GPM-8310

Digital Power Meter

FEATURES

- 5”TFT LCD
- DC, 0.1Hz ~ 100kHz Voltage/Current Test Bandwidth
- Two Numerical Display Modes
  - General Mode: Displays 2 Main Test Items + 8 Secondary Test Items
  - Simple Mode: Displays the Test Values of 4 Main Test Items
- Waveform Display: V (voltage), I (current), P (power)
- The Current/Voltage can be Measured to a Deformed Wave with CF of 3, and the Half-range CF can Reach 6 or 6A
- Meeting the IEC 61000-4-7 Harmonics Measurement Requirements (50/60Hz)
- 50th Order of Harmonic Measurement and Analysis (value and bar graph)
- Integration Function Supports Automatic Level-changing
- External Current Sensor Input Terminals (EXT1/EXT2)
- Standard Interfaces: RS-232C, USB Device/Host, LAN, GPIB
- Optional Interface: Digital I/O (DA4) (must be installed before leaving the factory)
- Optional Accessory: GPM-001

GW Instek GPM-8310 is a digital power meter for single-phase (1P/2W) AC power measurement. Features include DC, 0.1Hz~100kHz test bandwidth, 16bits A/D, and 300 kHz sampling rate. It adopts 5" TFT LCD screen with a five-digit measurement display and provides 25 power measurement related parameters, and has a high-precision measurement capability. It also features the ability to display waveform (voltage/current/power), the integration measurement function, harmonic measurement and analysis of each order (meeting the IEC 61000-4-7 harmonics measurement requirements at 50/60Hz), external sensor input terminals, and various communication interfaces, etc., to help users achieve clear, convenient and accurate power measurements. This power meter is a most cost-effective power meter with most complete functionalities among the products of the same category.

The rated direct input voltage of GPM-8310 is 600V and the input current is 20A. The minimum current level is 5mA (resolution up to 0.1uA) and the power measurement resolution is 0.1uW. The crest factor can reach 3 (half measurement range can reach 6 or 6A), and the voltage/current/power measurement capability can reach (±0.05% reading ±0.1% level). Different measurement modes can be selected according to (AC+DC/ AC/ DC/ V-MEAN), providing up to 25 relevant parameters for power measurement, including voltage (Vrms/ Vac/ Vdc/ Vmn/ V+pk / V-pk), current (Irms/ Iac/ Idc/ I+pk/ I-pk), frequency (VHz/ IHz), power (P/ P+pk/ P-pk), crest factor (CFV/ CFI), apparent power (VA), reactive power (VAR), power factor (PF), phase angle (DEG), total harmonic distortion rate (THDV/THDI), maximum current ratio (MCR), and the MATH calculation function. Hence, for the measurement of low current/low power such as standby power consumption, or the measurement of power consumption of general products, this power meter provides the best range and accuracy support.

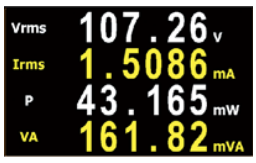
GPM-8310 also makes good use of the advantages of the TFT LCD to display the results of parameter measurement by using numerical and graphical methods. In terms of numerical values, the general mode and the simple mode are provided. The general mode can display 10 measurement parameters (2 main measurements + 8 monitoring measurements), and the simple mode can display four measurement parameters. These displayed parameters can be arbitrarily selected from 25 power parameters according to the needs of users. In terms of graphic display, a simple oscilloscope mode is provided to display waveforms for three parameters including voltage, current and power. In addition, the measurement and analysis of each harmonic order of the measurement signal can be completely displayed by numerical values or bar graphs. This power meter not only meets the needs of accuracy and legibility in process testing, but also meets the needs of diverse measurement applications in R&D design and quality verification.

In addition, the performance of GPM-8310 in auxiliary measurement mechanism/function is also comprehensive. For the application of measuring large voltage, the VT rate setting can be used with an external voltage Potential Transformer. For the measurement of large current, the type of current transformer ~ voltage output type or current output type will determine the applied method. If it is a current output type, it can be directly locked to the rear panel of the instrument and collocated with the CT rate setting to conduct measurement. If it is a voltage output type, measurement can be conducted through the external current sensor input terminals (EXT1/EXT2) provided by GPM-8310. Automatic level-changing can self-define the required level to save level-changing time. 10,000 lots of internal memories can be used to store measurement data according to the update rate set by GPM-8310 or a user-defined time interval for subsequent analysis.

In terms of data retrieval and storage, GPM-8310 provides a variety of communication interfaces including RS-232C/ USB device (virtual COM)/ LAN/ GPIB. Users can write programs to read the measurement results according to their habits or with existing system interfaces and there is no need to procure interfaces. USB host supports GPM-8310 screen capture, internal record data access, and firmware update. For the needs of external signal control or the use of data recorder to record data, GPM-8310 also provides an optional Digital I/O (DA4) interface (must be installed before leaving the factory), which can be connected to an external controller such as PLC or a data recorder to meet the application of automatic measurement or long recording.

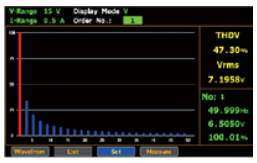
A. VARIOUS DISPLAY MODES

Numerical (General) Mode



Numerical (Simple) Mode

Waveform Mode



Harmonic (Bar Graph) Measurement

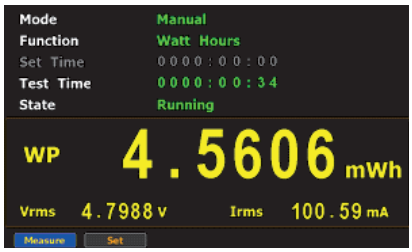
Harmonic (Table Column) Measurement

GPM-8310 provides the numerical value display mode and the waveform display mode, which help users to maximize the benefit of their measurement. Under the numerical mode, there are the general mode and the simple mode. The general mode has related measurement settings and can simultaneously display 10 measurement parameters (2 main measurements and 8 secondary measurements). The simple mode displays only 4 measurement parameter results. The parameters in each mode can be arranged and combined as required. Under the graphic mode, a simple oscilloscope function is provided to display the waveforms of three parameters including voltage, current and power. The horizontal scale can be adjusted (from 25us/div ~ 1s/div according to the set data update rate), and 3 magnification rates for waveform observation are also provided for users to select. In the harmonic measurement, the measurement results of each order of harmonics can be displayed by bar graphs, and a specific observation order can be specified. The relevant values of each order of harmonics (voltage/current/power/voltage distortion ratio/current distortion ratio/power distortion ratio/voltage phase angle/current phase angle) can be completely recorded and displayed.

B. RICH MEASUREMENT PARAMETERS

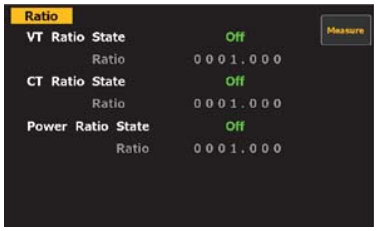
Measurement Items	Symbols
Voltage	Vrms, V+pk, V-pk, Vac*, Vdc*, Vmn*
Current	Irms, I+pk, I-pk, Iac*, Idc*
Power	P, P+pk, P-pk, VA, VAR
Power Factor	PF
Crest Factor	CFV, CFI
Phase Angle	DEG
Frequency	VHz, IHz
Total Harmonic Distortion	THDV, THDI
Maximum Current Ratio	MCR
Integration	WP, WP+, WP-, q, q+, q-, Vac, Iac

Note : "*" Only applicable to specific measurement modes for selection

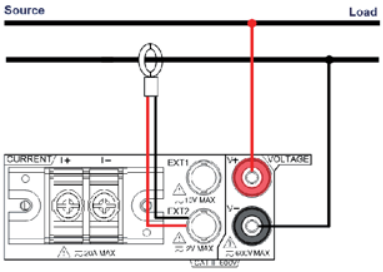


GPM-8310 provides a variety of measurement items and functions, including voltage, current, frequency, effective power, apparent power, reactive power, power factor, crest factor, total harmonic distortion, and can also measure the maximum current ratio. GPM-8310 is also equipped with the measurement function of power or current time integration for the DUT. Users set a period of time to perform instantaneous power integration at the set time period, and then divide by the time to obtain the average power of the DUT. In addition, when performing integration measurement, GPM-8310 supports automatic level-changing function for the power change of the DUT at different times in order to obtain the most complete integration result within the set time.

C. SUPERB MEASUREMENT ASSISTANCE



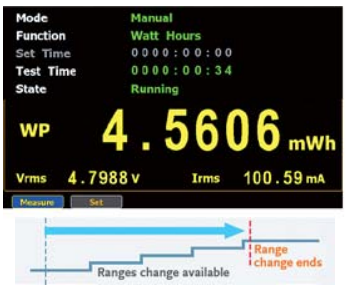
Ratio Configuration



External Current Sensor Input

With respect to the support of measurement assistance, the performance of GPM-8310 is outstanding. First of all, for the measurement of high voltage/high power, the setting of voltage ratio/power ratio is provided to restore the attenuated ratio to a true value. For the measurement of large current, other than the setting of current ratio, external current sensor terminals (EXT1/EXT2) can be utilized to connect with a voltage output type current transformer, making large current measurement more convenient. In addition, GPM-8310 provides 4 sets of panel settings for storage/recall and memory for storing 10,000 lots of measurement values. The measurement storage can log the measurement results based upon the update rate or a self-defined time interval to facilitate the subsequent analysis. The USB host on the front panel supports screen capture, measurement value storage, and GPM-8310 firmware update.

D. FLEXIBLE LEVEL-CHANGING MECHANISM



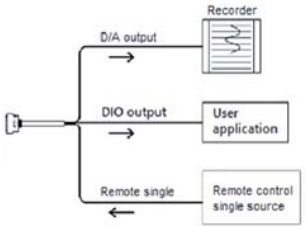
Automatic level-changing under the integration function

Self-defined automatic level-changing mechanism

GPM-8310 provides the measurement of the integration function under the automatic level-changing mode to allow users to fully calculate the total value of the power consumption of the DUT from the beginning to the end of the integration function. In addition, GPM-8310 also supports self-defined setting mechanism for level-changing. Users can select the required level to be changed to save time on level-changing and expedite the test.

E. CONVENIENT AND PRACTICAL INTERFACE

Practical Interface



DA4 Interface Mechanism

GPM-8310 provides comprehensive and diverse communications interfaces including RS-232 / USB / LAN / GPIB, which are suitable for customers to write computer software for remote control and the collection of measurement results through commands. The optional Digital I/O (DA4) interface provides 3 different modes: the external control mode, the DA4 output mode and the self-defined output mode based on user settings. When the setting is in the external control mode, it allows users to activate, stop, trigger or reset the integration measurement function through external signals. When the setting is in the DA4 output mode, users can define 4 measurement parameter values from the 25 measurement parameters provided (even with the result of integration measurement) to produce outputs by a fixed level (full scale +5V) or a manual level (full scale ±5V) and receive results by collocating with a data recorder. When the setting is in the self-defined output mode, a communications interface is required to control the action of each defined pin through commands.

PANEL INTRODUCTION

CE | USB Host | USB Device | LAN | RS-232 | GPIB | DA4

1. Hardcopy key & USB Host
2. 5" TFT LCD
3. Operation & Navigator Key
4. Current Input Terminal
5. External Current Sensor Input Terminal (EXT1/EXT2)
6. Voltage Input Terminal
7. Standard Interfaces : RS-232C, LAN, USB Device
8. Standard Interface : GPIB
9. Optional Interface : DA4

GPM-001 Test Fixture

GPM-001(EU) Test Fixture

GTL-213 Test Lead

GTL-210 Test Lead

SPECIFICATIONS

INPUT

Item	Specifications
Input Type	Voltage: Floating input through resistive voltage divider Current: Floating input through shunt
Measure Range	Voltage: 15V, 30V, 60V, 150V, 300V, 600V Current Direct input: 5mA, 10mA, 20mA, 50mA, 100mA, 200mA, 0.5A, 1A, 2A, 5A, 10A, 20A Sensor input: EXT 1: 2.5 V, 5 V, 10 V EXT 2: 50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2 V
Input Impedance	Voltage: Input resistance: approach 2 MΩ Current Direct input range 5mA ~ 200mA: Input resistance: approach 505 mΩ Direct input range 0.5A ~ 20A: Input resistance: approach 5 mΩ Sensor input Input range 2.5V ~ 10V (EXT1): Input resistance: approach 100 kΩ Input range 50mV ~ 2V (EXT2): Input resistance: approach 20 kΩ
Continuous Maximum Allowable Input	Voltage: peak value of 1.5kV or RMS value of 1kV, whichever is less Current Direct input range 5mA ~ 200mA: peak value of 30 A or RMS value of 20A, whichever is less Direct input range 0.5A ~ 20A: peak value of 100A or RMS value of 30A, whichever is less Sensor input: peak value less than or equal to 5 times of the rated range
Input Bandwidth	DC, 0.1 Hz ~ 100kHz
Continuous Maximum Common-mode Voltage	600 Vrms, CAT Ⅱ
Line Filter	select OFF or ON (cut off frequency of 500 Hz)
Frequency Filter	select OFF or ON (cut off frequency of 500 Hz)
A/D Converter	Simultaneous conversion voltage and current inputs Resolution 16bits Maximum conversion rate Approx. 300kHz

VOLTAGE AND CURRENT ACCURACY

Item	Specifications
Requirements	Temperature: 23 ± 5℃ Humidity: 30~75% RH Input waveform: Sine wave crest factor = 3 common-mode voltage: 0 V Number of displayed digits: 5 digits Frequency filter: Turn on to measure voltage or current of 200 Hz or less After 30 minutes after warm-up time has passed After measurement range is changed (zero-level compensation) Update interval is 250 ms
Accuracy	DC: ± (0.1% of reading + 0.2% of range) 0.1 Hz ≤ f < 45 Hz: ± (0.1 % of reading + 0.2 % of range) 45 Hz ≤ f ≤ 66 Hz: ± (0.1 % of reading + 0.05 % of range) 66 Hz < f ≤ 1 kHz: ± (0.1 % of reading + 0.2 % of range) 1 kHz < f ≤ 10 kHz: ± (0.07 *f) % of reading + 0.3% of range) 10 kHz < f ≤ 100 kHz: ± (0.5 % of reading + 0.5 % of range) ± [{0.04x(f-10)}% of reading]
Temperature Coefficient	Add: ±0.03% of reading/°C within the range 5 to 18°C or 28 to 40°C.
When the Line Flter is Turned ON	45 ~ 66 Hz: Add 0.2 % of reading < 45 Hz: Add 0.5 % of reading
Accuracy When the Crest Factor is Sset to 6 or 6A	accuracy obtained by doubling the measurement range error for the accuracy when the crest factor is set to 3
Accuracy Changes Caused by Data Update Interval	When the data update interval is 100 ms, and Auto, add 0.05% of reading to the 0.1 Hz to 1 kHz accuracy.
Influence of Temperature Changes After Zero-level Compensation or Range Change	Add 0.02% of range/°C to the DC voltage accuracy. Add the following value to the DC current accuracies. 5 mA/10 mA/20 mA/50 mA/100 mA/200 mA ranges: 5 µA/°C 0.5 A/1 A/2 A/5 A/10 A/20 A ranges: 500 µA/°C External current sensor input (/EXT1): 1 mV/°C External current sensor input (/EXT2): 50 µV/°C
Accuracy When the Crest Factor is Set to 6 or 6A	accuracy obtained by doubling the measurement range error for the accuracy when the crest factor is set to 3
Accuracy Changes Caused by Data Update Interval	When the data update interval is 100 ms, and Auto, add 0.05% of reading to the 0.1 Hz to 1 kHz accuracy.

ACTIVE POWER ACCURACY

Item	Specifications
Requirements	same as the conditions for voltage and current. Power factor: 1
Accuracy	DC: (0.1 % of reading + 0.2 % of range) 0.1Hz ≤ f < 45 Hz: ± (0.3 % of reading + 0.2 % of range) 45 Hz ≤ f ≤ 66 Hz: ± (0.1 % of reading + 0.05 % of range) 66 Hz < f ≤ 1kHz: ± (0.2 % of reading + 0.2 % of range) 1 kHz < f ≤ 10 kHz: ± (0.1 % of reading + 0.3 % of range) ± [{0.067x(f-1)}% of reading] 10 kHz < f ≤ 100 kHz: ± (0.5 % of reading + 0.5 % of range) ± [{0.09x(f-10)}% of reading]
Influence of Power Factor	when power factor (λ) = 0 (S: apparent power) ± 0.1 % of S for 45 Hz ≤ f ≤ 66 Hz

SPECIFICATIONS

	± {(0.1 + 0.15 × f) % of S } for up to 100 kHz as reference data •f is frequency of input signal in kHz when 0 < λ < 1 (Φ: phase angle of the Voltage and current) (power reading) × [(power reading error%) + (power range %) × (power range / indicated apparent power value) + {tanΦ × (influence when λ=o)%}]
When The Line Filter is Turned ON	45 ~ 66 Hz Add 0.3 % of reading < 45 Hz Add 1 % of reading
Temperature Coefficient	same as the temperature coefficient for voltage and current
Accuracy When The Crest Factor is Set to 6 or 6A	accuracy obtained by doubling the measurement range error for the accuracy when the crest factor is set to 3
Accuracy of Apparent Power S	voltage accuracy + current accuracy
Accuracy of Reactive Power Q	accuracy of apparent power + ($\sqrt{}$1.0004 - λ2) - ($\sqrt{}$1 - λ2) ×100 %
Accuracy of Power Factor Λ	± [(λ-λ/1.0002)+ |λcosø-cos{ø+sin-1 (influence from the power factor when λ = 0%/100)} |] ±1 digit when voltage and current are at the measurement range rated input
Accuracy of Phase Difference Φ	± [| ø-cos-1(λ/1.0002) | + sin-1 (influence from the power factor when λ = 0 % / 100)] ± 1 digit when voltage and current are at the measurement range rated input
Accuracy When The Crest Factor is Set to 6 or 6A	accuracy obtained by doubling the measurement range error for the accuracy when the crest factor is set to 3
Accuracy Changes Caused by Data Update Interval	When the data update interval is 100 ms, and Auto, add 0.05% of reading to the 0.1 Hz to 1 kHz accuracy.
VOLTAGE, CURRENT AND ACTIVE POWER MEASUREMENTS	
Item	Specifications
Measurement Method	Digital sampling method
Crest Factor	3 or 6 (6A)
Wiring System	Single-phase, two-wire (1 P2 W)
Range Select	Select manual or auto ranging
Auto Range	Auto-range increase The range is upped when any of the following conditions is met. Crest factor 3 Urms or Irms exceeds 130% of the currently set measurement range. Upk, Ipk value of the input signal exceeds 300% of the currently set measurement range. Crest factor 6 Urms or Irms exceeds 130% of the currently set measurement range. Upk, Ipk value of the input signal exceeds 600% of the currently set measurement range. Crest factor 6A Urms or Irms exceeds 260% of the currently set measurement range. Upk, Ipk value of the input signal exceeds 600% of the currently set measurement range. Auto-range decline The range is downed when all of the following conditions are met. Crest factor 3 Urms or Irms is less than or equal to 30% of the measurement range. Urms or Irms is less than or equal to 125% of the next lower measurement range. Upk, Ipk value of the input signal exceeds 300% of the currently set measurement range. Crest factor 6 or 6A Urms or Irms is less than or equal to 30% of the measurement range. Urms or Irms is less than or equal to 125% of the next lower measurement range. Upk, Ipk value of the input signal exceeds 600% of the currently set measurement range.
Display Mode Switching	Vrms (the true RMS value of voltage and current) VOLTAGE MEAN (the rectified mean value calibrated to the RMS value of the voltage and the true RMS value of the current) AC DC
Measurement Synchronization Source	Select voltage, current, or off In the case of Auto Update Rate, select the voltage or current from the equipped element.
Line Filter	Select OFF or ON (cutoff frequency at 500 Hz).
Peak Measurement	Measures the peak (max, min) value of voltage, current or power from the instantaneous voltage, instantaneous current or instantaneous power that is sampled.
Zero-level Compensation	Removes the internal offset of the measure unit (After measurement range is changed)
Measurement Parametersl	Voltage Vrms , Vmn, Vdc , Vac Current Irms , Idc , Iac Active Power P Apparent Power VA Reactive power VAR Power Factor PF Crest Factor CFI, CFV Phase Angle DEG Frequency IHz and VHz Voltage Peak V+pk and V-pk Current Peak I+pk and I-pk Active Power Peak P+pk and P-pk Total Harmonic Distortion THDI and THDV Maximum Current Ratio MCR

SPECIFICATIONS

FREQUENCY MEASUREMENT

Item	Specifications
Measurement Item	Voltage and current
Measurement Frequency Range	Data update interval / Measurement Frequency Range 0.1 s: 20 Hz ≤ f ≤ 100 kHz 0.25 s: 10 Hz ≤ f ≤ 100 kHz 0.5 s: 5 Hz ≤ f ≤ 100 kHz 1 s: 2.0 Hz ≤ f ≤ 100 kHz 2 s: 1.0 Hz ≤ f ≤ 100 kHz 5 s: 0.5 Hz ≤ f ≤ 100 kHz 10 s: 0.2 Hz ≤ f ≤ 100 kHz 20 s: 0.1 Hz ≤ f ≤ 100 kHz Auto (*): 0.1 Hz ≤ f ≤ 100 kHz (*) Limit of the measurement lower limit frequency by the Timeout setting Timeout / lower limit frequency 1 s: 2.0 Hz 5 s: 0.5 Hz 10 s: 0.2 Hz 20 s: 0.1 Hz
Measurement Range	Auto switching among six types: 100mHz, 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, and 100 kHz.
Frequency Filter	Select OFF or ON (cut off frequency of 500 Hz)
Accuracy	Requirements: When the input signal level is 30% or more of the measurement range If the crest factor is set to 3. (60% or more if the crest factor is set to 6 or 6A) • Frequency filter is ON when measuring voltage or current of 200 Hz or less. ± (0.06% of reading)

INTEGRATION

Item	Specifications
Mode	Select manual integration mode, standard integration mode, or repetitive integration mode.
Timer	Automatically stop integration by setting a timer. Selectable range: 0 hours 00 minutes 00 seconds to 9999 hours 59 minutes 59 seconds
Accuracy	±(Power accuracy (or current accuracy) + 0.1% of reading) (fixed range)
Range Setting	Auto range or fixed range is available for Integration
Timer Accuracy	±0.02%
Remote Control	Start, stop and reset operations are available using an external remote signal. (option)

HARMONIC MEASUREMENT

Item	Specifications
Measured Item	Voltage, Current, Power
Measured Method	Zero-cross simultaneous calculation method
Frequency Range	10 Hz to 1.2 kHz.
FFT Data Length	1024 4096 (Auto switch when both 50Hz/60Hz and update rate > 0.1s conditions are met)

Sample Rate, Window Width, and Upper Limit of Analysis Orders*

Fundamental Frequency	Sample rate	Window Width	upper limit of Analysis orders
10 Hz to 44 Hz	f x 1024	1	50
45 Hz to 55 Hz	f x 512	10	50
54 Hz to 66Hz	f x 512	12	50
67 Hz to 150 Hz	f x 512	2	32
150 Hz to 300 Hz	f x 256	4	16
300 Hz to 600 Hz	f x 128	8	8
600 Hz to 1200 Hz	f x 64	16	4

Accuracy

Frequency	Voltage	Current	Power
10 Hz ≤ f < 45 Hz	0.15% of reading + 0.35% of range	0.15% of reading + 0.35% of range	0.35% of reading + 0.50% of range
45 Hz ≤ f < 440 Hz	0.15% of reading + 0.35% of range	0.15% of reading + 0.35% of range	0.25% of reading + 0.50% of range
440 Hz ≤ f < 1.2kHz	0.20% of reading + 0.35% of range	0.20% of reading + 0.35% of range	0.40% of reading + 0.50% of range

* 50Hz/60Hz Compliant IEC61000-4-7

D/A OUTPUT (OPTIONS)

Item	Specifications
Output Voltage	±5 V FS (approach ±7.5 V maximum) against each rated value.
Number Of Output Channels	4
Output Items	Set for each channel: V, I, P, VA, VAR, PF, DEG, VHZ, IHZ, Vpk, Ipk, WP, WP±, q, q±, Off
Accuracy	±(accuracy of each measurement item + 0.2% of FS) (FS = 5 V)
D/A Conversion Resolution	16 bits
Minimum Load	100 kΩ
Update Interval	Same as the data update interval. In the case of Auto Update Rate, update interval is equal to signal interval. More than 100ms.
Temperature Coefficient	±0.05%/°C of FS

REMOTE CONTROL INPUT/OUTPUT SIGNAL (OPTIONS)

Item	Specifications
Remote Control Input Signal	EXT HOLD, EXT TRIG, EXT START, EXT STOP, EXT RESET
Remote Control Output Signal	INTEG BUSY
I/O Level	TTL
I/O Logic Format	Negative logic, Falling edge

SPECIFICATIONS

DIGITAL IO SIGNAL (OPTIONS)

Item	Specifications
I/O Control Output Signal	OUT1, OUT2, OUT3, OUT4
I/O Level	TTL
I/O Sink Current	Max 100mA (per/ch)

* Q (VAR), S (VA), λ (PF) and Φ (DEG) are originated from the measured values including voltage, current and active power which go through computation process. In respect to distorted signal input, accordingly, the value acquired from other instruments, which employ different methods, may differ from that acquired from GPM-8310 unit.
* "Zero" will be shown for S or Q and "--" will be displayed for λ and Φ when either current or voltage is less than 0.5% of the rated range (less than or equivalent to 1% when crest factor is set 6).

GENERAL

Note	The below are the basic conditions required to operate the GPM-8310 within specifications: • 1-year Calibration: Yearly • Operating Environment: 18~28 °C (64.4~82.4°F) • Humidity: <80%RH, • Accuracy: ± (% of reading + % of range) • The specifications apply when it warmed up for at least 30 minutes and operates in the slow rate. • The power supply cable must be grounded to ensure accuracy. • Input voltage and current must be standard sine wave. • The power factor must be 1. • The crest factor must be 3. • The common-mode voltage must be zero.
Specification Condition	Temperature: 23°C±5°C Humidity: <80%RH(non-condensing)
Operation Condition	Temperature 0°C ~ 40°C, • 30 ~ 40°C, Relative Humidity < 70%RH (non-condensing) • >40°C, Relative Humidity < 50%RH (non-condensing) Indoor use only Altitude: < 2000 meters Pollution degree 2
Storage Condition	Temperature −40°C ~ 70°C Humidity: < 90%RH (non-condensing)
Power Source	AC 100-240V, 50–60Hz ; Consumption Max. 30VA
Dimensions	268(W) x 107(H) x 379(D) mm (w/t bumpers)
Weight	Approx. 2.9kg

Specifications subject to change without notice.

ORDERING INFORMATION

GPM-8310	Digital Power Meter with RS-232C/USB device & host/LAN/GPIB
GPM-8310 with DA4	Digital Power Meter with RS-232C/USB device & host/LAN/GPIB and opt. DA4

ACCESSORIES

Safety Instruction Sheet x 1, Power cord x 1, Test lead GTL-209 x 1, Test lead GTL-212 x 1, CD x 1 (including complete user manual and USB driver), DA4 cable GTL-214 (available for GPM-8310 with DA4 only)

GTL-209

GTL-212

GTL-214

OPTION

GPM-DA4	DA4 Interface (including cable, GTL-214)

Note : Optional DA4 interface must be installed in factory.

OPTION ACCESSORIES

GPM-001	Test Fixture (including GTL-210 x 2, GTL-213 x 1)
GPM-001(EU)	Test Fixture (including GTL-210 x 2, GTL-213 x 1)
GTL-209	Test Lead, Banana to Bare-wire, Approx. 1000mm
GTL-210	Test Lead, Banana to Banana, Approx. 1000mm
GTL-212	Test Lead, O-Type to Bare-wire, Approx. 1000mm
GTL-213	Test Lead, O-Type to Banana, Approx. 1000mm
GTL-214	DA4 Cable, Approx. 1000mm
GTL-232	RS-232C cable, 9-pin Female to 9-pin, null modem for computer, Approx. 2000mm
GTL-246	USB Cable, A-B type, Approx. 1200mm
GTL-248	GPIB Cable, Approx. 2000mm
GRA-422	Rack Mount Kit, 19" 2U size