GL7000 specifications

Item			Description
Number of module			Attached to up to 10 modules *1
Number of input channels			Max. 112 channels in one GL7000
External Input/Output signals *2	Input		Start/Stop, Trigger, External sampling, Auto balance
			Signal type: Contact (relay), Open collector, Voltage
	Output		Trigger, Busy, Alarm (10 channels) *3
			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 rearm for the next data capture
			Disabled (OFF): Data capture is completed in a single trigger
	Trigger source		Start: Off, Measured signal, Alarm, External, Clock, Week or Time
			Stop: Off, Measured signal, Alarm, External, 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 *4: Higher/Rising, Lower/Falling
			Pulse *4: Higher/Rising, Lower/Falling, Window-in, Window-out
	Alarm determination condition *5		Combination: OR or AND condition at the level of signal or edge of signal
			Analog: Higher/Rising, Lower/Falling, Window-in, Window-out
			Logic *4: Higher/Rising, Lower/Falling
			Pulse *4: Higher/Rising, Lower/Falling, Window-in, Window-out
	Alarm output		10 channels
	Pre-trigger *6		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 (100ms 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 *7
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 function			Message: Record up to 8 messages in any timing (Any message can be set before data capture is started or during data capture.)
			Marker: Recorded when the trigger, alarm or a power failure occurs
Resume			Resume automatically in the same condition after power is recovered as when the power failure occurred during data capture *8
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 *9
Storage device	Built-in		RAM (2 million samples, built-in amplifier module), Flash memory (2 GB, built-in the main module)
	External *10		SD card (Support SDHC, up to 32 GB) slot, SSD (Approx. 64 GB)
			The file for capturing data is limited up to 2 GB.
Data saving function	Captured data*10		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 2 million samples in increments of 1
	Auto save*10		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
	Ring capturing mode*10*11		Saves most recent data
			Number of capturing data: 1000 to 2000000 points
			Destination of data: Built-in RAM, Built-in Flash, SD memory card, SSD
	During data capture		Displaying information in two windows, Hot-swapping the SD memory card, Saving data in between cursors
	Backup*10		Backup interval: Off, 1, 2, 6, 12, 24 hrs.
			Data destination: SD memory card, SSD, FTP server
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*12
Accuracy of clock (at 23 °C)			± 0.002 % (Monthly deviation approx. 50 sec.)
Operating environment			0 to 45 °C, 5 to 85 % RH (non condensed)
Power source			100 to 240 V AC, 50/60 Hz
Power consumption			Approx. 85 VA
Standard accessories			Quick guide, CD-ROM, AC power cable
External dimensions (W x D x H)			Main module: Approx. 193 x 141 x 160 mm (Excluding Projection), Alarm output terminal: Approx. 30 x 136 x 145 mm (Excluding projection)
Weight			Main module: Approx. 2 kg, Alarm output terminal: Approx. 350 g

Software specifications

Model name		Description
Model name		GL-Connection
Supported OS		Windows 7 (32/64-bits, Except Starter edition), Vista (32/64-bits), XP*13
Functions		Control GL7000, Real-time data capture, Replay data, Data format conversion
Controlled units		Up to 10 units (Max. 1120 channels)
GL7000 Settings control		Input settings, Memory settings, Trigger and Alarm settings, Other settings
Captued data*14		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.)
Displayed information		Analog waveforms, Logic waveforms, Pulse waveforms, Digital values
Display mode		Y-T waveform with digital values, X-Y graph in real time, Cursor information, Capture condition, Alarm information
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	Level	Specific level in any channels
	Alarm	Occurred alarm in any channel
	Time	Beginning, center, end of the data, Trigger point, Specific time (absolute, relative), Specific number
Operation lock		Operation screen can be locked (It is unlocked with a password.)

Display module specifications

Model number	GL7-DISP
Display device	5.7-inch TFT color LCD monitor (VGA: 640 x 480 dots)
Operation section	Touch panel and Cursor keys*15
Touch panel	Capacitive type touch panel, Operated by finger or the proprietary pen
Displayed language	English, French, German, Chinese, Korean, Japanese
Screen saver	Turns off backlight 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 X-Y
Connection cable	LAN cable (CAT5 class, Straight connection, Up to 10m) *16
Standard accessories	Bracket for slanted mount, Connection cable (40cm), Ground cable, Screws
External dimensions (W x D x H)	Approx. 187 x 35 x 199 mm (Excluding projection)
Weight	Approx. 530 g

SSD module specifications

Model number		GL7-SSD
Memory device		Solid state disk (SSD), Form factor: 2.5-inch HDD
Capacity		Approx. 64 GB (The file size of the captured data is limited up to 2 GB.)
Sampling speed*17	Attached to 1 or 2 modules	Max. 1 M Samples/s
	Attached to 3 or 4 modules	Max. 500 k Samples/s
	Attached to 5 to 10 modules	Max. 200 k Samples/s
External dimensions (W x D x H)		Approx. 49 x 136 x 160 mm (Excluding projection)
Weight		Approx. 770 g

Options and accessories

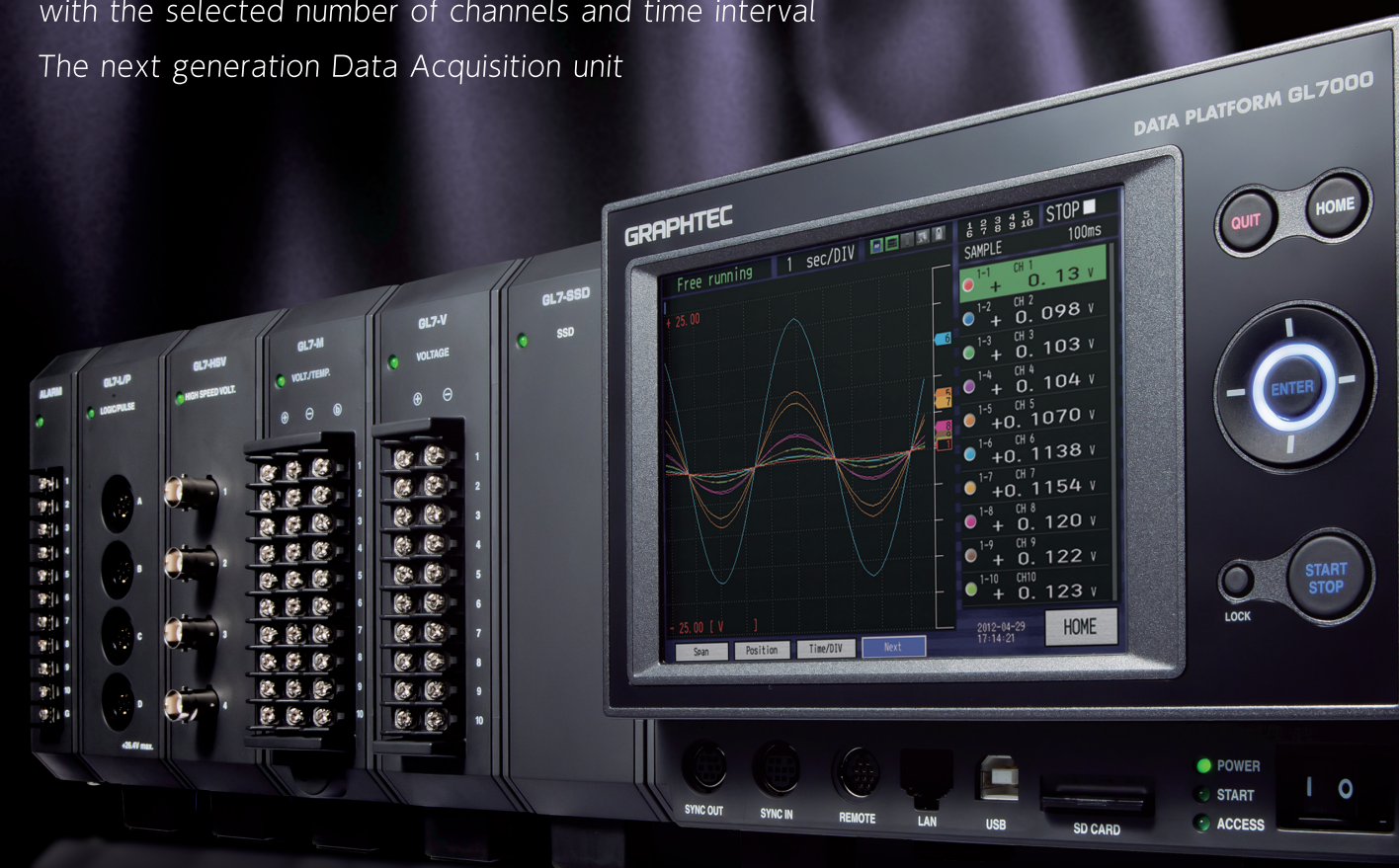| Item	Model number	Remarks
Input/Output cable	B-513	2m, One end is bare wire
Humidity sensor	B-530	3m cables for signal and power
Sync. Cable	B-559	1 m, Synchronizing between GL7000
Probe set for Logic input	RIC-10	4 channels, Cable with Alligator clip and IC clip
Input cable, BNC - BNC	RIC-112	1.5m, Non-isolated, Max. 500V
Input cable, Banana - BNC	RIC-113	1.5m, Non-isolated, Max. 500V
Input cable, Alligator clip - BNC	RIC-114	1.5m, Non-isolated, Max. 500V
Input cable, BNC - BNC	RIC-142	1.5m, Isolated, CAT II, Max. 1000V
Input cable, Banana - BNC	RIC-143	1.5m, Isolated, CAT II, Max. 600V
Clip, Alligator (small size)	RIC-144	CAT II, Max. 300V/15A, using with RIC-143
Clip, Alligator (middle size)	RIC-145	CAT II, Max. 1000V/32A, using with RIC-143
Clip, Grabber	RIC-146	CAT II, Max. 1000V/1A, using with RIC-143

Notes:
- *1 Excluding the function module as the Display module or SSD module.
- *2 The Input/Output cable (B-513) is required for connecting the signal. The Autobalance signal input and the Busy signal output are used in the DC Strain Module.
- *3 The alarm signals are output on the terminal block attached to the main module as standard accessory.
- *4 It is available on the Logic/Pulse module.
- *5 Method of detection
  - Volt./Temp. module: The alarm is detected in the sampling interval when the sampling interval is shorter than 5 seconds. The alarm is detected every 5 seconds when the sampling interval is longer than 5 seconds.
  - Other modules: The alarm is detected every 1ms when the sampling interval is shorter than 1ms. The alarm is detected in the sampling interval when the sampling interval is set between 2ms to 5 seconds, The alarm is detected every 5 seconds when the sampling interval is longer than 5 seconds.
- *6 It is available when the captured data is saved to the built-in RAM. The pre-trigger function may not work in combination with the trigger settings.
- *7 The result of real time calculation is displayed in the digital display mode.
- *8 When the captured data destination is set to the built-in-RAM, the captured data is not maintained after a power failure. The built-in Flash or the SD memory card may be damaged 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 one minute while data is being captured.
- *9 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 key on the display module.
- *10 The SD memory card is not included as a standard accessory. The SSD module is an option.
- *11 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. The sampling speed is limited up to 10 samples (100ms interval).
- *12 The Sync cable (B559) is required when this function is used. The GL-Connection software is required when the synchronizing function is used.
- *13 The SP2 or higher service pack need to be installed.
- *14 The captured data that is saved to the built-in-RAM or SSD cannot be saved to the PC in real time. The data in the built-in-RAM or SSD needs to be transferred to the PC after data capture is complete.
- *15 Most operations can be selected by both the touch panel and keys.
- *16 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.
- *17 The sampling speed in the GL7000 is limited to the fastest sampling speed of attached amplifier module. When the specified sampling speed 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 specified sampling speed until data is renewed by the next sampling.

Embedded in the device to create the system

Connected to the PC for measuring with the GL7000 (no display module)

Suitable for a variety of measurements due to flexible module combinations

Voltage Module
The output of various sensors such as displacement, pressure, wind speed, etc. Cell voltage of the battery.

Voltage / Temperature Module
Measuring temperature and voltage simultaneously. For environmental tests, etc.

High Speed Voltage Module
Measurement of parameters in the inverter system, vibration test, drop test, etc.

Logic / Pulse Module
Timing of system control signal, encoder output, rotational speed, flow rate, etc.

Modules will be released sequentially starting in the autumn of 2012

High Voltage Module
Measurement of the high voltage in the power line of equipment, Electric or Hybrid Vehicle testing, etc.

Charge Module
Measuring the output of sensor using the Piezoelectric device. Measurement of the vibration, acceleration, pressure, force, etc.

Voltage Output Module
An analog voltage corresponding to the captured data is output. Simulation testing by the actual measured data, the vibration test, etc.

Power Measurement Module
Measuring the voltage, current and power. Measurement of the power line of the device, etc.

DC Strain Module
Measuring the output of sensor using the strain gauge. Measurement of the load, displacement, vibration, acceleration, torque, pressure, etc.

GRAPHTEC

Modular Type Data Acquisition Unit

DATA PLATFORM
GL7000

To measure the selected signal on demand
with the selected number of channels and time interval
The next generation Data Acquisition unit

www.graphteccorp.com

The new generation data acquisition unit

It can measure the desired signal according to the needs and can expand into other applications adding different amplifier modules. It can be attached to a display module having a touch panel, used as a stand-alone unit or embedding into a system.

The number of channels and measurement types can be added to the amplifier module

Alarm output terminal
(included in the main module)

Main module

Display module (option)

Module is fixed by a screw

Intuitive operation is increased by the touch panel

The amplifier module can be expanded to accommodate a wide variety of measurements

A wide variety of measurements can be supported by the amplifier module

Measurements for different applications can be added to the amplifier module. It is also possible to mix measurements by adding different types of modules.

Amplifier can be attached to up to 10 modules

Up to 10 amplifier modules can be attached to multi-channel measurements, with up to 112 channels on one GL7000.

Maintains sampling speed even if the number of amplifier modules are increased

Voltage* and Volt/Temp amplifier can maintain high-speed and multichannel measurements without dropping the sampling speed, even if the number of modules are increased.

* In the High-speed voltage and Logic/Pulse module, the sampling speed will be limited by the recording medium.

Volt./Temp. module being used

- 10 ch being used, Maximum sampling speed 100S/s (10ms interval)
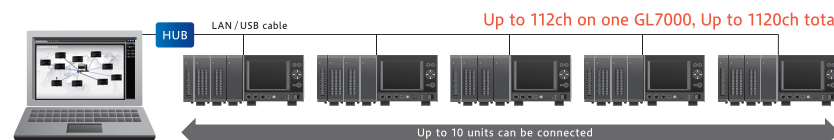- 20 ch being used, Maximum sampling speed 100S/s (10ms interval)
- 40 ch being used, Maximum sampling speed 100S/s (10ms interval)

Sampling speed

Amplifier Module	Channels in 1 module	Max. sampling speed in the module	Media type to save data	Max. sampling speed in the GL7000 Attached to 1 or 2 modules	Attached to 3 or 4 modules	Attached to 5 to 10 modules
Voltage Module	10ch	1K Samples/s (1ms interval)	Built-in RAM	1K Samples/s (1ms interval)		
			Built-in Flash			
			SD card			
			SSD *2			
Volt./Temp. Module	10ch	100 Samples/s (10ms interval)	Built-in RAM	100 Samples/s (10ms interval)		
			Built-in Flash			
			SD card			
			SSD *2			
High-speed voltage Module	4ch	1K Samples/s (1μs interval)	Built-in RAM	1M Samples/s(1ms interval)		
			Built-in Flash	1K Samples/s(1ms interval)		
			SD card			
			SSD *3	1MS/s(1μs interval) *1	500KS/s(2μs interval)	200KS/s(5μs interval)
Logic/Pulse Module	16ch	In Logic mode 1K Samples/s (1μs interval)	Built-in RAM	1M Samples/s(1μs interval) *1		
			Built-in Flash	1K Samples/s(1ms interval)		
			SD card			
			SSD *3	1MS/s(1μs interval) *1	500KS/s(2μs interval)	200KS/s(5μs interval)
		In Pulse mode 10K Samples/s (100μs interval)	Built-in RAM	10 kS/s (100μs interval) *1		
			Built-in Flash	1K S/s(1ms interval)		
			SD card			
			SSD *3	10 kS/s (100μs interval)		Not Available *2

*1 Using in Logic mode, the module can be attached up to 7 units. *2 Using in Pulse mode, module can be attached up to 2 units.
*3 SSD module is an option. Number of channels for pulse input will be limited when the High-speed voltage module and Logic/Pulse module are used simultaneously.

Multi-channel measurement is possible to 1120 channels using the PC
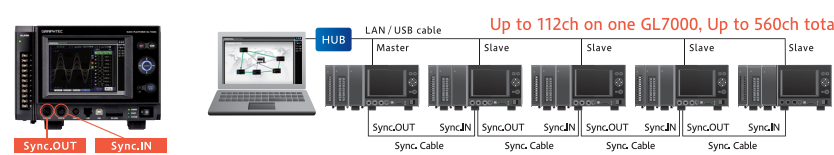
Up to 10 units of the GL7000 can be connected to 1 PC through LAN or USB and controlled using the software.

Require more channels

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.
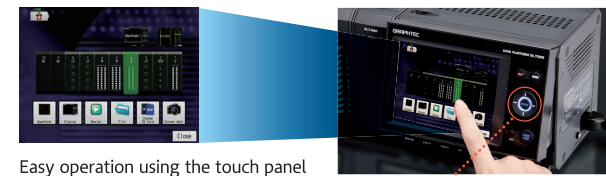
LAN / USB cable   HUB

Up to 112ch on one GL7000, Up to 1120ch total

Up to 10 units can be connected

LAN / USB cable   HUB

Up to 112ch on one GL7000, Up to 560ch total

Master Slave Slave Slave Slave
Sync.OUT Sync.IN

SyncOUT SyncIN SyncOUT SyncIN SyncOUT SyncIN SyncOUT SyncIN SyncOUT SyncIN
Sync. Cable Sync. Cable Sync. Cable Sync. Cable

Attaching the high-definition display module with touch panel allows stand-alone operation or embedding into a system

The detachable display module allows both stand-alone and embedded system configurations

Measurement settings and signal measurement can both be done without a PC by attaching the display module. The display module can be moved to different locations for remote operation by connecting it to the main module with a LAN cable*, it also can be embedded into the system. The module can still be operated by the PC even when the display module is connected.   * Up to 10m using CAT5 LAN cable (straight connection)

Improved ease-of-use with the high-definition display and touch panel

The touch panel makes setting the conditions intuitive, and it can also be operated using the cursor keys similar to the GL series.
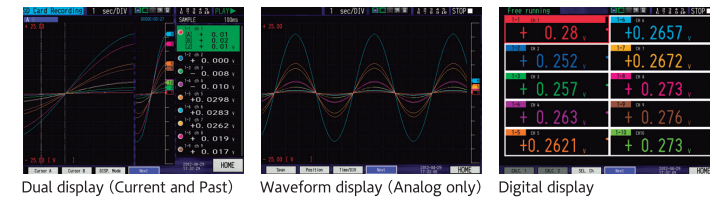
Easy operation using the touch panel
Can also be set using the cursor keys

Large easy-to-read 5.7-inch high-definition LCD monitor

Utilises a bright clear 5.7 inch wide TFT color LCD monitor (VGA: 640 x 480 dots). Makes it easy to read data in waveform or digital form and to check measurement parameter settings.

Dual display (Current and Past) Waveform display (Analog only) Digital display

Support interface friendly with the PC

Ethernet (10BASE-T, 100BASE-TX) and USB2.0 (Hi-speed) interface are standard. Each interface port is located in the front of the unit for easy cable connection.

WEB and FTP server function

It can be controlled by using a WEB browser such as Internet Explorer. It also supports monitoring the signal, and accessing the captured data in memory devices such as the built-in memory, SD card* and SSD*.
* SD memory card is not included as standard accessory. SSD module is an option.

FTP client function
Captured data is periodically transferred to the FTP server for backup.

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

USB drive mode
GL7000 can emulate an external USB device for quick data file transfer when it is started in the USB drive mode. The file in the built-in Flash or the SD card can be transferred or deleted from the PC.

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

Supports four destinations to save the captured data according to the conditions of the measurement

1 Built-in RAM
The RAM to save 2 million samples is built into each amplifier module. The data capture duration does not decrease with increasing numbers of channels because the built-in RAM for each amplifier module is used.
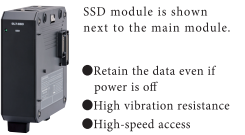
2 Built-in Flash memory
The 2GB of Flash memory is built into the main module. The captured data can be saved directly to the built-in Flash memory when the sampling is not faster than 1ms (sampling speed: 1 k Samples/s). Saved data is retained even when power is turned off because flash memory is used.

3 SD memory card
SD card slot (supports SDHC, up to 32GB) is standard on the main module. The captured data can be saved directly to the SD memory card when the sampling is not faster than 1ms (sampling speed: 1 k Samples/s). It supports hot-swap, so the SD memory card can be replaced during measurement without data loss.* The captured data can be transferred easily to the PC in offline condition.
* The hot-swap is possible when the sampling is slower than 100ms.

4 SSD module (64GB) Option
Allows large amounts of data to be quickly saved when the optional SSD module is attached. The captured data can be saved directly to the SSD when the sampling is not faster than 1μs (sampling speed: 1 M Samples/s).* It has a high vibration resistance and saved data is also retained even when power is turned off.
* The number of modules are limited.

SSD module is shown next to the main module.
- Retain the data even if power is off
- High vibration resistance
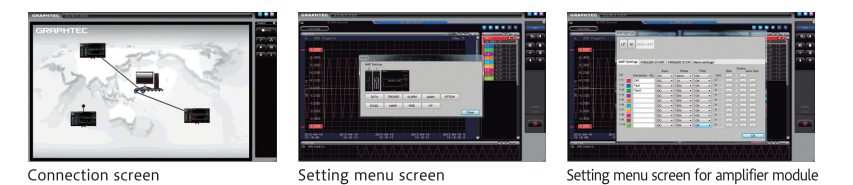- High-speed access

Capturing times *1

Amplifier Module	Storage Device	Device Capacity	Single module attached Total number of ch.	Sampling speed (interval) 1MS/s(1μs)	500KS/s(2μs)	200KS/s(5μs)	1KS/s(1ms)	100S/s(10ms)	1S/s(1s)	10 module attached Total number of ch.	Sampling speed (interval) 1MS/s(1μs)	500KS/s(2μs)	200KS/s(5μs)	1KS/s(1ms)	100S/s(10ms)	1S/s(1s)
Voltage Module	Built-in RAM	200M samples	10	N/A	N/A	N/A		33min.	5hrs.	23days	100	N/A	N/A	N/A		33min.	5hrs.	23days
	Built-in Flash memory	2GB*3						21hrs.	8days	893days						2hrs.	24hrs.	103days
	SD memory card*2	32GB is attached																
	SSD*2	64GB						22hrs.	9days	956days						2hrs.	26hrs.	111days
Volt./Temp. Module	Built-in RAM	200M samples	10	N/A	N/A	N/A	N/A		5hrs.	23days	100	N/A	N/A	N/A	N/A		5hrs.	23days
	Built-in Flash memory	2GB*3							8days	893days							24hrs.	103days
	SD memory card*2	32GB is attached							9days	956days							26hrs.	111days
	SSD*2	64GB																
High-speed Voltage Module	Built-in RAM	200M samples	4	2sec.	4sec.	10sec.	33min.	5hrs.	23day	40	2sec.	4sec.	10sec.	33min.	5hrs.	23days
	Built-in Flash memory	2GB*3		N/A	N/A	N/A	39hrs.	16days	1660days		N/A	N/A	N/A		5hrs.	53hrs.	223days
	SD memory card*2	32GB is attached																
	SSD*2	64GB		134sec.	268sec.	671sec.	42hrs.	17days	1775days					95sec.	5hrs.	57hrs.	239days

*1: The capturing time figures are approximate. *2: The file size of the captured data is limited to 2GB.
*3: Effective capacity for capturing data is varied by medium. Effective size of built-in Flash memory is 1.87GB.

Software for high performance and easy operation

The GL7000 can be controlled by the GL-Connection software that is included. The software has convenient functions such as saving data to the PC, replaying captured data, and converting data form. It is an integrated application software for the GL series, the GL900, GL820 and GL220 can also be connected.*
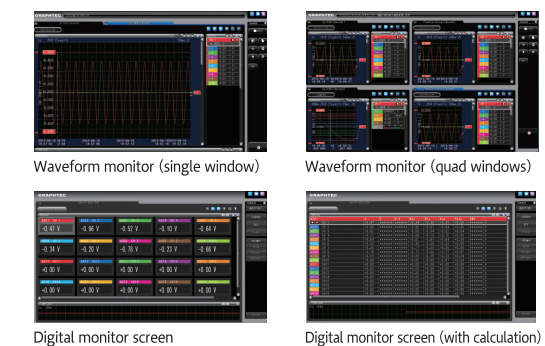*The version for supporting other GL series will be available in December 2012.

Connection screen   Setting menu screen   Setting menu screen for amplifier module

Various measurement screens

The measurement signal can be displayed as various types of screens by the unit, the module or the specific channels that are specified in the group function. It can also be displayed as a combination of the capturing data and captured data, the Y-T format and the X-Y format, simultaneously. Up to 112 channels can be displayed in each window.*
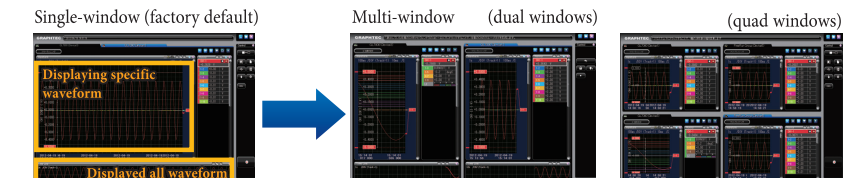* In case of using dual screen, total 224 channels can be displayed.

Waveform monitor (single window)   Waveform monitor (quad windows)

Digital monitor screen   Digital monitor screen (with calculation)

Multi-window function, measured waveform can be displayed in various forms using multiple windows

Single-window (factory default)   Multi-window (dual windows)   (quad windows)

Displaying specific waveform
Displayed all waveform

The complete measured waveform can be displayed on one screen.

Displayed items in each window can be specified by the unit, the module, or channels. (ex.: waveform measured in the each unit is displayed in the separate screens.)

Useful functions   For real time and the post processing.

- Statistical calculation: The maximum, minimum, peak, and average values are displayed while capturing data. The value between the cursors of the maximum, minimum, peak, average, and RMS will be displayed when replaying captured data.
- File operation: The data can be converted to the CSV format for a specified period, all data, or multiple files. A file can also be created by compressing or consolidating multiple files.
- Search: The search point can be set by the level, alarm, or time (the beginning of the data, center, end, trigger point, the specified time, instruction time, the number specified).
- Send mail: Alarm warnings can be sent via Email.