

Measure Everything from AC, DC and 3-Phase Power Sources to Standby Power

The optimal power meter lineup for all applications

POWER METER PW3337/PW3336



AC/DC POWER HITESTER 3334

POWER HITESTER 3333







Advancing the Standard for Power Measurement

The best performing instruments for power measurement on production lines, in laboratories, and in research facilities.

Hioki delivers the optimal power testing solutions based on use case conditions, practical application, and accuracy.

Three-phase Power Meter

The PW3337 and PW3336 are suitable for a wide variety of connections, such as measuring three-phase circuits and single-phase 2-wire multiple circuits.

There is little internal resistance for the current input, and large currents up to 65 A can be measured with great accuracy.





Single-phase Power Meter

The PW3335 provides highly accurate measurements for everything from standby power to operating power.

Compliant with the IEC62301 measurement standard for standby power, it is capable of measuring current as low as 10 µA.

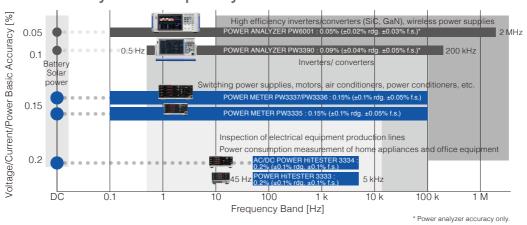
Designed for power consumption testing, the 3334 and 3333 are guaranteed for accuracy for up to 3 years.



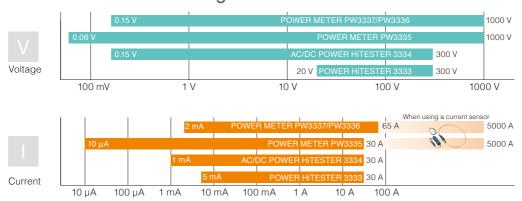




Basic Accuracy and Frequency Bands



Effective Measurement Range



Comparison Chart

		PW3337	PW3336	PW3335	3334	3333
No. of channels		3	2	1	1	1
Supported connections		Three-phase, three-phase + single-phase, single-phase x 3, DC x 3	Three-phase, single-phase x 2, DC x 2	Single-phase, DC	Single-phase, DC	Single-phase
Effective measur range, voltage	ement	0.15 V to 1000 V		0.06 V to 1000 V	0.15 V to 300 V	20 V to 300 V
Effective measur range, current	ement	2 mA to 65 A		10 μA to 30 A	1 mA to 30 A	5 mA to 30 A
Frequency band		DC, 0.1 Hz to 100 kHz			DC, 45 Hz to 5 kHz	45 Hz to 5 kHz
Basic accuracy, (Voltage, current		±0.1% rdg. ±0.05% f.s.			±0.1% rdg. ±0.1% f.s.	±0.1% rdg. ±0.2% f.s.
Basic accuracy, DC (Voltage, current, power)		±0.1% rdg. ±0.1% f.s.			±0.1% rdg. ±0.2% f.s.	-
Integrated power measurement	r 	Yes			Yes	-
Harmonic measu	ırement	IEC61000-4-7 compliant			-	
Current sensor in	nput	Ye	es	PW3335-03, -04	-	
	LAN		Yes		-	
Interface	RS-232C	Ye	es	PW3335, -02, -03, -04	Yes	
interrace	GP-IB	PW3337-01, -03	PW3336-01, -03	PW3335-01, -04	3334-01	3333-01
	D/A+n+	D(V)3332 U3 U3	D/Noose us us	DIMISSSE US UN	Voo	

Features

POWER METER PW3337/PW3336

Accurate measurement of power for three-phase equipment, through direct input up to 1000 V AC/DC / 65 A.





PW3337-03 Front Panel

PW3337-03 Rear Panel



Maximum 65 A input Cable terminals are fixed securely with large screws on the terminal block

- Voltage/current/power basic accuracy of ±0.1% *
- Direct input up to 1000 V AC/DC / 65 A
- Harmonic measurement as standard feature, IEC61000-4-7 compliant





- Measurement of multiple connections in the optimal range for each due to independent ranges for each channel
- Measure up to 5000 A AC with optional current sensor

POWER METER PW3335

Highly accurate AC/DC measurements from standby power to operating power











PW3336-03

Half-rack Size to Save Space



For development/production lines for electrical equipment

- Voltage/current/power basic accuracy ±0.1% *
- Highly accurate AC/DC measurements from standby power to operating power
- Accuracy guaranteed throughout a wide range, from 10 μA to 30 A and 60 mV to 1000 V AC/DC
- Harmonic measurement as standard feature, IEC61000-4-7 compliant
- Compliant with the IEC62301 and EN50564 measurement standards for standby power
- Power factor effect of ±0.1% f.s. delivers highly accurate measurements even for no-load testing of transformers with a low power factor
- Accurate measurement of fluctuating electric power thanks to auto range integration with guaranteed accuracy for measurements while range switching
- Measure up to 5000 A AC with optional current sensor (PW3335-03, -04)
- Ourrent input terminal LAN connector RS-232C connector GP-IB connector Voltage input terminal External control terminal D/A output terminal © Current sensor input terminal Synchronous control terminal

AC/DC POWER HITESTER 3334

Measurement of power consumption and integrated power for battery-operated equipment, home appliances, and office equipment





- Accuracy guaranteed up to 3 years
- Compliant with the SPECpower® server power evaluation test

POWER HITESTER 3333

Low-price model for measurement of power consumption on production/inspection lines

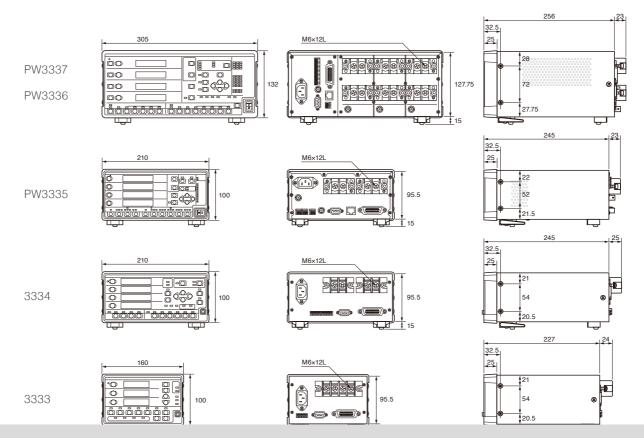




- Compact model for saving space, even when added to a system
- Accuracy guaranteed up to 3 years

Dimensional Drawings

Units: mm



ES France - Département Tests & Mesures - 127 rue de Buzenval BP 26 - 92380 Garches Tél. 01 47 95 99 45 - Fax. 01 47 01 16 22 - e-mail: tem@es-france.com - Site Web: www.es-france.com

Applications

Inspection of Electrical Equipment Production Lines



Our lineup provides reliable accuracy for a variety of measurement scenarios. Accurately measure the power consumption of a variety of household appliances, such as liquid crystal displays, refrigerators, and air conditioners.





Basic accuracy, AC

±0.1%

Accuracy Guaranteed Up to 3 Years (Longest in the Industry)



The 3333 and 3334 are guaranteed for accuracy for 3 years. Even after 3 years, they maintain an accuracy of $\pm 0.5\%$ rdg. as required for measurements. This 3-year accuracy guarantee, the longest in the industry, helps to save on calibration expenses.



Extensive Interfaces



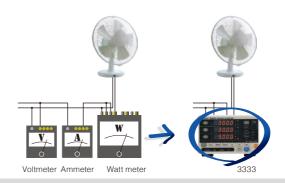
The built-in interfaces are convenient for transferring data to a PC and equipping the unit on automated machines. PC communication software can be downloaded free of charge from the HIOKI website. For details about the built-in interfaces, refer to the specifications for each model.



Replacement for Analog Meters



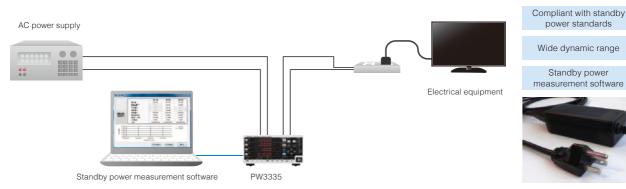
These models can be used as replacements for analog voltmeters, ammeters, and watt meters. Up to 4 parameters such as voltage, current, and power can be displayed at the same time, allowing 3 measuring devices to be covered with a single unit. The digital display avoids issues such as parallax due to viewing angle and zero shift of the indicator.



^{*} For complete details, please refer to the specifications

Standby Power Measurement





AC adapter standby power measurement, for primary AC and secondary DC

Key features

Compliant with IEC62301 and EN50564 Standards

The PW3335 is compliant with measurement standards for standby power, as welll as other measurement standards including the ErP Directive and Energy Star. Special parameters required by such standards including THD, CF, and MCR can also be checked with this unit.

Requirements for Measurement Instruments for Standby Power Measurements (excerpt)

Requirement	PW3335 Performance
Power resolution of 1 mW or better	✓ Minimum resolution of 0.01 mW (in the 300 V/1 mA range)
Crest factor 3 support	Crest factor 6 support
Harmonic component measurement of up to at least 50th order	Harmonic measurement as standard feature
Data acquisition via interface	LAN (standard feature), RS-232C, GP-IB

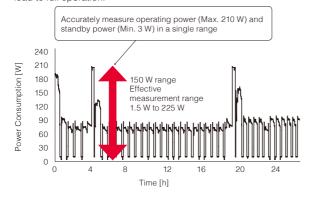
THD (Total Harmonic Distortion): Indicates to what extent harmonic components are present in an AC waveform

CF (Crest Factor): Ratio of the peak value to the effective (RMS) value of an AC waveform

MCR (Maximum Current Ratio): Current evaluation index, calculated from the crest factor and power factor

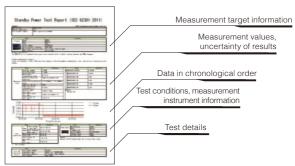
Wide Range of Effective Measurement

The PW3335 has an effective measurement range of 1% to 150%. Due to this wide range of effective measurement, even equipment with large load fluctuations, such as refrigerators, heaters, and pumps, can be measured accurately under all conditions from noload to full operation.



Create Reports with Free Software

Standby power measurement software can be downloaded free of charge from the HIOKI website. Enter the required information to perform standby power measurements according to standards. Use this software to create reports of measurement results and save test data in CSV format.

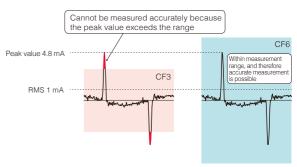


Example of Report Output

Support for CF6 (Crest Factor 6)

When an AC adapter or switching power supply operates with no load, the crest factor of the current waveform increases. The PW3335 can measure waveforms that exceed the range of watt meters that support crest factor 3.

In addition, although the power factor is low during no-load operation, the PW3335 is affected very little by power factor and can therefore achieve accurate measurements.



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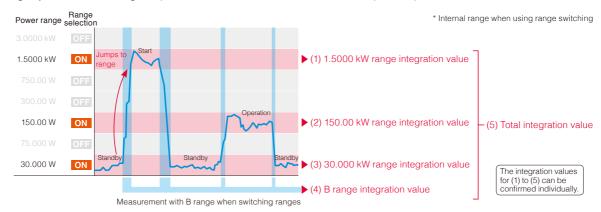
Measurement of Fluctuating Loads and Power Supply Control



Auto Range Integration with Guaranteed Accuracy when Switching Ranges



These models automatically jump to the optimal power range according to current consumption when performing integration measurements. When switching ranges, power is integrated using the B range*, and therefore there is no loss of integration data. Achieve seamless power integration with guaranteed accuracy, even with loads that experience frequent and repeated fluctuations. In addition, since power integration can be performed for individual ranges, you can measure integrated power for the various conditions of devices that experience power fluctuations.

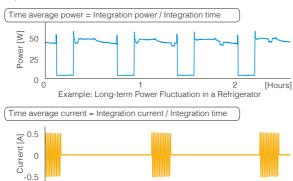


Intermittent Power Supply



Devices that perform intermittent operation and cycle control repeat a cycle of stopped states and operating states. Therefore, with normal power measurement, it is not possible to determine a value for rated power consumption.

Time average active power (current) is a function that allows the measurement of the time average for power (current) that experiences fluctuations.

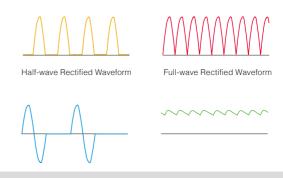


AC/DC Measurement



For equipment that uses rectifiers and control devices, it might not be possible to accurately measure voltage or current without an AC/DC power meter.

- · Half-wave rectified waveforms used for dryers and fans
- Full-wave rectified waveforms used for AC adapters
- Cycle control waveforms used for voltage and temperature adjustment heaters
- DC waveforms with superimposed ripple components



1 [Seconds]

Research, Development, and Inspection of Three-Phase Equipment [PW333 7] [PW333 6]

Transformer

Motor



Compliant with IEC61000-4-7 Harmonic Measurement Standards

Three-phase

These models are compliant with the IEC61000-4-7 international standard for harmonic measurements. Conduct harmonic analysis up to the 50th order. The upper limit for harmonic analysis can be set from 2nd to 50th, according to the standard used.

IEC61000-4-7 is an international standard for the measurement of harmonic current and harmonic voltage in power supply systems, and the harmonic current emitted from devices. It specifies the performance of standard measurement instruments. Among the series of standards that include specifications for power measurements, it is used as a reference standard for harmonic measurements.

Support for Various Connections

The PW3337 supports not only 3V3A, but also a variety of three-phase connections such as 3P4W, 3P3W2M, and 3P3W3M.

Accuracy Guaranteed for Currents Up to 65 A

Because DCCT allows a current with an input resistance of 1 m Ω or less, accuracy is guaranteed up to 65 A. No heat is generated even with the input of large currents, so there is no loss of accuracy due to self heating. Even if the current exceeds 65 A, an optional current sensor allows measurements up to 5000 A.





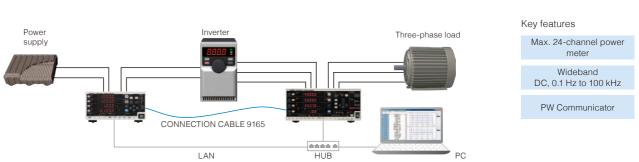
Current sensor input

DCCT current sensor (in the PW3337)

Temperature distribution image at 30 A DC/10-minute input

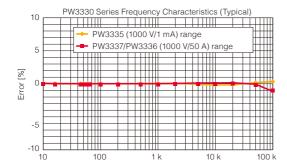
PW333 7 | PW333 6 | PW333 5

Inverter Efficiency Measurement



Wide Frequency Band (DC, 0.1 Hz to 100 kHz)

These models cover not only the fundamental frequency bands for inverters, but also carrier frequency bands, in a wide range that includes DC and frequencies from 0.1 Hz to 100 kHz.



24-channel Power Meter with Synchronous Control for up to 8 Units

Connect 8 units for synchronous measurement of up to 24 channels. The calculation and control timing for PW3337, PW3336, and PW3335 units that are set as slaves are synchronized with the master unit. Use this feature to measure the I/O efficiency of power supply devices, compare multiple pieces of equipment, or to perform simultaneous parallel testing of production lines. Use the free PW COMMUNICATOR* software to calculate the efficiency between multiple units and to acquire data simultaneously from multiple units.

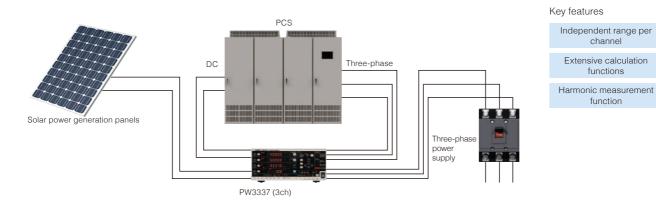


PV Power Conditioner (PCS) Efficiency Measurements



functions

function



I/O Efficiency Calculation with a Single Unit

Input and output can be measured independently at the optimal ranges, and the PCS efficiency can be calculated and displayed on a single unit. PCS can be evaluated with a simple system configuration.

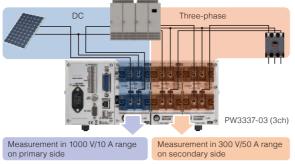
1000 V Range for Evaluation of Large Power Conditioners

These models support the measurement of large voltages, which is required in order to measure power conditioners for solar power generation. Measure up to 1000 Vrms and 1500 Vpeak.



Independent Ranges Per Channel for Highly Accurate Measurements

Independent channels allow the selection of the optimal range for each connection. One example is the simultaneous measurement of the primary side (DC) and secondary side (three-phase) of a PCS using a single unit. Selecting the optimal range for each target to be measured enables highly accurate measurements.

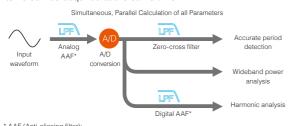


Setting Optimal Range According to Target to be Measured

Simultaneous Measurement of Power Data and Harmonics

In addition to standard measurement items such as voltage, current, and power, all items related to harmonics, such as distortion and content percentage, are calculated internally in parallel at the same time. Items such as RMS value, MEAN value, DC components, AC components, and fundamental wave components can all be confirmed simply by switching the display. Even for DC waveforms with superimposed ripple components, the AC/DC components can be measured separately.

In addition, when using PC software, more than 180 measurement items can be acquired at the same time

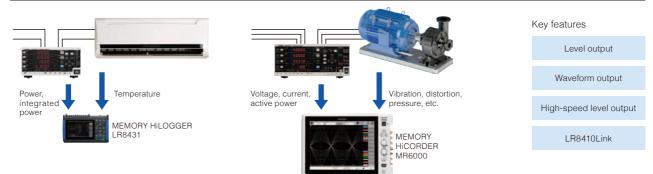


Aggregation of Output from DC Current Sensors (Up to 4000 A)

SENSOR UNIT CT9557 is a power supply for highly accurate current sensors that have a waveform output function. In addition to using it as a 4-channel power supply, it is also equipped with a sum feature for aggregating the input waveforms into a single waveform to be output.



Output Function Linked with Recorder

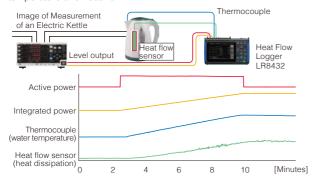


	PW3337-02 PW3337-03	PW3336-02 PW3336-03	PW3335-02 PW3335-04	3334 3334-01	3333 3333-01
Level output (Analog output)	Yes		Yes	Yes	Yes
Waveform output	Yes		Yes	Yes	-
High-speed level output	Active power only		Voltage, current, active power	-	-

Display Trends with a Data Logger



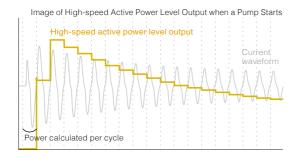
The level output (analog output) function delivers measured values that are displayed on the power meter with an analog voltage that is updated every 200 ms. Connect the unit to a data logger to check trends through synchronization with data such as temperature and heat flow*.



^{*} Heat flow: Parameter for understanding the heat reception and heat dissipation of an object. Can be measured with a heat flow sensor.

Observe Power for Each Cycle PW333 7 PW333 6 PW333 6 PW333

The PW3337, PW3336, and PW3335 feature built-in, high-speed active power level output. Level is output for power per cycle. When used in combination with a memory hicorder, fluctuations in power can be observed in real time. This feature is also useful for analyzing equipment that uses power, such as monitoring cutting and grinding tools.

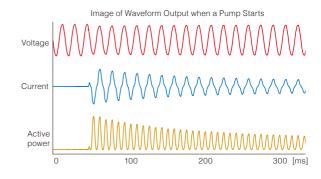


^{*} With the PW3335, high-speed level output is also possible for 45 Hz to 66 Hz

Observe Waveforms with a Memory Hicorder



The waveform output function outputs the voltage/current waveforms captured by a power meter in the form of high-speed analog voltage. Connect to a memory recorder to check behavior when load fluctuates, such as with the inrush current of a motor.



Transfer Information to Data Logger Wirelessly (LR8410Link)



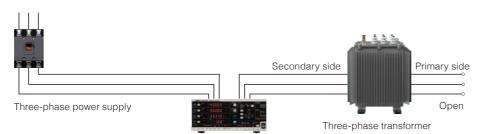
Connect the PW3335 (excluding model -01) and a data logger (with support for LR8410 Link) via Bluetooth® wireless technology* to wirelessly transmit 8 measurement parameters from the power meter to the data logger. In addition to the voltage and temperature measured by the multichannel data logger, you can also integrate current and power and observe and record them in real time.



 $^{^{\}star}$ Connection requires the serial - Bluetooth $\!\!\!^{\tiny{(\!0\!)}}$ wireless technology conversion

No-load Loss Measurements for Transformers

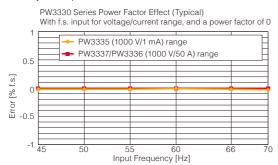




Key features Power factor effect ±0.1% f.s. or less Crest factor 6

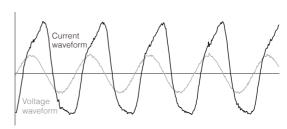
Power Factor Effect of 0.1% or Less, Even at Low Power Factors

A no-load loss test is one indicator for evaluating energy conservation for transformers and motors. The PW3337 and PW3336 are affected very little by power factor, at $\pm 0.1\%$ f.s. or less, allowing active power to be measured with a high level of accuracy at low power factors.



Support for Crest Factor 6

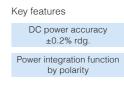
The crest factor of a current waveform increases during no-load operation. The PW3337, PW3336, and PW3335 support a crest factor 6. Therefore, even if the waveform peak value is large relative to the range, accurate measurements are possible without exceeding the range.



Example of Transformer Current Waveform during No-load Operation

DC Power Measurement for Batteries and Power Supplies





Best-in-class DC Power Accuracy



These models are best for measuring battery power consumption and output from switching power supplies. Make accurate measurements of DC power, which is an important factor in improving efficiency and saving energy.



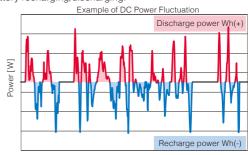


±0.1%

Current and Power Integration Function by Polarity



For integrated measurements, recharging power and discharging power are integrated by polarity every 200 ms. The amount of power in the positive direction, the amount of power in the negative direction, and the sum of the amounts of power in the positive and negative direction during the integration period are measured. Accurate measurement of recharging power and discharging power is possible even if there is rapid repetition of battery recharging/discharging.



^{*} For complete details, please refer to the specifications

Options

TYPE 1 Current Sensor (General Current Measurements)

Connect this unit to the current sensor input terminal (BNC) on the PW3337/PW3336/PW3335. It can be used with a direct connection.



Wiring method	External appearance	Product name/ model no.	Rated current	Frequency band	Diameter of measurable conductors	Basic accuracy (amplitude) Basic accuracy (phase)	Cord lengths	Power supply
	1	CLAMP ON SENSOR 9660	100 A	40 Hz to 5 kHz	⊠ 15 mm (0.59 in)	±0.3% rdg. ±0.02% f.s. Within ±1°		
	3/	CLAMP ON SENSOR 9661	500 A	40 Hz to 5 kHz	☑ 46 mm (1.81 in)	±0.3% rdg. ±0.01% f.s. Within ±0.5°		Not used
Clamp	A	CLAMP ON SENSOR 9669	1000 A	40 Hz to 5 kHz	№ 55 mm (2.17 in), 80 mm (3.15 in) × 20 mm (0.79 in) BUS BAR	±1.0% rdg. ±0.01% f.s. Within ±1°	3 m (9.84 ft)	
metriod	80	FLEXIBLE CLAMP ON SENSOR CT9667-01			☑ 100 mm (3.94 in)			AA (LR6) Alkaline Batteries x
		FLEXIBLE CLAMP ON SENSOR 500 A/ CT9667-02 5000 A		10 Hz to 20 kHz	№ 180 mm (7.09 in)	±2.0% rdg. ±0.3% f.s. Within ±1°		2 (approx. 7 days) or
		FLEXIBLE CLAMP ON SENSOR CT9667-03			⊠ 254 mm (10.00 in)			AC ADAPTER 9445-02 (optional)

Options for CT9667-01/-02/-03

External appearance	Product name/ model no.	Functions	Power supply
V	AC ADAPTER 9445-02	For supplying power to CT9667-01/-02/-03	100 to 240 V AC

TYPE 2 Current Sensor (Highly Accurate Current Measurements)

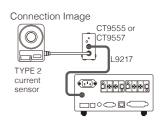
Connect this unit to the current sensor input terminal (BNC) on the PW3337/PW3336/PW3335. SENSOR UNIT CT9555 or CT9557 and CONNECTION CABLE L9217 are required.



Wiring method	External appearance	Product name/ model no.	Rated current	Frequency band	Diameter of measurable conductors	Basic accuracy (amplitude) Basic accuracy (phase)	Cord lengths	Power supply	
		CT6862-05	50 A	DC to 1 MHz	☑ 24 mm (0.94 in)	±0.05% rdg. ±0.01% f.s.	0.05% rda, +0.01% f.s.		
		CT6863-05	200 A	DC to 500 kHz	☑ 24 mm (0.94 in)	Within ±0.2°	3 m CT9555 or		
Through method		CT6875	500 A	DC to 2 MHz	☑ 36 mm (1.42 in)				
		CT6876	1000 A DC to 1.5 MHz	☑ 36 mm (1.42 in)	±0.04% rdg. ±0.008% f.s. Within ±0.1°			07	
	Q	CT6877	2000 A	DC to 1 MHz	⊠ 80 mm (3.15 in)				
	1	CT6841-05	20 A	DC to 1 MHz	☑ 20 mm (0.79 in)				
	*	CT6843-05	200 A	DC to 500 kHz	■ 20 mm (0.79 in)			0195	C19557
Clamp	*/	CT6844-05	500 A	DC to 200 kHz	☑ 20 mm (0.79 in)	±0.3% rdg. ±0.01% f.s. Within ±0.1°			
method		CT6845-05	500 A	DC to 100 kHz	⊠ 50 mm (1.97 in)				
	8	CT6846-05	1000 A	DC to 20 kHz	⊠ 50 mm (1.97 in)				
	8	9272-05	20 A/ 200 A	1 Hz to 100 kHz	☑ 46 mm (1.81 in)	±0.3% rdg. ±0.01% f.s. Within ±0.2°			

Options for Current Sensor TYPE 2

External appearance	Product name/ model no.	Max. no. of sensors	Functions	Power supply	Cord lengths
	SENSOR UNIT CT9555	1	For supplying power to the TYPE 2 current sensor	100 V to 240 V AC	-
2000	SENSOR UNIT CT9557	4	For supplying power to the TYPE 2 current sensor With addition output function	100 V to 240 V AC	-
//	CONNECTION CORD L9217	-	For connecting CT9555/CT9557 and PW3330 series units	-	1.6 m (5.25 ft)



Rack Mount Hardware

HIOKI can also manufacture rack mount hardware (EIA, JIS). Please contact your Hioki distributor or subsidiary for more information.

Printing with a Printer

Connect the 3333 to PRINTER 9442* to print out values.

Printing example

STATUS,000000,U,+0200.0E+0,I,+014.82E+0, P,+02.727E+3,S,+02.964E+3,PF,+00.920E+0



PRINTER 9442

Thermal serial dot method, 112 mm (4.41 in) paper width Power supply: AC ADAPTER 9443-02, or the included nickel hydride batteries

160 mm W × 67 mm H × 170 mm D (6.30 in W × 2.64 in H × 6.69 in D), 580 g (20.5 oz)





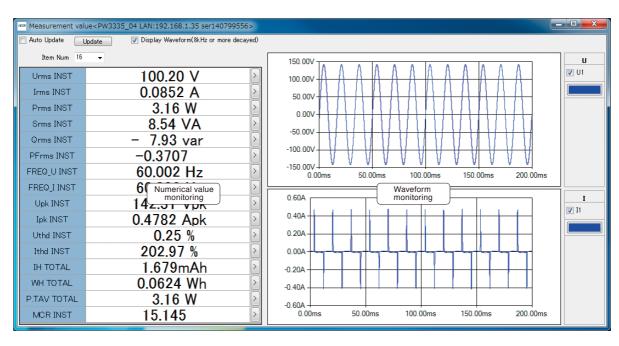


Software

PW Communicator



PW Communicator is an application for communicating between a PW3337/PW3336/PW3335 and a PC. This software can be downloaded free of charge from the HIOKI website. Use this software to configure the power meter, acquire interval data with a PC, perform numerical calculations for measurement data, calculate efficiency between multiple units, display 10 or more measurement items, and display waveforms.







Numerical value monitoring Display the PW3337/PW3336/PW3335 measurement values on the PC screen. You can freely select up to 64 values, such as voltage, current, power, and harmonics.

Waveform monitoring The voltage, current, and waveforms measured by the unit can be monitored on the PC screen.

Meter setting

The configuration of the connected power meter can be changed on the PC screen.

Synchronous

Efficiency calculations, such as input/output of the power supply conversion device, are possible between multiple measurement power meters. Use a sync cable to connect and synchronize the control of up to 8 units.

Save in chronological order

More than 180 pieces of measured data can be recorded to a file in CSV format at regular time intervals. The minimum time interval for recording is 200 ms.

LabVIEW Driver

Obtain data and configure measurement systems with the LabVIEW driver. (LabVIEW is a registered trademark of NATIONAL INSTRUMENTS.)

Sample Software



Sample software for loading data (via RS-232C) can be downloaded from the HIOKI website.

• The 3333/3334 front panel is displayed on the PC screen. Operate the power meter or change settings directly on the PC.

Standby Power Measurement Software



"Standby Power Measurement Software" is an application software exclusively designed for the Power Meter PW3335. This software lets you to view PW3335 measurement data and also save them as reports or in CSV format via a LAN, GP-IB, or RS-232C. Measure standby power consumption in accordance with IEC62301. Download the software free of charge from the HIOKI website.

Workflow for Standby Power Test

1. Connect to power meter

Configure the settings for communication with a power meter. Connect the PC to a power meter, and enter the settings required for the interface used (LAN/RS-232C/GP-IB).



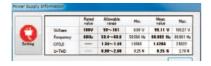
2. Configure the test target

Enter the information of the device under test. The information to be entered includes manufacturer name, model name, serial number, and operation mode. You can also register an image of the test target.



3. Configure the test power supply

Enter the information of the test power supply. Information to be entered includes rating and frequency. Also, enter the values of uncertainty due to the connection method, wiring, power supply, and temperature.



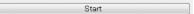
4. Configure the test conditions

Set the current range, stop conditions, algorithm used to judge stability, cycle time, and upper limit for test time.



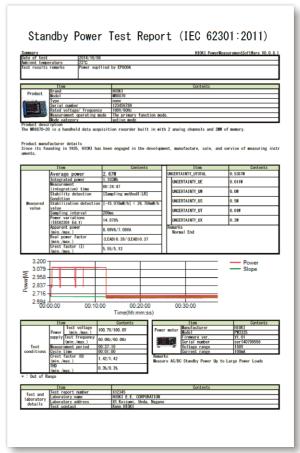
5. Run test

The consumed power is measured according to the configured settings.



6. Create report

Create a report of the test results. Output either a PDF report or CSV file.



Example of report output

Model	PW0005				
Serial Number	ser1 40799556				
Firmware Ver	V0.07				
Start Time	2014	7	28	14	32
Voltage Range	150V				
Current Range	200mA				
Update Rate	200ms				
Algorithm	LR	CA	SP1	SP2	SAE
Stop Factor	Pass[Condition1 (LR)]			
Valid Period	0	180			
Time(Sec)	Test voltage(V)	Test frequency(Hz)	U-THD(%)	Orest Factor U	Crest Factor I
14.0	99.49	60.002	0.26	1.4202	5.6212
15	99.49	60.002	0.27	1.4199	5.6585
15.2	99.49	60.002	0.25	1.4198	5.6696
15.4	99.49	60.002	0.26	1.4198	5.6834
15.6	99.49	60.002	0.26	1.4198	5.6652
15.8	99.49	60.002	0.26	1.4198	5.6668
16	99.49	60.002	0.26	1.4199	5.6484
16.2	99.49	60,002	0.26	1.4198	5.6675

CSV output example

pw3337 and PW3336 Specifications

PW333 PW333		JI U	IIG I	****	000 0		
Input Specificat	ions						
Measurement line	PW3336 series						
type	Single-phase 2-wire	(100)(/)	Single pha	co 3 wiro (1D3\\\\\		
туре	Three-phase 3-wire			se o-wile (11 3vv),		
	Wiring	CH1	CH2				
	1P2W×2	1P2W	1P2W				
	1P3W	1P	3W				
	3P3W	3P	3W	ĺ			
	3P3W2M	3P3\	W2M				
				'			
	PW3337 series						
	Single-phase 2-wire						
	Three-phase 3-wire		P3W2M, 3\	/3A, 3P3W	/3M),		
	Three-phase 4-wire	(3P4W)					
	Wiring	CH1	CH2	CH3			
	1P2W×3	1P2W	1P2W	1P2W			
	1P3W&1P2W	1P3W		1P2W			
	3P3W&1P2W	3P3W		1P2W			
	3P3W2M	3P3\	W2M				
	3V3A		3V3A				
	3P3W3M		3P3W3M				
	3P4W		3P4W				
Input methods	Voltage Isolated input	, resistanc	e voltage	division me	ethod		
	Current Isolated input, DCCT method Isolated input from current sensors						
Voltage measurement							
ranges	600.00 V/ 1000.0 V (set for each wiring mode)						
Current	AUTO/ 200.00 mA/ 500.00 mA/ 1.0000 A/ 2.0000 A/ 5.0000 A/						
measurement		10.000 A/ 20.000 A/ 50.000 A (set for each wiring mode)					
ranges							
	For more information about external current sensor input, see the						

Current	AUTO/ 200.00 mA/ 50						
measurement	10.000 A/ 20.000 A/ 50.000 A (set for each wiring mode)						
ranges	For more information about external current sensor input, see the external current sensor input specifications						
Power ranges	Depends on the combination of voltage and current ranges;						
3	PW3336: from 3.00	000W to 100.00kW (also 000W to 150.00kW (also	applies to VA, var)				
Input resistance	Voltage input terminal	: 2 MΩ	s applies to vit, vai)				
(50/60 Hz)	Current direct input ter						
Basic Measuren	nent Specifications	s					
	Simultaneous voltage		nling zero-cross				
wicasurciniciti mictilou	simultaneous calculati		piling, zero-cross				
Sampling frequency	Approx. 700 kHz						
A/D converter	16-bit resolution						
Frequency bands	DC, 0.1 Hz to 100 kHz	OC /five d et 000 me)					
Synchronization sources	U1, U2, U3, I1, I2, I3, E Can be set separately						
Measurement items			ver - Apparent power				
	· Reactive power · Pow						
	· Efficiency	· Current int					
	Active power integral						
	Voltage waveform pe Voltage crest factor	· Current cr	aveform peak value est factor				
	· Time average current		age active power				
	· Voltage ripple factor	 Current rip 	ple factor				
	Harmonic parameters	:					
	Harmonic voltage RN		current RMS value				
	Harmonic active pow		nic voltage distortion				
		nt distortion · Voltage fu waveform · Active power					
		ntal waveform · Reactive pov					
	Power factor fundame	ental waveform (displac	cement power factor)				
		e difference fundamen					
		fundamental wave pha					
	. Harmonic voltage co	fundamental wave pha	se anterence current content %				
	Harmonic active pow		Current Content 70				
		ers can be downloade	d as data during PC				
	communication but no		u as data during i C				
		ase angle · Harmonic	current phase angle				
	· Harmonic voltage cu	rrent phase difference					
Rectifiers	AC+DC: AC+DC meas						
		S values for both voltag	e and current				
	AC+DC Umn: AC+DC	value rectified RMS co	nverted values for				
		MS values for current	TIVELICA VAIACS IOI				
	DC: DC measurement						
		verages for both voltag					
	Usplay of values of values of value) for active po	alculated by (voltage D	C value)× (current DC				
	AC: AC measurement	WGI					
		alculated by fo <u>r both vo</u>	ltage and current				
	Display of values of	alculated by √(AC+DC	value)2 - (DC value)2				
	for active power						
		lay of the fundamental	wave component				
			Extraction and display of the fundamental wave component				
	from harmonic measurement						
	500 Hz/200 kHz						
Filter	500 Hz/200 kHz	Hz, 200 kHz: 0.1 Hz to					
Filter Measurement accuracy	500 Hz/200 kHz						
Filter Measurement accuracy Voltage	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500	Hz, 200 kHz: 0.1 Hz to	200 kHz				
Filter Measurement accuracy Voltage Frequency (f)	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s.	200 kHz 100%f.s. ≤ Input				
Filter Measurement accuracy Voltage Frequency (f) DC	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s.	200 kHz 100%f.s. ≤ Input ±0.2%rdg.				
Filter Measurement accuracy Voltage Frequency (f) DC 0.1Hz ≤ f < 16Hz	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg.				
Filter Measurement accuracy	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.2%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.2%rdg.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg.				
Filter Weasurement accuracy Voltage Frequency (f) DC 0.1Hz \leq f $<$ 16Hz \leq f $<$ 45Hz \leq f \leq 66Hz	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.2%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg.				
Filter Measurement accuracy	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.2%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.2%rdg. ±0.25%rdg. ±0.15%rdg.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg.				
Filter deasurement accuracy Voltage	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.2%f.s. ±0.5%rdg. ±0.3%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg.				
Frequency (f) DC 0.1Hz ≤ f < 16Hz 16Hz ≤ f < 45Hz 45Hz ≤ f ≤ 66Hz 66Hz < f ≤ 500Hz 500Hz < f ≤ 10Hz	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.2%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.05%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.2%f.s.	Hz, 200 kHz: 0.1 Hz to 50%fs. ≤ Input < 100%fs. ±0.1%rdg. ±0.1%fs. ±0.3%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.3%rdg.	100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.2%rdg.				
Filter Measurement accuracy Voltage	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.3%f.s. ±0.5%rdg. ±0.3%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.2%rdg, ±0.15%rdg, ±0.2%rdg, ±0.3%rdg, ±0.3%rdg, ±2.4%rdg,	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.15%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.3%rdg. ±2.4%rdg.				
Frequency (f) DC 0.1Hz ≤ f < 16Hz 16Hz ≤ f < 45Hz 45Hz ≤ f ≤ 66Hz 66Hz < f ≤ 500Hz 10kHz < f ≤ 50kHz 10kHz < f ≤ 50kHz 10kHz < f ≤ 50kHz 10kHz < f ≤ 10kHz Current (direct input) Frequency (f)	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.2%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.0%f.s. ±0.1%rdg, ±0.0%f.s. ±0.1%rdg, ±0.3%f.s. ±0.5%rdg, ±0.3%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.2%rdg, ±0.2%rdg, ±0.2%rdg, ±0.3%rdg, ±0.8%rdg, ±2.4%rdg.	100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.3%rdg. ±0.8%rdg. ±0.8%rdg.				
Frequency (f) DC 0.1Hz ≤ f < 16Hz 16Hz ≤ f < 45Hz 45Hz ≤ f ≤ 66Hz 66Hz < f ≤ 500Hz 10KHz < f ≤ 500Hz 500Hz < f ≤ 10kHz 10KHz < f ≤ 50kHz 50kHz < f ≤ 10kHz 50kHz < f ≤ 10kHz Terquency (f) DC	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.3%f.s. ±2.1%rdg, ±0.3%f.s. ±2.1%rdg, ±0.3%f.s. ±0.1%rdg, ±0.3%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. < Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.2%rdg, ±0.2%rdg, ±0.2%rdg, ±0.8%rdg, ±0.8%rdg, ±2.4%rdg. 50%f.s. < Input < 100%f.s. ±0.1%rdg, ±0.1%f.s.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.3%rdg. ±0.8%rdg. ±0.4%rdg. ±1.4%rdg.				
Filter Measurement accuracy Voltage	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.2%rdg, ±0.25%rdg, ±0.28%rdg, ±0.33%rdg, ±0.8%rdg, ±2.4%rdg, 50%f.s. ≤ Input < 100%f.s. ±0.15%rdg, ±0.1%f.s. ±0.3%rdg,	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.8%rdg. ±0.8%rdg. ±0.8%rdg. ±2.4%rdg. ±0.2%rdg. ±0.3%rdg.				
Frequency (f) DC 0.1Hz ≤ f < 16Hz 16Hz ≤ f < 45Hz 45Hz ≤ f ≤ 66Hz 66Hz < f ≤ 500Hz 500Hz < f ≤ 10kHz 10kHz < f ≤ 50kHz 10kHz < f ≤ 50kHz 10kHz < f ≤ 50kHz 50kHz < f ≤ 10kHz 0.1Hz ≤ f < 6Hz 10kHz < f ≤ 50kHz 10kHz < f ≤ 40kHz	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±0.5%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. < Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.2%rdg, ±0.2%rdg, ±0.3%rdg, ±0.3%rdg, ±0.8%rdg, ±2.4%rdg, 50%f.s. < Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.3%rdg, ±0.2%rdg,	100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.3%rdg. ±0.8%rdg. ±2.4%rdg. 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg.				
Frequency (f) DC 0.1Hz ≤ f < 16Hz 16Hz ≤ f < 45Hz 45Hz ≤ f < 66Hz 66Hz < f ≤ 500Hz 500Hz < f ≤ 10kHz 10kHz < f ≤ 50kHz 50kHz < f ≤ 10kHz 10kHz < f ≤ 10kHz 6Hz < f ≤ 60kHz 50kHz < f ≤ 10kHz 10kHz < f < 10kHz 10kHz < f < 64kHz 10kHz < f < 66kHz	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.3%rdg. ±0.8%rdg. ±2.4%rdg. 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.3%rdg. ±1.15%rdg.	100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.3%rdg. ±0.3%rdg. ±2.4%rdg. 100%f.s. ≤ Input ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg.				
$ \begin{array}{ll} \text{Filter} \\ \text{Measurement accuracy} \\ \text{Voltage} \\ \hline Frequency (f) \\ DC \\ 0.1 \text{Hz} \leq f < 16 \text{Hz} \\ 16 \text{Hz} \leq f < 45 \text{Hz} \\ 45 \text{Hz} \leq f \leq 66 \text{Hz} \\ 66 \text{Hz} < f \leq 500 \text{Hz} \\ 500 \text{Hz} < f \leq 100 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 50 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} \\ \hline 000 \text{Hz} < f \leq 60 \text{Hz} < f \leq 60 \text{Hz} $	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.3%f.s. ±0.5%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.2%rdg, ±0.2%rdg, ±0.2%rdg, ±0.3%rdg, ±0.8%rdg, ±0.8%rdg, ±2.4%rdg, 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg, ±0.1%f.s. ±0.1%rdg, ±0.1%f.s. ±0.3%rdg, ±0.1%rdg, ±0.1%f.s.	200 kHz 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.2%rdg. ±0.3%rdg. ±0.8%rdg. ±0.8%rdg. ±2.4%rdg. 100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.15%rdg. ±0.15%rdg. ±0.2%rdg.				
Filter Measurement accuracy Voltage Frequency (f) DC 0.1Hz \le f $<$ 16Hz 16Hz \le f $<$ 45Hz 45Hz \le f $<$ 66Hz 45Hz \le f $<$ 66Hz 66Hz $<$ f \le 500Hz 500Hz \le f $<$ 10kHz 10kHz $<$ f \le 10kHz 10kHz $<$ f \le 16Hz 16Hz \le f $<$ 45Hz \le f $<$ 45Hz \le f \le 66Hz	500 Hz/200 kHz 500 Hz: 0.1 Hz to 500 Input < 50% f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±2.1%rdg. ±0.3%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s. ±0.1%rdg. ±0.1%f.s.	Hz, 200 kHz: 0.1 Hz to 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.3%rdg. ±0.8%rdg. ±2.4%rdg. 50%f.s. ≤ Input < 100%f.s. ±0.1%rdg. ±0.1%f.s. ±0.3%rdg. ±0.3%rdg. ±1.15%rdg.	100%f.s. ≤ Input ±0.2%rdg. ±0.3%rdg. ±0.2%rdg. ±0.15%rdg. ±0.2%rdg. ±0.3%rdg. ±0.3%rdg. ±2.4%rdg. 100%f.s. ≤ Input ±0.2%rdg. ±0.2%rdg. ±0.2%rdg. ±0.2%rdg.				

Active power						
Frequency (f)	Input < 50% f.s.	50%f.s. ≤ Input <		100%f.s. ≤ Input		
DC	±0.1%rdg. ±0.1%f.s.	±0.1%rdg. ±0		±0.2%rdg.		
0.1Hz ≤ f < 16Hz	±0.1%rdg. ±0.2%f.s.	±0.3%rc		±0.3%rdg.		
16Hz ≤ f < 45Hz	±0.1%rdg. ±0.1%f.s.	±0.2%rc		±0.2%rdg.		
45Hz ≤ f ≤ 66Hz	±0.1%rdg. ±0.05%f.s.	±0.15%r		±0.15%rdg.		
66Hz < f ≤ 500Hz	±0.1%rdg. ±0.1%f.s.	±0.2%rc		±0.2%rdg.		
500Hz < f ≤ 1kHz	±0.1%rdg. ±0.2%f.s.	±0.3%rc		±0.3%rdg.		
$1kHz < f \le 10kHz$	±(0.03+0.07×F)%rdg.	±(0.23+0.07×	F)%rdg.	±(0.23+0.07×F)%rdq		
10kHz < f ≤ 50kHz	±0.2%f.s. ±(0.07×F)%rdg. ±0.3%f.s.	±(0.3+0.07×f	=)%rdg.	±(0.3+0.07×F)%rdg		
50kHz < f ≤ 100kHz	±(0.6+0.07×F)%rdg. ±0.3%f.s.	±(0.9+0.07×F)%rdg.	±(0.9+0.07×F)%rdç		
Guaranteed accuracy period Post-adjustment accuracy guaranteed Maximum effective peak voltage Maximum effective peak current Conditions of guaranteed accuracy	Values for f.s. depen "F" in the tables refe Add ±1mA to DC me Add ±1mA to DC me Add (±1mA) x (voltage re, power. When using the 2001 current and active po Values for voltage, c 0.1Hz ≤ f < 10Hz are Values for voltage, c 20A for which 10Hz ≤ Values for current an 50NHz < f ≤ 50NHz ar 50NHz ar Values for current an 50NHz < f ≤ 100NHz ≤ 1 year 6 months ±600% of each voltage However, for 300 V, 60 ±600% of each current However, for 20 A ram Temperature and hum Warm-up time: 30 min Input: Sine wave input;	rs to the freque assurement acc and value) to DC m mA or 500mA wer for which urrent, and act for reference or urrent, and act if < 16Hz are for active powers for reference diactive powers for reference of the form of the f	ency in kecuracy for easurement and easurement easurement and easurement easuremen	Hz. To reurrent. It accuracy for active dd ±0.1% rdg. to ≤ 10kHz. er for which er in excess of 220V once only. ss of 20A for which ss of 15A for which ss of 750V for which s, ±1500 Vpeak IO Apeak RH or less		
ŕ	voltage of 0V, af fundamental wa	ter zero adjustı ve satisfies syr	ment; wit	hin range in which the ation source condition		
Temperature characteristic Power factor effects	±0.03% f.s. per °C or I ±0.1% f.s. or less (45 t Internal circuitry voltage	o 66 Hz, at po				
Effect of common	±0.02% f.s. or less	go/ourrent pria	oc amore	51100. ±0.0070		
mode voltage Effect of external	(600 V, 50/60 Hz, app 400 A/m, DC and 50/6			ninals and enclosure)		
magnetic field interference	Active power:±3.0% f.	s. or ±10 mA, v	nfluence	er is greater, or less e quantity) × (±10 mA		
Magnetization effect	±10 mA equivalent or l	ess		input terminals)		
Adjacent channel nput effect	±10 mA equivalent or I (when inputting 50 A to	ess				
	t/ Active Power Me	easurement	t Speci			
Measurement types	Rectifiers: AC+DC, DC	C, AC, FND, AC	C+DC Un	nn		
Effective measuring range	(However, Current: 1% to 130 Active power: 0% to 169	0% of range 9% of the rang	e	and 1000 V RMS value)		
	within the	effective mea	suremen			
Display range		196% of the ra	nge (no :	zero-suppression)		
Polarity	Active power: 0% to 196% of the range (no zero-suppression) Voltage/ Current: Displayed when using DC rectifier Active power: +: Positive: Power consumption (no polarity display) -: Regenerated power					
Voltage/ Current/	Active power channe			lculation formulas		
Wiring	X: U (Voltage) or I (Active power)		
9		/	,	/		

Wiring		X: U(Voltage) or I(Current)	P (Active power)
All channels	1P2W	X(i)	P(i)
	1P3W 3P3W	$Xsum = \frac{1}{2}(X_{(1)} + X_{(2)})$	$Psum = (P_{(1)} + P_{(2)})$
Sum	3P3W2M		
values	3V3A	$X_{sum} = \frac{1}{3} (X_{(1)} + X_{(2)} + X_{(3)})$	Psum = (P(1) + P(2) + P(3))
	3P3W3M	3 (X(1) 1 X(2) 1 X(3))	7 Sum = (1 (1) 1 1 (2) 1 1 (3))
	3P4W		

(i): Measurement channel

(). Wicasurciniciti Cit								
Voltage Waveform Pe	ak Value /	ak Value / Current Waveform Peak Value Measurement Specifications						
Measurement		Measures the waveform's peak value (for both positive and						
method	negative polarity) based on sampled instantaneous voltage value					ge values.		
Sampling frequency	Approx. 7	'00 kHz						
Voltage peak range								
Voltage range	15V	30V	60V		0V	300V	600V	1000V
Voltage peak range	90.000V	180.00V	360.00V	900	.00V	1.8000kV	3.6000kV	6.0000kV
Current peak range								
Current range	200mA 5	500mA	1A :	2A	5 <i>A</i>	10A	20A	50A
Current peak range	1.2000A 3	3.0000A 6.	0000A 12.	000A	30.00	00.000 AOC	DA 120.00	A 300.00A
Measurement	Same as	the voltag	e or curre	nt me	easur	ement ac	curacy at	DC and
accuracy	when 10 l							
	range). Pi	rovided as	s referenc	e val	ue wh	nen 0.1 Hz	$2 \le f < 10$	Hz and
	when in e							
Effective	±5% to ±							
measuring range	±5% to ±	100% of c	urrent pe	ak rai	nge (ı	up to ±100) A)	
Display range	±0.3% to							ınge
	(values le	ss than ±	0.3% are	subje	ct to	zero-sup	pression)	
\/altana	-4/ 0			N				:4:

voltage Crest Fa	ctor/ Curren	it Crest Fa	actor ivieasi	urement S	specifications
1.4	0 1 1 1	f 1:			P. I. L.

method	Calculates values from display values once each display update interval for voltage and voltage waveform peak values or current
	and current waveform peak values.
	As per voltage and voltage waveform peak value or current and
range	current waveform peak value effective measurement ranges.
m	

Measurer nethod	ment					o peak [peak width]) as a C component	
Effective		proportion of the voltage or current DC component As per voltage and voltage waveform peak value or current and current waveform peak value effective measurement ranges					
measurin Display ra		0.00[%] to 500.		value e	errective	e measurement ranges	
Polarity		None					
Apparent Measurer		active Power/ Pov	wer Fac	tor/ Pha	se Ang	le Measurement Specification	ons
ypes	пеп	Apparent Power/		Power/ F	ower Fac	ctor : AC+DC, AC, FND, AC+DC U	mn
	asuring range		urrent, a			: AC, FND effective measurement range	S.
Display range		Power Factor	eactive Po	:	±0.000	% of the range (no zero-suppression) 10 to ±1.0000	
Polarity		Phase Angle Reactive Power		Factor	/ Phase		
		voltage wavefo	orm risir urrent la	ng edge ags volt	and the age (no	lead/lag relationship of the current waveform rising edo polarity display)	ge.
Power ch	nannel an	d sum value ca	alculati	on for	nulas		
	ring	S: Appa		wer		Q: Reactive power	
All channels	1P2W 1P3W	$S_{(i)} = U_{(i)} \times $ $S_{sum} = S_{(1)} +$			-	$Q(i) = si(i)\sqrt{S(i)^2 - P(i)^2}$	
_	3P3W	$S_{sum} = \frac{\sqrt{3}}{2} (S_{(1)})$)	-	$Q_{sum} = Q_{(1)} + Q_{(2)}$	
Sum values	3P3W2M 3V3A	$S_{sum} = \frac{\sqrt{3}}{3}(S_{(1)})$				-sum -(1) · -(2)	
	3P3W3M	$S_{sum} = S_{(1)} +$				$Q_{\text{sum}} = Q_{(1)} + Q_{(2)} + Q_{(3)}$	
i): Meas	3P4W urement ch		/	/		. // (0/	
Wi	ring	, ,	wer fact	-		ϕ : Phase angle	
All channels		$\lambda(i) =$	$SI(i) \left \frac{P_{(i)}}{S_{(i)}} \right $	-		$\phi(i) = si(i) \cos^{-1}l \ \lambda(i)l$	
_	1P3W 3P3W					nen Psum ≥ 0 Фsum = Sisum COS ⁻¹ I λ suml	
Sum values	3P3W2M 3V3A	λsum = ;	Sİsum Bu	m	W	(0° to ±90°) nen Psum≥0	
	3P3W3M 3P4W					Φ _{sum} = sisum 180 - cos ⁻¹ λ _{sum} (±90° to ±18	n II 30°)
i): Measu	irement cha	nnel; The polarity	symbol	sisum is	acquire	ed from the Qsum symbol.	
	ncy Mea	surement Sp	ecifica	ations			
channels							
Measurement source Measurement method		Select from U (VHz) or I (AHz) by channel Calculated from input waveform period (reciprocal method)					
wicasuieiile	ent method	Calculated from	n input v	vavefor	m perio	d (reciprocal method)	
Measureme	ent range	Calculated from 500 Hz/ 200 kH	n input v Iz (linke	vavefor d to zer	m perio	d (reciprocal method)	
Measureme Measureme Effective		Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c 0.1 Hz to 100 kH	n input v Iz (linke Igt. (0°0 Iz	vavefor d to zer C to 40°	m perio ro-cross °C)	d (reciprocal method)	
Measureme Measureme Effective	ent range ent accuracy	Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c 0.1 Hz to 100 kH For sine wave ir source's measu	n input v Iz (linke Igt. (0°0 Iz Input tha Irement	vavefor d to zer C to 40° at is at le range.	m perio ro-cross °C) east 20°	d (reciprocal method) s filter) % of the measurement	
Measureme Measureme Effective range	ent range ent accuracy measuring	Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c 0.1 Hz to 100 kH For sine wave ir source's measu Measurement lo 0.1000 Hz to 9.998	n input v lz (linke dgt. (0°0 Hz nput tha irement iwer limi 99 Hz, 9.9	vavefor d to zer C to 40° at is at le range. It freque	m perioro-cross CC) east 20° ency set	d (reciprocal method) s filter) % of the measurement ting: 0.1 sec. / 1 sec. / 10 se Hz, 99.00 Hz to 999.99 Hz,	
Measureme Measureme Effective range	ent range ent accuracy measuring ormat	Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c 0.1 Hz to 100 kH For sine wave ir source's measu Measurement lo 0.1000 Hz to 9.999 9900 kHz to 9.999	n input v Iz (linke dgt. (0°0 Hz nput tha urement wer limi 99 Hz, 9.1 99 kHz, 9	vavefor d to zer C to 40° It is at le range. It freque 900 Hz to .900 kHz	m perioro-cross CC) east 20° ency set	d (reciprocal method) s filter) % of the measurement ting: 0.1 sec. / 10 se	
Measureme Measureme Effective range Display fo	ent range ent accuracy measuring ormat	Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c.1% rdg. ±1 c.1 c.1 c.1 c.1 c.1 c.1 c.1 c.1 c.1 c.	n input v lz (linke dgt. (0°C Hz nput tha irement wer limi 99 Hz, 9.99 kHz, 9	vavefor d to zer C to 40° tt is at le range. it freque 900 Hz t 900 kHz	m perio co-cross C) east 20° ency set o 99.999 to 99.999	d (reciprocal method) s filter) % of the measurement ting: 0.1 sec. / 1 sec. / 10 se Hz, 99.00 Hz to 999.99 Hz,	Z
Measureme Measureme Effective range Display for Efficience Measureme Wiring mo	ent range ent accuracy measuring primat cy Measuring ent method odes	Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c 0.1 Hz to 100 kH For sine wave ir source's measu Measurement lo 0.1000 Hz to 9.999 9900 kHz to 9.999 urement Spec Calculates the efficie Calculated basis	n input v dz (linke dgt. (0°C Hz nput tha urement wwer limi 99 Hz, 9. 99 kHz, 9 ificatio	vavefor d to zer C to 40° tt is at le range. it freque 900 Hz tr .900 kHz	m perioro-cross PC) east 200 ency set to 99.999 to 99.999 atio of act	d (reciprocal method) s filter) % of the measurement ting: 0.1 sec. / 1 sec. / 10 se Hz, 99.00 Hz to 999.99 Hz, 99 kHz, 99.00 kHz to 220.00 kHz	Z
Measureme Measureme Effective range Display fo	ent range ent accuracy measuring ormat cy Measurent method odes ulation	Calculated from 500 Hz/ 200 kH ±0.1% rdg. ±1 c 0.1 Hz to 100 kH For sine wave ir source's measu Measurement lo 0.1000 Hz to 9.999 9900 kHz to 9.999 vrement Spec Calculates the efficie	n input v dz (linke dgt. (0°C Hz nput tha urement wwer limi 99 Hz, 9. 99 kHz, 9 ificatio	vavefor d to zer C to 40° tt is at le range. it freque 900 Hz tr .900 kHz	m perioro-cross PC) east 200 ency set to 99.999 to 99.999 atio of act	d (reciprocal method) s filter) % of the measurement ting: 0.1 sec. / 1 sec. / 10 se Hz, 99.00 Hz to 999.99 Hz, 99 kHz, 99.00 kHz to 220.00 kHz ive power values for channels and wi iffer active power Calculation formulas	Z
Measureme Measureme Effective range Display for Efficience Measureme Wiring meand calcu	ent range ent accuracy measuring ormat cy Measurent method odes ulation	Calculated from 500 Hz/ 200 kH 201 kg rdg. ±1 c 0.1 Hz to 100 kF or sine wave ir source's measu Measurement lo 0.1000 Hz to 9.993 9900 kHz to 9.993 urement Spec Calculated base PW3336 Wiring 1P2W × 2	n input v Iz (linke dgt. (0°C Hz nput tha uput tha wer limi 99 Hz, 9. 99 KHz, 9 eificatio ency h [%] ed on th	vavefor d to zero d to zero d to zero do control do con	m perioro-cross PC) east 200 ency set to 99.999 to 99.999 atio of act	id (reciprocal method) is filter) % of the measurement ting: 0.1 sec. / 1 sec. / 10 se Hz, 99.00 Hz to 999.99 Hz, 99 kHz, 99.00 kHz to 220.00 kHz iive power values for channels and wi	Z
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Scaling	Applies user-defined VT and CT ratio se	
(VT, CŤ)	These settings can be configured separ	
	VT ratio setting range : OFF (1.0), 0.1 CT ratio setting range : OFF (1.0), 0.1	1 to 1000 (setting: 0000)
HOLD	Stops display updates for all measured	values and fixes the
(HOLD)	display values at that point in time.	
	Measurement data acquired by commutate point in time	inications is also fixed at
	that point in time. Internal calculations (including integrati	on and integration elapsed
	time) will continue.	on and integration diapoed
	· Analog output and waveform output are	
Maximum value/ minimum value	 Detects maximum and minimum measumaximum and minimum values for the values. 	
hold	waveform peak and holds them on the	
(MAX/MIN HOLD)	For data with polarity, display of the ma	ximum value and minimum
	value for the data's absolute values is h and negative polarity values are shown	
	Internal calculations (including integrati	
	time) will continue.	
Zero Adjustment	 Analog output and waveform output are Degausses the current input unit DCCT 	
(0 ADJ)	current input offset.	and then zeroes out the
Key-lock	Disables key input in the measurement s	tate, except for the SHIFT
(KEY LOCK) Backup	key and KEY LOCK key. Backs up settings and integration data if	the instrument is turned
Баскир	off and if a power outage occurs.	the instrument is turned
System Reset	Initializes the instrument's settings. Communica	
	(communications speed, address, and LAN-rel	ated settings) are not initialized.
Integration Mea	surement Specifications	
	Simultaneous integration of the following 6 p.	arameters for each channel
	(total of 18 parameters):	
	Sum of current integrated values (displayed Positive current integrated value (displayed	
	Negative current integrated value (displayed	
	Sum of active power integrated values (disp	played as Wh on panel display)
	Positive active power integrated value (display Negative active power integrated value (disp	
Measurement types	Rectifiers: AC+DC, AC+DC Umn	, sa ao on panor display)
2	Current:	
	Displays the result of integrating of	
	(display values) once every displa 200 ms) as an integrated value.	y upuate interval (approx.
	Active power:	
	Displays the result of integrating a	
	by polarity calculated once every synchronization source as integra	
	Rectifier: DC	tod valdoo.
	Displays the result of integrating instar	
	sampling both current and active pow values (When the active power conta	
	DC component will not be integrated	
Integration time	1 min. to 10000 hr., settable in 1 min. blo	ocks
Integration time accuracy Integration	±100 ppm ±1 dgt. (0°C to 40°C) (Current or active power measurement accu	(racv) + (+0.01% rdg +1.dgt)
measurement accuracy	Current or active power measurement acct	iracy) + (±0.01% rug. ±1 ugi.)
Effective measuring range		curs
Display resolution	999999 (6 digits + decimal point)	
	999999 (6 digits + decimal point) - Stopping integration based on integrati	on time setting (timer)
Display resolution	999999 (6 digits + decimal point)	on time setting (timer) ayed as TIME on panel display)
Display resolution	99999 (6 digits + decimal point) - Stopping integration based on integration - Displaying the integration elapsed time (displ - Additional integration by repeatedly sta - Backing up integrated values and the integration	on time setting (timer) ayed as TIME on panel display) urting/stopping integration elapsed time during power outages
Display resolution Functions	999999 (6 digits + decimal point) Stopping integration based on integrati Displaying the integration elapsed time (displ Additional integration by repeatedly sta- Backing up integrated values and the integration c Stopping integration when power return	on time setting (timer) ayed as TIME on panel display) urting/stopping integration elapsed time during power outages is
Display resolution	99999 (6 digits + decimal point) - Stopping integration based on integration - Displaying the integration elapsed time (displ - Additional integration by repeatedly sta - Backing up integrated values and the integration	on time setting (timer) ayed as TIME on panel display) urting/stopping integration lapsed time during power outages is d values based on external control
Display resolution Functions External control Measuring range	99999 (6 digits + decimal point) Stopping integration based on integration based on integration bisplaying the integration elapsed time (displeted in the integration by repeatedly standard integration by repeatedly standard integration when power return stopping integration when power return stoppingslatring integration and resetting integrated Corresponds to the range set for START	on time setting (timer) ayed as TIME on panel display) urting/stopping integration lapsed time during power outages us d values based on external control integretation
Display resolution Functions External control Measuring range Harmonic Meas	99999 (6 digits + decimal point) Stopping integration based on integration based on integration bisplaying the integration elapsed time (displayed in the integration by repeatedly standard integration by repeatedly standard integration with the integration of Stopping integration when power return stopping/starting integration and resetting integrate Corresponds to the range set for START urement Specifications (built-in)	on time setting (timer) ayed as TIME on panel display) arting/stopping integration lapsed time during power outages as d values based on external control integretation function)
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Display resolution Functions External control Measuring range Harmonic Meas Measurement	99999 (6 digits + decimal point) Stopping integration based on integration based on integration based on integration bisplaying the integration elapsed time (disployable) Additional integration by repeatedly standard by the stopping integration when power return stopping integration when power return stopping/starting integration and resetting integrate Corresponds to the range set for START urement Specifications (built-in 'Zero-cross simultaneous calculation must by channel according to the wiring mochuliform thinning between zero-cross etc.	on time setting (timer) ayed as TIME on panel display) urting/stopping integration elapsed time during power outages is d values based on external control integretation function) ethod (separate windows le)
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External control Measuring range Harmonic Meas Measurement method Synchronization source Measurement items FFT processing word length Number of FFT points Window function Analysis window	99999 (6 digits + decimal point)	on time setting (timer) ayed as TIME on panel display) ayed as TIME on panel display ayed as TIME on panel display ayed as display ayed as ayed as ayed ayed as display ayed ayed as ayed ayed ayed ayed ayed ayed ayed ayed
External control Measuring range Harmonic Meas Measurement method Synchronization source Measurement items FFT processing word length Number of FFT points Window function Analysis window width Data update rate	99999 (6 digits + decimal point)	on time setting (timer) ayed as TIME on panel display) ayed as TIME on panel display ayed as TIME on panel display ayed as display ayed as ayed as ayed ayed as display ayed ayed as ayed ayed ayed ayed ayed ayed ayed ayed
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Analysis order	2nd to 50th	
upper limit setting		
Measurement	f.s.: Measurement range	
accuracy	Frequency (f)	Voltage, Current, Active power
	DC	±0.4%rdg.±0.2%f.s.
	10 Hz ≤ f < 30 Hz	±0.4%rdg.±0.2%f.s.
	30 Hz ≤ f ≤ 400 Hz	±0.3%rdg.±0.1%f.s.
	400 Hz < f ≤ 1 kHz	±0.4%rdg.±0.2%f.s.
	1 kHz < f ≤ 5 kHz	±1.0%rdg.±0.5%f.s.
	5 kHz < f ≤ 8 kHz	±4.0%rdg.±1.0%f.s.
	For DC, add ±1 mA to current and (±1 mA	A) × (voltage read value) to active power.

Display Specifications

Display	7-segment LED
Number of display parameters	4
Display resolution	Other than integrated values: 99999 count
	Integrated values: 999999 count
Display update rate	200 ms to 20 s (varies with number of averaging iterations setting)

Synchronized C	Synchronized Control				
Functions	Timing of calculations, display updates, data updates, integration start/stop/reset events, display hold operation, key lock operation, and zero-adjustment operation for the slave PW3336/ PW3337 are synchronized with the master PW3336/ PW3337.				
Terminal	BNC terminal × 1 (non-isolated)				
Terminal name	EXT SYNC				
I/O settings	Off: Synchronized control function off In: The EXT SYNC terminal is set to input, and a dedicated synchronization signal can be input (slave). Out: The EXT SYNC terminal is set to output, and a dedicated synchronization signal can be output (master).				
Number of units for which synchronized control can be performed	1 master unit and 7 slave units (total 8 units)				

External Current Sensor Input Specifications (built-in feature)

Terminal	Isolated BNC terminals	s, 1 for each channel	
Current sensor	Off / Type 1 / Type 2		
type switching	When set to off, input from	the external current sensor	r input terminal is ignored.
Current sensor	TYPE1 (100 A to 5000		
options	9660, 9661, 9669,	CT9667-01/-02/-03	
		A sensors, Power suppl	
		3-05, CT6875, CT6876	
		3-05, CT6844-05, CT684	
Current		A (range noted on pane	
measurement		ch wiring mode. Can be	e read directly by
range	manually setting the C	T ratio.	
Power range		ination of voltage and o	
configuration	60.000W to 15.000MV	V (also applies to VA, va	ar)
Measurement accuracy			
Current, Active power			
Frequency	Input < 50%f.s.	50%f.s. < Input < 100%f.s.	100%f.s. < Input

Frequency	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input
DC	±0.2%rdg. ±0.6%f.s.	±0.2%rdg. ±0.6%f.s.	±0.8%rdg.
0.1Hz≤ f <16Hz	±0.2%rdg. ±0.2%f.s.	±0.4%rdg.	±0.4%rdg.
16Hz≤ f < 45Hz	±0.2%rdg. ±0.2%f.s.	±0.4%rdg.	±0.4%rdg.
45Hz ≤ f ≤ 66Hz	±0.2%rdg. ±0.1%f.s.	±0.3%rdg.	±0.3%rdg.
66Hz < f ≤ 500Hz	±0.2%rdg. ±0.2%f.s.	±0.4%rdg.	±0.4%rdg.
500Hz < f ≤ 1kHz	±0.2%rdg. ±0.3%f.s.	±0.5%rdg.	±0.5%rdg.
1kHz < f ≤ 10kHz	±5.0%rdg.	±5.0%rdg.	±5.0%rdg.
10kHz < f ≤ 50kHz			
50kHz < f < 100kHz			

f.s.: Each measurement range
•To obtain the current or active power accuracy, add the current sensor's accuracy to the above current and active power accuracy figures.
•The effective measurement range and frequency characteristics conform to the current sensor's specifications.

Temperature characteristics

accuracy

conform to the current sensor's specifications.

•Values for current, and active power for which

0.1 H≥ ≤ f < 10 H≥ are for reference only.

•Values for voltage in excess of 220 V active power for which

10 H≥ ≤ f < 16 H≥ are for reference only.

Current, active power:

±0.08% f.s./°C (instrument temperature coefficient;
f.s.: instrument measurement range)

Add current sensor temperature coefficient to above.

•Instrument: ±0.15% f.s. or less (45 Hz to 66 Hz with power factor = 0)

•Internal circuit voltage/current phase difference: ±0.086°

•Add the current sensor phase accuracy to the internal circuit voltage/current phase difference noted above.

•(External current sensor input instrument accuracy) + (±2.0% f.s.)

(f.s.:current peak range)

•Add the current sensor accuracy to the above. Power factor effects Current peak value measurement

accuracy Harmonic measurement

f.s.: Each measurement range
•To obtain the current or active power accuracy, add the current sensor's accuracy to the above current and active power accuracy figures.

D/A Output Specifications (PW3336-02/-03 and PW3337-02/-03)

Number of	10
output channels	
Configuration	16-bit D/A converter (polarity + 15 bits)
Output parameters	U1 to U3 (voltage level) or u1 to u3 (instantaneous voltage waveform) (switchable) I1 to I3 (current level) or i1 to I3 (instantaneous current waveform) (switchable) P1 to P3 (active power level) or p1 to p3 (instantaneous prower waveform) (switchable) Psum (active power level) or Hi-Psum (high-speed active power level) (switchable) Psum and Hi-Psum output is not available (0 V) when using the 1P2W wiring mode.P12 is output when using 1P3W, 3P3W, or 3P3W2M, and P123 is output when using 3V3A, 3P3W3M, or 3P4W. D/A1 to D/A3 : Select any 3 from channel or sum value for Voltage, Current, Active power, Apparent power, Reactive power, Power factor, Phase angle, Total harmonic voltage/current fistortion, Inter-channel voltage/current fundamental wave phase difference, Voltage/current ripple rate, Frequency, Efficiency, Current integration, Active power integration Active power linegration, Active power integration Hi-P1 to Hi-P3 and Hi-Psum (hibh-speed active power level): Fixed to AC+DC.

Output accuracy	f.s.: Relative to the output voltage rated value for each output parameter
	Level output
	: (Output parameter measurement accuracy) + (±0.2% f.s.)
	High-speed active power level output
	: (Output parameter measurement accuracy) + (±0.2% f.s.)
	Instantaneous waveform output
	: (Output parameter measurement accuracy) + (±1.0% f.s.)
	Instantaneous voltage, instantaneous current: RMS value level Instantaneous power: Average value level
Output frequency	Instantaneous power. Average value level
band	At DC or 10 Hz to 5 kHz, accuracy is as defined above.
Output voltage	Level output
output voltago	Voltage, Current, Active power, Apparent power,
	Reactive power, Time average current/active power
	: ±2 V DC for ±100% of range
	Power factor
	: ±2 V DC at ±0.0000, 0 V DC at ±1.0000
	Phase angle
	: 0 V DC at 0.00°, ±2 V DC at ±180.00°
	Voltage/current ripple rate, total harmonic voltage/current distortion : + 2 V DC at 100.00%
	Voltage/current crest factor
	: +2 V DC at 10.000
	Frequency
	: Varies with measured value.
	+2 V DC per 100 Hz from 0.1000 Hz to 300.00 Hz
	+2 V DC per 10 kHz from 300.01 Hz to 30.000 kHz
	+2 V DC per 100 kHz from 30.001 kHz to 220.00 kHz
	Efficiency
	: +2 V DC at 200.00%
	Current integration, active power integration : ±5 V DC at (range) × (integration set time)
	Waveform output
	: 1 V f.s. relative to 100% of range
Maximum output voltage	Approx. ±12 V DC
Output update rate	Level output
	: Fixed at 200 ms ±50 ms (approx. 5 times per sec.)
	Update rate is unrelated to number of averaging iterations
	setting and display hold operation.
	Waveform output
	: Approx. 11.4 µs (approx. 87.5 kHz)
	High-speed P level
Deenenee time	: Updated once every cycle for the input waveform set as the synchronization source.
Response time	Level output : 0.6 sec. or less (when the input changes abruptly from 0% to 90%, or from
	100% to 10%, the time required in order to satisfy the accuracy range)
	Waveform output
	: 0.2 ms or less
	High-speed active power level output
	: 1 cycle
Temperature characteristic	±0.05% f.s./°C or less
Output resistance	100 Ω ±5 Ω

External control	(Duiit-iii ie	eature)					
Functions	Integration st	egration start/stop, integration reset and hold via external control					
External control	Input signal le	it signal level: 0 to 5 V (high-speed CMOS level or shorted [Lo]/open [Hi])					
	Functions	External control signal	External control terminal				
	Start	Hi → Lo	START/STOP				
	Stop	Lo → Hi	01711170101				
	Reset	Lo interval of at least 200 ms	RESET				
	Hold on	Hi → Lo	HOLD				
	Hold off	Lo → Hi	HOLD				

GP-IB Interrace	(PVV3336-01/-03, PVV3337-01/-03)
Method	IEEE488.1 1978 compliant; see IEEE488.2 1987
	Interface functions: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0
	Remote control by controller
Address	00 to 30

RS-232C interface (built-in feature)

Connector	D-sub 9-pin connector x 1
Communication	Full duplex, Start-stop synchronization, Stop bits: 1 (fixed),
method	Data bits: 8 (fixed), Parity: None
	Remote control by controller
Communication Speed	9600bps/ 38400bps

LAN interface (built-in feature)

Ī	Connector	RJ-45 connector x 1
	Electrical Specifications	IEEE802.3 compliant
Ī	Transmission Method	10BASE-T/100BASE-TX (automatic detection)
ı	Protocol	TCP/IP
Ī	Functions	HTTP server (remote operation, firmware updates)
		Dedicated ports (command control, data transfer)
		Remote control by controller (REMOTE lamp will light up.)

General Specifications (product guaranteed for 3 year) Operating environment Indoors, altitude up to 2000 m (6562-ft.), pollution degree 2 Operating temperature 0 to 40°C (32 to 104°F), 80% RH or less (non-condensating)

and humidity	· · · · · · · · · · · · · · · · · · ·
Storage temperature and humidity	-10 to 50°C (14 to 122°F) 80% RH or less (non-condensating)
Dielectric strength	4290 Vrms AC (sensed current: 1 mA)
	Between voltage input terminals and (case, interface, and output terminals) Between current direct input terminals and (case, interface, and output terminals) Between voltage input terminals and current direct input terminals
Maximum rated	Voltage input terminal, Current direct input terminal
voltage to earth	Measurement category III 600 V (anticipated transient overvoltage 6000 V) Measurement category II 1000 V (anticipated transient overvoltage 6000 V)
Maximum input voltage	Between voltage input terminals U: 1000 V, ±1500 Vpeak
Maximum input current	Between +/- current direct input terminals I: ±70 A, ±100 Apeak
Applicable Standards	Safety: EN61010, EMC: EN61326 Class A/ EN61000-3-2/ EN61000-3-3
Rated supply voltage	100 VAC to 240 VAC, Rated power supply frequency: 50/60 Hz
Maximum rated power	40 VA or less
Dimensions	Approx. 305W(12.01") × 132H(5.20") × 256D(10.08") mm
	(excluding protrusions)
Mass	PW3336 series Approx. 5.2 kg (183.4 oz.)
	PW3337 series Approx. 5.6 kg (197.5 oz.)
Accessories	Instruction manual × 1, Measurement guide × 1, Power cord × 1

PW3335 Specifications

Input Specificati	ons			
Measurement line type	Single-phase 2-wire(1P2W)			
Input methods	Voltage Isolated input, resistive voltage divider method			
	Current Isolated input, shunt input method			
Voltage measurement	AUTO/ 6 .0000 V/ 15.000 V/ 30.000 V/ 60.000 V/ 150.00 V/			
ranges	300.00 V/ 600.00 V/ 1.0000 kV			
Current	AUTO/ 1.0000 mA/ 2.0000 mA/ 5.0000 mA/ 10.000 mA/			
measurement	20.000 mA/ 50.000 mA/ 100.00 mA/ 200.00 mA/ 500.00 mA/			
ranges	1.0000 A/ 2.0000 A/ 5.0000 A/ 10.000 A/ 20.000 A			
Power ranges	Depends on the combination of voltage and current ranges;			
	From 6.0000 mW to 20.000 kW (also applies to VA, var)			
	The details are as below.			
Input resistance	Voltage input terminal: 2 MΩ			
	Current input terminal: 1 mA to 100 mA range 520 mΩ or less			

ranges	1.0000 A/ 2.0000 A/ 5	.0000 A/ 10.000 A/ 20.	000 A			
Power ranges	From 6.0000 mW to 20	Depends on the combination of voltage and current ranges; From 6.0000 mW to 20.000 kW (also applies to VA, var)				
In a set on a late of a sec	The details are as belo					
Input resistance	Voltage input terminal: Current input terminal:		nga 520 mO or lace			
	Current input terminal: 1 mA to 100 mA range 520 m Ω or less 200 mA to 20 A range 15 m Ω or less					
Basic Measuren	nent Specification					
Measurement		and current digital sam	pling, zero-cross			
method	simultaneous calculati					
Sampling frequency	Approx. 700 kHz					
A/D converter resolution	T6-bit DC, 0.1 Hz to 100 kHz (Values within 0.1Hz ≤ f < 10 Hz are for reference only)					
	U, I, DC (fixed to 200 r		az are for reference only)			
Measurement items		Current	Active power			
	Apparent power	Reactive power	Power factor			
	Phase angle	Frequency	Current integration			
	Active power integra					
	Voltage waveform po Voltage crest factor	Current cre	veform peak value			
	Maximum current ra					
	Time average active	power				
	Voltage ripple rate	Current rip	ple rate			
	Harmonic parameters Harmonic voltage R	MS value Harmonic	current RMS value			
	Harmonic active por		onic voltage distortion			
		t distortion Funda, mer				
	Fundamental wave of		tal wave active power			
		parent power Fundament oower factor (Displacer				
	Fundamental wave	oltage current phase of	lifference			
	Harmonic voltage co					
	Harmonic current co	ontent percentage wer content percentage				
	Harmonic voltage pl	can be downloaded as da	la via PC communication)			
	Harmonic current ph					
	Harmonic voltage cu	urrent phase difference	!			
Rectifiers	AC+DC : AC+DC mea	isurement values for both voltage	and aurrant			
	AC+DC Umn : AC+DC		and current			
	Display of average v	alue rectified RMS cor	verted values for			
	voltage and true RM	S values for current				
	DC : DC measuremen	t erages for both voltage	and current			
		d by (voltage DC value) × (curr				
	AC : AC measurement		, ,			
	Display of values ca	lculated by				
	√(AC+DC value)² - (DC Display of values ca	value) ² for both voltag lculated by	e and current			
	(AC+DC value) - (DC	C value) for active power	er			
	FND : Extraction and display	of the fundamental wave compone	ent from harmonic measurement			
Zero-cross Filter		Hz 500 Hz: 0.1 Hz to 5				
Measurement accuracy	5 KHZ: U.1 HZ (0 5 KHZ	100 kHz: 0.1 Hz to	100 KHZ			
Voltage						
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input			
DC	±0.1rdg.±0.1%f.s.	±0.1%rdg.±0.1%f.s.	±0.2%rdg.			
0.1Hz≤f<16Hz	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.			
16Hz≤f<45Hz	±0.1%rdg.±0.1%f.s.	±0.2%rdg.	±0.2%rdg.			
45Hz≤f≤66Hz	±0.1%rdg.±0.05%f.s.	±0.15%rdg.	±0.15%rdg.			
66Hz <f≤500hz 500Hz<f≤10khz< td=""><td>±0.1%rdg.±0.1%f.s. ±0.1%rdg.±0.2%f.s.</td><td>±0.2%rdg. ±0.3%rdg.</td><td>±0.2%rdg. ±0.3%rdg.</td></f≤10khz<></f≤500hz 	±0.1%rdg.±0.1%f.s. ±0.1%rdg.±0.2%f.s.	±0.2%rdg. ±0.3%rdg.	±0.2%rdg. ±0.3%rdg.			
10kHz <f≤50khz< td=""><td>±0.1%rdg.±0.2%f.s.</td><td>±0.8%rdg.</td><td>±0.8%rdg.</td></f≤50khz<>	±0.1%rdg.±0.2%f.s.	±0.8%rdg.	±0.8%rdg.			
50kHz <f≤100khz< td=""><td>±2.1%rdg.±0.3%f.s.</td><td>±2.4%rdg.</td><td>±2.4%rdg.</td></f≤100khz<>	±2.1%rdg.±0.3%f.s.	±2.4%rdg.	±2.4%rdg.			
Current	,					
Current Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input			
DC DC	±0.1%rdg.±0.1%f.s.	±0.1%rdg.±0.1%f.s.	±0.2%rdg.			
0.1Hz≤f<16Hz	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.			
16Hz≤f<45Hz	±0.1%rdg.±0.1%f.s.	±0.2%rdg.	±0.2%rdg.			
45Hz≤f≤66Hz	±0.1%rdg.±0.05%f.s.	±0.15%rdg.	±0.15%rdg.			
66Hz <f≤500hz 500Hz<f≤1khz< td=""><td>±0.1%rdg.±0.1%f.s.</td><td>±0.2%rdg. ±0.3%rdg.</td><td>±0.2%rdg. ±0.3%rdg.</td></f≤1khz<></f≤500hz 	±0.1%rdg.±0.1%f.s.	±0.2%rdg. ±0.3%rdg.	±0.2%rdg. ±0.3%rdg.			
1kHz <f≤10khz< td=""><td>±0.1%rdg.±0.2%f.s. ±(0.03+0.07×F)%rdg.</td><td>±0.3%rdg. ±(0.23+0.07×F)%rdg.</td><td>±0.3%rdg. ±(0.23+0.07×F)%rdg.</td></f≤10khz<>	±0.1%rdg.±0.2%f.s. ±(0.03+0.07×F)%rdg.	±0.3%rdg. ±(0.23+0.07×F)%rdg.	±0.3%rdg. ±(0.23+0.07×F)%rdg.			
	±0.2%f.s.					
10kHz <f≤100khz< td=""><td>±(0.3+0.04×F)%rdg.</td><td>±(0.6+0.04×F)%rdg.</td><td>±(0.6+0.04×F)%rdg.</td></f≤100khz<>	±(0.3+0.04×F)%rdg.	±(0.6+0.04×F)%rdg.	±(0.6+0.04×F)%rdg.			
	±0.3%f.s.					

A ative mayor	I				
Active power	Input + E00/f o	Eng/fo < Input < 1000/fo	1000/fo < Input		
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input		
DC 0.1Hz≤f<16Hz	±0.1%rdg.±0.1%f.s.	±0.1%rdg.±0.1%f.s.	±0.2%rdg. ±0.3%rdg.		
	±0.1%rdg.±0.2%f.s.	±0.3%rdg.			
16Hz≤f<45Hz	±0.1%rdg.±0.1%f.s.	±0.2%rdg.	±0.2%rdg.		
45Hz≤f≤66Hz	±0.1%rdg.±0.05%f.s.	±0.15%rdg.	±0.15%rdg.		
66Hz <f≤500hz< td=""><td>±0.1%rdg.±0.1%f.s.</td><td>±0.2%rdg.</td><td>±0.2%rdg.</td></f≤500hz<>	±0.1%rdg.±0.1%f.s.	±0.2%rdg.	±0.2%rdg.		
500Hz <f≤1khz< td=""><td>±0.1%rdg.±0.2%f.s.</td><td>±0.3%rdg.</td><td>±0.3%rdg.</td></f≤1khz<>	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.		
1kHz <f≤10khz< td=""><td>±(0.03+0.07×F)%rdg. ±0.2%f.s.</td><td>±(0.23+0.07×F)%rdg.</td><td>±(0.23+0.07×F)%rdg.</td></f≤10khz<>	±(0.03+0.07×F)%rdg. ±0.2%f.s.	±(0.23+0.07×F)%rdg.	±(0.23+0.07×F)%rdg.		
10kHz <f≤50khz< td=""><td>±0.2%i.s. ±(0.07×F)%rdg.</td><td>±(0.3+0.07×F)%rdg.</td><td>±(0.3+0.07×F)%rdg.</td></f≤50khz<>	±0.2%i.s. ±(0.07×F)%rdg.	±(0.3+0.07×F)%rdg.	±(0.3+0.07×F)%rdg.		
50kHz <f≤100khz< td=""><td>±0.3%f.s. ±(0.6+0.07×F)%rdg.</td><td colspan="2">±0.3%f.s.</td></f≤100khz<>	±0.3%f.s. ±(0.6+0.07×F)%rdg.	±0.3%f.s.			
30KI 12CI S 100KI 12	±0.3%f.s.		±(0.9+0.07×F)%rdg.		
Effective measuring range	• "F" in the tables refe • When using the 1 m/Add ±1 μA to 0.1 Hz t current. Add (±1 μA) × (voltage measurement accurare. When using the 200 n Add ±1 mA to D.C me Add (±1 mA) × (voltage rese when using the 1 mA/2. Add ±10 μA to D.C me Add (±10 μA) × (voltage rese when using the 200 n Add ±10 μA to D.C me Add (±10 μA) × (voltage rese when using the 200 n Add ±(0.02×F)% rdg and active power for •The measurement results f Values for voltage, current, and values for current and active Values for voltage and active Voltage 1% to 15f Current 1% to 15f Current 9% to 225% However, The Values for voltage and active Voltage 10% to 225% However, Values for voltage and active Voltage 10% to 25% However, Values for voltage and active Voltage 10% to 25% However, Values for voltage and active Voltage 10% to 25% However, Values for voltage voltage and active Voltage 10% to 25% However, Values for voltage	o 100 kHz measureme pe read value) to 0.1 Hz cy for active power. mA/500 mA/1 A/2 A/sesurement accuracy for advalue) to DC measurement accuracy for advalue) to DC measurement amA/500 mA/1 A/2 A/sesurement accuracy for advalue) to DC measurement amA/500 mA/1 A/2 A/sourement accuracy for a maximum ama/500 mA/1 A/2 A/sourement ama/500 mA/500 mA/5	Hz. Ant accuracy for to 100 kHz 5 A/ 10 A/ 20 A range: or current. t accuracy for active power. 5 of mA/ 100 mA range: or current. curacy for active power. 5 A/ 10 A/ 20 A range: current power. 5 A/ 10 A/ 20 A range: curacy for current 0 kHz). 0 Hz ≤ f < 10 Hz. 0 A for which 10 Hz ≤ f < 16 Hz. hich 500 Hz < f ≤ 100 kHz. which 30 kHz < f ≤ 100 kHz. √ range, up to 1000 V)		
peak voltage		e range 10 V, and 1000 V range	s +1500 V neak		
Maximum effective	±600% of each curren		0, ±1000 v pour		
peak current	However, for 20 A range				
Guaranteed accuracy	1 year	, , _ , , , , , , , , , , , , , , , , ,			
period	'				
Post-adjustment	6 months				
accuracy guaranteed					
Conditions of	Temperature and humidi	ty range: 23°C±5°C (73°F	+9°F) 80% BH or less		
guaranteed			20 1), 00 % 1111 01 1000		
accuracy	Warm-up time: 30 minutes Input: Sine wave input, power factor of 1, voltage to eart of 0 V, after zero-adjustment; within range in which the fundamental wave satisfies synchronization source conditions				
Temperature	±0.03%f.s. per °C or le				
coefficient		ge, ±0.06%f.s. per °C			
Effect of power		66 Hz, at power factor			
factor		ge/current phase difference			
Effect of common		0 V, 50 Hz/60 Hz, appli	ea petween input		
mode voltage	terminals and enclosu				
Effect of magnetic		Hz/60 Hz magnetic field	ı		
field	Voltage				
	±1.5%f.s. or less				
	Current ±1.5%f.s. or less than or equal to the following value, whichever is gre: 200 mA/500 mA/1 A/2 A/5 A/10 A/20 A range: ±20 mA 1 mA/2 mA/5 mA/10 mA/20 mA/50 mA/100 mA range: ±200 Active power ±3.0%f.s. or less than or equal to the following value, whichever is gre: 200 mA/500 mA/1 A/2 A/5 A/10 A/20 A range: (Voltage influence quantity)x(±20 mA/1 mA/2 mA/5 mA/10 mA/20 mA/50 mA/100 mA range: (Voltage influence quantity)x(±20 mA/10 mA/20 mA/50 mA/100 mA range: (Voltage influence quantity)x(±20 mA/10 mA/20 mA/50 mA/100 mA range: (Voltage influence quantity)x(±200 mA/100 mA/10				
Effect of self-	With input of at least 1				
	1 par or at loadt 1		****		
	Current				
heating	Current AC input signal				
	AC input signal	•			
	AC input signal ±(0.025+0.005×(I	•			
	AC input signal ±(0.025+0.005×(I DC input signal 200 mA/ 500 mA/ ±((0.025+0.005 1 mA/ 2 mA/ 5 mA	•	1×(I-15))mA) or less 1/ 100 mA range		

Active power
(above current influence quantity) × (voltage read value) or less
The effects of self-heating will continue to manifest themselves until
the input resistance temperature falls, even if the current value is low.

Range table (Power ranges)

Voltage Current	6.0000 V	15.000 V	30.000 V	60.000 V	150.00 V	300.00 V	600.00 V	1.0000 kV
1.0000 mA	6.0000 mW	15.000 mW	30.000 mW	60.000 mW	150.00 mW	300.00 mW	600.00 mW	1.0000 W
2.0000 mA	12.000 mW	30.000 mW	60.000 mW	120.00 mW	300.00 mW	600.00 mW	1.2000 W	2.0000 W
5.0000 mA	30.000 mW	75.000 mW	150.00 mW	300.00 mW	750.00 mW	1.5000 W	3.0000 W	5.0000 W
10.000 mA	60.000 mW	150.00 mW	300.00 mW	600.00 mW	1.5000 W	3.0000 W	6.0000 W	10.000 W
20.000 mA	120.00 mW	300.00 mW	600.00 mW	1.2000 W	3.0000 W	6.0000 W	12.000 W	20.000 W
50.000 mA	300.00 mW	750.00 mW	1.5000 W	3.0000 W	7.5000 W	15.000 W	30.000 W	50.000 W
100.00 mA	600.00 mW	1.5000 W	3.0000 W	6.0000 W	15.000 W	30.000 W	60.000 W	100.00 W
200.00 mA	1.2000 W	3.0000 W	6.0000 W	12.000 W	30.000 W	60.000 W	120.00 W	200.00 W
500.00 mA	3.0000 W	7.5000 W	15.000 W	30.000 W	75.000 W	150.00 W	300.00 W	500.00 W
1.0000 A	6.0000 W	15.000 W	30.000 W	60.000 W	150.00 W	300.00 W	600.00 W	1.0000 kW
2.0000 A	12.000 W	30.000 W	60.000 W	120.00 W	300.00 W	600.00 W	1.2000 kW	2.0000 kW
5.0000A	30.000 W	75.000 W	150.00 W	300.00 W	750.00 W	1.5000 kW	3.0000 kW	5.0000 kW
10.000 A	60.000 W	150.00 W	300.00 W	600.00 W	1.5000 kW	3.0000 kW	6.0000 kW	10.000 kW
20.000 A	120.00 W	300.00 W	600.00 W	1.2000 kW	3.0000 kW	6.0000 kW	12.000 kW	20.000 kW



Voltage/ Current/ Active Power Measurement Specificatio	Voltage/	Current/	Active	Power	Measurement	Specification
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Voltage/ Ourien	V Active Fower Measurement Specifications
Measurement types	Rectifiers: AC+DC, DC, AC, FND, AC+DC Umn
Effective measuring range	Voltage ±1% to ±150% of the range. However, up to ±1500 V peak value and 1000 V RMS value
	Current
	±1% to ±150% of the range
	Active Power ±0% to ±225% of the range. However, valid when the voltage and current fall within the effective measurement range.
Display range	Voltage Up to ±152% of the range. However, zero-suppression when less than ±0.5%
	Current Up to ±152% of the range. However, zero-suppression when less than ±0.5% or less than ±9 µA. Active Power
	±0% to ±231.04% of the range (no zero-suppression)
Polarity	Voltage/ Current Displayed when using DC rectifier
	Active Power Positive : Power consumption (no polarity display) Negative : generation or regenerated power

Voltage Waveform Peak Value/ Current Waveform Peak Value

Measurement S	•			
Measurement		m's peak value (for both positive an		
method		mpled instantaneous voltage value		
Range	Voltage			
configuration	Voltage range	Voltage peak range		
	6.0000 V	36.000 V		
	15.000 V	90.000 V		
	30.000 V	180.00 V		
	60.000 V	360.00 V		
	150.00 V	900.00 V		
	300.00 V	1.8000 kV		
	600.00 V	3.6000 kV		
	1.0000 kV	6.0000 kV		
	Current			
	Current range	Current peak range		
	1.0000 mA	6.0000 mA		
	2.0000 mA	12.000 mA		
	5.0000 mA	30.000 mA		
	10.000 mA	60.000 mA		
	20.000 mA	120.00 mA		
	50.000 mA	300.00 mA		
	100.00 mA	600.00 mA		
	200.00 mA	1.2000 A		
	500.00 mA	3.0000 A		
	1.0000 A	6.0000 A		
	2.0000 A	12.000 A		
	5.0000 A	30.000 A		
	10.000 A	60.000 A		
	20.000 A	120.00 A		
Measurement accuracy	$\pm 2.0\%$ f.s. at DC and when 10 Hz \le f \le 1 kHz (f.s.: current peak range). Provided as reference value when 0.1 Hz \le f $<$ 10 Hz and when 1 kHz $<$ f. The above measurement accuracy is multiplied by 2 for the 1 mA range.			
Effective measuring range	±5% to ±100% of current peak range, however, up to ±60 A			
Display range	Up to ±102% of current peak range, however, the value 0 will be displayed if the current RMS value triggers the instrument's zero suppression function.			

Voltage Crest Factor/Current Crest Factor Measurement Specifications

Measurement	Calculates the ratio of the voltage waveform peak value to the
method	voltage RMS value.
Effective	As per voltage and voltage waveform peak value, or current and
measuring range	current waveform peak value effective measurement ranges.
Display range	1.0000 to 612.00 (no polarity)

Voltage Ripple Rate/ Current Ripple Rate Measurement Specifications

Calculates the AC component (peak to peak [peak width]) as a proportion of the voltage or current DC component.
As per voltage and voltage waveform peak value, or current and current waveform peak value effective measurement ranges.
 0.00 to 500.00 (No polarity)

Apparent Power/ Reactive Power/ Power Factor/ Phase Angle

Measurement S	pecifications
Measurement	Rectifiers
types	Apparent Power/ Reactive Power/ Power Factor
	AC+DC, AC, FND, AC+DC Umn
	Phase Angle
	AC, FND
Effective	As per voltage, current, and active power effective measurement
measuring range	ranges
Display range	Apparent Power/ Reactive Power
	0% to 231.04% of the range (no zero-suppression)
	Power Factor
	±0.0000 to ±1.0000
	Phase Angle

Polarity	Reactive Power/ Power Factor/ Phase Angle
	Polarity is assigned according to the lead/lag relationship of the
	voltage waveform rising edge and the current waveform rising edge.
	+: When current lags voltage (no polarity display)
	-: When current leads voltage

Power Calculation Formulas

S : Apparent power	$S = U \times I$	
Q : Reactive power	$Q = si\sqrt{S^2 - P^2}$	
λ : Power factor	$\lambda = si \mid P/S \mid$	
ϕ : Phase angle	$\phi = \operatorname{si} \cos^{-1} \lambda $ $\phi = \operatorname{si} 180 - \cos^{-1} \lambda $	(±90° to ±180°)

U: Voltage, I: Current, P: Active Power, si: Polarity symbol (acquired based on voltage waveform and current waveform lead and lag)

Frequency Measurement Specifications

Number of	2 (Voltage, current)		
measurement channels			
Measurement method	Calculated from input waveform	period (reciprocal method)	
Measurement ranges	100 Hz/ 500 Hz/ 5 kHz/ 100 kHz	(linked to zero-cross filter)	
Measurement accuracy	±0.1% rdg. ±1 dgt. However, for 1 mA range, ±0.2% rdg. ±1 dgt.		
Effective	0.1 Hz to 100 kHz		
measuring range	For sine wave input that is at least 20% of the measurement		
	source's measurement range		
	Measurement lower limit frequency setting: 0.1 sec. / 1 sec. / 10		
	sec. (linked to synchronization timeout setting)		
Display format	0.1000 Hz to 9.9999 Hz,	9.900 Hz to 99.999 Hz,	
	99.00 Hz to 999.99 Hz,	0.9900 kHz to 9.9999 kHz,	
	9.900 kHz to 99.999 kHz,	99.00 kHz to 100.00 kHz	

Maximum Current Ratio Measurement Specifications (MCR)

	Calculates the ratio of the current crest factor to the power factor. (MCR) = (Current Crest Factor) / (Power Factor)
	As per power factor (voltage, current, active power) and current crest factor
measuring range	(current, current waveform peak value) effective measurement ranges.
Display range	1.0000 to 6.1200 M (no polarity)

Time Average Current/ Time Average Active Power Measurement Specifications

	Calculates the average by dividing the current or active power	
method	integrated value by the integration time.	
Measurement accuracy	(Current or Active power measurement accuracy) + (±0.01% rdg. ±1 dgt.)	
Effective measuring range	As per the current or active power integration effective measurement range.	
Display range	Time Average Current ±0% to ±612% of the range (Has polarity when using the DC rectifier.)	
	Time Average Active Power	

Range select

Averaging

	±0% to ±612% of the range (Has polarity when using the DC rectifier.)		
	Time Average Active Power ±0% to ±3745.4% of the range (Has polarity)		
Functional Specifications			
Auto-range (AUTO)	Automatically changes the voltage and current range according to the input.		
	Range up: The range is increased when input exceeds 150% of the range or when the peak is exceeded.		

Range down: The range is decreased when input falls below 15% of the range. However, the range is not decreased when the peak is exceeded at the lower range.

The input level is monitored, and the range is switched over multiple ranges. Range select can be used to disable ranges so that they are not selected Selects whether to enable (turn on) or disable (turn off) individual

Enabled (use):
Ranges can be selected with the range keys.

Range switching occurs using auto-range operation. Range switching occurs during auto-range integration. Disabled (do not use):

Ranges cannot be selected with the range keys.
Range switching does not occur using auto-range operation.
Range switching does not occur during auto-range integration.

Zero-cross filter's threshold level Sets the zero-cross filter's threshold level for voltage and current ranges. Set from 1% to 15% (in 1% intervals). Synchronization occurs when the percentage level set for each measurement range is exceeded.

voltage and current ranges.

Averages the voltage, current, active power, apparent power, and reactive power. (Other than harmonic measurement parameters.)
The power factor and phase angle are calculated from averaged data. Averaging is not performed for parameters other than those listed above. Method: Simple averaging

Indifficer of averaging iterations and display update interval		
Number of averaging iterations	Display update interval	
1 (OFF)	200 ms	
2	400 ms	
5	1 s	
10	2 s	
25	5 s	
50	10 s	
100	20 s	

Scaling (VT, CT) Applies user-defined VT and CT ratio settings to measured values. VT ratio setting range OFF (1.0), 0.001 to 1000 OFF (1.0), 0.001 to 1000 CT ratio setting range Hold

 Stops display updates for all measured values and fixes the display values at that point in time.

• Measurement data acquired by communications is also fixed at

that point in time. Internal calculations (including integration and integration elapsed time) will continue.

Maximum value/	Detects maximum and minimum measured values (except	FFT processing	FFT processing word length : 32	bits
minimum value hold (MAX/MIN	current integration, active power integration, integration elapsed time, time average current, and time average active power		Number of FFT points : 4096 points	
HOLD)	values) as well as maximum and minimum values for the voltage waveform peak and current waveform peak and holds them on	Window function	Rectangular	
	the display.	Analysis window width	45 Hz ≤ f < 56 Hz : 178.57 ms to 2 56 Hz ≤ f < 66 Hz : 181.82 ms to 2	
	For data with polarity, display of the maximum value and minimum value for the data's absolute values is held (so that both	width	Frequencies other than the above	
	positive and negative polarity values are shown). However, this does not apply to the voltage waveform peak value or the current	Data update rate	Depends on window width.	
	waveform peak value. Internal calculations (including integration and integration	Maximum analysis	Complete principalities from a company (f) as	Analysis ander
	elapsed time) will continue. The maximum and minimum values during integration are	order	Synchronization frequency (f) ra 10 Hz ≤ f < 45 Hz	ange Analysis order 50th
	detected (maximum/minimum value measurement during the integration interval).		45 Hz ≤ f < 56 Hz	50th
7	Analog output and waveform output are not held.		56 Hz ≤ f ≤ 66 Hz 66 Hz < f ≤ 100 Hz	50th 50th
Zero Adjustment Key-lock	Zeroes out the voltage and current input offset. Disables key input in the measurement state, except for the KEY		100 Hz < f ≤ 200 Hz	40th
Backup	LOCK key. Backs up settings and integration data if the instrument is turned		200 Hz < f ≤ 300 Hz	25th
	off and if a power outage occurs.		300 Hz < f ≤ 500 Hz 500 Hz < f ≤ 640 Hz	15th 11th
System Reset	Initializes the instrument's settings.	Analysis order	2nd to 50th	
	surement Specifications	upper limit setting Measurement	f.s.: Measurement range	
Integration operation modes	Switchable between fixed-range integration and auto-range integration. Fixed-range integration	accuracy	Frequency (f)	Voltage, Current, Active power
	Integration can be performed for all voltage and current ranges. The voltage and current ranges are fixed once integration starts.		DC 10 Hz ≤ f < 30 Hz	±0.4% rdg. ±0.2%f.s. ±0.4% rdg. ±0.2%f.s.
			30 Hz ≤ f ≤ 400 Hz	±0.3% rdg. ±0.1%f.s.
	Auto-range integration Integration can be performed for all voltage ranges.		400 Hz < f ≤ 1 kHz	±0.4% rdg. ±0.2%f.s.
	The current is set to auto-range operation using ranges from 200 mA to 20 A.		1 kHz < f ≤ 5 kHz 5 kHz < f ≤ 8 kHz	±1.0% rdg. ±0.5%f.s. ±4.0% rdg. ±1.0%f.s.
	The integrated value for each range can be displayed by switching		When using the 1 mA/2 mA ran	
Measurement items			Add ±1 μA to 10 Hz to 8 kHz me Add (±1 μA) × (voltage read value	
and display	Positive current integrated value (Ah+) Negative current integrated value (Ah-)		measurement accuracy for activ	e power.
	Sum of current integrated values (Ah) Positive active power integrated value (Wh+)		When using the 200 mA/ 500 m/	
	Negative active power integrated value (Wh-)		Add ±1 mA to DC measurement Add (±1 mA) × (voltage read val	accuracy for current. ue) to DC measurement accuracy
Measurement	Sum of active power integrated values (Wh) Rectifiers: AC+DC, AC+DC Umn		for active power.	
types	Current: Displays the result of integrating current RMS value data (display		When using the 1 mA/ 2 mA/ 5 mA/ Add ±10 µA to DC measurement	10 mA/ 20 mA/ 50 mA/ 100 mA range:
	values) once every display update interval as an integrated value.		Add (±10 µA) × (voltage read va	lue) to DC measurement accuracy
	Active power:		for active power.	
	Displays the result of integrating active power values by polarity calculated once every cycle for the selected synchronization	Display Specific	pations	
	source as integrated values.	Display Specific	7-segment LED	
	Rectifier: DC	Number of display parameters	4 (display area a, b, c, and d)	
	Displays the result of integrating instantaneous data obtained by sampling both current and active power by polarity as	Display resolution	Other than integrated values: 999	
	integrated values (these values are not integrated values for the DC component when active power contains both DC and AC		Integrated values: 999999 count	(6 digits)
	components)	Display update rate	200 ms ±50 ms (approx. 5 updat number of averaging iterations se	
Integration time	1 min. to 10000 hr., settable in 1 min. blocks	Tale	Trumber of averaging iterations se	
Integration time accuracy	±0.01% rdg. ±1 dgt.	Synchronized co	ontrol	
Integration measurement accuracy	(Current or active power measurement accuracy) + (±0.01% rdg. ±1 dgt.)	Functions	The timing of calculations; display	
Effective	Until PEAK OVER U lamp or PEAK OVER I lamp lights up.		start, stop, and reset events; displa operation; and zero-adjustment operation	y hold operation; key lock eration for the slave PW3335 series
measuring range Display resolution	999999 (6 digits + decimal point)		is synchronized with the master PW the PW3336 series and PW3337 se	
Functions	Stopping integration based on integration time setting (timer)			
	Stopping/starting integration and resetting integrated values based on external control	Terminal Terminal name	BNC terminal × 1 (non-isolated) External synchronization terminal	(EXT.SYNC)
	Displaying the integration elapsed time (displayed as TIME on panel display)	I/O settings	Off	if (aignala input to the automal
	Additional integration by repeatedly starting/stopping integration		Synchronized control function of synchronization terminal (EXT.S)	
	Backing up integrated values and the integration elapsed time during power outages		In	
	Stopping integration when power returns		The external synchronization ten and a dedicated synchronization	
	urement Specifications			r orginal dan bo input (olavo).
Measurement method	Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with		Out The external synchronization term	
	a digital antialiasing filter Interpolation calculations (Lagrange interpolation)		and a dedicated synchronization s	signal can be output (master).
	When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant	Number of units for	Up to 7 slaves per master	22C/DM2227 aprica)
	Gaps and overlaps may occur if the measurement frequency is	which synchronized control can be	(total of 8 units including the PW3	336/PW3337 series)
	not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range:	performed		
Synchronization	No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic	External Curren (PW3335-03 and	t Sensor Input Specificatio	ns
source	measurement specifications.	Terminal	Isolated BNC terminals	
Measurement items	Harmonic voltage RMS value Harmonic voltage content percentage Harmonic current RMS value	Current sensor	Off / TYPE.1 / TYPE.2	
	Harmonic current content percentage Harmonic current phase angle Harmonic active power	type switching	When set to off, input from the exterminal is ignored.	ternal current sensor input
	Harmonic active power content percentage	Current sensor	TYPE1 (100 A to 5000 A sensors)	
	Harmonic voltage current phase difference Total harmonic voltage distortion Total harmonic current distortion	options	9660, 9661, 9669, CT9667-01	
	Fundamental wave voltage Fundamental wave current Fundamental wave active power Fundamental wave apparent power		TYPE2 (20 A to 1000 A sensors, F	
	Fundamental wave reactive power Fundamental wave power factor Fundamental wave voltage current phase difference			375, CT6876, CT6877, 9272-05, 14-05, CT6845-05, CT6846-05, etc.
	(The following parameters can be downloaded as data with communications)	Current measurement	Auto/ 1 A/ 2 A/ 5 A (range noted of	
	Harmonic voltage phase angle Harmonic current phase angle	range	Can be read directly by manually	



Power range	Depends on the com	Depends on the combination of voltage and current ranges;			
configuration	from 24.000 W to 5.0000 MW (also applies to VA, var)				
Measurement					
accuracy					
Current/ Active Po		I			
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input		
DC	±0.1%rdg.±0.2%f.s.	±0.1%rdg.±0.2%f.s.	±0.3%rdg.		
0.1Hz≤f<16Hz	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.		
16Hz≤f<45Hz	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.		
45Hz≤f≤66Hz	±0.1%rdg.±0.1%f.s.	±0.2%rdg.	±0.2%rdg.		
66Hz <f≤500hz< td=""><td>±0.1%rdg.±0.2%f.s.</td><td>±0.3%rdg.</td><td>±0.3%rdg.</td></f≤500hz<>	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.		
500Hz <f≤1khz< td=""><td>±0.1%rdg.±0.2%f.s.</td><td>±0.3%rdg.</td><td>±0.3%rdg.</td></f≤1khz<>	±0.1%rdg.±0.2%f.s.	±0.3%rdg.	±0.3%rdg.		
Current					
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input		
1kHz <f≤10khz< td=""><td>±(0.03+0.07×F)%rdg. ±0.2%f.s.</td><td>±(0.23+0.07×F)%rdg.</td><td>±(0.23+0.07×F)%rdg.</td></f≤10khz<>	±(0.03+0.07×F)%rdg. ±0.2%f.s.	±(0.23+0.07×F)%rdg.	±(0.23+0.07×F)%rdg.		
10kHz <f≤100khz< td=""><td>±(0.3+0.04×F)%rdg. ±0.3%f.s.</td><td>±(0.6+0.04×F)%rdg.</td><td>±(0.6+0.04×F)%rdg.</td></f≤100khz<>	±(0.3+0.04×F)%rdg. ±0.3%f.s.	±(0.6+0.04×F)%rdg.	±(0.6+0.04×F)%rdg.		
Active Power					
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input		
1kHz <f≤10khz< td=""><td>±(0.03+0.07×F)%rdg. ±0.2%f.s.</td><td>±(0.23+0.07×F)%rdg.</td><td>±(0.23+0.07×F)%rdg</td></f≤10khz<>	±(0.03+0.07×F)%rdg. ±0.2%f.s.	±(0.23+0.07×F)%rdg.	±(0.23+0.07×F)%rdg		
10kHz <f≤50khz< td=""><td>±(0.07×F)%rdg. ±0.3%f.s.</td><td>±(0.3+0.07×F)%rdg.</td><td>±(0.3+0.07×F)%rdg.</td></f≤50khz<>	±(0.07×F)%rdg. ±0.3%f.s.	±(0.3+0.07×F)%rdg.	±(0.3+0.07×F)%rdg.		
50kHz <f≤100khz< td=""><td>±(0.6+0.07×F)%rdg. ±0.3%f.s.</td><td>±(0.9+0.07×F)%rdg.</td><td>±(0.9+0.07×F)%rdg.</td></f≤100khz<>	±(0.6+0.07×F)%rdg. ±0.3%f.s.	±(0.9+0.07×F)%rdg.	±(0.9+0.07×F)%rdg.		

- Values for f.s. depend on measurement ranges.

 "F" in the tables refers to the frequency in kHz.

 To obtain the current or active power accuracy, add the current sensor's accuracy to
- the above current and active power accuracy figures.

 The effective measurement range and frequency characteristics conform to the current sensor's specifications.
- The following input are considered reference values:
 Values for voltage, current, and active power for which 0.1 Hz ≤ f < 10 Hz. Values for voltage, current, and active power for which 0.1 Hz ≤ 1 < 10 Hz. Values for voltage and active power in excess of 220 V for which 10 Hz ≤ f < 16 Hz. Values for voltage and active power in excess of 750 V for which 30 kHz < f ≤ 100 kHz.

 • When using the CT684x-05 series, add ±2 mV to the CT684x-05 series accuracy after performing CT684x-05 series zero adjustment using the 1 A range noted on the panel.

	·			
Temperature coefficient	Current, active power: ±0.08%f.s./°C or less (instrument temperature coefficient; f.s.: instrument measurement range) Add current sensor temperature coefficient to above.			
Effect of power factor	Instrument: ±0.15%f.s. or less (45 to 66 Hz with power factor = 0) Internal circuit voltage/current phase difference: ±0.0859° Add the current sensor phase accuracy to the internal circuit voltage/current phase difference noted above.			
Current waveform peak value measurement specifications	$\pm 2.0\%$ at DC or 10 Hz \leq f \leq 1 kHz (f.s.: current peak range) Add the current sensor accuracy to the above.			
Harmonic	External current sensor input instrument measurement accuracy only			
measurement	Frequency (f)	Voltage, Current, Active power		
accuracy	DC	±0.4% rdg.±0.2%f.s.		
	10 Hz ≤ f < 30 Hz	±0.4% rdg.±0.2%f.s.		
	30 Hz ≤ f ≤ 400 Hz	±0.3% rdg.±0.1%f.s.		
	400 Hz < f ≤ 1 kHz	±0.4% rdg.±0.2%f.s.		
	1 kHz < f ≤ 5 kHz	±1.0% rdg.±0.5%f.s.		
	5 kHz < f ≤ 8 kHz	±4.0% rdg.±1.0%f.s.		
	Values for f.s. depend on measurement ranges. To obtain the current or active power accuracy, add the current sensor's accuracy to the above current and active power accuracy figures. When using the CT684x-05 series, add ±2 mV to the CT684x-05 series accuracy after performing CT684x-05 series zero adjustment using the 1 A range noted on the panel.			

D/A Output Specifications (PW3335-02 and PW3335-04)

Number of output channels	7 channels
Configuration	16-bit D/A converter (polarity + 15 bits)
Output voltage	The output level, output speed, and waveform output can be selected. Level output 2 Vf.s. or 5 Vf.s., linked to display updates High-speed level output 2 Vf.s. or 5 Vf.s., linked to synchronization interval Waveform output 1 Vf.s., linked to sampling
Output parameters	Output parameters for all channels Available selections vary with the output parameter. Level output/ High-speed level output/ Waveform output Voltage, current, active power Only Level output Apparent power, reactive power, power factor, phase angle, total harmonic voltage distortion, total harmonic current distortion, voltage ripple rate, current ripple rate, voltage crest factor, current crest factor, time average current, time average active power, maximum current ratio Only Level output 5 Vf.s. Frequency, current integration, active power integration The rectifier can be selected.

Output accuracy	f.s.: Relative to the output voltage rated value for each output
Output accuracy	parameter
	Level output
	(Output parameter measurement accuracy) + (±0.2%f.s.)
	High-speed level output
	(Output parameter measurement accuracy) + (±0.2%f.s.)
	Waveform output
	(Output parameter measurement accuracy) + (±1.0%f.s.)
Output frequency	Waveform output, high-speed level output
band	At DC or 10 Hz to 30 kHz, accuracy is as defined above.
Maximum output	Approx. ±12 V DC
voltage	
Output update	Level output
rate	Same as the data update period.
	High-speed level output
	AC Updated once every cycle for the input waveform set as the
	synchronization source. However, voltage and current are only
	updated once every cycle for input signals from 45 to 66 Hz.
	Waveform output
D .:	Approx. 1.43 μs (approx. 700 kHz)
Response time	Level output 0.6 sec. or less
	High-speed level output
	2 ms or less
	Waveform output
	0.2 ms or less
Temperature	±0.05%f.s./°C or less
coefficient	
Output resistance	Approx. 100 Ω
External control	
Functions	Integration start/stop, integration reset and hold via external
	control

GP-IB interface (PW3335-01 and PW3335-04)

	Compliant with IEEE488.1 1987, in reference to IEEE488.2 1987 Interface functions SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0
Address	00 to 30

RS-232C interface

(PW3335, PW3335-02, PW3335-03, and PW3335-04)

Connector	D-sub 9-pin connector x 1
Communication method	Full duplex, Start-stop synchronization Stop bits: 1 (fixed) Data length: 8 (fixed) Parity: None
Communication speed	9600 bps/ 38400 bps

LAN interface

Connector	RJ-45 connector x 1
Electrical specifications	Compliant with IEEE802.3
Transmission method	10Base-T/ 100Base-TX (automatic detection)
Protocol	TCP/ IP
Functions	HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller

General Specifications

General Specific	cations
Product warranty period	3 year
Operating environment	Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2
Operating temperature and humidity	0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)
Storage temperature and humidity	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Dielectric strength	4290 V rms AC (current sensitivity: 1 mA) Between the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals Between the current input terminals and a connection consisting of chassis, interfaces, and output terminals Between the voltage input terminals and current input terminals
Maximum rated voltage to earth	Voltage input terminal, Current input terminal Measurement category III 600 V (anticipated transient overvoltage: 6000 V) Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)
Maximum input voltage	Between the voltage input terminals U and ± 1000 V, ±1500 V peak
Maximum input current	Between the current input terminals I and ± 200 mA to 20 A range 30 A, ±100 A peak 1 mA to 100 mA range 20 A, ±30 A peak
Applicable Standards	Safety EN61010 EMC EN61326 Class A EN61000-3-2 EN61000-3-3
Rated supply voltage	100 V AC to 240 V AC 50 Hz/60 Hz
Maximum rated power	30 VA or less
Dimensions	Approx. 210W \times 100H \times 245D mm (8.27"W \times 3.94"H \times 9.65"D) (excluding protrusions)
Mass	Approx. 3 kg (105.8 oz.)
Accessories	Instruction manual ×1 Power cord ×1

3334 Specifications

Basic Specifications

Measu	rable lines	Single-phase, 2-wire (AC/DC)					
Measurement		Voltage, current, active power, apparent power, power factor,					
parameters		frequency, integrated current and active power, waveform peak					
		(voltage and current)					
Measure	ement method	Simultaneous digital sampling of voltage and current, True RMS					
Samplin	g Frequency	Approx. 74	.4kHz				
Measurement Ranges							
	Currnet Voltage	100.00 mA	300.0 mA	1.0000 A	3.000 A	10.000 A	30.00 A
	15.000 V	1.5000 W	4.500 W	15.000 W	45.00 W	150.00 W	450.0 W
	30.00 V	3.000 W	9.000 W	30.00 W	90.00 W	300.0 W	900.0 W
	150.00 V	15.000 W	45.00 W	150.00 W	450.0 W	1.5000 kW	4.500 kW
	300.0 V	30.00 W	90.00 W	300.0 W	900.0 W	3.000 kW	9.000 kW
E 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		DO 4511 + 5111					

Frequency bandwidth DC, 45Hz to 5kHz

1 year

3 years

1 year

Measurement accuracy

(Guaranteed at 23°C±5, max. 80%rh, sine wave input, power factor=1, in-phase voltage = 0V, accuracy specifications differ depending on usage period of 1 or 3 years)				
Warm-up time	3 minutes			
Period of guaranteed accuracy	3 years (bet	ter accuracy specifications	available for 1-year period)	
Post-adjustment accuracy guarantee	1 year (accu	racy specifications available	e for 1-year period)	
Effective measurement range	Voltage, current:1% to 100% (Power: 0% to 100%) Measurements below 0.5% of the voltage or current range will be zero suppressed.			
	Maximum ±0.4%±rdg. (45 to 66Hz)			
Temperature Coefficient	Maximum ±0.03%f.s./°C			
Frequency	Guaranteed Period	Voltage, current and active power (at less than 50% of input range)	Current and active power (at 50% to 100% of input range)	
DC *	1 year	±0.1 %rdg. ±0.2 %f.s.		
DC	3 years	±0.1 %rdg. ±0.35 %f.s.		
45 Hz ≤ f ≤ 66 Hz	1 year	±0.1 %rdg. ±0.1 %f.s.	±0.2 %rdg.	
45 HZ 5 I 5 00 HZ	3 years	±0.1 %rdg. ±0.2 %f.s.	±0.3 %rdg.	

±0.1 %rdg. ±0.2 %f.s.

±0.1 %rdg. ±0.35 %f.s.

±3.0 %f.s.

8 years ±4.5 %f.s. ±4.5 %rdg.

*Add ±50µA to the accuracy when measuring DC current
Add (±50µA x voltage value) to the accuracy when measuring DC active power

** Accuracy not defined for current input exceeding 20A

±0.3 %rdg.

±0.45 %rdg.

±3.0 %rdg.

Input Specifications

66 Hz < f ≤ 1 kHz **

1 kHz < f ≤ 5 kHz **

Input impedance	2.4 M Ω for voltage, 10 m Ω or better (50/60 Hz) for current
Maximum input voltage	300 V, ±425 Vpeak
Maximum input current	30 A, ±54.0 Apeak
Maximum effective peak voltage	±300% of each voltage range, Within ±425 Vpeak
Maximum effective peak current	±300% of each current range, Within ±54.0 Apeak *1
Max. rated voltage to earth	300 V (DC, 50/ 60 Hz)

Display Specifications

	Voltage and current: 0.5% to 105% of range
range	Active power: 0% to 110.25% of range
Displacement power factor	0.000 to 1.000 (no polarity display)
Display refresh rate	approx. 5 times per second
Response time	within 0.5 s (Time to rated accuracy after abrupt change in input [0 to 90% or 100 to 10% of range])
	-

Functional Specifications

i unctional oper	Siliodilollo		
Integration	No.of displayed digits:	Six digits	
measurement	Current Integration:	From 0.00000mAh, Polarity-independent	
		integration and Sum value	
	Active power Integration:	From 0.00000mWh, Polarity-independent	
		integration and Sum value	
	Integration time:	1 min to 10000 h	
14/	Measurement accuracy:	, i v	
Wave peak		itive and negative waveform of voltage/	
measurement	current (up to 300% of		
D 00 0 0 1		y: ±1.2%f.s. ("f.s." is 300% of each range)	
Rectification method		rue RMS), DC(simple average display) and AC(True RMS)	
Analog output	Parameter output repre		
(D/A output)		ctive power (3 simultaneous channels)	
		n Current integration, Active power integration,	
	Apparent power, power		
	Voltage output: ±2 VDC f.s. for each range Output accuracy: ±0.5% f.s. + individual measurement accuracy		
\A/			
Waveform output	Parameter output repre		
		Active power (3 simultaneous channels) OC f.s. for each range	
		% f.s. + individual measurement accuracy	
Average function		ied number of samples: 1, 2, 5, 10, 25, 50 or 100	
······································			
VT or CT ratio	VT ratios: 1, 2, 4, 10, 20		
		8, 10, 12, 15, 16, 20, 24, 25, 30, 40, 50, 60, 75,	
External Interfaces	RS-232C interface: Inc	300, 500, 1000, 2000, 3000, 5000, 10000	
External interfaces			
	Asynchronous comn	rate: 9600 bps (fixed)	
	GP-IB interface (Model		
		mpliant, IEEE-488.2 1987 reference	
Miscellaneous		n value hold, Peak value hold, Key lock,	
IVIISCEIIAI IEUUS		erves settings, integration data)	
	Dackup fullction (prese	orves settings, integration data;	

General Specifications

Safety	EN61010 Pollution Factor 2, Measurement Category III (4000 V anticipated overvoltage)
EMC	EN61326, EN61000-3-2, EN61000-3-3
Operating environment	0 to 40 °C, 80% RH or less, non-condensating
Storage environment	-10 to 50 °C, 80% RH or less, non-condensating
Rated supply voltage	100 to 240 VAC, 50/60 Hz
Maximum rated power	20 VA
Dimensions and mass	210 mm (8.27 in)W × 100 mm (3.94 in)H × 245 mm (9.65 in)D

3333 Specifications

Basic specifications

Measu	rable lines	Single-phase, 2-wire (AC)								
Measure	ment parameters	Voltage, Cu	Voltage, Current, Active power, Apparent power, Power factor							
Measure	ement method	Simultaneo	Simultaneous digital sampling of voltage and current, True RMS							
Samplin	ng frequency	Approx. 48	Approx. 48kHz							
Measur	rement ranges									
	Currnet Voltage	50.00 mA	200.0 mA	500.0 mA	2.000 A	5.000 A	20.00 A			
	200.0 V	10.000 W	40.00 W	100.00 W	400.0 W	1.0000 kW	4.000 kW			
Frequen	cy bandwidth	45Hz to 5k	Hz							

Measurement accuracy

Warm-up time	0 minutes							
Period of guaranteed accuracy	3 years (better accuracy spe	years (better accuracy specifications available for 1-year period)						
Post-adjustment accuracy guarantee	1 year (accuracy specific	ations available for 1-year period)						
	tive measurement Voltage, current, power: 10% to 150% Measurements below 1% of the voltage or current range will be zero suppressed.							
Effect of power factor (at pf=0.5)	Maximum ±0.4%±rdg. (4	aximum ±0.4%±rdg. (45 to 66Hz)						
Temperature Coefficient	Maximum ±0.03%f.s./°C							
Frequency Guaranteed Period Voltage, current and active power								
45 Hz ≤ f ≤ 66 Hz	1 year	±0.1 %rdg. ±0.1 %f.s.						
40 HZ ≤ 1 ≤ 66 HZ								

Frequency		Guaranteed Period	Voltage, current and active power			
45 Hz ≤ f ≤ 66 Hz	1 year	±0.1 %rdg. ±0.1 %f.s.				
	43 HZ S I S 00 HZ	3 years	±0.1 %rdg. ±0.2 %f.s.			
	66 Hz < f < 1 kHz *	1 year	±0.1 %rdg. ±0.2 %f.s.			
	00 HZ < I ≤ I KHZ	3 years	±0.1 %rdg. ±0.35 %f.s.			
	1 kHz < f < 5 kHz *	1 year	±3.0 %f.s.			
	1 KHZ < 1 ≤ 3 KHZ	3 years	±4.5 %f.s.			

* Accuracy not defined for current input exceeding 20A

Input specifications

Input impedance	2.4 MΩ for voltage, 7 mΩ or better (50/60 Hz) for current
Maximum input voltage	300 Vrms, 425 Vpeak
Maximum input current	30 Arms, 42.5 Apeak
Maximum effective peak voltage	Within 425Vpeak
Maximum effective peak current	±300% of each current range, Within ±42.5Apeak
Max. rated voltage to earth	300V (50/60Hz)

Display specifications

Display indication	voltage and current: 1% to 152% of range
range	active power: 0% to 231.04% of range
Displacement power factor	0.000 to 1.000 (no polarity display)
Display refresh rate	approx. 5 times per second
Response time	within 0.5 s (Time to rated accuracy after abrupt change in input [0
	to 90% or 100 to 10% of range])

Functional Specifications

Rectification method	AC(True RMS)
Analog output (D/A output)	Parameter output representation: voltage, current and active power (3 simultaneous channels) Voltage output: +2 VDC f.s. for each range Output accuracy: ±0.5% f.s. + individual measurement accuracy
Average function	Simple averaging of specified number of samples: 1, 2, 5, 10, 25, 50 or 100
VT or CT ratio	VT ratios: 1, 2, 4, 10, 20, 30, 60, 100 CT ratios: 1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 24, 25, 30, 40, 50, 60, 75, 80, 100
External Interfaces	RS-232C interface: Included as standard Asynchronous communication method: full-duplex; Baud rate: 9600 bps (fixed) GP-IB interface (Model 3333-01 only) IEEE-488.1 1987 compliant, IEEE-488.2 1987 reference
Miscellaneous	Display hold, Key lock, Settings backup (preserves settings)

General Specifications

Safety	EN61010 Pollution Factor 2,							
	Measurement Category III (4000 V anticipated overvoltage)							
EMC	EN61326, EN61000-3-2, EN61000-3-3							
Operating environment	0 to 40 °C, 80% RH or less, non-condensating							
Storage environment	-10 to 50 °C, 80% RH or less, non-condensating							
Rated supply voltage	100 to 240 VAC, 50/60 Hz							
Maximum rated power	20 VA							
Dimensions and mass	160 mm (6.30 in)W \times 100 mm (3.94 in)H \times 227 mm (8.94 in)D (excluding feet and projections), 1.9 kg (67.0 oz)							

Calculation formulas (3333 & 3334)

Odiodiation form	valouation formulas (5555 à 5554)							
Measurement	Formula							
Parameters								
Apparent Power (S)	$S = U \times I$							
Power Factor (図)	λ = I P/S I							
Integrated Current*	(Sum of I from start of integration)/ (Number of 1 hour data)							
Integrated Active	(Sum of P from start of integration)/ (Number of 1 hour data)							

3-phase Power Meter

Model & Appearance	Model No. (Order Code)	Number of Channels	AC/ DC	Harmonic Measurement	LAN	RS-232C	GP-IB	D/A output	Current Sensor Input	Synchronized Control
	PW3337	3	AC/ DC	~	~	~	×	×	•	~
POWER METER PW3337	PW3337-01	3	AC/ DC	~	~	~	~	×	~	~
\$0000 33310- 100	PW3337-02	3	AC/ DC	~	v	~	×	~	~	~
	PW3337-03	3	AC/ DC	~	~	~	~	~	~	~
	PW3336	2	AC/ DC	~	~	~	×	×	~	~
POWER METER PW3336	PW3336-01	2	AC/ DC	~	~	v	~	×	~	~
33310- 108"	PW3336-02	2	AC/ DC	V	v	~	×	~	~	~
	PW3336-03	2	AC/ DC	V	~	v	✓	~	~	~

Accessories: Instruction manual ×1, Measurement guide ×1, Power cord ×1

Single-phase Power Meter

Model & Appearance	Model No. (Order Code)	Number of Channels	AC/ DC	Harmonic Measurement	LAN	RS-232C	GP-IB	D/A output	Current Sensor Input	Synchronized Control
	PW3335	1	AC/ DC	✓	✓	~	×	×	×	~
POWER METER	PW3335-01	1	AC/ DC	~	~	×	~	×	~	~
PW3335	PW3335-02	1	AC/ DC	~	~	~	×	~	×	~
•	PW3335-03	1	AC/ DC	~	~	~	×	×	~	~
	PW3335-04	1	AC/ DC	~	~	~	~	~	~	~
AC/ DC POWER HITESTER 3334	3334	1	AC/ DC	×	×	~	×	V	×	×
12000 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3334-01	1	AC/ DC	×	×	~	~	~	×	×
POWER HITESTER 3333	3333	1	AC	×	×	~	×	~	×	×
3000 3000 8000:	3333-01	1	AC	×	×	v	~	~	×	×

Accessories : Instruction manual ×1, Power cord ×1

Communications and control options



RS-232C CABLE 9637 Cable length: 1.8 m (5.91 ft) 9pin to 9pin



GP-IB CONNECTOR CABLE 9151-02 Cable length: 2 m (6.56 ft)

DISTRIBUTED BY



9642
Cable length: 5 m (16.41 ft) supplied with straight to cross conversion cable



CONNECTION CORD 9165 For synchronized control Cable length: 1.5 m (4.92 ft), metal BNC to metal BNC

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