



GL7000

Modular Data Platform

- Measurement ranges: ± 20 mV ... ± 100 V, thermocouples, Pt100, JPt100, Pt1000, humidity, strain gauge, vibration sensors
- Measurement channels: up to 112
- Resolution: 16 bit
- Sampling rate: 10 μ s to 1h per channel (dep. on module)
- Interface: Ethernet, USB
- Operation: stand-alone, PC based, FTP, HTTP



GRAPHTEC

FEATURES

- 7 types of Input Modules for Voltage, Temperature, DC Strain, Vibration and Logic/pulse available
- 4 types of Function Modules: Display, SSD, Alarm, Voltage Output
- Up to 10 modules can be attached.
- Flexible module combination allows a wide variety of measurements
- Attaching the high-definition display module with touch panel allows both stand-alone operation and embedding into a system.
- 2 interfaces for connection to your PC: USB 2.0 and Ethernet
- 4 destinations to save the recorded data: build-in RAM, build-in Flash memory, SD memory card and SSD module





FOUR DESTINATIONS TO SAVE CAPTURED DATA

1. Built-in RAM

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

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 1 ms (sampling speed 1 kSamples/s). Saved data is retained even when the power is turned off because flash memory is used.

3. SD Memory Card

SD card slot (supports SDHC, up to 32 GB) 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 1 ms (sampling speed: 1 kSamples/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. GL7-SSD Module (64 GB)

Allows multiple large amounts of data to be quickly saved when the optional SSD module is attached. It has high vibration resistance and the captured data can be saved directly to the SSD when the sampling is not faster than 1 μ s*. It retains data even when power is off. * The number of modules is limited.

Capturing times ^{1*}

Module	Storage device	Capacity	Sampling speed (interval)						
			1 MS/s (1 μ s)	500 kS/s (2 μ s)	200 kS/s (5 μ s)	100 kS/s (10 μ s)	1 kS/s (1 ms)	100 S/s (10 ms)	1 S/s (1 s)
GL7-V	RAM	2M S					33min (33min)	5h (5h)	23d (23d)
	Flash	2GB					21h (2h)	8d (24h)	893d (103d)
	SD card ^{2*}	32 GB	--	--	--	--	22h (2h)	9d (26h)	955d (110d)
	SSD ^{2*}	64 GB							
GL7--M	RAM	2M S						5h (5h)	23d (23d)
	Flash	2GB						8d (24h)	893d (103d)
	SD card ^{2*}	32 GB	--	--	--	--		9d (26h)	955d (110d)
	SSD ^{2*}	64 GB							
GL7-HSV	RAM	2M S	2s (2s)	4s (4s)	10s (10s)	20s (20s)	33min (33min)	5h (5h)	23d (23d)
	Flash	2GB					39h (5h)	16d (2d)	1659d (223d)
	SD card ^{2*}	32 GB	--	--	--	--	42h (5h)	17d (2d)	1775d (238d)
	SSD ^{2*}	64 GB	134s (--)	268s (--)	671s (95s)	22min (3min)			
GL7-HV	RAM	2M S	2s (2s)	4s (4s)	10s (10s)	20s (20s)	33min (33min)	5h (5h)	23d (23d)
	Flash	2GB					2d (8h)	23d (3d)	2323d (363d)
	SD card ^{2*}	32 GB	--	--	--	--	2d (9h)	24d (3d)	2485d (388d)
	SSD ^{2*}	64 GB	134s (--)	268s (--)	671s (167s)	22min (5min)			
GL7-DCB ^{3*}	RAM	2M S				20s (20s)	33min (33min)	5h (5h)	23d (23d)
	Flash	2GB					39h (6h)	16d (2d)	1659d (276d)
	SD card ^{2*}	32 GB	--	--	--		42h (7h)	17d (2d)	1775d (295d)
	SSD ^{2*}	64 GB				22min (3min)			
GL-CHA	RAM	2M S				20s (20s)	33min (33min)	5h (5h)	23d (23d)
	Flash	2GB					39h (5h)	16d (2d)	1659d (223d)
	SD card ^{2*}	32 GB	--	--	--		42h (5h)	17d (2d)	1775d (238d)
	SSD ^{2*}	64 GB				22min (3min)			
GL7-L/P (Logic mode)	RAM	2M S	2s	4s	10s	20s	33min	5h	23d
	Flash	2GB					2d	29d	2904d
	SD card ^{2*}	32 GB	--	--	--	--	3d	31d	3106d
	SSD ^{2*}	64 GB	134s	268s	671s	22min			
GL7-L/P (Pulse mode)	RAM	2M S					33min	5h	23d
	Flash	2GB					7h	3d	331d
	SD card ^{2*}	32 GB	--	--	--	--	8h	3d	355d
	SSD ^{2*}	64 GB							

^{1*} The capturing times are approximate. Black letters: single module attached; grey letters: 10 modules attached

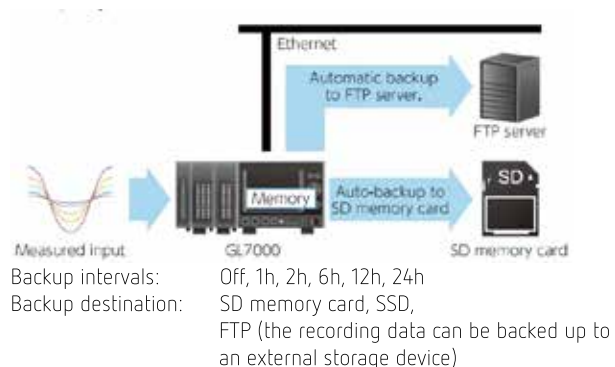
^{2*} Each file is limited to 2GB.

^{3*} Reference recording time is for 8 modules due to the number of modules is limited up to 8 modules.

USEFUL FUNCTIONS

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.

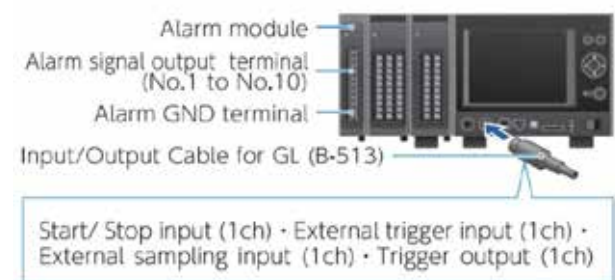


Recording destination	Backup destination		
	SD	SSD	FTP
Flash memory	Yes	Yes	Yes
SD memory card	--	Yes	Yes
SSD module	Yes	--	Yes

- You can not specify the same location as 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.

Input/Output Cable Connection for GL

Trigger and exterior sampling input and trigger output functions can be used by using an output cable for the GL input/output cable (B-513, optional). The alarms are output from the alarm signal output terminal on the alarm module. The output cable for GL input/output cable (B-513) is connected to the REMOTE terminal as shown on the chart below.



Alarm Signal Output Specifications

- Open collector output (pull-up resistance 10 kΩ)
- Maximum rating of the output transistor:
 - Voltage between collector and GND: 50 V
 - Collector current: 2.0 A
 - Collector dissipation: 0.6 W

Data Search

Moves the cursor to the position that satisfies the set conditions.

Search types: Analogue · Pulse · Logic · Alarm

Search condition on setting screen



Data search result on screen 1 Data search result on screen 2



When you are searching for a particular set condition, cursor can move between „next“ and/or „previous“ search condition.

Ring Capture

The most recent data is saved to selected data destination (built-in RAM, built-in Flash, SD card, SSD) in ring memory mode.

Message/Marker Function

The characters set in a marker can be displayed on the screen. Outputs the marker. The outputted marker is displayed on screen and recorded with the data..





Main Unit Specifications

Parameter	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 Functions	Function: The registered messages are recorded for any timing. Number of registration messages: Max. 8 Message : Unspecified message is input before or during recording
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 ^{*12} 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 ^{*13}
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. 2.2 kg, Alarm output terminal: Approx. 350 g

GL-Connection Software Specifications

Parameter	Description	
Supported OS	Windows 8 ,Windows 7 (32/64-bits, Except Starter edition), Vista (32/64-bits), XP™	
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	
Captured data™	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 occurs	
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.)	

Options and Accessories (@ available at ALTHEN only)

Model Number	Description
B-513	Logic / alarm cable (2 m)
B-530	Humidity sensor 0 ... 100 % RH, cable length: 3 m
B-559	Synchronization cable for synchronization of multiple GL7000 main units
B-560	Conversion connector between DSUB and screw terminal, for DC strain module GL7-DCB
B-561	Conversion cable between DSUB and NDIS, for DC strain module GL7-DCB
B-562	SMA-BNC conversion cable for Voltage Output Module (GL7-DCO), cable 2 m
RIC-07	Logic-IC-cable, for connecting RIC-08/09 to a Logic amplifier
RIC-08	Alligator clip cable
RIC-09	IC clip cable
RIC-10	Probe Set (Set RIC-07 to RIC-09)
KA-BNC-BA4 @	Connecting cable with 1 BNC connector (isolated) and 2 banana plugs 4 mm (not isolated) for safety extra-low voltage, length 1.6 m
KA-BNC-iso-sw-...@	BNC safety connection cable with 2 BNC connectors, material: PVC, rating: 1000 V, CAT II (600 V CAT III), color black
ADAPAK2B-SB4 @	Set of two clamps (red/black), with protection against contact, 4 mm banana jack, for wires up to 9.5 mm, recommended accessory for cable KA-BNC-BA4
RIC-141A	Safe probe acc. to IEC/EN61010 (BNC safety type) 1:1, 42 pF, 1.2 m
GL7000-Kit @	Call for information
B1009 90601	Certificate inspection and test protocol
GLET-B530-10K @	Humidity supply box, for connecting up to 10 humidity sensors
GLET-B513-KA-BA4 @	Passive modular enclosure for trigger inputs, logic inputs and alarm outputs
GLET-B513-KABA4-REL@	Active modular enclosure for 1 trigger- and 2 logic inputs and 3 alarm outputs
GLET-IU-BA2-BA4 @	Passive modular enclosure for the conversion of up to 4 measuring signals 0(4) ... 20 mA into a precise 0(1) ... 5 V signal



GLET-SU-BA2/B514-BI5 [®]	Active modular enclosure for wiring of an active transducer/sensor with voltage output in 3-wire technology
GLET-SG2K-BA2-BI7 [®]	Active modular enclosure for the connection of passive strain gauge transducers/sensors
GLET-8B4K-BA2-BI5 [®]	Active modular enclosure with base rack for up to 4 8B-module amplifiers, 8B modules for different sensors and signals
TK-midi-4 [®]	Transportation case
RIC-410	K-type thermocouple, rod-shaped, cable length 1.1 m
RIC-420	K-type thermocouple for static surfaces, cable length 1.1 m
RIC-430	L-type thermocouple for static surfaces, L-shaped, cable length 1.1 m
TCK-401140-5E [®]	K-type thermocouple with adhesive pad, cable length 2 m, set of 5 pieces
TCK-401301-5E [®]	K-type thermocouple, cable length 2 m, set of 5 pieces
TCT-401304-5E [®]	T-type thermocouple, cable length 2 m, set of 5 pieces
TCJ-401307-5E [®]	J-type thermocouple, cable length 2 m, set of 5 pieces
TCN-401310-5E [®]	N-type thermocouple, cable length 2 m, set of 5 pieces
PT100-514140-1E	Pt100 resistance temperature sensor, 2-wire, cable length 2 m
PT100-515680-1E	Pt100 resistance temperature sensor, self-adhesive, 2-wire, cable length 2 m
WKZ-... [®]	Factory calibration by ALTHEN

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 Auto-balance 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 every 5 seconds when the sampling interval is longer than 5 seconds. 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 1ms when the sampling interval is shorter than 1ms and reported. The alarm is detected in the sampling interval when the sampling interval is set between 2ms to 5 seconds and reported. The alarm is detected every 5 seconds when the sampling interval is longer than 5 seconds and reported.

6. It is available when the captured data is saved to the built-in RAM. Maximum sampling interval 100ms. 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. Compatible SD card type: SD, SDHC Speed class 4 or latest. 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. Maximum sampling interval 100ms when multi-functions are used

13. The Sync cable (B-559) is required when this function is used. The GL-Connection software is required when the synchronizing function is used.

14. The SP2 or higher service pack need to be installed.