GRAPHTEC

DATA PLATFORM GL7000

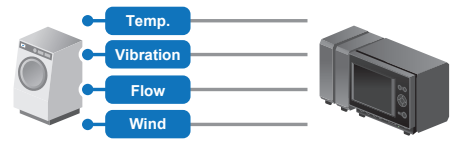
Vibration and Temperature Measurement Set

Easy Vibration and Temperature measurement by charge module (GL7-CHA) and multi-input module (GL7-M)

- Supports Charge or Voltage output (IEPE) type sensor in GL7-CHA module
- Supports thermocouple and RTD for measuring temperature in GL7-M module
- Supports FFT analysis function
- Converts to Engineering Unit by scaling

5.7-inch TFT color LCD (with touch panel control) | Ethernet | USB | SD card slot

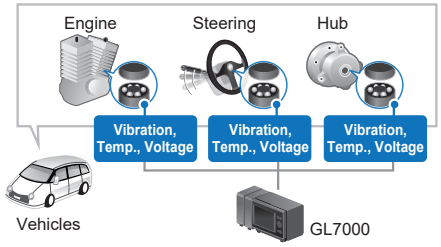
Evaluation of home appliances



High-performance washing machine

GL7000

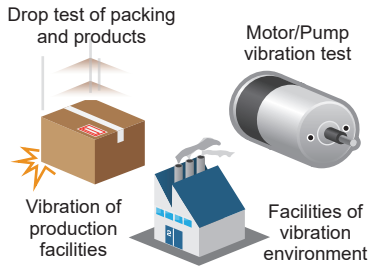
Durability testing for bearing



Vehicles

GL7000

Other measurements



Easy connect the sensor in GL7-CHA

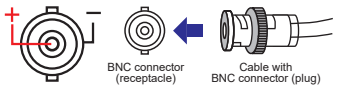
Support a direct connection with the piezoelectric type sensor, and allows a wide variety measurements.

- Supports charge and voltage output type sensors
- Supports voltage measurement
- Supports RMS (effective value) measurement

Charge output type sensor

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

Voltage output (IEPE) type sensor, Voltage



Supported acceleration sensor 0.01mV/(m/s²) to 999.9mV/(m/s²)

Easy measure temperature in GL7-M

Support multiple input type for voltage and temperature, and allows a wide variety measurements.

- Faster sampling speed up to 10ms
- All isolated input channels (10ch/unit)
- Supports multiple input types
  Voltage : max. 50V (Allows 4-20mA current loop using B-551 shunt)
  Temperature : Thermocouple and RTD
  Humidity : optional sensor (B-530)

FFT function

Not only direct FFT analysis, it is also possible to FFT analysis the recorded data.

Scaling function

Measured value can be converted to specified engineering unit.

Measure momentary and long-time phenomenon

Support multiple types of storage device realize to capture data in an endurance test of long time and even also an impact test of short time.

Supported storage device
- Built-in RAM
- Built-in Flash
- SD memory card
- SSD (Option)

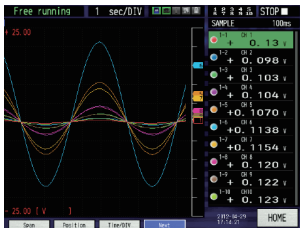
Storage	Sampling speed/Capturing time Using 14 channels (4ch in GL7-CHA & 10ch in GL7-M)		
	100kS/s(10µs)	1kS/s(1ms)	1S/s(1s)
Built-in RAM	20 seconds	Approx. 33 min.	Approx. 23 days
Built-in Flash memory *1	Not Available	Approx. 12 hr. 42 min.	Over 365 days
SD card *2	Not Available	Approx. 12 hr. 33 min.	Over 365 days

*1 : In 2GB data file size, GBD data format.
*2 : Uses 2GB SD memory card, GBD data format.

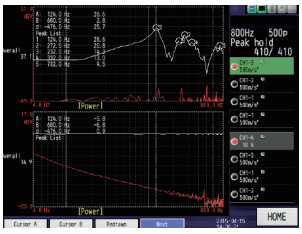
Various type of display

Utilizes a clear 5.7-inch TFT color monitor. Makes it easy to read data in waveform or digital form by multiple type of display method.

Y-T display



FFT display



It is also available X-Y and Digital displays.

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GL7000 specifications

Item		Description
Number of module		Attached to up to 10 modules *1
Number of input channels		Max. 112 channels in 1 of GL7000
External Input/Output signals *2	Input	Start/Stop, External 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 re-armed for the next data capture function Disabled (OFF): Data capture is completed in a single trigger
	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 *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		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 *8
FFT analysis function (Firmware ver. 1.20 or later)	Analyzing frequency range	0.08, 0.2, 0.4, 0.8, 1.6, 2, 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 averageg, 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 *9
Storage device	Built-in	RAM (2 million samples for each channels, 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
	Capturing mode *10	Mode: Off, Normal, Ring, Realy Ring*11: 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*12: 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 *13	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 *14
Operating environment		0 to 45 °C, 5 to 85 % RH (non condensed)
Power source		100 to 240 V AC, 50 to 60Hz
Power consumption		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

Display module specification

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 34.5 x 119 mm (Excluding projection)
Weight	Approx. 530 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 pluse 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. The alarm signals are outputted on the terminal block attached to the main module as standard accessory.
*4. It is available on the Logic/Pulse (GL7-L/P) module.
*5. 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.
*6. It is available when the captured data is saved to the built-in RAM. The pre-trigger function may not available in combination with the trigger settings.
*7. The result of real time calculation is displayed in the digital display mode. Available sampling speed is the 10 samples/s (100 ms interval).
*8. 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 distination 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 mnodule (GL7-DCO) is used.
*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 START/STOP 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 faster. The SSD module (GL7-SSD) is an option.

Charge input module specifications

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 (10µs to 1hr.)
Built in RAM		2 million samples for each channel
Input type		Sensor in charge output type, Sensor in IEPE type, Voltage
Input coupling		Sensor: Charge, IEPE, Charge-RMS, IEPE-RMS Voltage: DC, AC, DC-RMS, AC-RMS
Measurement range	Acceleration sensor	1, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10000, 20000, 50000 m/s²
	Voltage input	DC, AC coupling: 50, 100, 200, 500 mV, 1, 2, 5, 10V RMS measurement: 20, 50, 100, 200, 500 mVrms, 1, 2, 5 Vrms (Crest Factor in RMS measurement: up to 4 in 20mVrms to 2 Vrms range, up to 2 in 5 Vrms range)
Supported sensitivity	Charge output type	0.01 pC/(m/s²) to 999.9 pC/(m/s²)
	IEPE type	0.01 mV/(m/s²) to 999.9 mV/(m/s²)
Measuring accuracy*17	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] ≥ 200mV)
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 is up to 22 V.)
Maximum input charge signal		Max. 50000 pC
Maximum input voltage	Between (+)/(-)terminal	25 Vp-p
	Between channels	25 Vp-p (Between negative (-) terminals in different channels)
	Between channel/GND	25 Vp-p
Max. voltage (withstand)	Between channels	300 Vp-p (1 minute)
	Between channel/GND	300 Vp-p (1 minute)
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
	Low pass	Off, Line(1.5Hz), 3, 6, 10, 30, 50, 60, 100, 300, 500 Hz, 1k, 3k, 5k, 10k Hz (in -30dB/oct)
	Anti-aliasing	Off, On
Support TEDS	Standard	IEEE 1451.4 Class1 (Temperate No.25)
	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. 850g

Voltage/Temperature input module specifications

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 with 1-10ch to 1 Sample/h (10 ms with 1-10ch 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 (WRe5-26) RTD: Pt100, JPt100 (JIS), Pt1000 (IEC751)	
	Humidity		0 to 100 % RH, using optional humidity sensor (B-530)	
Measurement accuracy *17	Voltage		± 0.1% of Full Scale	
	Temperature	Thermocouple	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	400 ≤ 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 0.32mm diameter in the T type and 0.65mm 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		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)	
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 sensor B-530, 1 channel	
External dimensions (W×D×H)			Approx. 49 x 136 x 160 mm (Excluding projections)	
Weight			Approx. 770 g	

*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. Available sampling speed is up to 10 samples/s (100ms interval).
*12. The file size of captured data is limited up to 2 GB. When the captured data distination 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 in limited up to 50 thousand samples/s (20 µs interval) when 1 or 2 modules are attached.
*13. This function is able to be available when sampling speed is set up to 10 samples/s (100 ms interval).
*14. The Sync cable (B-559) is required when this function is used. The GL-Connection software is required when the synchronizing function is used.
*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. 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.

GL7000 model for Vibration and Temperature measurement

Item	Model number	Quqntity
Main module	GL7000	1
Input module	GL7-CHA, Charge input module	1
Input module	GL7-M, Voltage/Temperature input module	1
Display module	GL7-DISP	1

- Due to the possibility of equipment or PC failure, the data files on the instrument will not be guaranteed to be held on the memory. Please make a backup of data whenever possible to avoid data loss.
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- Specifications 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 malfunction or an electric shock by current leakage or voltage, please ensure a ground connection and use according to the specification.

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