faster than the module, the sampling is done in fastest sampling on the module. The same value is stored to the memory device in the selected sampling speed until data is renewed by the next sampling.

(*25) When the sampling speed in the GL7000 is selected to the 1 MS/s (1 μs) or 500 kS/s (2 μs), the number of available channels in the Logic/Pulse module will be limited.

(*26) Red and black (per 1 unit). Connectable with RIC-143, RIC-147.

(*27) Measurable temperature range: -25 ~ 80°C

- The data loss caused by the equipment / PC failure is not guaranteed. Please make sure to back up your data.
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- Items mentioned are subject to change without notice. For more information about product, please check the web site or contact your local representative.



For using equipment in correctly and safely

- Before using it, please read the user manual and then please use it properly in accordance with the description.
- To avoid an occurrence of malfunction or an electric shock by leakage, please ensure ground connection and use it in specified power source.

GRAPHTEC
Graphtec Corporation



503-10 Shinano-cho, Totsuka-ku, Yokohama 244-8503, Japan
Tel : +81-45-825-6250 Fax : +81-45-825-6396
Email : webinfo@graphtec.co.jp