

GPM-8320-60/8330-60

Digital Power Meter

FEATURES

- 5" TFT LCD
- Voltage/Current Test Freq. Bandwidth: DC, 0.1 Hz to 100 kHz
- Direct Input Current up to 60 A
- Waveform Display : V (Voltage), I (Current), P (Wattage)
- Distorted Wave Current/Voltage Measurement: Full Range for CF=3, and Half Range for CF=6 (or 6A)
- Meeting IEC 61000-4-7 Harmonic Measurement (50 Hz/60 Hz)
- Wiring Selecting Button (1P3W, 3P3W, 3P4W, 3V3A)
- Harmonic Measurement & Analysis up to 50 Orders
- Auto Ranging Function for Integration Mode
- Screen Capture Through USB Host
- Provide External Current Sensor Input (EXT1/EXT2)
- Standard Interface: RS-232C, USB Device/Host, LAN
- Optional Interface: GPM-DA12 - GPIB + Digital I/O (Factory Installed Only)

GW INSTEK
Simply Reliable

GW Instek GPM-8320-60/GPM-8330-60 are extension models of the existing three-phase power meter GPM-8320/GPM-8330. The GPM-8320-60 provides 2 input elements, and the GPM-8330-60 provides 3 input elements and the added ""-60"" symbol means the maximum current of the direct input can reach 70 A (60 A is guaranteed specification) , which not only enhance the high-current power measurement applications, but also save the cost of current transformer compared to the existing models. These models have a testing bandwidth of DC, 0.1 Hz to 100 kHz and feature 16-bit A/D converters and a sampling rate of 300 kHz. A 5-inch TFT LCD display, 5 digits of measurement readings, 25 different power measurement parameters, and high precision measurement capabilities are also provided. GPM-8320-60/GPM-8330-60 also feature waveform display capabilities (voltage/current/power), the integration measurement function, harmonics measurement and analysis of multiple orders (50 Hz / 60 Hz measurement complies with IEC61000-4-7 requirements), external sensor input terminals, and a variety of communications interfaces. These features help users achieve clear, convenient, and accurate power measurements, making them the most fully-featured and cost-effective power meters in the same category.

GPM-8320-60/GPM-8330-60 provide multiple input voltage configuration wiring modes (1P3W/3P3W/3P4W/3V3A). Users can choose the wiring mode according to their specific requirements to measure parameters for specific wiring methods, and even calculate efficiency. In addition, for a rated input voltage of 1000 V and an input current of 60 A, they support a minimum current range of 1 A (resolution of 0.1 mA), power measurement resolution of 0.1 mW, crest factor of 3 (for half range, the CF can reach up to 6 or 6A), and voltage/current/power measurement accuracy of $\pm 0.1\%$ reading $\pm 0.05\%$ range. Users can select different measurement modes (AC+DC/AC/DC/V-MEAN) to provide up to 25 related parameters for power measurement. These parameters include voltage ($V_{rms}/V_{ac}/V_{dc}/V_{mn}/V_{+pk}/V_{-pk}$), current ($I_{rms}/I_{ac}/I_{dc}/I_{+pk}/I_{-pk}$), 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 (THDV/THDI), maximum current ratio (MCR), and MATH calculation function. Therefore, they provide the best range and accuracy support for measuring the power consumption of electrical and electronic products.

GPM-8320-60/GPM-8330-60 also effectively utilize the advantages of TFT LCD display, providing results of parameter measurements in both numerical and graphical formats. In terms of numerical display, it offers a general mode and a multiple mode. The general mode includes 4 tabs (page1~page4), and each tab can display 10 measurement parameters (2 main measurements + 8 monitoring measurements). Users can freely combine these parameters to display the results of measurements from various modules. The multiple mode can simultaneously display the measurement results of three modules, which is particularly suitable for comparing differences in measurements between modules, such as unbalanced three-phase. This mode also offers 4 tabs, and each tab can display 8 measurement parameters. In terms of graphical display, they offer a simple oscilloscope mode to display voltage, current, and power parameters in waveform format. Additionally, the display provides numerical or bar chart display for the measurement and analysis of harmonics signals at various orders that not only satisfies the need for accuracy and clear readability in process testing, but also meets the diverse measurement application requirements for research and development, design and quality verification.

GPM-8320-60/GPM-8330-60 have comprehensive mechanisms and functions for auxiliary measurements. For applications that require measuring high voltage, they provide VT rate settings that can be used with external potential transformers. For measuring large current, it depends on the type of current transformer, whether it is a voltage output type or a current output type. If it is a current output type, it can be directly locked onto the meter's rear panel and used with CT rate settings for measurement. If it is a voltage output type, it can be measured through the external current sensor input terminals (EXT1/EXT2) provided by GPM-8320-60/GPM-8330-60. Automatic range switching can be customized to the required range to save unnecessary time spent on range switching. The internal memory of 10,000 data logs can store measurement data at the update rate set by GPM-8320-60/GPM-8330-60 or at a user-defined time interval for future analysis.

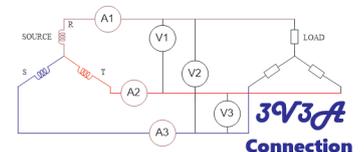
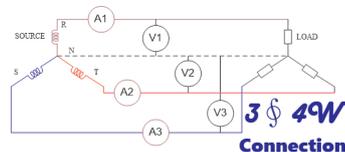
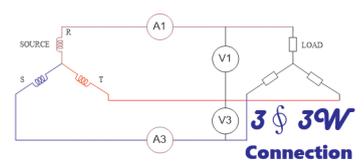
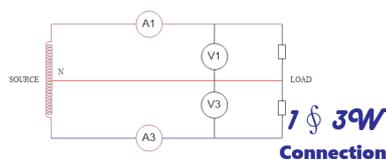
In terms of data acquisition and storage, GPM-8320-60/GPM-8330-60 offer a variety of communications interfaces, including RS-232C/USB device (virtual COM)/LAN, or optional GPIB. Users can choose to write programs to read measurement results according to their habits or in collocation with existing system interfaces. The USB host can support screen capture, internal data logging, and firmware updates for GPM-8320-60/GPM-8330-60. For those with the needs of using external signal control or data recorder for data recording, GPM-8320-60/GPM-8330-60 also offer an optional Digital I/O (DA12) interface (must be installed at the factory), which can be connected to external controllers such as PLC or data recorders to meet the needs of automated measurements or long recording applications.

A. WIRING SELECTION KEY

1P3W 3P3W 3P4W 3V3A

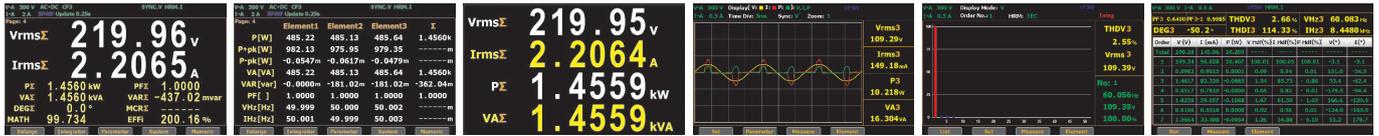


	1P3W	3P3W	3P4W	3V3A
GPM-8330-60	✓	✓	✓	✓
GPM-8320-60	—	✓	✓	✓



GPM-8320-60/GPM-8330-60 provide multiple input voltage configuration wiring modes (1P3W/3P3W/3P4W/3V3A). Users can choose the wiring mode according to their specific requirements to measure parameters for specific wiring methods, and even calculate efficiency.

B. VARIOUS DISPLAY MODES



Numerical (Single) Mode

Numerical (Multiple) Mode

Numerical (Simple) Mode

Waveform Mode

Harmonics (Bar Graph) Measurement

Harmonics (List) Measurement

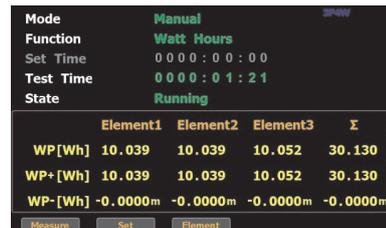
GPM-8320-60/GPM-8330-60 provide two display modes, numerical and graph, which help users maximize the benefits of their measurements. In numerical mode, there are two options: single and multiple. In single mode, there are four tabs that can be customized with the module's measurement settings, and each tab can display up to 10 measurement parameters (2 main and 8 secondary measurements). In multiple mode, there are also four tabs, and users can simultaneously observe the same 8 measurement parameters from three different modules. Parameters in both modes can be arranged and customized as needed, and a simple mode that displays only the first four parameters is also available regardless of which tab is selected. In graph mode, there is a simple oscilloscope function that displays the waveforms of three parameters:

voltage, current, and power. The horizontal scale can be adjusted (from 50 μ s/div to 10 ms/div depending on the set data update rate), and three waveform observation magnification ratios are available. When measuring harmonics, the harmonics measurement results of each order can be displayed in a bar chart, and a specific observation order can be specified. Additionally, all relevant values for harmonics of each order (voltage/current/power voltage distortion percentage/current distortion percentage/power distortion percentage/voltage phase angle/current phase angle) can be fully recorded and presented.

C. 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
Mathematical Computation	MATH
Maximum Current Ratio	MCR, Effi
Integration	WP, WP+, WP-, q, q+, q-, Vac, Iac

*: Only applicable to specific measurement modes and available for selection



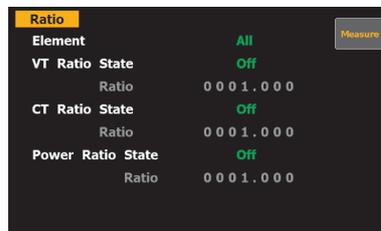
GPM-8320-60/GPM-8330-60 provide a variety of measurement items, including voltage, current, frequency, active power, apparent power, reactive power, power factor, crest factor, total harmonic distortion, and even the ability to measure maximum current ratio. Additionally, GPM-8320-60/GPM-8330-60 are equipped with measurement functions for power or current time integration specific to the DUT. Users set a period

of time to perform instantaneous power integration during this time, and then divide by the time to obtain the average power of the DUT. Moreover, during integration measurements, GPM-8320-60/GPM-8330-60 support automatic range switching function to obtain the most complete integration results in response to the power changes of the DUT in different time periods.

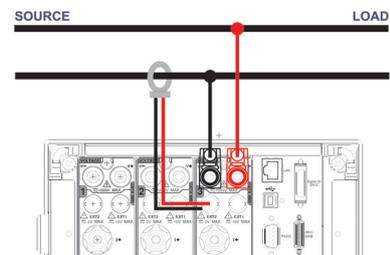
D. SUPERB MEASUREMENT ASSISTANCE



Direct Input



Ratio Configuration

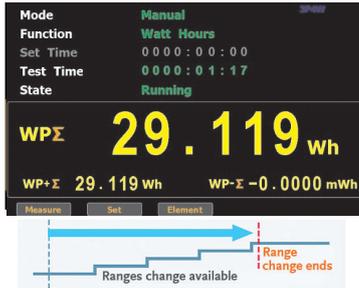


External Current Sensor Input

In terms of measurement support, the GPM-8320-60/GPM-8330-60 perform very well. First, in high voltage/power measurements, a voltage/power ratio setting is provided to restore the decay rate to its true value. For high current measurement, in addition to the direct input of up to 60 A current measurement, they also provide current ratio setting and external current sensor terminals (EXT1/EXT2) to connect current sensors or voltage output type current transformers, making high current

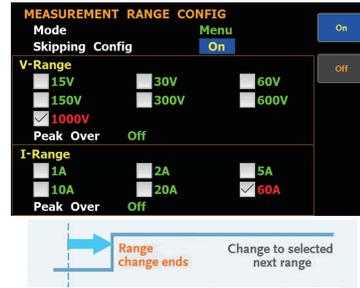
measurement above 60 A more convenient. In addition, the GPM-8320-60/GPM-8330-60 provides 4 sets of panel settings for storage/recall, and a memory that can store up to 10,000 measurements. Measurement storage can record measurement results at an update rate or user-defined time intervals for later analysis. The USB host on the front panel supports screen capture, measurement value storage and firmware updates.

E. FLEXIBLE LEVEL-CHANGING MECHANISM



Automatic level-changing under the integration function

GPM-8320-60/GPM-8330-60 offer automatic range switching mode for integral measurement, allowing users to calculate the total value of the DUT's power variation from the start to the end of the integration period. In addition, GPM-8320-60/GPM-8330-60 also support a customizable



Self-defined automatic level-changing mechanism

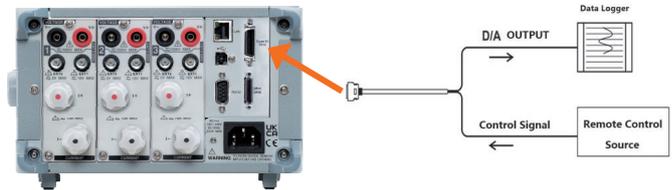
range switching mechanism. Users can select the desired range, which not only saves time wasted during range switching but also speeds up the testing process.

F. CONVENIENT AND PRACTICAL INTERFACE



Practical Interface

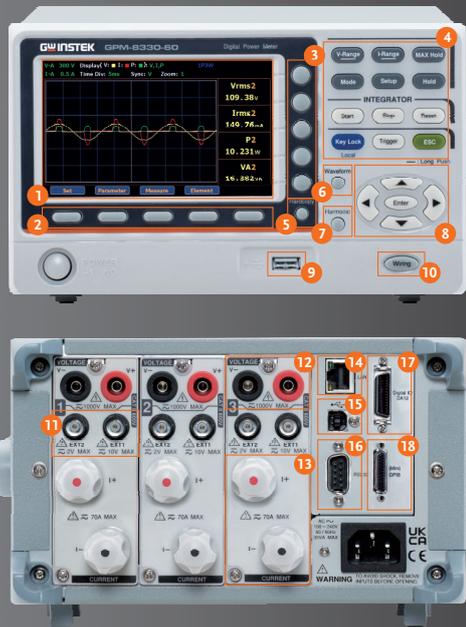
GPM-8320-60/GPM-8330-60 offer a comprehensive and diverse set of communications interfaces, including RS-232/USB/LAN/GPIB (optional), suitable for users to remotely control and collect measurement results through command sets to program computer software. The optional Digital I/O (DA12) interface provides three different modes according to users' settings: including external control, DA12 output, and self-defined output. When the setting is external control mode, users can activate, stop, trigger, or reset the integration measurement function through



DA12 Interface Mechanism

external signals. When it is set to DA12 output mode, users can define 12 measurement parameter values from the provided 17 measurement parameters (even the result of integration measurement) to output in a fixed range (full scale + 5 V) or manual range (full scale \pm 5 V) and receive the results in collocation with a data recorder. When it is set to custom output mode, it needs to be used with a communications interface, and the action of each defined pin is controlled through commands.

PANEL INTRODUCTION



1. LCD
2. Function Keys (F1-F5)
3. Soft Keys
4. Function Keys
5. Hardcopy Key
6. Waveform Key
7. Harmonic Key
8. Arrow Keys
9. USB Host Port
10. Wiring Key
11. External Input 1/2
12. Voltage Input Terminal
13. Current Input Terminal
14. LAN Port
15. USB Device Port
16. RS-232 Connector
17. Digital IO / DA12 (Opt.)*
18. Mini GPIB Connector (Opt.)*

* GPIB and Digital IO are 2-in-1 interfaces called GPM-DA12; they must be installed in the factory.

SPECIFICATIONS

INPUT		
Item	Specifications	
Input type	Voltage	Floating input through resistive voltage divider
	Current	Floating input through shunt
Measure range	Voltage	15 V, 30 V, 60 V, 150 V, 300 V, 600 V and 1000 V
	Current	
	Direct input	1 A, 2 A, 5 A, 10 A, 20 A and 60 A
	Sensor input	EX1: 2.5 V, 5 V and 10 V EX2: 50 mV, 100 mV, 200 mV, 500 mV, 1 V and 2 V
Input impedance	Voltage	Input resistance: approach 2 MΩ
	Current	
	Direct input range 1 A to 60 A	Input resistance: approach 1.65 mΩ
	Sensor input	
	Input range 2.5 V to 10 V (EX1) Input range 50 mV to 2 V (EX2)	Input resistance: approach 100 kΩ Input resistance: approach 20 kΩ
Continuous maximum allowable input	Voltage	Peak value of 1.5 kV or RMS value of 1 kV, whichever is less. When range 1000 V CF=1.5
	Current	
	Direct input range 1 A to 60 A Sensor input	Peak value of 150 A or RMS value of 70 A, whichever is less. Guaranteed specifications 65 A Peak value less than or equal to 5 times of the rated range
Input bandwidth	DC, 0.1 Hz to 100 kHz	
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 16 bits	
	Maximum conversion rate Approx. 300 kHz	
Display update interval	When the data update interval is 100 ms the numeric display 10 items display update interval is 200 ms	
	When the data update interval is 100 ms or 250 ms and the numeric value display is set to Matrix or ALL Items display update interval is 500 ms	
	The waveform display update intervals are approximately 1 s	
VOLTAGE AND CURRENT ACCURACY		
Item	Specifications	
Requirements	Temperature	23 °C ± 5 °C
	Humidity	30 % to 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)	
Accuracy	Effective range	1 % to 105 % of range
	DC	± (0.2 % 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 x f) % of reading + 0.3% of range) to Voltage ± ((0.13 x f) % of reading + 0.4% of range) to Current ± ((0.07 x f) % of reading + 0.3% of range) to EXT 1/2
	10 kHz < f ≤ 100 kHz	± (0.5 % of reading + 0.5 % of range) ± [(0.04 x (f-10)) % of reading] to Voltage ± ((0.13 x f) % of reading + 0.5% of range) to Current ± (0.5 % of reading + 0.5 % of range) ± [(0.04 x (f-10)) % of reading] to EXT 1/2
	Values for voltage in excess of 750 V for which 30 kHz < f ≤ 100 kHz are reference only Values for current in excess of 20 A for which 30 kHz < f ≤ 100 kHz are reference only	
Temperature coefficient	Add	± 0.03 % of reading/°C within the range 5 °C to 18 °C or 28 °C to 40 °C
When the line filter is turned ON	45 Hz to 66 Hz	Add 0.3 % of reading
	< 45 Hz	Add 1 % of reading
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	
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.	
	1 A / 2 A / 5 A / 10 A / 20 A / 60 A ranges	500 μA/°C
	External current sensor input (/EX1)	1 mV/°C
	External current sensor input (/EX2)	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	

SPECIFICATIONS

ACTIVE POWER ACCURACY

Item	Specifications	
Requirements	same as the conditions for voltage and current.	
Accuracy	Power factor	1
	Effective range	1 % to 110 % of range
	DC	± (0.3 % of reading + 0.2 % of range)
	0.1 Hz ≤ 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 ≤ 1 kHz	± (0.2 % of reading + 0.2 % of range)
	1 kHz < f ≤ 10 kHz	± (0.3 % of reading + 0.5 % of range) ± [(0.13 × f) % of reading]
Influence of power factor	when power factor (λ) = 0 (S: apparent power)	
	± 0.1 % of S for 45 Hz ≤ f ≤ 66 Hz	
	± {(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=0)%}]		
When the line filter is turned ON	45 Hz to 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 + (√1.0004 - λ ²) - (√1 - λ ²) × 100 %	
Accuracy of power factor λ	± [(λ-λ/1.0002) + cosφ-cos{φ+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	± [φ-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 MEASUREMENT		
Item	Specifications	
Measurement method	Digital sampling method	
Crest factor	3 or 6 (6A)	
Wiring system	1P3W, 3P3W, 3P4W, 3V3A	
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	Vrms or Irms exceeds 130 % of the currently set measurement range Vpk, Ipk value of the input signal exceeds 300 % of the currently set measurement range
	Crest factor 6	Vrms or Irms exceeds 130 % of the currently set measurement range Vpk, Ipk value of the input signal exceeds 600 % of the currently set measurement range
	Crest factor 6A	Vrms or Irms exceeds 260 % of the currently set measurement range Vpk, 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	Vrms or Irms is less than or equal to 30 % of the measurement range Vrms or Irms is less than or equal to 125 % of the next lower measurement range Vpk, Ipk value of the input signal exceeds 300 % of the currently set measurement range
	Crest factor 6 or 6A	Vrms or Irms is less than or equal to 30 % of the measurement range Vrms or Irms is less than or equal to 125 % of the next lower measurement range Vpk, Ipk value of the input signal exceeds 600 % of the currently set measurement range
	Display mode Switching	AC+DC (the true RMS value of voltage and current)
V-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 parameters	Voltage	Vrms, Vmn, Vdc, Vac
	Current	Irms, Idc, Iac
	Active Power	P
	Apparent Power	VA

SPECIFICATIONS

	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		
	Mathematical Computation	MATH, EFFi		
	Maximum Current Ratio	MCR		
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	5.0 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: 100 mHz, 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			
Count overflow	WP: 999999 MWh / -99999 MWh q: 999999 MAh / -99999 MAh			
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	4096 (Auto switch when both 50 Hz / 60 Hz and update rate must be greater than or equal to 0.5 s)			
Sample rate, window width, and upper limit of Analysis orders**		Sample rate	Window Width	upper limit of Analysis orders
	45 Hz to 55 Hz	f × 512	10	50
	54 Hz to 66 Hz	f × 512	12	50
Sample rate, window width, and upper limit of Analysis orders**		Sample rate	Window Width	upper limit of Analysis orders
	10 Hz to 67 Hz	f × 1024	1	50
	67 Hz to 150 Hz	f × 512	2	32
	150 Hz to 300 Hz	f × 256	4	16
	300 Hz to 600 Hz	f × 128	8	8
	600 Hz to 1200 Hz	f × 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
		0.15 % of reading + 0.35 % of range	0.15 % of reading + 0.35 % of range	0.25 % of reading + 0.50 % of range

SPECIFICATIONS

	440 Hz ≤ f < 1.2 kHz	0.20 % of reading	0.20 % of reading	0.40 % of reading
		+ 0.35 % of range	+ 0.35 % of range	+ 0.50 % of range
* 50 Hz / 60 Hz Compliant IEC61000-4-7 (update rate must be > 0.5 s)				
* Harmonic calculation: FFT method in which FFT data length is divided into 2 types: 1024 and 4096.				
* FFT data length automatically switches in accord with the Frequency and Update Rate of measured signal.				
D/A OUTPUT (OPTIONS)				
Item	Specifications			
Output voltage	± 5 V FS (approach ± 7.5 V maximum) against each rated value			
Number of output channels	12			
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 100 ms			
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			

* 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-8320-60/8330-60 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).

Specifications subject to change without notice. PM-8320-60/8330-60CD1B1H

ORDERING INFORMATION

GPM-8320-60	Digital Power Meter (RS-232C/USB/USB device & host/LAN)
GPM-8320-60 (with GPM-DA12)	Digital Power Meter (RS-232C/USB/USB device & host/LAN and opt. GPM-DA12)
GPM-8330-60	Digital Power Meter (RS-232C/USB/USB device & host/LAN)
GPM-8330-60 (with GPM-DA12)	Digital Power Meter (RS-232C/USB/USB device & host/LAN and opt. GPM-DA12)

ACCESSORIES

Power cord x 1, Terminal Cover GPM-002 x 1
GPM-8320-60: Test LEAD GTL-209 x 2, Test Lead GTL-212A x 2
GPM-8330-60: Test LEAD GTL-209 x 3, Test Lead GTL-212A x 3
DA12 cable GTL-214 (available for GPM-8320-60/8330-60 with GPM-DA12)

OPTION

GPM-DA12 GPIB+DA12 Interface (including cable, GTL-214)
Note : The option is 2-in-1 interface and must be installed in factory.

OPTION ACCESSORIES

GCP-300	Current Probe (suitable for the external input, EXT2, connection)
GTL-209	Test Lead, Banana to Bare-wire, Approx. 1000 mm
GTL-212A	Test Lead, O-Type to Bare-wire, Approx. 1000 mm
GTL-214	DA12 Cable, Approx. 1000 mm
GTL-232	RS-232 Cable, 9 pin F-F type, null modem for computer, Approx. 2000 mm
GTL-246	USB Cable, A-B type, Approx. 1200 mm
GTL-258	GPIB Cable, 25-pin Micro-D connection, Approx. 1900 mm
GRA-452	Rack Mount Kit (19" 3U)



GPM-002



GTL-209



GTL-212A



GTL-214

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