



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.



### High Voltage Module

- Measurement of the high voltage in the power line of equipment, Electric or Hybrid Vehicle testing, 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.



### DC Strain Module

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



### Charge Module

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



### Power Measurement Module

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

Modules will be released sequentially starting in the autumn of 2012

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 Trigger: Busy, Alarm (10 channels) *3 Output Signal type: Open collector (pulled-up by resistor 10 k ohms)
Trigger, Alarm function	Trigger action Trigger repeat Trigger condition Trigger determination conditions for measured signal Alarm determination condition *5 Alarm output Pre-trigger *6
Calculation function	Between channels Statistical
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 automatically in the same condition after power is recovered as when the power failure occurred during data capture *8
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 External *10
Data saving function	Captured data *10 Data in built-in RAM Ring capturing mode *10 *11 Backup *10
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	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
Captured 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 is limited by the number of channels used. (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 Alarm Time
Operation lock	Specific level in any channels Occurred alarm in any channel Beginning, center, end of the data, Trigger point, Specific time (absolute, relative), Specific number Operation screen can be locked (It is unlocked with a password.)

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Display module specifications	
Model name	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 (WxDxH)	Approx. 187 x 35 x 199 mm (Excluding projection)
Weight	Approx. 530 g

SSD module specifications	
Model name	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 Attached to 3 or 4 modules Attached to 5 or 10 modules
External dimensions (WxDxH)	Approx. 49 x 136 x 160 mm (Excluding projection)
Weight	Approx. 770 g

Options and accessories	
Item	Model number
Input/Output cable	B-513
Humidity sensor	B-530
Sync. cable	B-559
Probe set for Logic input	RIC-10
Input cable, BNC - BNC	RIC-112
Input cable, Banana - BNC	RIC-113
Input cable, Banana - BNC	RIC-114
Input cable, BNC - BNC	RIC-142
Input cable, Banana - BNC	RIC-143
Clip, Alligator (small size)	RIC-144
Clip, Alligator (middle size)	RIC-145
Clip, Grabber	RIC-146

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 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 signal conditioning 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.

**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



RoHS Compliant model







ER231205\_AD Vol.09

[www.graphteccorp.com](http://www.graphteccorp.com)



# Amplifier Module

## Amplifier Module

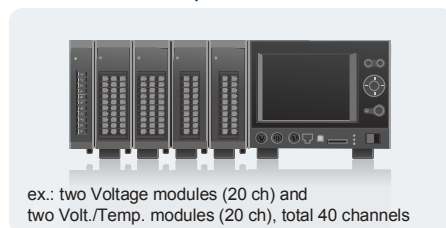
Module	Voltage	High Speed Voltage	Voltage/Temperature	Logic/Pulse
Model number	GL7-V	GL7-HSV	GL7-M	GL7-L/P
Module image				
Number of input channels	10 channels	4 channels	10 channels	16 channels
Input terminal	Screw terminal (M3)	BNC connector	Screw terminal (M3)	Circular connector (10 position, socket)
Input method	All channels isolated unbalanced input, simultaneous sampling		All channels isolated balanced input, scanning channels for sampling	
Sampling speed	1 k Samples/s to 1 Sample/h (1ms to 1hr. interval)	1 M Samples/s to 1 Sample/h (1μs to 1hr. interval)	100 Samples/s with 1-10ch to 1 Sample/h (10ms with 1-10ch to 1hr. interval)	Logic mode: up to 1 M Samples/s (1μs interval) Pulse mode: up to 10 k Samples/s (100μs interval)
Measurement range	100mV to 100V F.S., and 1-5V F.S.		Volt.: 20mV to 50V F.S., and 1-5V F.S. Temp.: Thermocouple: K, J, E, T, R, S, B, N, W (WRe5-26) RTD: Pt100 (IEC751), Pt1000 (IEC751), Pt100J (JIS)	Bi-level signal, up to 24V Select either Logic or Pulse mode Logic: Signal pattern Pulse: Counting in Instant, Accumulating, Rotation (max. 15 million count)
A/D converter	Successive Approximation, 16 bits		Sigma-delta, 16 bits	
Maximum Voltage	Between channels: 1000 V, 1 min. Between inputs and GND: 1000 V, 1 min.		Between channels: 350 V, 1 min. Between inputs and GND: 350 V, 1 min.	
Built-in RAM	2 million samples			

## Combinations of amplifier modules

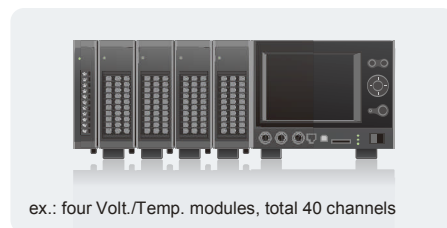
### Simple measurement with a single module



### Variety of measurements with different amplifier modules



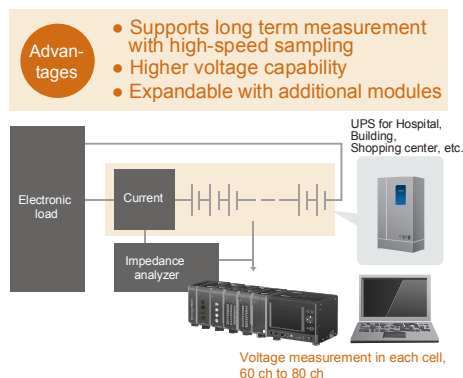
### Multi-channel measurement with several amplifier modules



## Typical applications

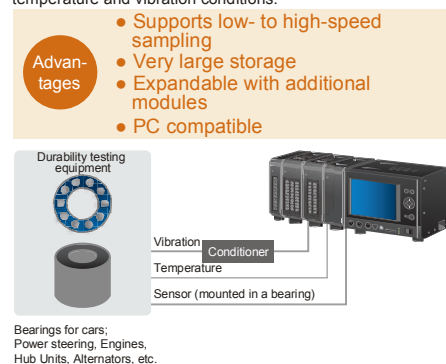
### Example: Batteries / UPS (Uninterruptible Power Supply) test

Evaluation testing for the charging current, the output voltage with discharge capacity, etc.



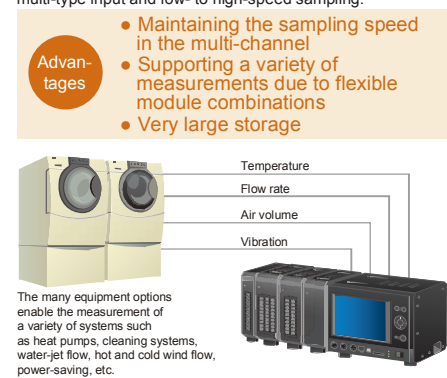
### Example: Vehicles / Bearing durability test

Utilized in temperature, vibration and other testing to check the durability of the bearings that are used in extreme temperature and vibration conditions.



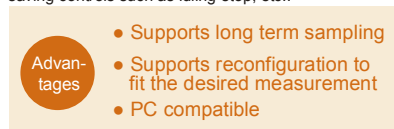
### Example: Appliance / Washer-dryer evaluation test

Used to measure various evaluation items such as the temperature, flow rate, air volume, sound, vibration, etc. using multi-type input and low- to high-speed sampling.

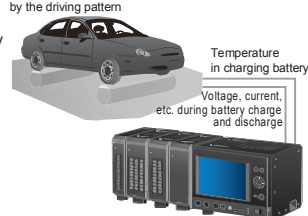


### Example: Vehicles / Automobile battery test

Utilized to measure the charge and discharge characteristics of the battery in vehicles that have energy saving controls such as idling-stop, etc..

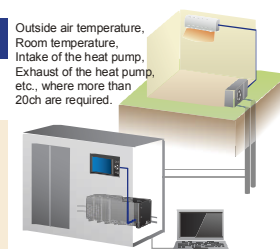
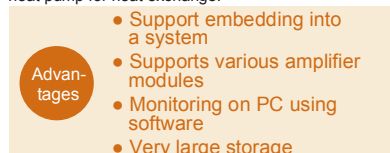


### Chassis dynamometer test



### Example: Others / Geothermal test

Used for demonstration and evaluation testing of new air conditioning systems that utilize a geothermal heat pump for heat exchange.



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 with 1-10ch to 1 Sample/h (10 ms at 1-10ch to 1 hr. interval)		
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)		
Measurement accuracy*2	Humidity *1	0 to 100 % (using scanning function in 5V range, humidity sensor B-530)		
	Voltage	± 0.1 % of F.S.		
Temp- couple	R/S	Measurement range	Measurement accuracy	
		0 °C ≤ TS ≤ 100 °C	± 5.2 °C	
	B	100 °C < TS ≤ 300 °C	± 3.0 °C	
		R: 300 °C < TS ≤ 1600 °C	± (0.05 % of reading + 2.0 °C)	
		S: 300 °C < TS ≤ 1760 °C	± (0.05 % of reading + 2.0 °C)	
	K	400 °C ≤ TS ≤ 600 °C	± 3.5 °C	
		600 °C < TS ≤ 1820 °C	± (0.05 % of reading + 2.0 °C)	
	E	-200 °C ≤ TS ≤ -100 °C	± (0.05 % of reading + 2.0 °C)	
		-100 °C < TS ≤ 1370 °C	± (0.05 % of reading + 1.0 °C)	
	T	-200 °C ≤ TS ≤ -100 °C	± (0.05 % of reading + 2.0 °C)	
		-100 °C < TS ≤ 800 °C	± (0.05 % of reading + 1.0 °C)	
	J	-200 °C ≤ TS ≤ -100 °C	± (0.1 % of reading + 1.5 °C)	
		-100 °C < TS ≤ 400 °C	± (0.1 % of reading + 0.5 °C)	
	N	-200 °C ≤ TS ≤ -100 °C	± 2.7 °C	
		-100 °C < TS ≤ 100 °C	± 1.7 °C	
	W	100 °C < TS ≤ 1100 °C	± (0.05 % of reading + 1.0 °C)	
		100 °C < TS ≤ 1300 °C	± (0.1 % of reading + 1.0 °C)	
	Reference Junction Compensation (R.J.C.) accuracy: ± 0.5 °C *3	RTD	Measurement range	Driving current
		Pt100	-200 °C to 850 °C (FS = 1050 °C)	1 mA
		JPt100	-200 °C to 500 °C (FS = 700 °C)	1 mA
JPt1000		-200 °C to 500 °C (FS = 700 °C)	0.2 mA	
			Accuracy	
			± 1.0 °C	
R.J. Compensation	Selecting of the internal or external			
A/D Converter	Sigma-Delta type, 16 bits (effective resolution: 1/40000 of measuring full range)			
Stability with temperature	Gain	0.01 % of F.S./°C		
	Zero *4	0.02 % of F.S./°C		
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	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)	49 × 136 × 160 mm (Excluding protrusion)			
Weight	Approx. 770 g			

#### Notes:

\*1. Using optional humidity sensor (B-530).

\*2. Subject to the following 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 1s with 10 channels.
- GND terminal is connected to ground.

\*3. Wire size of thermocouple to use is 0.32mm in T type, 0.65mm in other type.

\*4. It is effective when the 10, 20, 50ms sampling is used. When the sampling is slower than 100ms, it is not effective by executing the Zero calibration periodically.

\*5. Subject to the following 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 (1.5 Hz).
- Sampling rate is set to 1s.
- GND terminal is connected to ground.

\*6. The measuring mode is set in each module (16 channels).

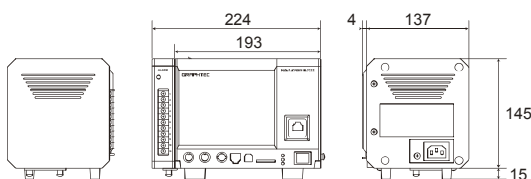
When the module is used in the Logic, up to 7 modules can be attached to one main module. (max. 112 ch) When the module is used in the Pulse, up to 2 modules can be attached to one main module. (max. 32 ch) The amplifier module can be attached to up to 10 modules. The maximum number of channels is limited to up to 112 channels.

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	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)
Measurement range		100, 200, 500 m V, 1, 2, 5, 10, 20, 50, 100 V, and 1-5 V/F.S.	
Measurement accuracy*5		± 0.25 % of F.S.	
A/D Converter		Successive Approximation type, 16 bits (effective resolution: 1/40000 of measuring full range)	
Stability with temperature	Gain	0.01 % of F.S./°C	
	Zero	0.02 % of F.S./°C	
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	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 2 k Hz (at +1/-3 dB)
Filter (Low pass)		Off, Line(1.5Hz), 5, 50, 500 Hz (-3dB, 6db/oct)	Off, Line(1.5Hz), 5, 50, 500, 5k, 50k Hz (-3dB, 6dB/oct)
External dimensions (W×D×H)		49 x 136 x 160 mm (Excluding protrusion)	
Weight		Approx. 840 g	Approx. 740 g

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)
Measurement mode		Selecting of the Logic input mode or Pulse input mode *6
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
Accumulating count	Range	50, 500, 5000, 50 k, 500 k, 5 M, 50 M, 500 M rpm/F.S.
	Function	Accumulating the number of pulses from the start of measurement
Instant count	Range	50, 500, 5 k, 50 k, 500 k, 5 M, 50 M, 500 M counts/F.S.
	Function	Counting the number of pulses per sampling interval (count is reset at each sampling)
Max. input frequency	Range	50, 500, 5 k, 50 k, 500 k, 5 M, 50 M, 500 M counts/F.S.
	Max. number of count	1 M Hz
Input signal	Voltage range	15 M counts (24 bits counter is used)
	Signal type	0 to +24 V (common ground)
	Threshold	Contact (Relay), Open collector, Voltage
	Hysteresis	Approx. 2.5 V
Filter		Approx. 0.5 V (2.5 V to 3 V)
External dimensions (W×D×H)		Off or On (-3 dB at 50 Hz)
Weight		49 x 136 x 160 mm (Excluding protrusion)
		Approx. 700 g

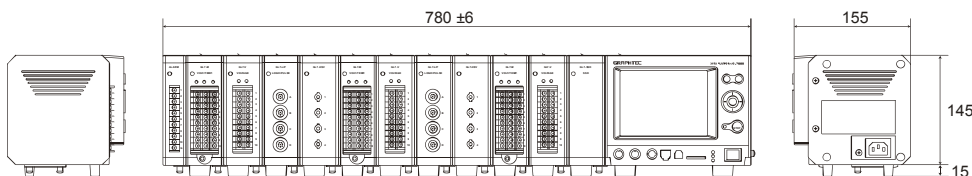
## External dimensions (Excluding protrusion)

### ■ GL7000 Main Module



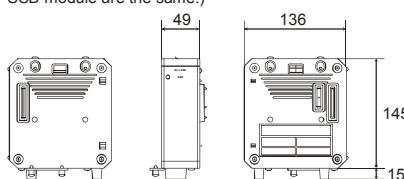
### ■ Maximum configuration

(10 amplifier modules, SSD module and display module are attached.)

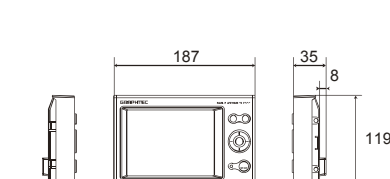


### ■ Amplifier and SSD module

(Dimensions of the amplifier and SSD module are the same.)



### ■ Display Module



Unit: mm  
Tolerance: ±1mm

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