GRAPHTEC

Extensible Data Acquisition Unit
DATA PLATFORM GL7000
Amplifier Unit Selection Guide

GL7000 features

- The amplifier module can be expanded to accommodate a wide variety of measurements. (Amplifier can be attached to up to 10 modules)
- Attaching the high-definition display module with a touch panel allows both stand-alone operation and embedding into a system.
- 2 interfaces to connect the GL7000 to your PC : USB 2.0, Ethernet.
- 4 destinations to save the recording data. (Built-in RAM, Built-in Flash memory, SD memory card, and SSD module)
- Software for high performance and easy operation (GL-Connection)

Flexible amplifier module combination allows wide range of measurments

Voltage Module GL7-V

Voltage	MAX	Simultaneous sampling	
10ch/unit	1kS/s (1ms)	Isolated	Voltage measurement for sensor output and battery cell. (Displacement, Pressure, Wind speed, etc)

- 1kS/s Simultaneous sampling
- 10 channels / unit
- Maximum input voltage 100V

Voltage/Temperature Module GL7-M

Voltage/ Temperature	MAX	Sigma-Delta type A/D converter	
10ch/unit	100S/s (10ms)	Isolated	Measurement of internal temperature and working voltage of samples within an environmental test chamber.

- 10ms / 10ch High speed scan method
- 10 channels / unit
- Variety of input types (Voltage, Thermocouple, RTD)

High Speed Voltage Module GL7-HSV

High Speed	MAX	Simultaneous sampling	
4ch/unit	1MS/s (1µs)	Isolated	Inverter measurement, Vibration Testing, Drop test

- 1MS/s High speed simultaneous sampling
- 4 channels / unit
- Maximum input voltage 100V

High Voltage Module GL7-HV

Voltage	MAX	MAX Input Voltage1000V	
2ch/unit	1MS/s (1µs)	Isolated	Power supply line, Electric Vehicle battery, etc.

- High withstand voltage (Maximum input voltage: 1,000V)
- Maximum sampling speed 1MS/s
- Real-time RMS measurement

DC Strain Module GL7-DCB NEW

※1 ※2

Strain Voltage	MAX	Strain Gauge TEDS Sensor	
4ch/unit	100kS/s (10µs)		Strain measurement with strain gauge or strain gauge transducer

- Built-in bridge amp enables direct connection to strain guages
- Excitation supply for bridge circuit (Constatnt voltage / Constant current)
- Supports TEDS sensors

※1 Conversion connector between DSUB and screw terminal : B-560(Option)
※2 Conversion cable between DSUB and NDIS : B-561(Option)

Charge Module GL7-CHA NEW

Charge Voltage	MAX	Charge IEPE	
4ch/unit	100kS/s (10µs)		Acceleration is measured with the general accelerometer which is typically used for vibration tests.

- Charge / IEPE / Voltage type sensor compatible
- The wide variety of filter functions allow high-precision measurements.
- Supports TEDS sensors

Voltage Output Module GL7-DCO NEW

※3

Output voltage	MAX	Recording data Arbitrary waveform	
8ch/unit	100kS/s (10µs)		Test with arbitrary waveform for R&D and designing purposes Simulation for the experiment data

- 8 channels / unit
- Output voltage from recorded data
- Output data can be created by dedicated software Output voltage

※3 SMA-BNC conversion cable : B-562(Option)

Logic/Pulse Module GL7-L/P

※4

Logic/ Pulse	MAX	Simultaneous sampling	
(16ch/unit)	1MS/s (1µs)		Measurement of timing, encoder output, rotation, and flow for controlled equipment

- 16 channels / unit (4channels / 4 slots)
- Logic : 1MS/s High speed sampling
  Pulse : 10kS/s High speed sampling

※4 Probe set for Logic input : RIC-10 (Option)

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)		1 k Samples/s to 1 Sample/h (1ms to 1h)	1 M Samples/s to 1 Sample/h (1µs to 1h)
Built in RAM		2M samples	
Measurement range		100, 200, 500 mV,1, 2, 5, 10, 20, 50, 100 V, and 1-5 V/F.S.	
A/D Converter		Successive Approximation type, 16 bits (effective resolution: 1/40000 of measuring full range)	
Input impedance		1 MΩ ± 5 %	
Maximum input voltage	Between (+) / (-) terminal	100mV to 1V range: 60 V p-p, 2V to 100V range: 100 V p-p	
	Between channels	60 V p-p	
	Between channel / GND	60 V p-p	
Maximum voltage	Between channels	1000 V p-p (1 minute)	
	Between channel / GND	1000 V p-p (1 minute)	
Isolation resistance	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 k Hz (at +1/-3 dB)	DC to 200 k Hz (at +1/-3 dB)
Filter (Low pass)		Off,Line(1.5Hz),5,50,500 Hz(at -3dB 6dB/oct)	Off,Line(1.5Hz),5,50,500,5k,50k Hz (at -3dB 6dB/oct)
External dimensions (W×D×H)		Approx. 49.2 x 136 x 160 mm (Excluding projections)	
Weight		Approx. 840 g	Approx. 740 g

Voltage/Temperature 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		100 Samples/s at 1-10ch to 1 Sample/h (10 ms with 1-10ch to 1 hr. interval)
Built-in RAM		2M samples
Measurement range	Voltage	20, 50, 100, 200, 500 mV, 1, 2, 5, 10, 20, 50 V, and 1-5 V/F.S.
	Temperature	Thermocouple: K, J, E, T, R, S, B, N, and W (WRe5-26),RTD: Pt100, JPt100 (JIS), Pt1000 (IEC751)
	Humidity *1	0 to 100 % (using scaling function in 1V range, humidity sensor B-530)
R.J. Compensation		Select internal or external
A/D Converter		Sigma-Delta type, 16 bits (effective resolution: 1/40000 of measuring full range)
Input impedance		1 MΩ ± 5 %
Maximum input voltage	Between(+)/(-)terminal	60 V p-p
	Between channels	60 V p-p
	Between channel / GND	60 V p-p
Maximum voltage	Between channels	350 V p-p (1 minute)
	Between channel / GND	350 V p-p (1 minute)
Isolation resistance	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		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.)
5V output		Driving the humidity sensor B-530, 1 channel
External dimensions (W×D×H)		Approx. 49.2 x 136 x 160 mm (Excluding projections)
Weight		Approx. 770 g

High Voltage Module Specifications		
Model number		GL7-HV
Number of input channels		2 channels
Input connector		Isolated BNC connector
Input Method		All channels isolated unbalanced input, Simultaneous sampling
Sampling speed		1MS/s (1µs)～1h
Built-in RAM		2M samples
Input coupling		AC, DC, AC-RMS, DC-RMS
Measurement range	DC、AC	2・5・10・20・50・100・200・500・1000V F.S.
	DC-RMS, AC-RMS	1・2・5・10・20・50・100・200・500Vrms F.S. Crest Factor：1～200Vrms (C.F4) 500Vrms (C.F2)
A/D Convertor		Successive Approximation type, 16bits Effective Resolution: AC, DC coupling 1/40000 of measuring full range AC-RMS, DC-RMS coupling 1/20000 of measuring full range
Input impedance		1MΩ±5%
Input signal source resistance		1kΩ or Less
Maximum input voltage	Between (+) / (-) terminal	1000Vp-p
	Between channels	300VACrms
	Between channel / GND	300VACrms
Maximum voltage	Between channels	2300VACrms (1 minute)
	Between channel / GND	2300VACrms (1 minute)
Isolation resistance	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～200kHz(+1/-3dB) AC Coupling：4Hz～200kHz(+1/-4.5dB)
Filter		OFF・Line (1.5Hz), 5Hz, 50Hz, 500Hz, 5kHz, 50kHz (at -3dB/6dB oct)
External dimension (W x D x H)		Approx. 49.2 x 136 x 160mm (Excluding projections)
Weight		Approx. 740 g

DC Strain Module Specifications		
Model number		GL7-DCB
Number of input channels		4 channels
Input connector		D-SUB 9pins (Female) STD accessories : D-SUB 9pin (Male) x 4pieces Optional accessory : Wiring converter (D-SUB/Universal connector)
Input method		All channels isolated balanced input, Simultaneous sampling
Sampling speed		100kS/s(10µs)～1h
Built in RAM		2M samples
Input type		DC Voltage, Strain, Resistance (Potentiometric)
Measurement range	Strain	500・1000・2000・5000・10000・20000µε(µε：10^{-6} Strain) 0.25・0.5・1.0・2.5・5.0・10.0mV/V
	DC Voltage	1・2・5・10・20・50・100・200・500mV, 1・2・5V
	Resistance	1・2・5・10・20・50・100・200・500Ω, 1・2・5・10・20・50kΩ
A/D Converter		Successive Approximation type, 16 bits Effective Resolution: 1/40000 of measuring full range
Gauge Ratio		2.0 constant
Compatible Sensor	Strain*2	[Strain Gauge] 2- or 3- or 4-wire quarter bridge (3- or 4-wire: Remote sensing) 3- or 4- or 5-wire half bridge (4- or 5-wire: Remote sensing) 4- or 6-wire full bridge (6-wire: Remote sensing) 4-wire full bridge with constant current excitation
	Resistance	Potentiometric, Resistance
Bridge resistance		50～10kΩ
Internal Resistor*3		Quarter, half bridge: 120Ω/350Ω
Excitation voltage		DC1・2・2.5・5・10V
Constant current	Current	0.1～20mA
Bridge excitation	Compliance Voltage	10V
Zero Adjust	Method	Fully automatic (via push button or setting the condition menu)
for Strain gauge	Max. Range	±10,000µε(µε：10^{-6} Strain)
Remote sensing		3- or 4-wire quarter bridge4- or 5-wire half bridge6-wire full bridge
Shunt Calibration		Approx. 60kΩ (120Ω gauge), Approx. 175kΩ (350Ω gauge)
Maximum Input Voltage	Between (+) / (-) terminal	DC10V (balanced input)
	Common-mode voltage	10VACrms
	Between channels	10Vp-p
	Between channel / GND	60Vp-p
With-stand voltage	Between channel / GND	1000Vp-p (1 minute)
Isolation resistance	Between channel / GND	Min. 100MΩ (at 500 V DC)
Common-mode rejection ratio		Min. 80 dB (50/60 Hz, Signal source impedance: Max. 300 Ω)
Frequency Response		DC～20kHz
Filter	LPF	Off・Line (1.5Hz), 3Hz, 6Hz, 10Hz, 30Hz, 50Hz, 60Hz, 100Hz, 300Hz, 500Hz, 1kHz, 3kHz, 5kHz, 10kHz at -30dB/oct
	AAF	Off・On (Anti-aliasing filter)
TEDS	Standard	IEEE 1451.4 Class2 (temperate No.33)
	Information	OUT as rated output
External Dimensions (W x D x H)		Approx. 49.2 x 136 x 160mm (Excluding Protection)
Weight		Approx. 840 g

Charge Module Specifications		
Model number		GL7-CHA
Number of input channels		4 channels
Input Connector		BNC Terminal / Miniature connector (#10-32UNF)
Input method		All channels isolated unbalanced input, Simultaneous sampling
Sampling speed		100kS/s (10µs)～1h
Built in RAM		2M samples
Input type		Charge type, IEPE type, Charge type-RMS, IEPE type-RMS, AC, DC, AC-RMS,DC-RMS
Measurement range	Acceleration sensor input	1・2・5・10・20・50・100・200・500、1000・2000・5000・10000・20000・50000m/s²
	Voltage input	AC、DC：50・100・200・500mV・1・2・5・10V RMS：20・50・100・200・500mVrms, 1・2・5Vrms Crest factor：Min. 2Vrms (C.F4), Max 5Vrms (C.F2)
Sensor Sensitivity	Charge input	0.01pC/ (m/s²)～999.9pC/ (m/s²)
	IEPE input	0.01mV/ (m/s²)～999.9mV/ (m/s²)
A/D Converter		Successive Approximation type, 16bits Effective Resolution: 1/40000 of measuring full range
Input impedance		100kΩ±5%
Power Supply		22V±10%, 4mA・8mA±20%
Maximum Input Charge		50,000pC
Maximum input voltage	Between (+) / (-) terminal	25Vp-p
	Between channels	25Vp-p
	Between channel / GND	25Vp-p
Maximum voltage	Between channels	300Vp-p (1 minute)
	Between channel / GND	300Vp-p (1 minute)
Isolation resistance	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	1.5Hz～45kHz
	IEPE type	1Hz～45kHz
Filter	HPF	Off・0.15Hz・1Hz・10Hz
	LPF	Off・Line (1.5Hz), 3Hz, 6Hz, 10Hz, 30Hz, 50Hz, 60Hz, 100Hz, 300Hz, 500Hz, 1kHz, 3kHz, 5kHz, 10kHz at -30dB/oct
	AAF	Off・On (Anti-aliasing filter)
TEDS	Standard	IEEE 1451.4 Class1 (temperate No.25)
	Information	OUT as rated output
Engineering scale function		Integration (Velocity), Double Integration (Displacement)
External Dimensions (W x D x H)		Approx. 49.2 x 136 x 160mm (Excluding projections)
Weight		Approx. 850 g

Voltage Output Module Specification		
Model number		GL7-DCO
Number of output channels		8 channels
Output connector		SMA Connector
Output method		All channels common ground
Sampling speed		100kS/s (10µs)
Output target		Voltage module, Voltage / Temperature module, High speed voltage module, High voltage module, DC strain module, Charge module ※Sampling speed from 10µs. ※Temperature and Humidity data is not compatible. ※Sine wave, pulsed wave (Duty cycle can be set when creating output data)/ ramp wave/triangle wave/Simple arbitrary waveform/DC voltage can be output by creating data with dedicated PC software. ※Input signal can be recorded with input type module during output signal is generated from voltage output module.
Output range	Voltage	±1・2・5・10V F.S.

Logic/Pulse Module specifications		
Model number		GL7-L/P
Number of input channels		16 channels
Input method		All channels common ground, simultaneous sampling, Circular connector (4ch/connector)
Sampling speed	Logic mode	Up to 1 M Samples/s (1µs interval)
	Pulse mode	Up to 10 k Samples/s (100µs interval)
Built-in RAM		2M samples
Measurement mode		Selecting of the Logic input mode or Pulse input mode *4
Mode	Pulse	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/F.S.
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/F.S.
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/F.S.
Max. input frequency		1 M Hz
Max. 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 (W×D×H)		Approx. 49.2 x 136 x 160 mm (Excluding projections)
Weight		Approx. 700 g

*1 Using optional humidity sensor (B-530)

*2 Remote sensing is not available when a NDIS connector is used When a bridge box is used, the connection needs to be 4-wire or 6-wire full bridge Bridge excitation: Constant current drives a strain gauge type converter or a 4-wire full bridge.
When connecting with a Half bridge (Opposite side), an additional bridge box is required.
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.

*3 When the built-in in bridge resistance is 120Ω, the excitation voltage needs to be set it to 1V, 2V, or 2.5V.
The gauge type and built-in resistance can be selected by a DIP-SW which is located on the front face of the module.

*4 The measuring mode is set in each module (16 channels) In Logic mode, up to 7 modules can be attached to one main module. (max. 112ch) In Pulse mode, up to 2 modules can be attached to one main modules.
The maximum number of channels are limited to up to 112 channels.

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