POWER METER Series

# ΗΙΟΚΙ

# 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



CC 3year

# 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

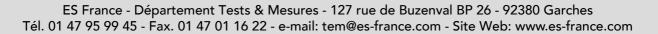
The PW3337 and PW3336 are suitable for a wide variety of connections, such as measuring three-phase circuits and single-phase 2-wire multiple circuits. There is little internal resistance for the current input, and large currents up to 65 A can be measured with great accuracy.

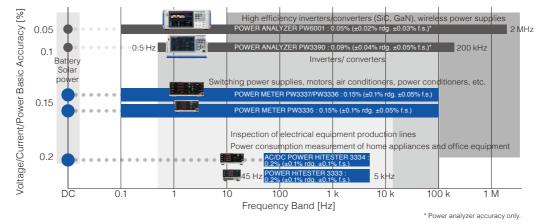


# Single-phase Power Meter

 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.

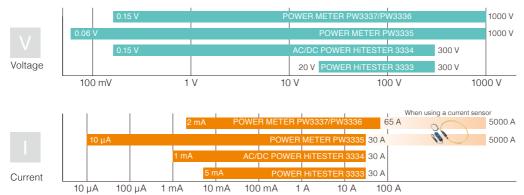






### Basic Accuracy and Frequency Bands

## 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 measurement range, voltage		0.15 V to	0.15 V to 1000 V 0.06 V t		0.15 V to 300 V	20 V to 300 V
Effective measurement range, current		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, (Voltage, current		±0.1% rdg. ±0.1% f.s.			±0.1% rdg. ±0.2% f.s.	-
Integrated power measurement	r	Yes			Yes	-
Harmonic measu	urement	IEC61000-4-7 compliant			-	
Current sensor input		Yes PW33		PW3335-03, -04	-	
	LAN		Yes	·	-	
Interface	RS-232C	Ye	es	PW3335, -02, -03, -04	Yes	
Internace	GP-IB	PW3337-01, -03	PW3336-01, -03	PW3335-01, -04	3334-01	3333-01
		DIM/2227 02 02	D/M0006 00 00	DW0005 00 04	Vaa	

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### POWER METER PW3337/PW3336

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



### POWER METER PW3335

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



PW3335-04 Front Panel







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)



### 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

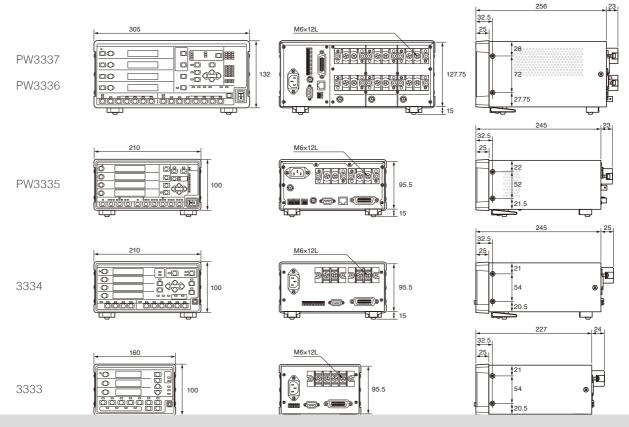


• Compact model for saving space, even when added to a system

Units: mm

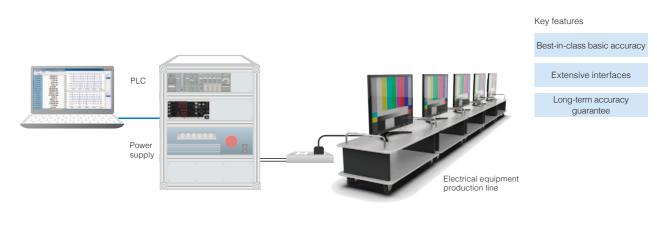
• Accuracy guaranteed up to 3 years

# **Dimensional Drawings**



# Applications

### Inspection of Electrical Equipment Production Lines



#### Best-in-class Accuracy ±0.1% \* [PW333 7] [PW333 6] [PW333 5]

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.



\* For complete details, please refer to the specifications

#### 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.



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

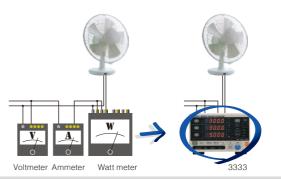


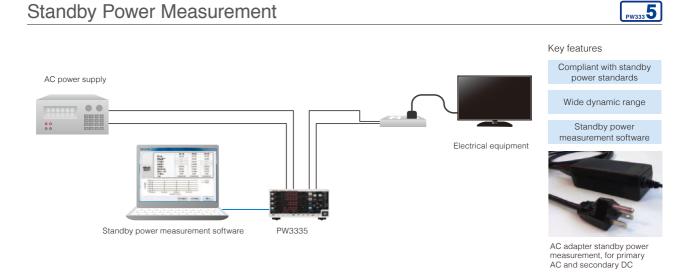
The 3333 and 3334 are guaranteed for accuracy for 3 years. Even after 3 years, they maintain an accuracy of  $\pm 0.5\%$  rdg. as required for measurements. This 3-year accuracy guarantee, the longest in the industry, helps to save on calibration expenses.



# 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.





### Compliant with IEC62301 and EN50564 Standards

The PW3335 is compliant with measurement standards for standby power, as well 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 (excernt)

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

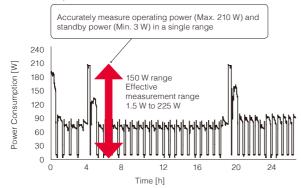
THD (Total Harmonic Distortion): Indicates to what extent harmonic components are present in an AC waveform

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

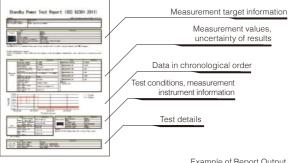
#### Wide Range of Effective Measurement

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.

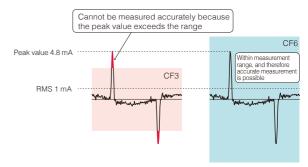


Example of Report Output

#### 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.

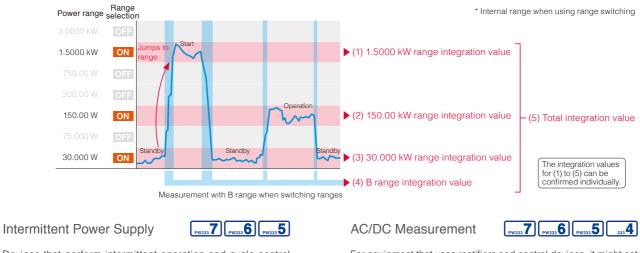


### Measurement of Fluctuating Loads and Power Supply Control



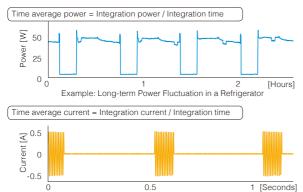
#### Auto Range Integration with Guaranteed Accuracy when Switching Ranges

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.



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.



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.

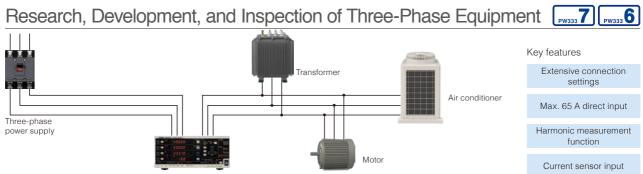
- Half-wave rectified waveforms used for dryers and fans
- · Full-wave rectified waveforms used for AC adapters
- Cycle control waveforms used for voltage and temperature adjustment heaters
- · DC waveforms with superimposed ripple components

Half-wave Rectified Waveform

Full-wave Rectified Waveform

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Compliant with IEC61000-4-7 Harmonic Measurement Standards

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

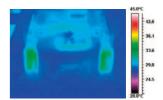
The PW3337 supports not only 3V3A, but also a variety of threephase connections such as 3P4W, 3P3W2M, and 3P3W3M.

#### Accuracy Guaranteed for Currents Up to 65 A

Because DCCT allows a current with an input resistance of 1 m $\Omega$  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.



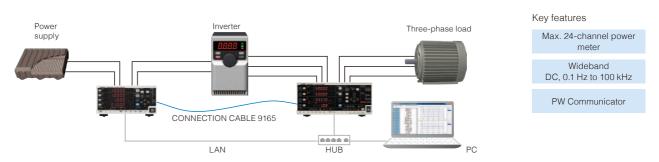
DCCT current sensor (in the PW3337)



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

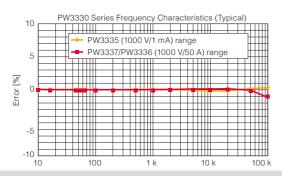
PW333 7 || PW333 6 || PW333 5

### Inverter Efficiency Measurement



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

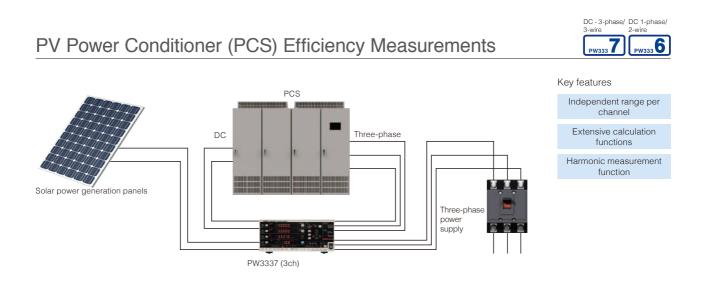
These models cover not only the fundamental frequency bands for inverters, but also carrier frequency bands, in a wide range that includes DC and frequencies from 0.1 Hz to 100 kHz.



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

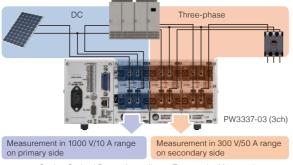
Connect 8 units for synchronous measurement of up to 24 channels. The calculation and control timing for PW3337, PW3336, and PW3335 units that are set as slaves are synchronized with the master unit. Use this feature to measure the I/O efficiency of power supply devices, compare multiple pieces of equipment, 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.





# 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.

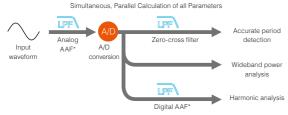


Setting Optimal Range According to Target to be Measured

# 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.



#### \* AAF (Anti-aliasing filter)

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.

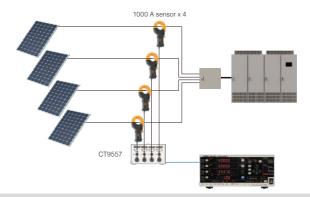
#### 1000 V Range for Evaluation of Large Power Conditioners

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.



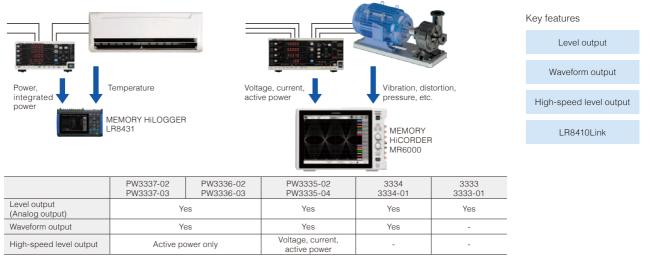
# Aggregation of Output from DC Current Sensors (Up to 4000 A)

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.



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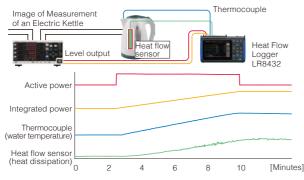
### Output Function Linked with Recorder



# Display Trends with a Data Logger



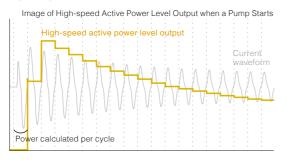
The level output (analog output) function delivers measured values that are displayed on the power meter with an analog voltage that is updated every 200 ms. Connect the unit to a data logger to check trends through synchronization with data such as temperature and heat flow\*.



\* 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 [PW3337] [PW3356] [PW3355]

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.

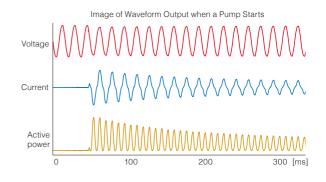


\* With the PW3335, high-speed level output is also possible for 45 Hz to 66 Hz

# 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.



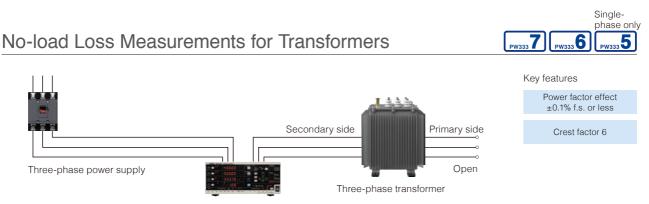
#### Transfer Information to Data Logger Wirelessly (LR8410Link)



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.



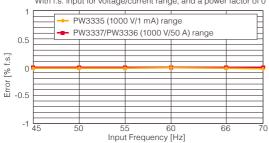
\* Connection requires the serial - Bluetooth® wireless technology conversion



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

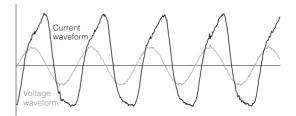
A no-load loss test is one indicator for evaluating energy conservation for transformers and motors. The PW3337 and PW3336 are affected very little by power factor, at  $\pm 0.1\%$  f.s. or less, allowing active power to be measured with a high level of accuracy at low power factors.

> PW3330 Series Power Factor Effect (Typical) With f.s. input for voltage/current range, and a power factor of 0



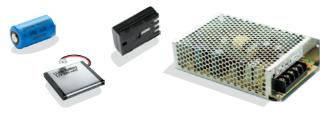
#### Support for Crest Factor 6

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.







\* For complete details, please refer to the specifications



Key features

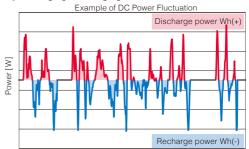
DC power accuracy ±0.2% rdg.

Power integration function by polarity

#### 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.



# 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°		
		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 method		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)	
metrioù	80	FLEXIBLE CLAMP ON SENSOR CT9667-01		10 Hz to 20 kHz	🛛 100 mm (3.94 in)		- (9.64 II)	AA (LR6) Alkaline Batteries x
	80	FLEXIBLE CLAMP ON SENSOR CT9667-02	500 A/ 5000 A		🛛 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)
C	Options for CI	Г9667-01/-02/-03						
	External Product name/ Functions					Power supply		
	<b>N</b>	AC ADAPTER 9445-02		F	or supplying power to CT96	67-01/-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 External Rated Frequency Diameter of measurable Basic accuracy (amplitude) Cord Product name/ Power supply lengths method appearance model no. current band conductors Basic accuracy (phase) CT6862-05 50 A DC to 1 MHz Ø 24 mm (0.94 in) ±0.05% rdg. ±0.01% f.s. Within ±0.2° CT6863-05 200 A DC to 500 kHz 24 mm (0.94 in) Through CT6875 500 A DC to 2 MHz 🛛 36 mm (1.42 in) method ±0.04% rdg. ±0.008% f.s. CT6876 DC to 1.5 MHz 1000 A 🛛 36 mm (1.42 in) Within ±0.1° 0 CT6877 2000 A DC to 1 MHz 🛛 80 mm (3.15 in) CT9555 3 m ٩, CT6841-05 DC to 1 MHz 20 A 20 mm (0.79 in) (9.84 ft) CT9557 ٩ CT6843-05 DC to 500 kHz 200 A 🛛 20 mm (0.79 in) ±0.3% rdg. ±0.01% f.s. ٩. CT6844-05 500 A DC to 200 kHz ⊠ 20 mm (0 79 in) Within ±0.1° Clamp method CT6845-05 500 A DC to 100 kHz 🛛 50 mm (1.97 in) CT6846-05 1000 A DC to 20 kHz ⊠ 50 mm (1.97 in) 20 A/ 200 A ±0.3% rdg. ±0.01% f.s. 9272-05 1 Hz to 100 kHz 🛛 46 mm (1.81 in) Within ±0.2°

Options for Current Sensor TYPE 2

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

### age CT9555 or ICT9557 9217

#### **Back 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

CONNECTION CABLE 9444 9-pin - 9-pin, straight, 1.5 m (4.92 ft)



PRINTER 9442 Power supply:

Thermal serial dot method, 112 mm (4.41 in) paper width AC ADAPTER 9443-02, or the included nickel hydride batteries Dimensions, mass: 160 mm W × 67 mm H × 170 mm D (6.30 in W  $\times$  2.64 in H  $\times$  6.69 in D),

580 g (20.5 oz)

RECORDING PAPER 1196 112 mm (4.41 in) × 25 m (82.03 ft),

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

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PW333 7 PW333 6 PW333 5





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### **PW** Communicator

PW333 7 PW333 6 PW333 5

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.

Measurement val	lue <pw3335_04 lan:192.168.1.35="" ser140799556=""></pw3335_04>		x
🔲 Auto Update 📃	Update 📝 Display Waveform(8kHz or more decayed)		
Item Num 16	-		U
Urms INST	100.20 V		J1
Irms INST	0.0852 A	50.00	
Prms INST	3.16 W ≥	0.00	
Srms INST	8.54 VA	-50.007	
Qrms INST	– 7.93 var 🕑	-100.007	
PFrms INST	-0.3707		
FREQ_U INST	60.002 Hz	-150.00V	
FREQ_I INST	6 Numerical value	Waveform monitoring	
Upk INST			1
Ipk INST	0.4782 Apk	0.40A	
Uthd INST	0.25 %	0.20A	
Ithd INST	202.97 %	┃	
IH TOTAL	1.679mAh	-0.20A	
WH TOTAL	0.0624 Wh	-0.40A	
P.TAV TOTAL	3.16 W ≥	-0.60A	
MCR INST	15.145 🕑	0.00ms 50.00ms 100.00ms 150.00ms 200.00ms	

Regist A Regist B	Communicator Status Host information READY PW337 LAN 192 168 12 cont READY PW337 LAN 192 168 12 cont Settings Screen Scr
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 measurement	Efficiency calculations, such as input/output of the power supply conversion device, are possible between multiple 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.



PW333 7 PW333 6 PW333 5

### 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 5. Run test Configure the settings for communication with a The consumed power is measured according to the configured power meter. Connect the PC to a power meter, and settings. enter the settings required for the interface used (LAN/RS-232C/GP-IB). Start 6. Create report Create a report of the test results. Output either a PDF report or CSV file. Standby Power Test Report (IEC 62301:2011) 2. Configure the test target Enter the information of the device under test. The erature r suplied by EP information to be entered includes manufacturer name, model name, serial number, and operation mode. You can also register an image of the test target. y function mode 8.086VA 0.080A 0.415A 5.548 Average powe Integrated pow ICERTAINTY\_U 011 NCERTAINTY U ). OW (integration) time Stability detection Sampling method1:LR Condition Stabilization d -15 078mil/bl < 26 706 CERTAINTY\_U 0. 5W value Sampling interv Power variation ERTAINTY\_U . 01 Omd UNCERTAINTY\_UX 0. 2W (IEC62301 Ed. 1 opparent power arks 8. 09VA/7. 0 i al End (min./max.) Real power facto (LEAD) 0. 39/ (LEA Expand Shrink Graph /max e (I 3.20 Power Slope 3.079 2.958 3. Configure the test power supply 2.594 00:20:00 00:30:00 Enter the information of the test power supply. Information т to be entered includes rating and frequency. Also, enter the values of uncertainty due to the connection method, wiring, power supply, and temperature. max.) period 0:37:1 1.42 4. Configure the test conditions Set the current range, stop conditions, algorithm used to Example of report output judge stability, cycle time, and upper limit for test time. ser1 40799556 rial Numb V0.07 art Time 2014 14 32 150V Itage Ra 200mA 200ms LR ition1(LR)] Crest 60.002 14 0.20 0.27 0.25 0.26 99.49 99.49 15 15.2 15.4 15.6 15.8 16 16.2 60.000 .4199 5 658



60.002 CSV output example

99.48

99.49

99.49

60.002

60.002

60.002

60.002

60.002

0.26

0.26

0.26

5.6696

6834

5.6652

6668

5.6484 5.6675

4198

.4198

4198

1.4199 1.4198



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# **PW3337 and PW3336 Specifications**

#### Input Specifications

PW333

input opcomout	0110					
Measurement line	PW3336 series					
type	Single-phase 2-wire (1P2W), Single-phase 3-wire (1P3W),					
	Three-phase 3-wire (3P3W, 3P3W2M)					
	Wiring	CH1	CH2			
	1P2W×2	1P2W	1P2W			
	1P3W		3W			
	3P3W		3W			
	3P3W2M	3P3	W2M			
	PW3337 series					
	Single-phase 2-wire	e (1P2W), S	Single-phas	se 3-wire (	1P3W),	
	Three-phase 3-wire					
	Three-phase 4-wire	(3P4W)				
	Wiring	CH1	CH2	CH3		
	1P2W×3	1P2W	1P2W	1P2W	1	
	1P3W&1P2W	1P3W		1P2W	]	
	3P3W&1P2W	3P3W		1P2W	]	
	3P3W2M	3P3	W2M			
	3V3A		3V3A			
	3P3W3M		3P3W3M			
	3P4W		3P4W			
Input methods	Voltage Isolated input					
	Current Isolated input,					
Voltage measurement	AUTO/ 15.000 V/ 30.00				0 V/	
ranges	600.00 V/ 1000.0 V (se					
Current	AUTO/ 200.00 mA/ 500					
measurement	10.000 A/ 20.000 A/ 50					
ranges	For more information a				out, see the	
	external current sensor					
Power ranges	Depends on the combi					
	PW3336: from 3.00					
	PW3337: from 3.00			so applies	to VA, var)	
Input resistance	Voltage input terminal		2 MΩ			
(50/60 Hz)	Current direct input ter	minai : 1	i mΩ or les	S		

#### **Basic Measurement Specifications**

Basic Measuren	nent Specification	5					
Measurement method	Simultaneous voltage and current digital sampling, zero-cross						
Sampling frequency	simultaneous calculation Approx. 700 kHz						
A/D converter	16-bit resolution						
Frequency bands	DC, 0.1 Hz to 100 kHz						
Synchronization	U1, U2, U3, I1, I2, I3, [	U1, U2, U3, I1, I2, I3, DC (fixed at 200 ms)					
sources	Can be set separately	for each wiring mode.					
Measurement items	Voltage - Curr Reactive power - Pow Efficiency Active power integral Voltage waveform pe Voltage crest factor Time average curren Voltage ripple factor	er factor Phase and Current in tion Integrated ak value Current w Current cr	gle Frequency tegration I time aveform peak value est factor age active power				
	Harmonic parameters: Harmonic voltage RMS value Harmonic active power Total harmonic voltage distortion Total harmonic voltage distortion Voltage fundamental waveform Apparent power fundamental waveform Power factor fundamental waveform (displacement power factor) Voltage current phase difference fundamental waveform Interchannel voltage fundamental wave phase difference Interchannel voltage content % Harmonic current fundamental wave phase difference Harmonic active power content %						
	communication but no · Harmonic voltage ph · Harmonic voltage cu	ase angle Harmonic rrent phase difference	-				
Rectifiers	<ul> <li>AC+DC: AC+DC measurement</li> <li>Display of true RMS values for both voltage and current</li> <li>AC+DC Umn: AC+DC measurement</li> <li>Display of average value rectified RMS converted values for voltage and true RMS values for current</li> <li>DC: DC measurement</li> <li>Display of simple averages for both voltage and current</li> <li>Display of simple averages for both voltage and current</li> <li>Display of values calculated by (voltage DC value)× (current DC value) for active power</li> <li>AC: AC measurement</li> <li>Display of values calculated by for both voltage and current</li> <li>Display of values calculated by √(AC+DC value)<sup>2</sup> - (DC value)<sup>2</sup></li> <li>FND</li> <li>Extraction and display of the fundamental wave component from harmonic measurement</li> </ul>						
Zero-Crossing	500 Hz/200 kHz		000111				
Filter	500 HZ: 0.1 HZ to 500	Hz, 200 kHz: 0.1 Hz to	200 KHZ				
Measurement accuracy							
Voltage		500/f	4000/6				
Frequency (f)	Input < 50% f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input				
DC	$\pm 0.1\%$ rdg. $\pm 0.1\%$ f.s.	±0.1%rdg. ±0.1%f.s. ±0.3%rdg.	±0.2%rdg.				
0.1Hz ≤ f < 16Hz 16Hz ≤ f < 45Hz	±0.1%rdg. ±0.2%f.s. ±0.1%rdg. ±0.1%f.s.	±0.3%rdg. ±0.2%rdg.	±0.3%rdg. ±0.2%rdg.				
$45Hz \le f \le 66Hz$	±0.1%rdg. ±0.05%f.s.	±0.2%rdg.	±0.15%rdg.				
66Hz < f ≤ 500Hz	±0.1%rdg. ±0.1%f.s.	±0.13%rdg.	±0.13%rdg.				
500Hz < f ≤ 10kHz	±0.1%rdg. ±0.2%f.s.	±0.3%rdg.	±0.3%rdg.				
$10kHz < f \le 50kHz$	±0.5%rdg. ±0.3%f.s.	±0.8%rdg.	±0.8%rdg.				
50kHz < f ≤ 100kHz	±2.1%rdg. ±0.3%f.s.	±2.4%rdg.	±2.4%rdg.				
Current (direct input)							
Frequency (f)	Input < 50% f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input				
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	±0.1%rdg. ±0.1%f.s.	±0.2%rdg.	±0.2%rdg.				
500Hz < f ≤ 1kHz	±0.1%rdg. ±0.2%f.s.	±0.3%rdg.	±0.3%rdg.				
1kHz < 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	±(0.3+0.04×F)%rdg.	$\pm (0.6+0.04 \times F)\%$ rdg.	±(0.6+0.04×F)%rdg.				

		1					
Active p	ower uency (f)	Input < 50% f.s.	50%f.s. ≤ Input < 100%	.f.s. 100%f.s. ≤ Input			
	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.			
	≤ f < 45Hz	±0.1%rdg. ±0.1%f.s.	±0.2%rdg.	±0.2%rdg.			
	$\leq f \leq 66Hz$	±0.1%rdg. ±0.05%f.s.	±0.15%rdg.	±0.15%rdg.			
	$f \le 500$ Hz	±0.1%rdg. ±0.1%f.s.	±0.2%rdg.	±0.2%rdg.			
	$< f \le 1 \text{ kHz}$ $f \le 10 \text{ kHz}$	±0.1%rdg. ±0.2%f.s. ±(0.03+0.07×F)%rdg.	±0.3%rdg. ±(0.23+0.07×F)%rc	±0.3%rdg. ig. ±(0.23+0.07×F)%rd			
	$< f \le 50 \text{ kHz}$	±0.2%f.s.	±(0.23+0.07×F)%rd	· · · ·			
	$< f \le 100 \text{kHz}$	±0.3%f.s.	±(0.9+0.07×F)%rd	· · · ·			
		±0.3%f.s. • Values for f.s. depend					
		<ul> <li>"F" in the tables refers</li> </ul>	s to the frequency i	n kHz.			
		<ul> <li>Add ±1mA to DC mea</li> </ul>					
		<ul> <li>Add (±1mA) × (voltage real</li> </ul>	d value) to DC measure	ment accuracy for active			
		<ul> <li>power.</li> <li>When using the 200m</li> </ul>	A or 500mA range	add +0.1% rdg to			
		current and active pov					
		<ul> <li>Values for voltage, cu</li> </ul>		ower for which			
		$0.1Hz \le f < 10Hz$ are for					
		20A for which 10Hz $\leq$		ower in excess of 220V			
		<ul> <li>Values for current and</li> </ul>					
		$500Hz < f \le 50kHz$ are					
		<ul> <li>Values for current and</li> </ul>					
		$50$ kHz < f $\leq$ 100kHz an					
		<ul> <li>Values for voltage and 30kHz &lt; f ≤ 100kHz at</li> </ul>		xcess of 750V for which			
Guarante	ed	1 year		у.			
accuracy							
Post-adjus	stment	6 months					
	guaranteed						
	n effective	±600% of each voltage		and +1E00 Vessle			
peak volt Maximum	age 1 effective	However, for 300 V, 600 ±600% of each current		iges, ±1000 vpeak			
peak curi		However, for 20 A range		±100 Apeak			
Conditior	ns of	Temperature and humic	dity: 23°C ±5°C, 80				
guarante		Warm-up time: 30 minu	tes				
accuracy		Input: Sine wave input,					
				within range in which th nization source condition			
Temperature	characteristic	±0.03% f.s. per °C or le					
	ctor effects	±0.1% f.s. or less (45 to	66 Hz, at power fa				
F44		Internal circuitry voltage	e/current phase dif	terence: ±0.0573°			
Effect of a mode vol			±0.02% f.s. or less				
Effect of e		(600 V, 50/60 Hz, applied between input terminals and enclosure) 400 A/m, DC and 50/60 Hz magnetic field					
magnetic	field	Voltage :±1.5% f.s	. or less				
interferen	ice			ever is greater, or less			
				nce quantity) × (±10 mA			
Magnetiz	ation	±10 mA equivalent or le	r is greater, or less ss				
effect		(after inputting 100 A DC to the current direct input terminals)					
Adjacent		(when inputting 50 A to adjacent channel)					
input effe			-				
Voltage	/ Curren	t/ Active Power Me					
Measurem	ient types	Rectifiers: AC+DC, DC,		Umn			
Effective	a rango		% of range	ue and 1000 V RMS value)			
measurin	y range		p to ±1500 v peak val % of range	ue anu 1000 v Mivio value)			
		Active power: 0% to 169					
		. (However,	defined when the	voltage and current fall			
Dia			effective measurer				
Display ra	ange	Voltage/ Current: 0.5% to 1 Active power: 0% to 1		pression when less than 0.5%			
Polarity		Voltage/ Current: Display					
		Active power: +: Posit	ive: Power consump	tion (no polarity display)			
			enerated power				
Voltage/	Current/	Active power channe	I and sum value	calculation formulas			
Wi	ring	X: U (Voltage) or I (C	urrent)	P (Active power)			
All channels	1	<b>X</b> (i)	P(i)				
-	1P3W	$X_{sum} = \frac{1}{2} (X_{(1)} + X_{(2)})$	Perm	$m = (P_{(1)} + P_{(2)})$			
	3P3W	$2^{(\Lambda(1) + \Lambda(2))}$					
Sum	3P3W2M						
values	3V3A	$X_{sum} = \frac{1}{3} (X_{(1)} + X_{(2)})$	1+X(3) P	m = (P(1) + P(2) + P(3))			
	3P3W3M	$\int \frac{1}{3} \left( \Lambda(1) + \Lambda(2) \right)$	FSUI	u = (I(1) + I(2) + F(3))			
	3P4W	1					
i): Meas	urement ch	annel	1				
			orm Dook Value Mar	ouromont Charification			
www.auevv		ak Value / Current Wavefo					
	nent	Measures the waveform		ooth positive and ntaneous voltage value			
Measurer	nom		a on oumpidu insta	manoous vonaye value			
Measurer method							
Measurer method Sampling	frequency eak range	Approx. 700 kHz					
Measurer method Sampling Voltage p Voltage	frequency eak range range	Approx. 700 kHz 15V 30V 6					
Measurer method Sampling Voltage p Voltage Voltage	frequency eak range range peak range	Approx. 700 kHz 15V 30V 6					
Measurer method Sampling Voltage p Voltage Voltage Current p	frequency eak range range peak range eak range	Approx. 700 kHz 15V 30V 6 90.000V 180.00V 360	.00V 900.00V 1.8	000kV 3.6000kV 6.0000k			
Measurer method Sampling Voltage p Voltage Voltage Current p Current	frequency eak range range peak range eak range range	Approx. 700 kHz 15V 30V 6 90.000V 180.00V 360 200mA 500mA 1A	2A 5A	000kV 3.6000kV 6.0000k			
Measurer method Sampling Voltage p Voltage Voltage Current p Current Current	frequency eak range peak range eak range range peak range peak range	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000	.00V 900.00V 1.8 2A 5A A 12.000A 30.000A	000kV 3.6000kV 6.0000k 10A 20A 50A 60.000A 120.00A 300.00			
Measurer method Sampling Voltage p Voltage Voltage Current p Current Current Measurer	frequency eak range peak range eak range range peak range peak range ment	Approx. 700 kHz 15V 30V 6 90.000V 180.00V 360 200mA 500mA 1A 1.2000A 3.0000A 6.0000 Same as the voltage or	.00V 900.00V 1.8 2A 5A 12.000A 30.000A current measurem	000kV 3.6000kV 6.0000k 10A 20A 50A 60.000A 120.00A 300.00 ent accuracy at DC and			
Measurer method Sampling Voltage p Voltage Voltage Current p Current Current	frequency eak range peak range eak range range peak range peak range ment	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 Hz ≤ f ≤ 1 kHz         1 kHz	.00V 900.00V 1.8 2A 5A A 12.000A 30.000A current measurem (f.s.: voltage peak	000kV 3.6000kV 6.0000k 10A 20A 50A 60.000A 120.00A 300.00 ent accuracy at DC and range or current peak			
Measurer method Sampling Voltage p Voltage Voltage Current p Current Current Measurer	frequency eak range peak range eak range range peak range peak range ment	Approx. 700 kHz 15V 30V 6 90.000V 180.00V 360 200mA 500mA 1A 1.2000A 3.0000A 6.0000 Same as the voltage or	.00V         900.00V         1.8           2A         5A           A         12.000A         30.000A           current measurem (f.s.: voltage peak serence value when serence value	000kV 3.6000kV 6.0000k 10A 20A 50A 60.000A 120.00A 300.00 ent accuracy at DC and range or current peak			
Measurer method Sampling Voltage Voltage Current Current Current Measurer accuracy	frequency leak range peak range eak range range peak range peak range ment	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.200A         3.0000A         6.0000           Same as the voltage or when 10 Hz ≤ f ≤ 1 kHz range). Provided as refewhen in excess of 1 kHz         rescess of 1 kHz	.00V 900.00V 1.8 2A 5A A 12.000A 30.000A current measurem (f.s.: voltage peak rence value when z. pe peak range (up 1	000kV         3.6000kV         6.0000kV           10A         20A         50A           60.000A         120.00A         300.00           ent accuracy at DC and range or current peak         0.1 Hz ≤ f < 10 Hz and			
Measurer method Sampling Voltage Voltage Current p Current Measurer accuracy Effective measurin	frequency eak range range peak range eak range range peak range ment g range	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 Hz ≤ f ≤ 1 kHz range). Provided as refe when in excess of 1 kH⊥ ±5% to ±100% of voltag ±5% to ±100% of currer	.00V         900.00V         1.8           2A         5A           A         12.000A         30.000A           current measurem (f.s.: voltage peak rence value when z. je peak range (up t t) peak range (up t	000kV         3.6000kV         6.0000k           10A         20A         50A           60.000A         120.00A         300.00           ent accuracy at DC and range or current peak         0.1 Hz ≤ f < 10 Hz and			
Measurer method Sampling Voltage Voltage Current Current Current Measurer accuracy	frequency eak range range peak range eak range range peak range ment g range	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 H2 < f < 1 kHz range). Provided as refer when in excess of 1 kHz ±5% to ±100% of voltag ±5% to ±100% of currer ±0.3% to ±102% of volt	.00V         900.00V         1.8           2A         5A           112.000A         30.000A           current measurem (f.s.: voltage peak erence value when pe peak range (up t peak range (up t peak range or	000kV         3.6000kV         6.0000kV           10A         20A         50A           60.000A         120.00A         300.00           ent accuracy at DC and range or current peak         0.1 Hz ≤ f < 10 Hz and			
Measurer method Sampling Voltage p Voltage Voltage Current p Current Current Measurer accuracy Effective measurin Display ra	frequency eeak range peak range eak range range peak range ment g range ange	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 H2 < f < 1 kHz	.00V     900.00V     1.8       2A     5A       12.000A     30.000A       current measurem       (f.s.: voltage peak       rence value when       z.       pe peak range (up 1       th peak range (up 2       age peak range (up 2       are subject to zer	000kV         3.6000kV         6.0000kV           10A         20A         50A           60.000A         120.00A         300.00           ent accuracy at DC and range or current peak         0.1 Hz $\leq f < 10$ Hz and           io ±1500 V) or o ±100 A)         current peak range           current peak range         0.5000 A			
Measurer method Sampling Voltage Voltage Voltage Current p Current Current Measurer accuracy Effective measurin Display ra	frequency eak range range peak range eak range range peak range nent g range ange Crest Fa	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 Hz ≤ f ≤ 1 kHz range). Provided as reft when in excess of 1 kHz         range). to voltag ±5% to ±100% of voltag ±5% to ±100% of current ±0.3% to ±102% of current (values less than ±0.3% ctor/ Current Crest	.000/     900.00V     1.8       2A     5A       A     12.000A     30.000A       current measurem     (f.s.: voltage peak       rence value when     2       ze peak range (up t     peak range or       age peak range or     are subject to zer       Factor Measure     Factor Measure	$\begin{array}{c c c c c c c c c c c c c c c c c c c $			
Measurer method Sampling Voltage Voltage Current Current Measurer accuracy Effective measurin Display re Voltage Measurer	frequency eak range range peak range eak range range peak range nent g range ange Crest Fa	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 Hz ≤ f ≤ 1 kHz range). Provided as refe when in excess of 1 kH±         1.5% to ±100% of voltag ±5% to ±100% of voltag ±5% to ±100% of voltag ±5% to ±100% of voltag ±0.3% to ±102% to	.00V         900.00V         1.8           2A         5A           12.000A         30.000A           current measurem           ge peak         range (up t           ge peak range (up t           are subject to zo	000kV         3.6000kV         6.0000ł           10A         20A         50A           60.000A         120.00A         300.00           ent accuracy at DC and range or current peak         0.1 Hz ≤ f < 10 Hz and			
Measurer method Sampling Voltage Voltage Current p Current Current Measurer accuracy Effective measurin Display ra	frequency eak range range peak range eak range range peak range nent g range ange Crest Fa	Approx. 700 kHz           15V         30V         6           90.000V         180.00V         360           200mA         500mA         1A           1.2000A         3.0000A         6.0000           Same as the voltage or when 10 Hz ≤ f ≤ 1 kHz range). Provided as reft when in excess of 1 kHz         range). to voltag ±5% to ±100% of voltag ±5% to ±100% of current ±0.3% to ±102% of current (values less than ±0.3% ctor/ Current Crest	1.00V 900.00V 1.8 2.00V 900.00V 1.8 2.000A 30.000A current measurem (f.s.: voltage peak rence value when z. 19 peak range (up t 1 peak range (up t 1 peak range (up t 1 peak range or are subject to zer <b>Factor Measure</b> display values onc voltage waveform	000kV         3.6000kV         6.0000           10A         20A         50A           60.000A         120.00A         300.00           ent accuracy at DC and range or current peak         0.1 Hz ≤ f < 10 Hz and			

Effective measuring As per voltage and voltage waveform peak values. Effective measuring As per voltage and voltage waveform peak value or current and range current waveform peak value effective measurement ranges.

#### Voltage Ripple Rate / Current Ripple Factor Measurement Specifications

Measurement method	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
measuring range	current waveform peak value effective measurement ranges
Display range	0.00[%] to 500.00[%]
Polarity	None

Apparent Power/ Reactive Power/ Power Factor/ Phase Angle Measurement Specifications

Measurement	Rectifiers					
types	Apparent Power/ Reactive Power Phase Angle	r/ Power Factor	: AC+DC, AC, : AC, FND	FND, AC+DC Umn		
Effective measuring range	As per voltage, current, and ac	tive power effe	ective measur	rement ranges.		
Display range	Apparent Power/ Reactive Power	: 0% to 196% of	the range (no zer	o-suppression)		
	Power Factor	: ±0.0000 to	5 ±1.0000			
	Phase Angle	: +180.00 to				
Polarity	Reactive Power/ Power Fact					
	Polarity is assigned accord					
	voltage waveform rising edge and the current waveform rising edge.					
	+ : When current lags voltage (no polarity display)					
	- : When current leads	voltage				

#### Power channel and sum value calculation formulas

Wiring		S: Apparent power	Q: Reactive power
All channels	1P2W	$S_{(i)} = U_{(i)} \times I_{(i)}$	$Q(i) = si(i)\sqrt{S(i)^2 - P(i)^2}$
	1P3W	$S_{sum} = S_{(1)} + S_{(2)}$	
Sum values	3P3W	$S_{sum} = \frac{\sqrt{3}}{2} (S_{(1)} + S_{(2)})$	$Q_{sum} = Q_{(1)} + Q_{(2)}$
	3P3W2M 3V3A	$S_{sum} = \frac{\sqrt{3}}{3} (S_{(1)} + S_{(2)} + S_{(3)})$	
	3P3W3M 3P4W	$S_{sum} = S_{(1)} + S_{(2)} + S_{(3)}$	$Q_{sum} = Q_{(1)} + Q_{(2)} + Q_{(3)}$

( i ): Measurement channel

Wiring		$\lambda$ : Power factor	$\phi$ : Phase angle
All channels	1P2W	$\lambda(i) = \mathbf{S}\mathbf{i}(i) \left  \frac{P_{(i)}}{S_{(i)}} \right $	$\phi_{(i)} = si_{(i)} \cos^{-1}l \lambda_{(i)}l$
Sum values	1P3W 3P3W 3P3W2M 3V3A 3P3W3M 3P4W	$\lambda_{sum} = si_{sum} \left  \frac{P_{um}}{S_{uum}} \right $	$ \begin{array}{l} \text{When } P_{sum} \geq 0 \\ \phi_{sum} = sisum \; cos^{-1}  \lambda \; sum  \\ (0^{\circ} \; to \; \pm 90^{\circ}) \\ \text{When } P_{sum} \geq 0 \\ \phi_{sum} = sisum \; 180 - cos^{-1}  \lambda \; sum  \\ (\pm 90^{\circ} \; to \; \pm 180^{\circ}) \\ \end{array} $

( i ): Measurement channel ; The polarity symbol sisum is acquired from the Qsum symbol.

### Frequency Measurement Specifications

	0 011
channels	
Measurement source	Select from U (VHz) or I (AHz) by channel
Measurement method Calculated from input waveform period (reciprocal method	
Measurement range	500 Hz/ 200 kHz (linked to zero-cross filter)
Measurement accuracy	±0.1% rdg. ±1 dgt. (0°C to 40°C)
Effective measuring	0.1 Hz to 100 kHz
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.
Display format	0.1000 Hz to 9.9999 Hz, 9.900 Hz to 99.999 Hz, 99.00 Hz to 999.99 Hz,
	9900 kHz to 9.9999 kHz, 9.900 kHz to 99.999 kHz, 99.00 kHz to 220.00 kHz

#### Efficiency Measurement Specifications

Measurement method Calculates the efficiency h [%] from the ratio of active power values for channels and wires Wiring modes Calculated based on the AC+DC rectifier active power

Wiring         CH1         CH2         Calculation formulas           1P2W × 2         1P2W         1P2W         η1=100x P2  /  P1            1P3W         1P3W         1P3W         1P3W	d calculation P	ulation PW3336	PW3336					
IP2W         IP2W         IP2W         η2=100× P1 / P2            1P3W         1P3W         1P3W         1P3W	Jations	<sup>3</sup> Wiring	CH1	CH2		Calculation formulas	٦	
		1P2W ×	2 1P2W	/ 1P2W				
		1P(	3W 11	P3W			٦	
3P3W 3P3W		3P3	3W 3I	P3W				
3P3W2M 3P3W2M		3P3V	V2M 3P3	3W2M				
PW3337	P	PW3337	·					
Wiring CH1 CH2 CH3 Calculation formulas		Wiring	CH1	CH2	CH3	Calculation formulas		
1P2W × 3 1P2W 1P2W 1P2W η1=100× P3  /  P1  η2=100× P1  /  P3		1P2W ×	3 1P2W	/ 1P2W				
1P3W & 1P2W 1P3W 1P2W η1=100× P3  /  Psum		1P3W 8	1P2W 1	1P3W 1		η1=100× P3  /  Psum	٦	
3P3W & 1P2W 3P3W 1P2W n2=100× Psum  /  P3				P3W	1P2W	η2=100× Psum  /  P3		
3P3W2M 3P3W2M			Л	3P3W2M				
	3V3A 3V3A							
3P3W3M 3P3W3M			Л					
3P4W 3P4W								
Effective measuring range As per the active power effective measurement range.	ctive measuring range A	asuring range As per t	ne active pow	er effect	ive mea	surement range.		
Display range 0.00[%] to 200.00[%]	play range 0	ange 0.00[%]	to 200.00[%]					

 Time Average Current / Time Average Active Power Measurement Specifications (T.AV)

 Measurement method
 Calculates the average by dividing the integrated value by the integration time

 Measurement accuracy
 ±(Current or active power measurement accuracy) ±(±0.01%rdg. ±1dgt.)

 Effective measuring range
 As per the current or active power effective measurement range

#### **Functional Specifications**

i anotional opoc	inoutiono							
Auto-range	Automatically changes f			nd cur	rrent ra	ange fo	or eacl	n
(AUTO)	wiring mode according	to the	input					
	Range up:							
	The range is incre					s 130°	% of th	е
	range or when the	e peak	is exc	eeded	l			
	Range down:							
	The range is decr							
	range. However, t				crease	d whe	n the p	beak
	is exceeded at the							
Averaging	Averages the voltage, of	curren	t, activ	e pow	er, ap	parent	powe	r, and
(AVG)	reactive power.							
	<ul> <li>The power factor and ph</li> </ul>							
	<ul> <li>Measured values other</li> </ul>							
	integrated values, T.AV				e rate,	total h	armor	nic
	distortion, and harmon			iged.				
	Method : Simple ave							
	Number of averaging	g iterat	ions ar	nd disp	olay up	odate	interva	.1
	Number of averaging iterations	1 (OFF)	2	5	10	25	50	100
		000	400	4	0	5	10	00

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.	Scaling (VT, CT)					
Iminium values         Iminium values for the voltage and current waveform peak and holds them on the display.           (MAX/MINHOLD)         -For data with polentry, display of the maximum value and minimum value for the data's should values is held to shat both positive and registre polarity values are shown).           - Trading output and waveform output are not held.         -Analog output and waveform output are not held.           Zero Adjustment         Degausses the current input on the Zerose out the current input offset.           Key-lock         Desables key input in the measurement state, except for the SHIFT (KeY-LOCK)           Backsup Backsup systems and integration data if the instrument is turned communications speed, address, and LAN-related settings icommunications speed, address, and LAN-related settings icommunications speed, address, and LAN-related settings icommunications integration of the following 6 parameters for each channel (total of 16 parameters): Sum of current integrated values (displayed as Mh- on panel display) Sum of current integrated values (displayed as Mh- on panel display) Sum of current integrated values (displayed as Mh- on panel display) Sum of current integrated values (displayed as Mh- on panel display) Sum of current integrated values (displayed as Mh- on panel display) Sum of current integrated values (displayed as Mh- on panel display) Sum of current integrated values (displayed as Mh- on panel display) Sum of active power integrated values (displayed as Mh- on panel display) Sum of active power integrated values (displayed as Mh- on panel display) Sum of active power integrated values (displayed as Mh- on panel display) Sum of active power integrated values (displayed as Mh- on panel display) Sum of active powere integrated values (displayed as Mh- on panel displa	HOLD (HOLD)	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. • Analog output and waveform output are not held.				
- Analog output and waveform output are not held.           2ero Adjustment         Degausses the current input unit DCCT and then zeroes out the current input offset.           Key-lock         Disables key input in the measurement istate, except for the SHIFT (KEY LOCK)           Rey, and KEY LOCK key.         Backsup settings and integration data if the instrument is turned off and if a power outage occurs.           System Reset         Infidiazes the instrument's settings. Communications-related settings communications and addes, and LAN-related settings are not initialized integration.           Communications speed, addess, and LAN-related settings are not initialized current integrated value (displayed as N-n on panel display). Sum of aurent integrated value (displayed as N-n on panel display). Sum of aurent integrated value (displayed as N-n on panel display). Sum of aurent integrated value (displayed as N-n on panel display). Sum of aurent integrated value (displayed as N-n on panel display). Sum of aurent integrated value (displayed as N-n on panel display). Sum of aurent integrated value (displayed as N-n on panel display). Negative active power related value.           Measurement types         Rectifiers: AC-DC AC+DC Umn           Current: OC         Displays the result of integrating active power values by colarity as integrated value.           Active power:         Displays the result of integrating instantaneous data obtained by sempling both current and active power to yolarity as integrated values.           Rectifiers: OC         Displays the result of integrating instantaneous data obtained by sempling both current and active power to yolarity as integrated value. <td>Maximum value/ minimum value hold (MAX/MIN HOLD)</td> <td>maximum and minimum values for the v waveform peak and holds them on the - For data with polarity, display of the ma value for the data's absolute values is h and negative polarity values are shown - Internal calculations (including integrat</td> <td>voltage and current display. ximum value and minimur ield (so that both positive ).</td>	Maximum value/ minimum value hold (MAX/MIN HOLD)	maximum and minimum values for the v waveform peak and holds them on the - For data with polarity, display of the ma value for the data's absolute values is h and negative polarity values are shown - Internal calculations (including integrat	voltage and current display. ximum value and minimur ield (so that both positive ).			
Key-lock (KEY LOCK, Key         Disables key input in the measurement state, except for the SHITT key and KEY LOCK key.           Backup         Backs up settings and integration data if the instrument is turned off and if a power outage occurs.           System Reset         Initializes the instrument's settings. Communications-related settings are not initialize communications speed, addises, and LAN-related settings are not initialize trunced to the power integrated values (displayed as Ah on panel display) Positive current integrated values (displayed as Ah on panel display) Positive current integrated values (displayed as Ah on panel display) Negative current integrated values (displayed as Ah on panel display) Positive current integrated values (displayed as Ah on panel display) Negative active power integrating outer of the SMI on panel display Desitive current integrated values (displayed as Ah on panel display) Negative active power integrated values.           Measurement types         Rectifiers: AC-DD, CA-DC DC Unn Current: Displays the result of integrating instrumeneous data obtained by sampling both current and active power yould be interval (approx. 200 ms) as an integrated value.           Active power: Displays the result of integrating instrumeneous data obtained by sampling both current act currency) + (s0.01% rdg. st dg measurement accuracy.           Integration time Imagration time Displays result of integration in the setting (timer) Displays the integration datased on integration time setting (timer) Displaying the integration datased on integration gate and the setting (timer) Displaying the integration datased on integration time setting (timer) Displaying the integration datased on integration datased in sternal contro Measurement tacouracy.           Displays resolution </td <td>Zero Adjustment</td> <td>Analog output and waveform output are     Degausses the current input unit DCCT</td> <td></td>	Zero Adjustment	Analog output and waveform output are     Degausses the current input unit DCCT				
of and if a power outage occurs.           System Rest           Initializes the instrument's settings. Communications-related settings are not initializes to instrument's settings. Communications related settings are not initializes to integration of the following 6 parameters for each channel (total of 18 parameters):           Sum of current integrated values (displayed as Ah on panel display) Positive current integrated values (displayed as Ah on panel display) Negative current integrated value (displayed as Ah on panel display) Negative current integrated value (displayed as Ah on panel display) Negative active power integrated value (displayed as Wh on panel display) Negative active power integrated value (displayed as Wh on panel display) Negative active power integrated value (displayed as Wh on panel display) Negative active power integrated values (displayed as Wh on panel display) Negative active power integrated values (displayed as Wh on panel display) Negative active power integrated values (displayed as Wh on panel display) Negative active power:           Measurement types         Rectifiers: AC-DC, AC+DC Urm           Current:         Displays the result of integrating instrumeous data obtained by asampling both current and active power yould use.           Notifier DC         Displays the result of integration interesting (timer)           Displays the result of integration interesting (timer)           Display resolution         Qurrent active power to polarity as integrated values.           Rectifier: DC         Displays the active power to polarity as integrated values.           Rectifier: DC         Displays integration and active power to polarity as integ	Key-lock (KEY LOCK)	Disables key input in the measurement s key and KEY LOCK key.	· ·			
Integration Measurement Items         Simultaneous integration of the following 6 parameters for each channel (total of 18 parameters): Sum of current integrated values (displayed as Ah on panel display) Negative current integrated values (displayed as Ah on panel display) Negative current integrated values (displayed as Ah on panel display) Negative active power integrated values (displayed as Ah on panel display) Negative active power integrated values (displayed as Ah on panel display) Negative active power integrated values (displayed as Ah on panel display) Negative active power integrated values (displayed as Ah on panel display) Negative active power integrated values (displayed as Ah on panel display) Displays the result of integrating active power values by polarity calculated once every display update interval (exprox.	System Reset	off and if a power outage occurs. Initializes the instrument's settings. Communica	ations-related settings			
Measurement items         Simultaneous integration of the following 6 parameters for each channel (total of 14 parameters): Sum of current integrated value (displayed as Ah - on panel display) Positive current integrated value (displayed as Ah - on panel display) Sum of current: integrated value (displayed as Ah - on panel display) Positive active power integrated value (displayed as Wh - on panel display) Measurement types           Measurement types         Rectifiers: AC-DC, AC+DC Umn Current: Displays the result of integrating current RMS value data (display values) once every display update interval (approx. 200 ms) as an integrated value.           Active power: Displays the result of integrating instantaneous data obtained by sampling both current and active power by polarity a integrated walues (When the active power contains both AC and DC, the Displays the result of integrating instantaneous data obtained by sampling both current and active power by polarity as integrated walues (When the active power contains both AC and DC, the Displays the result of integrating instantaneous data obtained by sampling both current and active power by polarity as integrated walues (When the active power contains both AC and DC, the Displays rebuilt on the integration time setting (timer) Display rebuilt performed active power dower active walues (When the active power integration time setting (timer) Display rebuilt performed active power dower active supplay (a digits - decimal point)           Functions         Stopping integration based on integration time setting (timer) Display rebuilt be the range set (or START) integrated wildows portion integration by repeatedly starting/stopping integration -Actinonal integration supplay displaying integrated integrated wildows -Actinonal integration they repeatedly starting/stopping integration -Actinonal integration supplay dis a dintegrated wildo	Integration Mea		aleu settings) are not initialized			
Sum of current integrated value (displayed as Ah on panel display) Negative current integrated value (displayed as Ah- on panel display) Sum of active power integrated value (displayed as Wh- on panel display) Negative active power integrated value (displayed as Wh- on panel display) Negative active power integrated value (displayed as Wh- on panel display) Measurement types           Measurement types         Rectifiers: AC-DC, AC+DC Um Current: Displays the result of integrating active power values by polarity calculated once every display update interval (approx. 200 ms) as an integrated value.           Active power: Displays the result of integrating active power values by polarity activated once every cycle for the selected synchronization source as integrated values.           Integration time         1 mon. to 1000 hr., settable to the selected synchronization source as integrated values.           Integration time         1 min. to 1000 hr., settable to the selected synchronization source as integrated.           Integration time         1 min. to 1000 hr., settable to the selected synchronization source as integrated.           Integration time acture, y =t00 ppm ± ddi. (Or to 40°C)           Integration         2 Current or active power measurement accuracy) + (±0.01% rdg, ±1 dgi Eleptay resolution.           Eleptay resolution         999999 (6 diglis ± decimal point)           Stopping integration based on integrating instanted wales based on external displa resolution integrated wales and the integrated elegtable the db Hz to 66 Hz range solution within the synchronization source (SYNC) for the basis measurement specification reacond wale baserial point)           Fu		Simultaneous integration of the following 6 p	arameters for each channel			
Displays the result of integrating current RMS value data (display values) once every cipplay update interval (approx. 200 ms) as an integrated value.           Active power:         Displays the result of integrating active power values by polarity calculated once every cycle for the selected synchronization source as integrated values.           Rectifier: DC         Displays the result of integrating instantaneous data obtained by sampling both current and active power contains both AC and DC, the DC component will not be integrated)           Integration time         1 min. to 10000 hr., settable in 1 min. blocks           Integration gate         ±100 ppm ±1 dq1. (0°C to 40°C)           Integration gate         (Current or active power measurement accuracy) + (±0.01% rdg. ±1 dg1 measurement accuracy)           Flictive measuring range         Ourrent or active power treasurement accuracy) + (±0.01% rdg. ±1 dg1 measuring range           Display resolution         999999 (6 dig1s + decimal point)           Functional         The present on based on integration time setting (timer)           Displaying the integration based on integration time setting (timer)         Displaying the integration based on integrated values based on external control           Measuring range:         Stopping integration based on integrated values the adjust antilational integration of the sevine model (starting/stopping integration)           Hearmonic Corresponds to the range set for START integrated windows by channel according to the winnig model           Vinform thinning between zero-cross events after proc	Measurement types	Sum of current integrated values (displayed Positive current integrated value (displayed Negative current integrated value (displaye Sum of active power integrated values (disp Positive active power integrated value (display Negative active power integrated value (display	as Ah+ on panel display) d as Ah- on panel display) blayed as Wh on panel displa yed as Wh+ on panel display)			
sampling both current and active power by polarity as integrated values (When the active power contains both AC and DC, the DC component will not be integrated)           Integration time         1 min. to 10000 hr., settable in 1 min. blocks           integration fine accuracy         ±100 ppm ±1 dgt, (0°C to 40°C)           Integration fine accuracy         ±100 ppm ±1 dgt, (0°C to 40°C)           Integration fine accuracy         ±100 ppm ±1 dgt, (0°C to 40°C)           Integration fine accuracy         ±100 ppm ±1 dgt, (0°C to 40°C)           Functions         Display resolution           Display resolution         99999 (6 digts + decimal point)           Functions         - Stopping integration based on integration rule setting (timer) - Display resolution when power returns           Measuring range         Corresponds to the range set for START integrated values based on external control Measuring rule corresponds to the range set for START integrateation           Measuring rule Corresponds to the range set for START integrates windows by - Uniform thinning between zero-cross events after processing with a digital antialialising filter           - Interpolation calculations (Lagrange interpolation)           - When the synchronization frequency falls within the 45 Hz to 66 Hz range * No gaps or overlap will occur           Synchronization source (SYNC) for the basic measurement specification Measurement items           3           Measurement items         - Harmonic voltage phase angle - Harmonic current pha		Displays the result of integrating of (display values) once every displa 200 ms) as an integrated value. Active power: Displays the result of integrating a by polarity calculated once every synchronization source as integra Rectifier: DC	y update interval (approx. active power values cycle for the selected ted values.			
Integration       ±100 ppm ±1 dgt. (0°C to 40°C).         Integration       (Current or active power measurement accuracy) + (±0.01% rdg. ±1 dgt)         measurement accuracy       Until PEAK OVER U or PEAK OVER I occurs         Display resolution       999999 (6 digits + decimal point)         Functions       • Stopping integration based on integration time setting (timer)         • Display resolution       99999 (6 digits + decimal point)         Functions       • Stopping integration abased on external control         Measuring range       Corresponds to the range set for START integrated on external control         Measurement method       • 2ero-cross simultaneous calculation method (separate windows by channel according to the wiring mode)         • Uniform thinning between zero-cross events after processing with a digital antialiaising filter       • 1eropolation requency falls within the 45 Hz to 66 Hz range         • No gaps or overlap will occur       • No gaps or overlap will occur       • No gaps or overlap will occur         Synchronization source Conforms to synchronization frequency falls within the 45 Hz to 66 Hz range       • No gaps or overlap will occur         • No gaps or overlap will occur       • Harmonic current formonic voltage content %       • Harmonic current formonic voltage content %         • Harmonic current distortion       • Voltage fundamental waveform       • Voltage current phase difference         • Internonic voltage phase angle	Integration time	sampling both current and active pow values (When the active power conta DC component will not be integrated	er by polarity as integrated ins both AC and DC, the )			
Effective measuring range         Until PEAK OVER U or PEAK OVER I loccurs           Display resolution         99999 (6 digits + decimal point)           Functions         - Stopping integration based on integration time setting (timer)           - Displaying the integration based on integration time setting (timer)         - Backing up integration when power returns           External control         Stopping integration when power returns           Measurement         Corresponds to the range set for START integretation           Harmonic Measurement Specifications (built-in function)         Measurement of the wiring mode)           - Uniform thinning between zero-cross events after processing with a digital antialising filter         - Interpolation calculations (Lagrange interpolation)           When the synchronization frequency falls within the 45 Hz to 66 Hz range will occur         - When the synchronization frequency falls within the 45 Hz to 66 Hz range will occur           Synchronization source         Saps and overlaps may accur if the basic measurement specification waveform superindication source (SNC) for the basic measurement specification - Apparent lower observer content %           Harmonic current content %         - Harmonic current the power content %           Harmonic current content %         - Harmonic current phase difference           - Uniform thinning between zero content %         - Harmonic current phase difference           - Interpolation calcuba powere unotent %         - Harmonic curent appace t	Integration time accuracy Integration	±100 ppm ±1 dgt. (0°C to 40°C)				
Functions       • Stopping integration based on integration time setting (timer)         Displaying the integration by repeatedly starting/stopping integration       • Backing up integration by repeatedly starting/stopping integration         • Additional integration when power returns       Stopping integration when power returns         External control       Stopping integration when power returns         Harmonic Measurement Specifications (built-in function)         Measurement method       • Zero-cross simultaneous calculation method (separate windows by channel according to the wing mode)         • Uniform thining between zero-cross events after processing with a digital antialiasing filter       • Iterpolation calculations (Lagrange interpolation)         • When the synchronization frequency falls within the 45 Hz to 66 Hz range as Bac or evertage met frequency is not 50 Hz or 60 Hz       • No gaps or overlap will occur         Synchronization source (Conforms to synchronization source (SYNC) for the basic measurement specification measurement items       • Harmonic voltage RMS value       • Harmonic voltage current phase difference         • Harmonic voltage current phase difference       • Harmonic current content %       • Harmonic voltage fundamental waveform         • Additional interdamental waveform       • Active power fundamental waveform       • Active power fundamental waveform         • No taps or overlap will occur       • Additore overlap will we shase difference       • Harmonic voltage current phase difference <td< td=""><td>Effective measuring range</td><td></td><td>curs</td></td<>	Effective measuring range		curs			
External control         Stopping/starting integration and resetting integrated values based on external control           Measurement         Corresponds to the range set for START integretation           Harmonic Measurement         :Zero-cross simultaneous calculation method (separate windows by channel according to the wining mode)           • Uniform thinning between zero-cross events after processing with a digital antialiasing filter         • Interpolation calculations (Lagrange interpolation)           • When the synchronization frequency falls within the 45 Hz to 66 Hz range         • IEC 61000-47::2002 compliant           • Saps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hg.         • When the synchronization frequency falls within the 45 Hz to 66 Hz range           • No gaps or overlap will occur         • No gaps or overlap will occur           Synchronization source         Conforms to synchronization source (SYNC) for the basic measurement specification           Measurement items         • Harmonic current other %         • Harmonic current file remotic current file remotic voltage content %           • Harmonic current content %         • Harmonic current fundamental waveform         • Otala period waveform           • Total harmonic current distortion         • Otalape current phase difference         • Total harmonic current phase angle           • Harmonic current phase difference         • Harmonic current phase angle         • Harmonic current file maxetorm           • Harmonic current phase	Functions	<ul> <li>Stopping integration based on integrati</li> <li>Displaying the integration elapsed time (displ Additional integration by repeatedly sta</li> <li>Backing up integrated values and the integration</li> </ul>	ayed as TIME on panel display arting/stopping integration elapsed time during power outage			
Harmonic Measurement Specifications (built-in function)         Measurement method       · Zero-cross simultaneous calculation method (separate windows by channel according to the wiring mode)         · Uniform thinning between zero-cross events after processing with a digital antialiasing filter         · Interpolation calculations (Lagrange interpolation)         · When the synchronization frequency falls within the 45 Hz to 66 Hz range         * IEC 61000-4-7:2002 compliant         * Bas and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz         · When the synchronization frequency falls outside the 45 Hz to 66 Hz range         * No gaps or overlap will occur         Synchronization source         Conforms to synchronization source (SYNC) for the basic measurement specification         Measurement items         · Harmonic voltage PMS value         · Harmonic current content %         · Harmonic current content %         · Harmonic current distortion         · Otal paremonic voltage fundamental waveform         · Power factor fundamental waveform         · Power factor fundamental waveform         · Notage current phase difference         · Interchannel voltage phase angle         · Harmonic voltage phase angle         · Harmonic voltage phase difference         · Interchannel voltage fundamental wave form         · Power factor funda	External control	Stopping/starting integration and resetting integrate	d values based on external contro			
Measurement method       - Zero-cross simultaneous calculation method (separate windows by channel according to the wiring mode) - Uniform thinning between zero-cross events after processing with a digital antialiasing filter - Interpolation calculations (Lagrange interpolation) - When the synchronization frequency talls within the 45 Hz to 66 Hz range * IEC 61000-4.7:2002 compliant Saps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz When the synchronization frequency falls outside the 45 Hz to 66 Hz range * No gaps or overlap will occur         Synchronization source       Conforms to synchronization source (SYNC) for the basic measurement specification Measurement channels         Measurement items       - Harmonic voltage Phase angle - Harmonic current content % - Harmonic current content % - Harmonic current fundamental waveform - Current fundamental waveform - Current fundamental waveform - Apparent power fundamental waveform - Noltage current phase difference - Interchannel voltage fundamental waveform - Noltage current phase angle - Harmonic current phase angle - Harmonic voltage turnet phase difference - Interchannel voltage fundamental waveform - Voltage current phase difference fundamental waveform - Noltage current phase difference fundamental waveform - Noltage current phase angle - Harmonic current phase angle - Harmonic voltage phase angle - Harmonic current phase angle - Harmonic voltage phase angle - Harmonic current phase angle - Harmonic voltage phase angle - Harmonic current phase angle - Harmonic voltage phase angle - Harmonic current phase angle - Harmonic voltage phase angle - Harmonic current phase angle - Harmonic voltage current phase difference         FFT poetist       4096         Window function       Rectangular         Analysis window       4	~ ~ ~					
methodby channel according to the wiring mode) - Uniform thinning between zero-cross events after processing with a digital antialiasing filter - Interpolation calculations (Lagrange interpolation) - When the synchronization frequency falls within the 45 Hz to 66 Hz range * IEC 61000-4-7:2002 compliant * Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz - When the synchronization frequency falls outside the 45 Hz to 66 Hz range * No gaps or overlap will occurSynchronization source Conforms to synchronization source (SYNC) for the basic measurement specification measurement channelsMeasurement items-Harmonic voltage RMS value -Harmonic current ontent % -Harmonic current ontent % -Harmonic current ontent % -Harmonic active power -Harmonic active power -Harmonic current distortion -Voltage current thudamental waveform -Voltage current fundamental waveform -Voltage current phase difference -Interchannel voltage phase angle -Harmonic current fundamental waveform -Voltage current phase difference -Interchannel voltage phase angle -Harmonic current fundamental waveform -Voltage current phase difference -Interchannel voltage fundamental wave phase difference -Interchannel current fundamental waveform -Voltage current phase differenceFFT processing wordleight 32 bitsNumber of FFT points 4096Window function RectargularRectargular Manup Analysis window widthSt Hz $\leq f < 56$ Hz: 178.57 ms to 222.22 ms (10 cycles) 56 Hz $\leq f < 66$ Hz: 181.82 ms to 214.29 ms (12 cycles) Frequencies other than the above: 185.92 ms to 214.08 msData update rate Depends on window width Synchronization frequency rangeMaximum analysis order10						
Measurement channels       3         Measurement items       -Harmonic voltage phase angle -Harmonic current content % -Harmonic current content % -Harmonic current phase difference -Harmonic voltage current phase difference -Total harmonic current distortion       -Harmonic voltage distortion -Total harmonic current distortion         -Total harmonic voltage current phase difference       -Total harmonic voltage difference -Total harmonic voltage current distortion       -Voltage fundamental waveform -Apparent power fundamental waveform         -Voltage current phase difference       -Total harmonic voltage difference       -Total harmonic voltage difference         - Interchannel voltage fundamental waveform       -Voltage current phase difference       -Notage current phase difference         - Interchannel voltage phase angle       - Harmonic voltage phase angle       - Harmonic current phase difference         - Harmonic voltage phase angle       - Harmonic current phase difference       - Harmonic voltage current phase difference         FFT processing word length       32 bits       - Harmonic voltage current phase difference       - Harmonic voltage current phase difference         FFT processing word length       32 bits       - Harmonic voltage current phase totage mase interval       - Harmonic voltage current phase difference         FFT processing word length       32 bits       - Harmonic voltage current phase difference       - Harmonic voltage current phase difference         FFT processing word length       <	method	by channel according to the wiring moc - Uniform thinning between zero-cross e - digital antialiasing filter - Interpolation calculations (Lagrange int - When the synchronization frequency falls w >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	te) vents after processing with erpolation) ithin the 45 Hz to 66 Hz range int frequency is not 50 Hz or 60 H; tside the 45 Hz to 66 Hz range			
Measurement items-Harmonic voltage RMS valueHarmonic voltage ontent % -Harmonic current content % -Harmonic active power -Harmonic active power -Harmonic active power -Harmonic active power -Iter and iter ontent % -Harmonic active power -Total harmonic current distortion -Total harmonic urrent distortion -Voltage fundamental waveform -Power factor fundamental waveform -Voltage current phase difference -Interchannel voltage phase angle -Harmonic active power fundamental waveform -Voltage current phase difference -Interchannel voltage fundamental waveform -Voltage current phase difference -Interchannel voltage phase angle -Harmonic current fundamental wave phase difference -Interchannel voltage phase angle -Harmonic current phase angle -Harmonic voltage current phase differenceFFT processing wordlength 32 bits-Harmonic voltage phase angle -Harmonic voltage current phase differenceFFT processing wordlength 32 bits22 bitsNumber of FFT points4096Window function widthRectangular Analysis window 45 Hz ≤ f < 56 Hz: 178.57 ms to 222.22 ms (10 cycles) 56 Hz ≤ f < 66 Hz: 181.82 ms to 214.29 ms (12 cycles) Frequencies other than the above: 185.92 ms to 214.08 ms Data update rate Depends on window widthData update rate Maximum analysis order 10 Hz to 640 HzSynchronization frequency (f) range Analysis order 10 Hz ≤ f < 56 Hz			basic measurement specification			
$\begin{tabular}{ c c c c c } \hline Harmonic voltage current phase difference \\ \hline FFT processing word length 32 bits \\ \hline Status 51 bits \\ \hline Status 51 bits 51 bits \\ \hline Status 51 bits 51 $		Harmonic voltage phase angle       Harm         Harmonic active power       Harm         Harmonic voltage current phase difference       Total harmonic voltage current phase difference       Total harmonic voltage current phase difference         Current fundamental waveform       Active         Apparent power factor fundamental waveform       Reactive         Power factor fundamental waveform       Notage         Voltage current phase difference fundamental wave       Interchannel voltage fundamental wave         Interchannel voltage fundamental wave       Interchannel voltage fundamental wave         The following parameters can be downlo       communication but not displayed:	onic current RMS value onic active power content % narmonic voltage distortion je fundamental waveform power fundamental waveform e power fundamental waveform nental waveform phase difference ohase difference aded as data during PC			
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Number of FFT points	Harmonic voltage current phase differer <u>32 bits     4096     </u>				
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Window function Analysis window width	45 Hz $\leq$ f < 56 Hz: 178.57 ms to 222.22 r 56 Hz $\leq$ f < 66 Hz: 181.82 ms to 214.29 r	ns (12 cycles)			
	Data update rate		15 to 214.08 ms			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Synchronization					
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Maximum					
200 Hz < f ≤ 300 Hz 25th	analysis order		50th 50th 50th 50th 50th			
		200 Hz < f ≤ 300 Hz	25th			

# PW333 7 PW333 6

Analysis order upper limit setting	2nd to 50th				
Measurement	f.s.: Measurement ra	nge			
accuracy	Frequency	(f)		Current, Active power	
	DC 10 Hz ≤ f < 3	0.1.1-		4%rdg.±0.2%f.s.	
	$\frac{10 \text{ Hz} \le 1 < 3}{30 \text{ Hz} \le f \le 40}$			4%rdg.±0.2%f.s. 3%rdg.±0.1%f.s.	
	400 Hz < f ≤			4%rdg.±0.2%f.s.	
	1 kHz < f ≤ 5	kHz	±1.	0%rdg.±0.5%f.s.	
	5 kHz < f ≤ 8			0%rdg.±1.0%f.s.	
		rent and (±1 mA	(voltage	read value) to active power.	
Display Specific					
Display	7-segment LED				
Number of display parameters Display resolution	Other than integrated		00 count		
Display resolution	Integrated values: 99		55 Count		
Display update rate			er of avera	aging iterations setting)	
Synchronized C	ontrol				
Functions		play updates, d	lata updates	, integration start/stop/reset	
	events, display hold operation	ation, key lock o	peration, and	d zero-adjustment operation	
			ronized with	the master PW3336/ PW3337.	
Terminal	BNC terminal × 1 (no	n-isolated)			
Terminal name I/O settings	EXT SYNC Off: Synchronized co	ontrol functio	n off		
i/O Sottings	In : The EXT SYNC t			and a dedicated	
	synchronization	signal can b	e input (sl	ave).	
	Out: The EXT SYNC				
Number of units for which	synchronization				
Number of units for which synchronized control can	1 master unit and 7 s	slave units (to	otal 8 units	)	
be performed					
External Current	Sensor Input Spec				
Terminal	Isolated BNC termina	als, 1 for eac	h channel		
Current sensor	Off / Type 1 / Type 2				
type switching Current sensor	TYPE1 (100 A to 500			sor input terminal is ignored.	
options	9660, 9661, 9669				
optione		TYPE2 (20 A to 1000 A sensors, Power supply is required to use)			
	CT6862-05, CT6863-05, CT6875, CT6876, CT6877, 9272-05,				
	CT6841-05, CT684	13-05, CT684	4-05, CT6	845-05, CT6846-05, etc.	
Current	Auto / 10 A / 20 A / 5				
measurement	User-selectable for e		node. Can	be read directly by	
range Power range	manually setting the CT ratio. Depends on the combination of voltage and current ranges; from				
configuration	60.000W to 15.000MW (also applies to VA, var)				
Measurement accuracy					
Current, Active power					
Frequency	Input < 50%f.s.	50%f.s. ≤ Inp	out < 100%f.s.	100%f.s. ≤ Input	
DC	±0.2%rdg. ±0.6%f.s.		1. ±0.6%f.s.	±0.8%rdg.	
0.1Hz≤ f <16Hz 16Hz≤ f < 45Hz	±0.2%rdg. ±0.2%f.s. ±0.2%rdg. ±0.2%f.s.		%rdg. %rdg.	±0.4%rdg. ±0.4%rdg.	
45Hz ≤ f ≤ 66Hz	±0.2%rdg. ±0.1%f.s.		%rdg.	±0.3%rdg.	
66Hz < f ≤ 500Hz	±0.2%rdg. ±0.2%f.s.	±0.4	%rdg.	±0.4%rdg.	
$\frac{500\text{Hz} < f \le 1\text{kHz}}{1\text{kHz} < f \le 10\text{kHz}}$	±0.2%rdg. ±0.3%f.s. ±5.0%rdg.		%rdg. %rdg.	±0.5%rdg. ±5.0%rdg.	
$10$ kHz < f $\leq$ 50kHz	±3.0%itug.	±3.0	76rug.	±3.0%iug.	
50kHz < f ≤ 100kHz					
	f.s. : Each measurer	nent range			
	•To obtain the current	or active pow		y, add the current sensor's	
	accuracy to the above				
	•The effective measurement range and frequency characteristics conform to the current sensor's specifications.				
	•Values for current, a				
	0.1 Hz ≤ f < 10 Hz a				
	Values for voltage in			e power for which	
Temperature	10 Hz ≤ f < 16 Hz ar Current, active powe		ce only.		
characteristics	±0.08% f.s./°C (ir		nperature	coefficient:	
				ment range)	
D ( )	Add current sensor t				
Power factor effects	<ul> <li>Instrument: ±0.15% fs. or less (45 Hz to 66 Hz with power factor = 0)</li> <li>Internal circuit voltage/current phase difference: ±0.086°</li> <li>Add the current sensor phase accuracy to the internal circuit</li> </ul>				
enects					
	voltage/current pha				
Current peak value	· (External current se	nsor input in		accuracy) + (±2.0% f.s.)	
measurement	(f.s.:current peak ra				
accuracy Harmonic	Add the current sen				
measurement	Frequency DC ±	Voltage 0.4%rdg. ±0		Eurrent, Active power ±0.6%rdg. ±0.8%f.s.	
accuracy	10Hz≤f < 30Hz ±	<u>-0.4%rag. ±0</u> -0.4%rdg. ±0	).2%fs	±0.6%rdg. ±0.8%f.s. ±0.6%rdg. ±0.4%f.s.	
	30Hz≤ f ≤ 400Hz ±	±0.3%rdg. ±0	D.1%f.s.	±0.5%rdg. ±0.3%f.s.	
	400Hz < f ≤ 1kHz ±	:0.4%rdg. ±0	).2%f.s. :	±0.6%rdg. ±0.5%f.s.	
		±1.0%rdg. ±0		±1.0%rdg. ±5.5%f.s.	
		±4.0%rdg. ±1	1.U%t.S. :	±2.0%rdg. ±6.0%f.s.	
	f.s.: Each measurem		or accure a	wadd the ourrent economic	
	<ul> <li>Io obtain the current accuracy to the above</li> </ul>			y, add the current sensor's	
		s surrent anu		o. accouncey rightee.	

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

DIA Output Speci	incations (F W3530-02/-03 and F W5557-02/-05)
Number of	16
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 power 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 distortion, Inter-channel voltage/current
	fundamental wave phase difference, Voltage/current crest factor, Time
	average current/active power, Voltage/current ripple rate, Frequency,
	Efficiency, Current integration, Active power integration
	(Harmonic output is not available for individual orders).
	Hi-P1 to Hi-P3 and Hi-Psum (high-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.) : (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 Instantaneous waveform output : (Output parameter measurement accuracy) + (±1.0% f.s.) Instantaneous voltage, instantaneous current: RMS value level Instantaneous waveform output, high-speed active power level output At DC or 10 Hz to 5 kHz, accuracy is as defined above. I such output Hz Output frequency band Output voltage Level output 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 : ±2 V DC at 2000 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% V trace/current crest factor 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 Hz 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% 
 H2 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

 :Eved of 200 mp ±50 mp (concret, 5 times approx.50 mp ±50 mp (concret, 5 times approx.50 mp ±50 mp ±50 mp (concret, 5 times approx.50 mp (concret, 5 tim (concret, 5 tim : 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 Updated incevery cycle for the input waveform set as the synchronization source.
 Updated incevery cycle for the input waveform set as the synchronization source.
 Update incevery cycle for the input changes abruptly from 0% to 90%, or from 100% to 10%, the time required in order to satisfy the accuracy range) Response time Waveform output : 0.2 ms or less High-speed active power level output 
 Ingli opool dation point

 : 1 cycle

 Temperature characteristic

 ±0.05% f.s./°C or less
 Output resistance 100 Ω ±5 Ω

#### External control (built-in feature)

Functions	Integration st	art/stop, integration reset and ho	old via external control
External control	Input signal le	vel: 0 to 5 V (high-speed CMOS le	vel or shorted [Lo]/open [Hi])
	Functions	External control signal	External control terminal
	Start	$Hi \rightarrow Lo$	START/STOP
	Stop	$Lo \rightarrow Hi$	01/11/0101
	Reset	Lo interval of at least 200 ms	RESET
	Hold on	$Hi \rightarrow Lo$	HOLD
	Hold off	$I_0 \rightarrow Hi$	HOLD

#### GP-IB interface (PW3336-01/-03, PW3337-01/-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)		

RS-232C interface (built-in feature)				
Connector	D-sub 9-pin connector × 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			

I AN interface (built-in feature)

LAN Interface (D	/			
Connector	RJ-45 connector × 1			
Electrical Specifications				
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 (REMOTE lamp will light up.)			
General Specific	cations (product guaranteed for 3 year)			
Operating environment	Indoors, altitude up to 2000 m (6562-ft.), pollution degree 2			
Operating temperature and humidity	0 to 40°C (32 to 104°F), 80% RH or less (non-condensating)			
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)			
, i i i i i i i i i i i i i i i i i i i	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			
	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 x 1, Measurement guide x 1, Power cord x 1			

# **PW3335 Specifications**

#### Input Specifications

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			
	200 mA to 20 A range 15 mO or less			

#### **Basic Measurement Specifications**

Measurement Simultaneous voltage and current digital sampling, zero-cross

method	simultaneous calculati	ion		p		
Sampling frequency	Approx. 700 kHz					
A/D converter resolution	16-bit					
	DC, 0.1 Hz to 100 kHz (Values within 0.1Hz ≤ f < 10 Hz are for reference of					
	U, I, DC (fixed to 200 r Voltage	ms) Current		Active power		
Measurement items	Apparent power         Reactive power         Power factor           Phase angle         Frequency         Current integration           Active power integration         Integration time           Voltage waveform peak value         Current waveform peak value           Voltage crest factor         Current crest factor           Maximum current ratio         Time average current					
	Time average active	e power		-		
	Voltage ripple rate Harmonic parameters	C	Current rip	pierale		
	Harmonic voltage RMS value Harmonic active power Total harmonic current distortion Fundamental wave current Fundamental wave current Fundamental wave current Fundamental wave power factor Fundamental wave voltage Fundamental wave voltage current Fundamental wave reactive power Fundamental wave voltage current Fundamental wave reactive Fundamental wav					
	Harmonic voltage ci		difference			
Rectifiers	<ul> <li>AC+DC : AC+DC measurement</li> <li>Display of true RMS values for both voltage and current</li> <li>AC+DC Umn : AC+DC measurement</li> <li>Display of average value rectified RMS converted values for voltage and true RMS values for current</li> <li>DC : DC measurement</li> <li>Display of simple averages for both voltage and current</li> <li>Display of values calculated by (voltage DC value) × (current DC value) for active power</li> <li>AC : AC measurement</li> <li>Display of values calculated by</li> <li>√(AC+DC value)<sup>2</sup> for both voltage and current</li> <li>Display of values calculated by</li> <li>(AC+DC value)<sup>2</sup> for both voltage and current</li> <li>Display of values calculated by</li> <li>(AC+DC value)<sup>2</sup> for active power</li> <li>FND : Extraction and display of the fundamental wave component from harmonic measurement</li> </ul>					
Zero-cross Filter	100 Hz: 0.1 Hz to 100	Hz 500 Hz:	0.1 Hz to 5	00 Hz		
M	5 kHz: 0.1 Hz to 5 kHz	100 kHz:	: 0.1 Hz to	100 kHz		
Measurement accuracy Voltage						
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input	t < 100%f.s.	100%f.s. ≤ Input		
DC	±0.1rdg.±0.1%f.s.	±0.1%rdg.±		±0.2%rdg.		
0.1Hz≤f<16Hz	±0.1%rdg.±0.2%f.s.	±0.3%		±0.3%rdg.		
16Hz≤f<45Hz	±0.1%rdg.±0.1%f.s.	±0.2%		±0.2%rdg.		
45Hz≤f≤66Hz	±0.1%rdg.±0.05%f.s.	±0.15%		±0.15%rdg.		
66Hz <f≤500hz< td=""><td>±0.1%rdg.±0.1%f.s.</td><td>±0.2%</td><td>rdg.</td><td>±0.2%rdg.</td></f≤500hz<>	±0.1%rdg.±0.1%f.s.	±0.2%	rdg.	±0.2%rdg.		
500Hz <f≤10khz< td=""><td>±0.1%rdg.±0.2%f.s.</td><td>±0.3%</td><td></td><td>±0.3%rdg.</td></f≤10khz<>	±0.1%rdg.±0.2%f.s.	±0.3%		±0.3%rdg.		
10kHz <f≤50khz< td=""><td>±0.5%rdg.±0.3%f.s.</td><td>±0.8%</td><td></td><td>±0.8%rdg.</td></f≤50khz<>	±0.5%rdg.±0.3%f.s.	±0.8%		±0.8%rdg.		
50kHz <f≤100khz< td=""><td>±2.1%rdg.±0.3%f.s.</td><td>±2.4%</td><td></td><td>±2.4%rdg.</td></f≤100khz<>	±2.1%rdg.±0.3%f.s.	±2.4%		±2.4%rdg.		
Current		1	-	ÿ		
Current	Innut - FOO/f -	E00/6 a 11-	. 1000/1	1000/6		
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.±		±0.2%rdg.		
0.1Hz≤f<16Hz 16Hz≤f<45Hz	±0.1%rdg.±0.2%f.s.	±0.3%		±0.3%rdg. ±0.2%rdg.		
	±0.1%rdg.±0.1%f.s.	±0.2%				
45Hz≤f≤66Hz 66Hz <f≤500hz< td=""><td><math>\pm 0.1\%</math>rdg.<math>\pm 0.05\%</math>f.s.</td><td>±0.15%</td><td></td><td>±0.15%rdg.</td></f≤500hz<>	$\pm 0.1\%$ rdg. $\pm 0.05\%$ f.s.	±0.15%		±0.15%rdg.		
	±0.1%rdg.±0.1%f.s.	±0.2%		±0.2%rdg.		
500Hz <f≤1khz 1kHz<f≤10khz< td=""><td>±0.1%rdg.±0.2%f.s. ±(0.03+0.07×F)%rdg. ±0.2%f.s.</td><td>±0.3% ±(0.23+0.07</td><td></td><td>±0.3%rdg. ±(0.23+0.07×F)%rdg.</td></f≤10khz<></f≤1khz 	±0.1%rdg.±0.2%f.s. ±(0.03+0.07×F)%rdg. ±0.2%f.s.	±0.3% ±(0.23+0.07		±0.3%rdg. ±(0.23+0.07×F)%rdg.		
10kHz <f≤100khz< td=""><td></td><td>±(0.6+0.04)</td><td>×F)%rdg.</td><td>±(0.6+0.04×F)%rdg.</td></f≤100khz<>		±(0.6+0.04)	×F)%rdg.	±(0.6+0.04×F)%rdg.		
		1				

Active power			
Frequency (f)	Input < 50%f.s.	50%f.s. ≤ Input < 100%f.s.	100%f.s. ≤ Input
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< 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 %1.5. ±(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 %1.5. ±(0.07×F)%rdg.	±(0.3+0.07×F)%rdg.	±(0.3+0.07×F)%rdg.
101012313001012	±0.3%f.s.	±(0.010.07x17)010g.	±(0.010.01X1)/014g.
50kHz <f≤100khz< td=""><td>±(0.6+0.07×F)%rdg.</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.	±(0.9+0.07×F)%rdg.	±(0.9+0.07×F)%rdg.
	±0.3%f.s.	(	(
	<ul> <li>Values for f.s. depen</li> </ul>	d on measurement ran	aes.
		rs to the frequency in k	
	<ul> <li>When using the 1 m/</li> </ul>	A/ 2 mA range:	
	Add ±1 µA to 0.1 Hz t	o 100 kHz measureme	nt accuracy for
	current.		
		ge read value) to 0.1 Hz	to 100 kHz
	measurement accura		
		mA/ 500 mA/ 1 A/ 2 A/	
		asurement accuracy fo	
		ad value) to DC measuremen mA/ 5 mA/ 10 mA/ 20 mA/	
		easurement accuracy f	
		d value) to DC measurement a	
		mA/ 500 mA/ 1 A/ 2 A/	
		. to the measurement a	
	and active power for	which (10 kHz < $f \le 100$	) kHz).
		or following input are consid	
		ent, and active power for	
		active power in excess of 220 V or 2	
		e power in excess of 20 A for w e power in excess of 10 A for w	
		e power in excess of 750 V for	
Effective		0% of the range (1000 '	
measuring range		0% of the range	· (dingo, dp to 1000 • )
5 . 5		6 of the range (when using 10	000 V range, up to 150%)
		valid when the voltage an	
		neasurement range.	
Maximum effective	±600% of each voltag		
peak voltage		0 V, and 1000 V range	s, ±1500 V peak
Maximum effective	±600% of each currer		
peak current Guaranteed accuracy	However, for 20 A rang 1 year	je, ±60 A peak	
period	i yeai		
Post-adjustment	6 months		
accuracy guaranteed			
Conditions of	Temperature and humidi	ty range: 23°C±5°C (73°F	±9°F), 80% RH or less
guaranteed	Warm-up time: 30 mi		
accuracy		vave input, power facto	
		, after zero-adjustment	
		ndamental wave satisfi	es synchronization
Temperature	±0.03%f.s. per °C or le	e conditions	
coefficient		ge, ±0.06%f.s. per °C (	or less
Effect of power	±0.1%f.s. or less (45 to	66 Hz, at power factor	r = 0)
factor	Internal circuitry voltage	ge/current phase differe	ence: ±0.0573°
Effect of common	±0.01%f.s. or less (60)	0 V, 50 Hz/60 Hz, appli	
mode voltage	terminals and enclosu		
Effect of magnetic	400 A/m, DC and 50 F	re) Iz/60 Hz magnetic field	I
	400 A/m, DC and 50 H Voltage		1
Effect of magnetic	400 A/m, DC and 50 H Voltage ±1.5%f.s. or less		1
Effect of magnetic	400 A/m, DC and 50 H Voltage ±1.5%f.s. or less Current	Iz/60 Hz magnetic fielc	
Effect of magnetic	400 A/m, DC and 50 F Voltage ±1.5%f.s. or less Current ±1.5%f.s. or less than of	Hz/60 Hz magnetic field	lue, whichever is greater
Effect of magnetic	400 A/m, DC and 50 F Voltage ±1.5%f.s. or less Current ±1.5%f.s. or less than of 200 mA/ 500 mA/ 1	Iz/60 Hz magnetic fielc	lue, whichever is greater range: ±20 mA
Effect of magnetic	400 A/m, DC and 50 F Voltage ±1.5%f.s. or less Current ±1.5%f.s. or less than of 200 mA/ 500 mA/ 1	Hz/60 Hz magnetic field or equal to the following va A/ 2 A/ 5 A/ 10 A/ 20 A	lue, whichever is greater range: ±20 mA
Effect of magnetic	400 A/m, DC and 50 F Voltage ±1.5%f.s. or less Current ±1.5%f.s. or less than or 200 mA/ 500 mA/ 1 1 mA/ 2 mA/ 5 mA/ 11 Active power ±3.0%f.s. or less than or	Iz/60 Hz magnetic field or equal to the following va A/ 2 A/ 5 A/ 10 A/ 20 A 0 mA/ 20 mA/ 50 mA/ 10 or equal to the following va	lue, whichever is greater range: ±20 mA 0 mA range: ±200 μA Iue, whichever is greater
Effect of magnetic	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than of 200 mA/ 500 mA/ 1 1 mA/2 mA/5 mA/ 11 Active power ±3.0%(s. or less than of 200 mA/500mA/1 A/2 A/5A	Iz/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A 0 mA/20 mA/50 mA/10 or equal to the following va /10 A/20 A range: (Voltage inlue	lue, whichever is greater range: ±20 mA 0 mA range: ±200 μA ilue, whichever is greater equantity/s(±20 mA)
Effect of magnetic field	400 A/m, DC and 50 F Voltage ±1.5%(.s. or less Current ±1.5%(.s. or less than or 200 mA/ 500 mA/ 1 1 mA/2 mA/ 5 mA/ 1 Active power ±3.0%(.s. or less than or 200 mA/500 mA/ 14/2A/5 1 mA/2 mA/5 mA/ 10 mA/20)	Iz/60 Hz magnetic field or equal to the following va A/ 2 A/ 5 A/ 10 A/ 20 A 0 mA/ 20 mA/ 50 mA/ 10 or equal to the following va 10 A/ 20 anage: (Voltage influe mA/ 50 mA/ 100 mA range: (Voltage	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA)
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%f.s. or less Current ±1.5%f.s. or less than c 200 mA/ 500 mA/ 1 1 mA/2 mA/ 5 mA/ 11 Active power ±3.0%f.s. or less than c 200 mA/500 mA/ 1 A/2 A/5 A 1 mA/2 mA/5 mA/ 10mA/200 With input of at least 1	Iz/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A 0 mA/20 mA/50 mA/10 or equal to the following va /10 A/20 A range: (Voltage inlue	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA)
Effect of magnetic field	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than of 200 mA/ 500 mA/ 1 1 mA/ 2 mA/ 5 mA/ 11 Active power ±3.0%(s. or less than of 200 mA/ 500 mA/ 1 A/2A/5 A 1 mA/2 mA/5 mA/ 10 mA/20/ With input of at least 1 Current	Iz/60 Hz magnetic field or equal to the following va A/ 2 A/ 5 A/ 10 A/ 20 A 0 mA/ 20 mA/ 50 mA/ 10 or equal to the following va 10 A/ 20 anage: (Voltage influe mA/ 50 mA/ 100 mA range: (Voltage	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA)
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(.s. or less Current ±1.5%(.s. or less than of 200 mA/ 500 mA/ 1 1 mA/2 mA/5 mA/ 11 Active power ±3.0%(.s. or less than of 200 mA/500 mA/1 x) 2 A/5 1 mA/2 mA/5 mA/ 10 mA/20/ With input of at least 1 Current AC input signal	Iz/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A D mA/20 mA/50 mA/10 or equal to the following va 10 A/20 A range: (Voltage inlue nA/50 mA/100 mA range: (Voltage 5 A to current input terr	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA)
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than c 200 mA/ 500 mA/ 1 1 mA/2 mA/ 5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/500 mA/ 14/2A/5 1 mA/2 mA/5 mA/ 10 mA/20 With input of at least 1 Current AC input signal ±(0.025+0.005×(1	Iz/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A D mA/20 mA/50 mA/10 or equal to the following va 10 A/20 A range: (Voltage inlue nA/50 mA/100 mA range: (Voltage 5 A to current input terr	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA)
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(.s. or less Current ±1.5%(.s. or less than c 200 mA/ 500 mA/ 1 1 mA/ 2 mA/ 5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/ 500 mA/ 1 A/2A/5A 1 mA/2 mA/5 mA/ 10 mA/20 With input of at least 1 Current AC input signal ±(0.025+0.005x(I DC input signal	4z/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A D mA/20 mA/50 mA/10 or equal to the following va /10 A/20 Arange: (Voltage influen mA/50 mA/100 mArange: (Voltage 5 A to current input terr -15))%rdg. or less	lue, whichever is greater range: ±20 mA 10 mA range: ±20 μA Ilue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA) ninals
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than of 200 mA/500 mA/1 1 mA/2 mA/5 mA/11 Active power ±3.0%(s. or less than of 200 mA/500 mA/13/2A/5 1 mA/2 mA/5 mA/10 mA/20/ With input of at least 1 Current AC input signal ±(0.025+0.005x(1 DC input signal 200 mA/500 mA/	12/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A 0 mA/20 mA/50 mA/10 or equal to the following va 1/0 A/20 A range: (Voltage inlue mA/50 mA/100 mA range: (Voltage 5 A to current input terr -15))%rdg. or less 1 A/2 A/5 A/10 A/20	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA ilue, whichever is greater ce quantity/x(±20 mA) e influence quantity/x(±200 μA) ninals A range
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than or 200 mA/ 500 mA/ 1 1 mA/2 mA/5 mA/ 11 Active power ±3.0%(s. or less than or 200 mA/500 mA/14/24/5 1 mA/2 mA/5 mA/10 mA/201 With input of at least 1 Current AC input signal ±(0.025+0.005×(1 DC input signal 200 mA/500 mA/ ±((0.025+0.005))	Iz/60 Hz magnetic field or equal to the following va A/ 2 A/ 5 A/ 10 A/ 20 A 0 mA/ 20 mA/ 50 mA/ 10 or equal to the following va 10 A/ 20 A range; (Voltage inlue mA/50 mA/ 100 mA range; (Voltag 5 A to current input terr -15))%rdg. or less 1 A/ 2 A/ 5 A/ 10 A/ 20 ×(I-15))% rdg.+(0.5+0.	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA lue, whichever is greater ce quantity)x(±20 mA) influence quantity)x(±200 μA) ninals A range 1x(I-15))mA) or less
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than c 200 mA/ 500 mA/ 1 1 mA/ 2 mA/ 5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/500 mA/ 1A/2A/5A 1mA/2mA/5mA/10mA/201 With input of at least 1 Current AC input signal ±(0.025+0.005×(1 DC input signal 200 mA/ 500 mA/ ±((0.025+0.005) 1 mA/2 mA/5 mA/10mA/5 mA/10mA/201 200 mA/200 mA/500 mA/	12/60 Hz magnetic field or equal to the following va A/2 A/5 A/10 A/20 A 0 mA/20 mA/50 mA/10 or equal to the following va 1/0 A/20 A range: (Voltage inlue mA/50 mA/100 mA range: (Voltage 5 A to current input terr -15))%rdg. or less 1 A/2 A/5 A/10 A/20	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA lue, whichever is greater ce quartity)x(±20 mA) influence quantity)x(±200 μA) ninals A range 1x(I-15))mA) or less A/ 100 mA range
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than c 200 mA/ 500 mA/ 1 1 mA/ 2 mA/ 5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/500 mA/ 1A/2A/5A 1mA/2mA/5mA/10mA/201 With input of at least 1 Current AC input signal ±(0.025+0.005×(1 DC input signal 200 mA/ 500 mA/ ±((0.025+0.005) 1 mA/2 mA/5 mA/10mA/5 mA/10mA/201 200 mA/200 mA/500 mA/	łz/60 Hz magnetic field           or equal to the following va           A/ 2 A/ 5 A/ 10 A/ 20 A           D mA/ 20 mA/ 50 mA/ 10           or equal to the following va           10 A/ 20 A range. (Voltage influen           x/10 A/ 20 A range. (Voltage influen           x/10 A/ 20 A range. (Voltage influen           x/10 A/ 20 mA/ 100 mA range. (Voltage           5 A to current input terr           -15))% rdg. or less           1 A/ 2 A/ 5 A/ 10 A/ 20           x(I-15))% rdg.+(0.5+0.           x(I-15))% rdg.+(5+1x)(I	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA lue, whichever is greater ce quartity)x(±20 mA) influence quantity)x(±200 μA) ninals A range 1x(I-15))mA) or less A/ 100 mA range
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than c 200 mA/ 500 mA/ 1 1 mA/ 2 mA/ 5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/500 mA/ 1A/2A/5A 1mA/2mA/5mA/10mA/20 With input of at least 1 Current AC input signal ±(0.025+0.005×(1 DC input signal 200 mA/ 500 mA/ ±((0.025+0.005) 1 mA/ 2 mA/5 mA/ 10 AC input signal 200 mA/ 200 mA/ ±((0.025+0.005) 1 mA/ 2 mA/5 mA/ 10 Current read val Active power	łz/60 Hz magnetic field           or equal to the following va           A/ 2 A/ 5 A/ 10 A/ 20 A           D mA/ 20 mA/ 50 mA/ 10           or equal to the following va           /10A/20 Arange: (Voltage influen           nA/ 20 mA/ 50 mA/ 10           or equal to the following va           /10A/20 Arange: (Voltage influen           rat/50 mA/ 100 mA range: (Voltage 5 A to current input terr           -15))%rdg. or less           1 A/ 2 A/ 5 A/ 10 A/ 20           (-1-5))% rdg.+(0.5+0.x)           /10 mA/ 20 mA/ 50 mx           x(1-15))% rdg.+(5+1x(I-ue (A))	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA lue, whichever is greater ce quantity/x(±20 mA) influence quantity/x(±200 μA) ninals A range lx(I-15))mA) or less A/ 100 mA range (15))μA) or less
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(.s. or less Current ±1.5%(.s. or less than of 200 mA/ 500 mA/ 1 1 mA/2 mA/5 mA/ 11 Active power ±3.0%(s. or less than of 200 mA/500 mA/ 1 Active power AC input signal ±(0.025+0.005×(1 DC input signal 200 mA/500 mA/ ±((0.025+0.005×(1 DC input signal 200 mA/500 mA/ ±((0.025+0.005) 1 mA/2 mA/5 mA/ ±((0.025+0.005) 1 cA/2 mA/5 mA/ ±((0.025+0.005) 1 cA/2 mA/5 mA/ ±(0.025+0.005) 1 cA/2 mA/5 mA/ 1 cA/2 mA/ 5 cA/2 mA/	łz/60 Hz magnetic field         or equal to the following va         A/2 A/5 A/10 A/20 A         0 mA/20 mA/50 mA/10         or equal to the following va         /10 A/20 A range: (Voltage influen         mA/50 mA/100 mA range: (Voltage influen         *15))% rdg. or less         1 A/2 A/5 A/10 A/20         *(I-15))% rdg.+(0.5+0.         *(1-15))% rdg.+(5+1×(I))         *(I-15))% rdg.+(5+1×(I))         ue (A)	lue, whichever is greater range: ±20 mA 0 mA range: ±200 μA lue, whichever is greater ce quartity/x(±20 μA) ninals A range Ix(I-15))mA) or less A/ 100 mA range -15))μA) or less er read value) or less
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than c 200 mA/ 500 mA/ 1 1 mA/2 mA/5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/500 mA/ 13/2A/5A 1 mA/2 mA/5 mA/ 10 mA/20/ With input of at least 1 Current AC input signal ±(0.025+0.005x(1 DC input signal 200 mA/500 mA/ ±((0.025+0.005c) 1 mA/2 mA/5 mA ±((0.025+0.005c) 1: Current read val Active power (above current influe The effects of self-heat	łz/60 Hz magnetic field           or equal to the following va           A/2 A/5 A/10 A/20 A           0 mA/20 mA/50 mA/10           or equal to the following va           /10 A/20 A range: (Voltage inline           A/2 A/5 A/10 A/20 mA/50 mA/10           5 A to current input terr           -15))%rdg. or less           1 A/2 A/5 A/10 A/20           ×(1-15))% rdg.+(0.5+0.           /10 mA/20 mA/50 mz           ×(1-15))% rdg.+(5+1×(1-U))           ue (A)	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±200 μA) influence quantity)x(±200 μA) ninals A range 1x(I-15))mA) or less A/ 100 mA range .15))μA) or less e read value) or less est themselves until
Effect of magnetic field Effect of self-	400 A/m, DC and 50 F Voltage ±1.5%(s. or less Current ±1.5%(s. or less than c 200 mA/ 500 mA/ 1 1 mA/2 mA/5 mA/ 11 Active power ±3.0%(s. or less than c 200 mA/500 mA/ 13/2A/5A 1 mA/2 mA/5 mA/ 10 mA/20/ With input of at least 1 Current AC input signal ±(0.025+0.005x(1 DC input signal 200 mA/500 mA/ ±((0.025+0.005c) 1 mA/2 mA/5 mA ±((0.025+0.005c) 1: Current read val Active power (above current influe The effects of self-heat	łz/60 Hz magnetic field         or equal to the following va         A/2 A/5 A/10 A/20 A         0 mA/20 mA/50 mA/10         or equal to the following va         /10 A/20 A range: (Voltage influen         mA/50 mA/100 mA range: (Voltage influen         *15))% rdg. or less         1 A/2 A/5 A/10 A/20         *(I-15))% rdg.+(0.5+0.         *(1-15))% rdg.+(5+1×(I))         *(I-15))% rdg.+(5+1×(I))         ue (A)	lue, whichever is greater range: ±20 mA 10 mA range: ±200 μA .lue, whichever is greater ce quantity)x(±200 μA) influence quantity)x(±200 μA) ninals A range 1x(I-15))mA) or less A/ 100 mA range .15))μA) or less e read value) or less est themselves until

#### 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

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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 Pe Measurement Specifications

Measurement method		rm's peak value (for both positive an ampled instantaneous voltage values
Range	Voltage	ampled motamaneous voltage value
configuration	Voltage range	Voltage peak range
0	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 500.00 mA	1.2000 A 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
accuracy Effective measuring range	The above measurement accura	an 0.1 Hz ≤ f < 10 Hz and when 1 kHz < f. cy is multiplied by 2 for the 1 mA range. k range, however, up to $\pm$ 60 A
Display range		range, however, the value 0 will be value triggers the instrument's zero
Voltage Crest F		r Measurement Specifications
Measurement	Calculates the ratio of the vol	tage waveform peak value to the
method Effective	voltage RMS value.	aveform peak value, or current and
		effective measurement ranges.
measuring range Display range	1.0000 to 612.00 (no polarity	
biopiay range	1.0000 to 012.00 (no polarity	1
/oltage Rinnle	Rate/ Current Rinnle Ra	e Measurement Specificatior
Measurement		t (peak to peak [peak width]) as a
method	proportion of the voltage or c	
Effective	As per voltage and voltage w	aveform peak value, or current and
measuring range		effective measurement ranges.
Display range	0.00 to 500.00 (No polarity)	
	er/ Reactive Power/ Pow Specifications	er Factor/ Phase Angle
Measurement	Rectifiers	
types	Apparent Power/ Reactive Po	
	AC+DC, AC, FND, AC+DC	Umn
	Phase Angle	
Effective	AC, FND	tive power offective
Effective		tive power effective measurement
measuring range	ranges Apparent Power/ Reactive Po	wor
Display range	0% to 231.04% of the range	
	5 % to 251.04 % of the fally	(10 2010-30pp10331011)
	Power Factor ±0.0000 to ±1.0000	

IS	Polarity	P	active Power/ Power Factor/ olarity is assigned according	to the lead/lag relatio		
S value		+	bltage waveform rising edge When current lags voltage When current leads voltage	(no polarity display)		:uye.
	Power Calculati		Formulas	<u> </u>		
	S : Apparent power			S = U × I		
	Q : Reactive power		Q =	= si√S² - P²		
in the	$\lambda$ : Power factor			= si   P/S		
	$\pmb{\phi}$ : Phase angle			e = si cos <sup>-1</sup>   λ   si   180 - cos <sup>-1</sup>   λ	(±90° to ±1 ( 0° to ±90	· /
ss than ±0.5%	waveform and curren	nt wa	: Active Power, si: Polarity veform lead and lag)		ased on vo	oltage
s than ±9 µA.			ement Specifications			
.o tildir 10 pr ti	Number of measurement channels	<u> </u>	(oltage, current)	a pariad (regime cal	wethed)	
ı)	Measurement method Measurement ranges		culated from input waveforn Hz/ 500 Hz/ 5 kHz/ 100 kH			
	Measurement accuracy		1% rdg. ±1 dgt. However, fo			at
	Effective measuring range	0.1 Fo so Me	Hz to 100 kHz r sine wave input that is at le urce's measurement range easurement lower limit frequ	east 20% of the meas ency setting: 0.1 sec	surement	
	Display format		c. (linked to synchronization) 00 Hz to 9.9999 Hz.	9.900 Hz to 99.99	99 Hz.	
eak Value	,		00 Hz to 999.99 Hz, 00 kHz to 99.999 kHz,	0.9900 kHz to 9.9 99.00 kHz to 100	9999 kHz,	
positive and Itage values.	Maximum Curre	ent	Ratio Measurement S	Specifications (N	/ICR)	
0	Measurement		culates the ratio of the curre		,	tor.
ge	method		CR) = (Current Crest Factor			
	Effective		per power factor (voltage, curren			ctor
	measuring range		rent, current waveform peak val		nt ranges.	
	Display range	1.0	000 to 6.1200 M (no polarity	()		
	Time Average Cur	rent	Time Average Active Po	wer Measurement	Specifica	tions
	Measurement		culates the average by divid			
	method		grated value by the integrat			
	Measurement accuracy	(Cu	rent or Active power measurer	ment accuracy) + (±0.0	1% rdg. ±1	dgt.)
	Effective measuring range	As p	er the current or active power in	tegration effective meas	urement ranç	ge.
	Display range		e Average Current % to ±612% of the range (Has	polarity when using the	e DC rectifie	er.)
ge		Tim	e Average Active Power			
		<u>  ±t</u>	% to ±3745.4% of the range	e (Has polarity)		
	Functional Spec					
	Auto-range (AUTO)	Auto	matically changes the voltage a	nd current range accord	ing to the inp	put.
		Th	nge up: e range is increased when i ien the peak is exceeded.	input exceeds 150%	of the rang	je or
		Rar	ige down:			
		Th Hc	e range is decreased when wever, the range is not dec the lower range.			
ak range).			input level is monitored, and the			
en 1 kHz < f.	D		ge select can be used to disabl			
1 mA range.	Range select		ects whether to enable (turn	on) or disable (turn	ott) individi	ual
60 A			age and current ranges.			
			bled (use): nges can be selected with	the range keys		
e 0 will be ent's zero			nge switching occurs using		n.	
0111 0 2010		Ra	nge switching occurs durin	g auto-range integra	tion.	
		Dis	abled (do not use):			
cifications		Ra	nges cannot be selected w			
e to the			nge switching does not occ nge switching does not occ			
		1 118	inge awitening does not oct	a auniy auto-range	, meyrati0	
urrent and anges.	Zero-cross filter's threshold level	Set	the zero-cross filter's thresho from 1% to 15% (in 1% interval centage level set for each mea	s). Synchronization oc	curs when th	
	Averaging	-	rages the voltage, current, acti			active
ecifications		pow	er. (Other than harmonic meas	surement parameters.)		
dth]) as a			power factor and phase angle			
			raging is not performed for par hod: Simple averaging	ameters other than tho	se listed abo	uve.
urrent and			nber of averaging iterations	and display undate	interval	
anges.			Number of averaging iterations	Display update i		1
		⊩'	1 (OFF)	200 ms		1
nale		⊩		200 ms		1

2

400 ms

Measurement S	Specifications	_	5	1 s
Measurement	Rectifiers		10	2 s
types	Apparent Power/ Reactive Power/ Power Factor AC+DC, AC, FND, AC+DC Umn		25	5 s
	Phase Angle		50	10 s
	AC, FNĎ	_	100	20 s
Effective measuring range Display range	0 0	Scaling (VT, CT)	Applies user-defined VT and CT ratio settings to measured va VT ratio setting range OFF (1.0), 0.001 to 1000	
Display range		CT ratio setting range OFF (1.0), 0.001 to 1000 Hold • Stops display updates for all measured values and fixes t		
	Power Factor ±0.0000 to ±1.0000 Phase Angle	Hold	display values at that point in	time. by communications is also fixed at

Maximum value/ minimum value hold (MAX/MIN HOLD)	<ul> <li>Detects maximum and minimum measured values (except current integration, active power integration, integration elapsed time, time average current, and time average active power values) as well as maximum and minimum values for the voltage waveform peak and current waveform peak and holds them on the display.</li> <li>For data with polarity, display of the maximum value and minimum value for the data's absolute values is held (so that both positive and negative polarity values are shown). However, this does not apply to the voltage waveform peak value or the current waveform peak value.</li> <li>Internal calculations (including integration and integration elapsed time) will continue.</li> <li>The maximum and minimum value measurement during the integration interval).</li> </ul>
Zero Adjustment	Zeroes out the voltage and current input offset.
Key-lock	Disables key input in the measurement state, except for the KEY LOCK key.
Backup	Backs up settings and integration data if the instrument is turned off and if a power outage occurs.
System Reset	Initializes the instrument's settings.

#### Integration Measurement Specification

Integration	surement Specifications Switchable between fixed-range integration and auto-range integration.			
operation modes	Fixed-range integration Integration can be performed for all voltage and current ranges. The voltage and current ranges are fixed once integration starts.			
	Auto-range integration Integration can be performed for all voltage ranges. The current is set to auto-range operation using ranges from 200 mA to 20 A.			
	The integrated value for each range can be displayed by switching the current range (200 mA to 20 A) while integration is stopped.			
and display	Simultaneous integration of the following 6 parameters: Positive current integrated value (Ah+) Negative current integrated value (Ah-)			
	Sum of current integrated values (Ah) Positive active power integrated value (Wh+) Negative active power integrated value (Wh-) Sum of active power integrated values (Wh)			
Measurement types	Rectifiers: AC+DC, AC+DC Umn Current:			
(),,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Displays the result of integrating current RMS value data (display values) once every display update interval as an integrated value.			
	Active power: Displays the result of integrating active power values by polarity calculated once every cycle for the selected synchronization source as integrated values.			
	Rectifier: DC Displays the result of integrating instantaneous data obtained by sampling both current and active power by polarity as integrated values (these values are not integrated values for the DC component when active power contains both DC and AC components)			
Integration time	1 min. to 10000 hr., settable in 1 min. blocks			
Integration time accuracy	±0.01% rdg. ±1 dgt.			
Integration measurement accuracy	(Current or active power measurement accuracy) + (±0.01% rdg. ±1 dgt.)			
Effective measuring range	Until PEAK OVER U lamp or PEAK OVER I lamp lights up.			
Display resolution	999999 (6 digits + decimal point)			
Functions	Stopping integration based on integration time setting (timer)     Stopping/starting integration and resetting integrated values     based on external control     Displaying the integration elapsed time     displaying the integration elapsed time			
	<ul> <li>(displayed as TIME on panel display)</li> <li>Additional integration by repeatedly starting/stopping integration</li> <li>Backing up integrated values and the integration elapsed time during power outages</li> <li>Stopping integration when power returns</li> </ul>			
Harmonic Meas	urement Specifications			
Measurement	Zero-cross simultaneous calculation method			
method	Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant			
	Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range:			
Synchronization	No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic			
source	measurement specifications.			
Measurement items				
	Harmonic voltage current phase difference			

		1		
Detects maximum and minimum measured values (except current integration, active power integration, integration elapsed	FFT processing	FFT processing word length : 32 I Number of FFT points : 4096 point		
time, time average current, and time average active power values) as well as maximum and minimum values for the voltage	Window function	Rectangular		
waveform peak and current waveform peak and holds them on the display. • For data with polarity, display of the maximum value and	Analysis window width	56 Hz $\leq$ f $<$ 66 Hz : 181.82 ms to 214.29 ms (12 cycles) Frequencies other than the above : 185.92 ms to 214.08 ms		
minimum value for the data's absolute values is held (so that both positive and negative polarity values are shown). However, this does not apply to the voltage waveform peak value or the current	Data update rate			
<ul> <li>waveform peak value.</li> <li>Internal calculations (including integration and integration</li> </ul>				
<ul> <li>The maximum and minimum values during integration are</li> </ul>	Maximum analysis order	Synchronization frequency (f) ra 10 Hz ≤ f < 45 Hz	inge Analysis order 50th	
detected (maximum/minimum value measurement during the		45 Hz ≤ f < 56 Hz	50th	
<ul><li>Analog output and waveform output are not held.</li></ul>		56 Hz ≤ f ≤ 66 Hz	50th	
Zeroes out the voltage and current input offset.		66 Hz < f ≤ 100 Hz	50th	
Disables key input in the measurement state, except for the KEY LOCK key.		100 Hz < f ≤ 200 Hz 200 Hz < f ≤ 300 Hz	40th 25th	
Backs up settings and integration data if the instrument is turned		300 Hz < f ≤ 500 Hz	15th	
off and if a power outage occurs. Initializes the instrument's settings.		500 Hz < f ≤ 640 Hz	11th	
· · · · · · · · · · · · · · · · · · ·	Analysis order	2nd to 50th		
Surement Specifications Switchable between fixed-range integration and auto-range integration.	upper limit setting Measurement	f.s.: Measurement range		
Fixed-range integration	accuracy	Frequency (f)	Voltage, Current, Active power	
Integration can be performed for all voltage and current ranges.		DC 10 Hz ≤ f < 30 Hz	±0.4% rdg. ±0.2%f.s.	
The voltage and current ranges are fixed once integration starts.		$10 \text{ Hz} \le 1 < 30 \text{ Hz}$ $30 \text{ Hz} \le 1 \le 400 \text{ Hz}$	±0.4% rdg. ±0.2%f.s. ±0.3% rdg. ±0.1%f.s.	
Auto-range integration		400 Hz < f ≤ 1 kHz	±0.4% rdg. ±0.2%f.s.	
Integration can be performed for all voltage ranges. The current is set to auto-range operation using ranges from 200 mA		1 kHz < f ≤ 5 kHz	±1.0% rdg. ±0.5%f.s.	
to 20 A. The integrated value for each range can be displayed by switching		5 kHz < f ≤ 8 kHz	±4.0% rdg. ±1.0%f.s.	
the current range (200 mA to 20 A) while integration is stopped.		<ul> <li>When using the 1 mA/ 2 mA ran Add ±1 µA to 10 Hz to 8 kHz mea</li> </ul>		
Simultaneous integration of the following 6 parameters:		Add $\pm 1 \mu\text{A}$ to 10 Hz to 8 kHz mea Add ( $\pm 1 \mu\text{A}$ ) × (voltage read value		
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 mA		
Negative active power integrated value (Wh+)		Add $\pm 1$ mA to DC measurement Add ( $\pm 1$ mA) x (voltage read value	accuracy for current. ue) to DC measurement accuracy	
Sum of active power integrated values (Wh)		for active power.		
Rectifiers: AC+DC, AC+DC Umn Current:		• When using the 1 mA/2 mA/5 mA/	10 mA/ 20 mA/ 50 mA/ 100 mA range:	
Displays the result of integrating current RMS value data (display values) once every display update interval as an integrated value.		Add ±10 µA to DC measurement		
Active power: Displays the result of integrating active power values by polarity				
calculated once every cycle for the selected synchronization	Display Specific	ations		
source as integrated values.	Display	7-segment LED		
Rectifier: DC	Number of display	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	parameters Display resolution	Other than integrated values: 999	999 count (5 digits)	
integrated values (these values are not integrated values for the		Integrated values: 999999 count (6 digits)		
DC component when active power contains both DC and AC components)	Display update	200 ms ±50 ms (approx. 5 updat	es per sec.) to 20 s (varies with	
1 min. to 10000 hr., settable in 1 min. blocks	rate	number of averaging iterations se		
±0.01% rdg. ±1 dgt.				
	Synchronized c			
(Current or active power measurement accuracy) + (±0.01% rdg. ±1 dgt.)	Functions	The timing of calculations; display ustart, stop, and reset events; displa		
Until PEAK OVER U lamp or PEAK OVER I lamp lights up.		operation; and zero-adjustment operation	eration for the slave PW3335 series	
999999 (6 digits + decimal point)		is synchronized with the master PW the PW3336 series and PW3337 se		
Stopping integration based on integration time setting (timer)	Taurational	DNO to provide all and (an and in a lateral)		
<ul> <li>Stopping/starting integration and resetting integrated values based on external control</li> </ul>	Terminal Terminal name	BNC terminal × 1 (non-isolated) External synchronization terminal	(EXT.SYNC)	
Displaying the integration elapsed time	I/O settings	Off	<u> </u>	
<ul> <li>(displayed as TIME on panel display)</li> <li>Additional integration by repeatedly starting/stopping integration</li> </ul>		Synchronized control function of synchronization terminal (EXT.S)		
<ul> <li>Backing up integrated values and the integration elapsed time during power outages</li> </ul>				
Stopping integration when power returns		In		
		The external synchronization terr	ninal (EXT.SYNC) is set to input,	
surement Specifications				
Zero-cross simultaneous calculation method		The external synchronization terr and a dedicated synchronization Out	signal can be input (slave).	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with		The external synchronization tern and a dedicated synchronization Out The external synchronization term	signal can be input (slave). nal (EXT.SYNC) is set to output,	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation)		The external synchronization terr and a dedicated synchronization Out	signal can be input (slave). nal (EXT.SYNC) is set to output,	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range:	Number of units for which synchronized	The external synchronization tern and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master	n signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master).	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is	which synchronized control can be	The external synchronization tern and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s	n signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master).	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant	which synchronized	The external synchronization tern and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master	n signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master).	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur.	which synchronized control can be performed External Curren	The external synchronization tern and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio	a signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master). 336/PW3337 series)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range:	which synchronized control can be performed External Curren (PW3335-03 an	The external synchronization tern and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04)	a signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master). 336/PW3337 series)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7.2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic voltage content percentage	which synchronized control can be performed External Curren	The external synchronization tern and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio	a signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master). 336/PW3337 series)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications.	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type	The external synchronization terr and a dedicated synchronizatior Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04) Isolated BNC terminals Off /TYPE.1 / TYPE.2 When set to off, input from the ext	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic current RMS value Harmonic current phase angle Harmonic current phase angle Harmonic active power	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor	The external synchronization tern and a dedicated synchronizatior Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04) Isolated BNC terminals Off / TYPE.1 / TYPE.2	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic current RMS value Harmonic active power Harmonic active power content percentage Harmonic ovltage current phase difference	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type switching Current sensor	The external synchronization tern and a dedicated synchronizatior Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04) Isolated BNC terminals Off / TYPE.1 / TYPE.2 When set to off, input from the ext terminal is ignored. TYPE1 (100 A to 5000 A sensors)	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic current content percentage Harmonic current ontent percentage Harmonic active power Harmonic active power content percentage Harmonic active power content percentage Harmonic voltage current phase difference Total harmonic ovoltage distortion Total harmonic current distortion	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type switching	The external synchronization terr and a dedicated synchronizatior Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04) Isolated BNC terminals Off / TYPE.1 / TYPE.2 When set to off, input from the ext terminal is ignored.	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series)	
Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 6100-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic current pase angle Harmonic current precentage Harmonic active power Harmonic cuttage current phase difference Total harmonic voltage current phase difference Total harmonic voltage Gurrent pase difference Total harmonic voltage Current phase difference Total harmonic voltage Current phase difference Total harmonic voltage Kortion Total harmonic current distortion Fundamental wave voltage	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type switching Current sensor	The external synchronization terr and a dedicated synchronizatior Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 <b>t Sensor Input Specificatio</b> <b>d PW3335-04</b> ) Isolated BNC terminals Off / TYPE.1 / TYPE.2 When set to off, input from the ext terminal is ignored. TYPE1 (100 A to 5000 A sensors) 9660, 9661, 9669, CT9667-01 TYPE2 (20 A to 1000 A sensors, F	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series) ns ernal current sensor input /-02/-03 Power supply is required to use)	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic current content percentage Harmonic current content percentage Harmonic active power content percentage Harmonic coltage current phase difference Total harmonic voltage distortion Total harmonic current distortion Fundamental wave voltage Fundamental wave eactive power Fundamental wave exparent power Fundamental wave encore for the source Fundamental wave set on power Fundamental wave power fundamental wave power factor	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type switching Current sensor	The external synchronization terr and a dedicated synchronization Out The external synchronization terr and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04) Isolated BNC terminals Off / TYPE.1 / TYPE.2 When set to off, input from the ext terminal is ignored. TYPE1 (100 A to 5000 A sensors) 9660, 9661, 9669, CT9667-01 TYPE2 (20 A to 1000 A sensors, F CT6862-05, CT6863-05, CT6	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series) ns ernal current sensor input /-02/-03	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7:2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage phase angle Harmonic current content percentage Harmonic active power Harmonic voltage current phase difference Total harmonic voltage distortion Total harmonic current distortion Fundamental wave voltage Fundamental wave current Fundamental wave cactive power Fundamental wave voltage current phase difference	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type switching Current sensor options	The external synchronization terr and a dedicated synchronization Out The external synchronization term and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 <b>t Sensor Input Specificatio</b> <b>d PW3335-04</b> ) Isolated BNC terminals Off / TYPE.1 / TYPE.2 When set to off, input from the ext terminal is ignored. TYPE1 (100 A to 5000 A sensors) 9660, 9661, 9669, CT9667-01 TYPE2 (20 A to 1000 A sensors, F CT6862-05, CT6863-05, CT684	A signal can be input (slave). nal (EXT.SYNC) is set to output, signal can be output (master). 336/PW3337 series) AND AND AND AND AND AND AND AND	
Zero-cross simultaneous calculation method Uniform thinning between zero-cross events after processing with a digital antialiasing filter Interpolation calculations (Lagrange interpolation) When the synchronization frequency falls within the 45 Hz to 66 Hz range: IEC 61000-4-7.2002 compliant Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz. When the synchronization frequency falls outside the 45 Hz to 66 Hz range: No gaps or overlap will occur. Conforms to synchronization source (SYNC) for the basic measurement specifications. Harmonic voltage RMS value Harmonic current precentage Harmonic current ontent percentage Harmonic current precentage Harmonic collage current phase difference Total harmonic voltage distortion Total harmonic current distortion Fundamental wave voltage Fundamental wave exactive power Fundamental wave exactive power Fundamental wave active power Fundamental wave page reactive power Fundamental wave	which synchronized control can be performed External Curren (PW3335-03 an Terminal Current sensor type switching Current sensor options	The external synchronization terr and a dedicated synchronization Out The external synchronization terr and a dedicated synchronization s Up to 7 slaves per master (total of 8 units including the PW3 t Sensor Input Specificatio d PW3335-04) Isolated BNC terminals Off / TYPE.1 / TYPE.2 When set to off, input from the ext terminal is ignored. TYPE1 (100 A to 5000 A sensors) 9660, 9661, 9669, CT9667-01 TYPE2 (20 A to 1000 A sensors, F CT6862-05, CT6863-05, CT6	nal (EXT.SYNC) is set to output, ignal can be output (master). 336/PW3337 series) ns ernal current sensor input /-02/-03 Power supply is required to use) 375, CT6845-05, CT6846-05, etc. n panel)	

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

PW333 🔁

Power range	Depends on the corr	bination of voltage and	d current ranges;
configuration		0000 MW (also applies	
Veasurement			
accuracy Current/ Active Po	wer		
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.	$50\% f.s. \le Input < 100\% f.s.$	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 voltage • When using the C	e and active power in e CT684x-05 series, add 4x-05 series zero adju Current, active powe	excess of 220 V for white xcess of 750 V for white ±2 mV to the CT684x-C stment using the 1 A ra	h 30 kHz < f ≤ 100 kHz. )5 series accuracy afte nge noted on the pane
	temperature coefficie	ent; f.s. : instrument me	
Effect of power	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens	emperature coefficient s. or less (45 to 66 Hz y ge/current phase differe sor phase accuracy to t	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit
Effect of power factor	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens voltage/current phas	emperature coefficient s. or less (45 to 66 Hz v je/current phase differe sor phase accuracy to t ie difference noted abo	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve.
Effect of power factor Current waveform peak value measurement	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens voltage/current phas ±2.0% at DC or 10 H	emperature coefficient s. or less (45 to 66 Hz y ge/current phase differe sor phase accuracy to t	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range)
Effect of power factor Current waveform peak value measurement specifications Harmonic	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens voltage/current phas ±2.0% at DC or 10 H Add the current sens External current sens	emperature coefficient s. or less (45 to 66 Hz v je/current phase differe sor phase accuracy to t e difference noted abo $ z \le f \le 1$ kHz (f.s.: curre sor accuracy to the abo or input instrument mea	asurement range) to above. with power factor = 0) nnce: ±0.0859° he internal circuit ve. Int peak range) ve. surement accuracy only
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens voltage/current phas ±2.0% at DC or 10 H Add the current sens External current sens Frequency	$\begin{array}{ll} \text{emperature coefficient} \\ \text{s. or less (45 to 66 Hz v)} \\ ge/current phase differe sor phase accuracy to the difference noted above the differen$	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range) ve. surement accuracy only Current, Active power
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens voltage/current phas ±2.0% at DC or 10 H Add the current sens External current sens Frequency DC	emperature coefficient         s. or less (45 to 66 Hz n/s)         je/current phase differe         sor phase accuracy to the         eifference noted abord         Iz $\leq f \leq 1$ kHz (f.s.: curres         sor accuracy to the abord         or input instrument meast         (f)       Voltage, $\pm 0.4$	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range) ve. surement accuracy only Current, Active power 4% rdg.±0.2%f.s.
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sens voltage/current phas ±2.0% at DC or 10 H Add the current sens External current sens Frequency DC 10 Hz ≤ f < 3	emperature coefficient       s. or less (45 to 66 Hz m)       je/current phase differences       sor phase accuracy to the difference noted about the difference noted about the difference noted about the difference noted about the about the about the difference noted about the difference	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range) ve. surement accuracy only Current, Active power 4% rdg.±0.2%f.s.
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: $\pm 0.15$ %f. Internal circuit voltag Add the current sens voltage/current phas $\pm 2.0\%$ at DC or 10 H Add the current sens External current sens Frequency DC 10 Hz $\leq 1 < 3$ $30$ Hz $\leq 5 \leq 40$	emperature coefficient         s. or less (45 to 66 Hz model)         je/current phase difference         sor phase accuracy to the abord         z ≤ f ≤ 1 kHz (f.s.: curresor accuracy to the abord)         sor accuracy to the abord         or input instrument means         (f)       Voltage, ±0.4         0 Hz       ±0.4         00 Hz       ±0.5	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range) ve. surement accuracy only Current, Active power 4% rdg.±0.2%f.s. 4% rdg.±0.2%f.s. 3% rdg.±0.1%f.s.
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: $\pm 0.15\%$ f. Internal circuit voltag Add the current sens voltage/current phas $\pm 2.0\%$ at DC or 10 H Add the current sens External current sens Frequency DC 10 Hz $\leq f < 33$ $30$ Hz $\leq f \leq 40$ $400$ Hz $< f \leq 40$	emperature coefficient         s. or less (45 to 66 Hz model)         je/current phase difference         sor phase accuracy to the abord         iz $\leq f \leq 1$ kHz (f.s.: curreson accuracy to the abord)         or input instrument means         (f)       Voltage, $\pm 0.4$ 00 Hz $\pm 0.4$ 1 kHz $\pm 0.4$	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range) ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 3% rdg.±0.1%f.s. 4% rdg.±0.2%f.s.
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: $\pm 0.15\%$ f. Internal circuit voltag Add the current sensively a to the current sensively a to the current sensively a to the current sensively. External current sensively a to the current sensively a to the current sensively a to the current sensively. External current sensively a to the current sensively a to the current sensively a to the current sensitively. The current sensitively a to the current sensitively a to the current sensitively a to the current sensitively. The current sensitively a to the current sensitively a to the current sensitively a to the current sensitively. The current sensitively a to the current sensitively a t	emperature coefficient         s. or less (45 to 66 Hz         je/current phase difference         sor phase accuracy to t         e difference noted abord         iz $\leq f \leq 1$ kHz (f.s.: currection of accuracy to the abord of the ab	asurement range) to above. with power factor = 0) nnce: ±0.0859° he internal circuit ve. int peak range) ve. surement accuracy only Current, Active power 4% rdg.±0.2%f.s. 4% rdg.±0.2%f.s. 4% rdg.±0.2%f.s. 4% rdg.±0.2%f.s. 5% rdg.±0.5%f.s.
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: $\pm 0.15\%$ f. Internal circuit voltag Add the current sens voltage/current phas $\pm 2.0\%$ at DC or 10 H Add the current sens External current sens Frequency DC 10 Hz $\leq f < 33$ $30$ Hz $\leq f \leq 40$ $400$ Hz $< f \leq 40$	emperature coefficient         s. or less (45 to 66 Hz         je/current phase difference         sor phase accuracy to t         e difference noted abord         iz $\leq f \leq 1$ kHz (f.s.: currection of accuracy to the abord of the ab	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. ent peak range) ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 3% rdg.±0.1%f.s. 4% rdg.±0.2%f.s.
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement	Add current sensor t Instrument: $\pm 0.15\%$ f. Internal circuit voltag Add the current sensitive voltage/current phase $\pm 2.0\%$ at DC or 10 H Add the current sensitive External current sensitive Frequency DC 10 Hz $\le f < 33$ $30$ Hz $\le f \le 40$ $400$ Hz $< f \le 5$ $5$ kHz $< f \le 25$ $5$ kHz $< f \le 25$ 5 kHz $<$	emperature coefficient         s. or less (45 to 66 Hz         je/current phase difference         sor phase accuracy to t         e difference noted abord         iz $\leq f \leq 1$ kHz (f.s.: currection of accuracy to the abord of the ab	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement accuracy	Add current sensor t Instrument: $\pm 0.15\%$ f. Internal circuit voltag Add the current sens voltage/current phas $\pm 2.0\%$ at DC or 10 H Add the current sens Frequency DC 10 Hz $\leq f < 32$ $30$ Hz $\leq f \leq 44$ $400$ Hz $< f \leq 5$ $5$ kHz $< f \leq 62$ $1$ kHz $< f \leq 52$ $5$ kHz $< f \leq 82$ Values for f.s. depe To obtain the current sensor's accuracy accuracy figures. When using the CT	emperature coefficient         s. or less (45 to 66 Hz m)         je/current phase differences         sor phase accuracy to the abore         sor accuracy to the abore         sor accuracy to the abore         is f ≤ 1 kHz (f.s.: curres         sor accuracy to the abore         or input instrument means         (f)       Voltage,         0 Hz       ±0.4         00 Hz       ±0.4         1 kHz       ±1.0         kHz       ±1.1         i kHz       ±4.6         end on measurement randor active power accuto to the above current ar         684x-05 series, add ±2         ter performing CT684x-	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.6%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement accuracy	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sensively voltage/current phase ±2.0% at DC or 10 H Add the current sensively External current sensively External current sensively External current sensively C 10 Hz ≤ f < 3 30 Hz ≤ f < 40 400 Hz < f ≤ 5 5 kHz < f ≤ 8 • Values for f.s. depe • To obtain the currer sensor's accuracy accuracy figures. • When using the CT series accuracy and adjustment using the ecifications and PW33335-04)	emperature coefficient         s. or less (45 to 66 Hz m)         je/current phase differences         sor phase accuracy to the abore         sor accuracy to the abore         sor accuracy to the abore         is f ≤ 1 kHz (f.s.: curres         sor accuracy to the abore         or input instrument means         (f)       Voltage,         0 Hz       ±0.4         00 Hz       ±0.4         1 kHz       ±1.0         kHz       ±1.1         i kHz       ±4.6         end on measurement randor active power accuto to the above current ar         684x-05 series, add ±2         ter performing CT684x-	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.6%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±
Effect of power factor	Add current sensor t Instrument: $\pm 0.15\%$ f. Internal circuit voltag Add the current sensor t $\pm 2.0\%$ at DC or 10 H Add the current sensor $\pm 2.0\%$ at DC or 10 H Add the current sensor $\pm 2.0\%$ at DC or 10 H Add the current sensor Frequency DC 10 Hz $\le f < 33$ $30$ Hz $\le f \le 40$ $400$ Hz $< f \le 25$ $5$ kHz $< f \le 26$ • Values for f.s. depe • To obtain the current sensor's accuracy aft adjustment using the CT series accuracy aft adjustment using the CT series accuracy aft adjustment using the CT series accuracy aft adjustment using the CT Second PW3335-04 7 channels	emperature coefficient s. or less (45 to 66 Hz h je/current phase differe- sor phase accuracy to the e difference noted above tz $\leq f \leq 1$ kHz (f.s.: curre- sor accuracy to the above or input instrument mea- (f) Voltage, $\pm 0.4$ $0$ Hz $\pm 0.4$ $1$ kHz $\pm 1.0$ $1$ kHz $\pm 1.0$ $1$ kHz $\pm 1.4$ $1$ kHz $\pm 1.4$ $1$ kHz $\pm 1.6$ $1$ kHz $\pm 1.6$ kHz $\pm 1.6$ $1$ kHz $\pm 1.6$ kHz $\pm 1.6$	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.6%f.s. 1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±0.5%f.s. 1% rdg.±0.5%f.s.1% rdg.±
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement accuracy	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sensor voltage/current phas ±2.0% at DC or 10 H Add the current sensor External current sensor External current sensor Trequency DC 10 Hz ≤ f < 33 0 Hz < f < 32 30 Hz < f < 44 400 Hz < f ≤ 5 kHz < f ≤ 82 • Values for f.s. depe • To obtain the curre sensor's accuracy figures. • When using the CT series accuracy aff adjustment using the cerifications of PW3335-04) 7 channels 16-bit D/A convertent The output level, out selected. Level output 2 Vf.s. or 5 Vf.s., li Waveform output	emperature coefficient s. or less (45 to 66 Hz with the second	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s
Effect of power factor Current waveform peak value measurement specifications Harmonic measurement accuracy D/A Output Spec (PW3335-02 ar Number of output channels Configuration	Add current sensor t Instrument: ±0.15%f. Internal circuit voltag Add the current sensor t voltage/current phas ±2.0% at DC or 10 H Add the current sensor External current sensor Trequency DC 10 Hz ≤ f < 3 30 Hz ≤ f ≤ 4 400 Hz < f ≤ 5 kHz < f ≤ 6 5 kHz < f ≤ 8 Values for f.s. depe • To obtain the current sensor's accuracy accuracy figures. • When using the CT series accuracy aff adjustment using the Cfications d PW3335-04) 7 channels 16-bit D/A convertent The output level, out selected. Level output 2 Vf.s. or 5 Vf.s., li High-speed level out 2 Vf.s. or 5 Vf.s., vi	emperature coefficient s. or less (45 to 66 Hz, to je/current phase differe- sor phase accuracy to the edifference noted above takes of 1 kHz (f.s.: curres- sor accuracy to the above or input instrument mea- (f) Voltage, $\pm 0.4$ $0 \text{ Hz}$ $\pm 0.4$ $1 \text{ kHz}$ $\pm 0.4$ $1 \text{ kHz}$ $\pm 0.4$ $1 \text{ kHz}$ $\pm 1.4$ $2 \text{ kHz}$ $\pm 1.4$ $1 \text{ kHz}$ $\pm 1.4$ $2  current ar- 1684 \times 05 series, add \pm 12fer performing CT684×-he 1 A range noted on 11  current ar-1  $	asurement range) to above. with power factor = 0) ence: ±0.0859° he internal circuit ve. surement accuracy only Current, Active power 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s. 1% rdg.±0.2%f.s

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
	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
0.1.11	(Output parameter measurement accuracy) + (±1.0%f.s.)
Output frequency band	Waveform output, high-speed level output At DC or 10 Hz to 30 kHz, accuracy is as defined above.
Maximum output	Approx. ±12 V DC
voltage	
Output update rate	Level output Same as the data update period.
Tale	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
Deere en en time e	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	Αρρrox. 100 Ω
External control	
	Integration start/stop, integration reset and hold via external
T diletions	control
Input signal level	0 to 5 V (high-speed CMOS level) or shorted [Lo]/ open [Hi]
GP-IB interface	
(PW3335-01 an	, , , , , , , , , , , , , , , , , , , ,
Method	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 interfa	ace
(PW3335, PW33	35-02, PW3335-03, and PW3335-04)
Connector	D-sub 9-pin connector × 1
Communication method	Full duplex, Start-stop synchronization
method	Stop bits: 1 (fixed) Data length: 8 (fixed)
	Parity: None
Communication speed	9600 bps/ 38400 bps
LAN interface	DL45 comparison 4
Connector	RJ-45 connector × 1
	Compliant with IEEE802.3
Electrical specifications	Compliant with IEEE802.3
Electrical specifications Transmission	Compliant with IEEE802.3 10Base-T/ 100Base-TX (automatic detection)
Electrical specifications Transmission method	10Base-T/ 100Base-TX (automatic detection)
Electrical specifications Transmission method Protocol	10Base-T/ 100Base-TX (automatic detection) TCP/ IP
Electrical specifications Transmission method	10Base-T/ 100Base-TX (automatic detection)
Electrical specifications Transmission method Protocol	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates)
Electrical specifications Transmission method Protocol Functions	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller
Electrical specifications Transmission method Protocol Functions General Specific Product warranty	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller cations 3 year
Electrical specifications Transmission method Protocol Functions General Specific Product warranty	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller Cations
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller cations 3 year
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         4290 V rms AC (current sensitivity: 1 mA)
Electrical specifications Transmission method Protocol Functions <b>General Specifi</b> Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity	10Base-T/ 100Base-TX (automatic detection) TCP/ IP HTTP server (remote operation, firmware updates) Dedicated ports (command control, data transfer) Remote control by controller cations 3 year Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2 0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation) -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation) 4290 V rms AC (current sensitivity: 1 mA) Between the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals
Electrical specifications Transmission method Protocol Functions <b>General Specifi</b> Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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         aconnection consisting of chassis, interfaces, and output terminals
Electrical specifications Transmission method Protocol Functions <b>General Specific</b> Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated	10Base-T/ 100Base-TX (automatic detection)         TCP/IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         ccations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Voltage input terminal, Current input terminals         Voltage input terminal, current input terminals
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength	10Base-T/ 100Base-TX (automatic detection)         10P(IP)         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 current input terminals and a connection consisting of chassis, interfaces, and output terminals         Voltage input terminal, current input terminals         Measurement category III 600 V (anticipated transient
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller <b>cations</b> 3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Voltage input terminals (Current input terminals and current input terminals         Voltage input terminals (Current input terminals         Voltage input terminals         Poltage input terminals         Returned transient         Vovervoltage: 6000 V)
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth	10Base-T/ 100Base-TX (automatic detection)         10Ey IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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         Voltage input terminal, Current input terminals         Measurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)
Electrical specifications Transmission method Protocol Functions <b>General Specifi</b> Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Voltage input terminals, Current input terminals         Between the voltage input terminals and current input terminals         Vortage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage inpu
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Voltage input terminals and current input terminals         Weasurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category III 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage input terminals U and ± 1000 V, ±1500 V peak
Electrical specifications Transmission method Protocol Functions <b>General Specifi</b> Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth	10Base-T/ 100Base-TX (automatic detection)         TCP/IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         etheren the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Voltage input terminal, Current input terminals         Voltage input terminal, Current input terminal         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage input terminals U and ±         1000 V, ±1500 V peak         Between the current input terminals I and ±
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Voltage input terminals and current input terminals         Weasurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category III 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage input terminals U and ± 1000 V, ±1500 V peak
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage Maximum input current Applicable	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Vottage input terminal, Current input terminal         Measurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category III 1000 V (anticipated transient overvoltage: 6000 V)         Between the current input terminals I and ± 1000 V, ±1500 V peak         Between the current input terminals I and ± 200 mA to 20 A range 30 A, ±100 A peak         Safety       EN61010
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input current	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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         Voltage input terminal, current input terminals         Between the current input terminals and a connection consisting of chassis, interfaces, and output terminals         Voltage input terminals and current input terminals         Between the current input terminals and current input terminals         Voltage input terminals of und chansient overvoltage: 6000 V)         Between the voltage input terminals U and ± 1000 V, ±1500 V peak         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         Safety       EN61010         EMC       EN61010
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage Maximum input current	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Vottage input terminal, Current input terminal         Measurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category III 1000 V (anticipated transient overvoltage: 6000 V)         Between the current input terminals I and ± 1000 V, ±1500 V peak         Between the current input terminals I and ± 200 mA to 20 A range 30 A, ±100 A peak         Safety       EN61010
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input current Applicable Standards Rated supply	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 a connection consisting of chassis, interfaces, and output terminals         Notage input terminals, Current input terminals         Measurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category III 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage input terminals U and ± 1000 V, ±1500 V peak         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         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage Maximum input current Applicable Standards Rated supply voltage	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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         Voltage input terminal, Current input terminals         Between the current input terminals and a connection consisting of chassis, interfaces, and output terminals         Voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Voltage: 6000 V)         Between the voltage input terminals U and ±         000 V, ±1500 V peak         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         Safety       EN6100         EN61000-3-2       EN61000-3-2
Electrical specifications Transmission method Protocol Functions Ceneral Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input current Applicable Standards Rated supply voltage Maximum rated	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 a connection consisting of chassis, interfaces, and output terminals         Notage input terminals, Current input terminals         Measurement category III 600 V (anticipated transient overvoltage: 6000 V)         Measurement category III 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage input terminals U and ± 1000 V, ±1500 V peak         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         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage Maximum input current Applicable Standards Rated supply voltage	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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         Voltage input terminal, Current input terminals         Between the current input terminals and a connection consisting of chassis, interfaces, and output terminals         Voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Voltage: 6000 V)         Between the voltage input terminals U and ±         000 V, ±1500 V peak         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         Safety       EN6100         EN61000-3-2       EN61000-3-2
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage Maximum input current Applicable Standards Rated supply voltage Maximum rated power Dimensions	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         -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 current input terminals and current input terminals         Between the voltage input terminals and current input terminals         Notage input terminals, Current input terminals         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage 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         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak         Safety       EN61010         EMC
Electrical specifications Transmission method Protocol Functions General Specific Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input current Applicable Standards Rated supply voltage Maximum rated power Dimensions Mass	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         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 voltage input terminals and a connection consisting of chassis, interfaces, and output terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals and current input terminals         Between the voltage input terminals U and ± 1000 V, ±1500 V peak         Between the voltage 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         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A pea
Electrical specifications Transmission method Protocol Functions <b>General Specifi</b> Product warranty period Operating environment Operating temperature and humidity Storage temperature and humidity Dielectric strength Maximum rated voltage to earth Maximum input voltage Maximum input current Applicable Standards Rated supply voltage Maximum rated power Dimensions	10Base-T/ 100Base-TX (automatic detection)         TCP/ IP         HTTP server (remote operation, firmware updates)         Dedicated ports (command control, data transfer)         Remote control by controller         Cations         3 year         Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2         0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)         -10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)         -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 current input terminals and current input terminals         Between the voltage input terminals and current input terminals         Notage input terminals, Current input terminals         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)         Measurement category II 1000 V (anticipated transient overvoltage: 6000 V)         Between the voltage 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         1 mA to 100 mA range 20 A, ±30 A peak         1 mA to 100 mA range 20 A, ±30 A peak         Safety       EN61010         EMC

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# **4** 3334 Specifications

#### **Basic Specifications**

Measurable lines	Single-phase, 2-wire (AC/DC)								
Measurement parameters	Voltage, current, active power, apparent power, power factor, frequency, integrated current and active power, waveform peak (voltage and current)								
Measurement method	Simultanec	Simultaneous digital sampling of voltage and current, True RMS							
Sampling Frequency	Approx. 74	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			
Frequency bandwidth	DC, 45Hz t	o 5kHz							

#### Measurement accuracy

Warm-up time	3 minutes	minutes							
Period of guaranteed accuracy	3 years (bet	years (better accuracy specifications available for 1-year period)							
Post-adjustment accuracy guarantee	1 year (accu	year (accuracy specifications available for 1-year period)							
Effective measurement	Voltage, cur	Voltage, current:1% to 100% (Power: 0% to 100%)							
range	Measurements	below 0.5% of the voltage or current	nt range will be zero suppressed.						
Effect of power factor (at pf=0.5)	Maximum ±	Maximum ±0.4%±rdg. (45 to 66Hz)							
Temperature Coefficient	Maximum ±	0.03%f.s./°C							
Frequency	Guaranteed	Voltage, current and active power	Current and active power						
Frequency	Period	(at less than 50% of input range)	(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.						
40 HZ S I S 00 HZ	3 years	±0.1 %rdg. ±0.2 %f.s.	±0.3 %rdg.						
66 Hz < f ≤ 1 kHz **	1 year	±0.1 %rdg. ±0.2 %f.s.	±0.3 %rdg.						
	3 years	±0.1 %rdg. ±0.35 %f.s.	±0.45 %rdg.						
1 kHz < f ≤ 5 kHz **	1 year	±3.0 %f.s.	±3.0 %rdg.						
	3 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

=1, in-phase voltage =0V, accuracy specifications differ depending on usage period of 1 or 3 w

#### Input Specifications

Input impedance	2.4 M $\Omega$ for voltage, 10 m $\Omega$ 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**

No.of displayed digits:	Six digits				
Current Integration:	From 0.00000mAh, Polarity-independent				
Ŭ	integration and Sum value				
Active power Integration:	From 0.00000mWh, Polarity-independent				
	integration and Sum value				
Integration time:	1 min to 10000 h				
Measurement accuracy:	Measurement accuracy of active power ±1dgt.				
Maximum value of posi	tive and negative waveform of voltage/				
current (up to 300% of	full scale range)				
Measurement accuracy	/: ±1.2%f.s. ("f.s." is 300% of each range)				
Switchable between AC+DC(T	rue RMS), DC(simple average display) and AC(True RMS)				
Parameter output repre	sentation:				
Voltage, Current and A	ctive power (3 simultaneous channels)				
D/A select an item from Current integration, Active power integration,					
Apparent power, power factor					
Voltage output: ±2 VDC f.s. for each range					
Output accuracy: ±0.5% f.s. + individual measurement accuracy					
Parameter output representation:					
Voltage, Current and Active power (3 simultaneous channels)					
	% f.s. + individual measurement accuracy				
Simple averaging of specifi	ed number of samples: 1, 2, 5, 10, 25, 50 or 100				
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,					
	300, 500, 1000, 2000, 3000, 5000, 10000				
RS-232C interface: Included as standard					
RS-232C interface: Inc	luded as standard				
Asynchronous comm	nunication method:				
Asynchronous comm full-duplex; Baud r	nunication method: rate: 9600 bps (fixed)				
Asynchronous comm full-duplex; Baud r GP-IB interface (Model	unication method: rate: 9600 bps (fixed) 3334-01 only)				
Asynchronous comm full-duplex; Baud r GP-IB interface (Model IEEE-488.1 1987 cor	nunication method: rate: 9600 bps (fixed) 3334-01 only) mpliant, IEEE-488.2 1987 reference				
Asynchronous comm full-duplex; Baud r GP-IB interface (Model IEEE-488.1 1987 cor Display hold, Maximum	nunication method: rate: 9600 bps (fixed) 3334-01 only) piliant, IEEE-488.2 1987 reference value hold, Peak value hold, Key lock,				
Asynchronous comm full-duplex; Baud r GP-IB interface (Model IEEE-488.1 1987 cor Display hold, Maximum	nunication method: rate: 9600 bps (fixed) 3334-01 only) mpliant, IEEE-488.2 1987 reference				
Asynchronous comm full-duplex; Baud r GP-IB interface (Model IEEE-488.1 1987 cor Display hold, Maximum	nunication method: rate: 9600 bps (fixed) 3334-01 only) piliant, IEEE-488.2 1987 reference value hold, Peak value hold, Key lock,				
	Current Integration: Active power Integration: Integration time: Measurement accuracy: Maximum value of posi current (up to 300% of Measurement accuracy Switchable between AC+DC(T Parameter output reprev Voltage, Current and Ar D/A select an item fron Apparent power, power Voltage output: ±2 V Output accuracy: ±0.5 Parameter output reprev Voltage, Current and Voltage output: 1 VD Output accuracy: ±1.0 Simple averaging of specifit VT ratios: 1, 2, 3, 4, 5, 6, 80, 100, 200, 3				

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

Measurable lines Single-phase, 2-wire (AC)								
Measurement paramete		Voltage, Current, Active power, Apparent power, Power factor						
Measurement method		Simultaneous digital sampling of voltage and current, True RMS						
Sampling frequency	Approx. 48	3kHz						
Measurement range		1						
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		
Frequency bandwidth								
Measurement (Guaranteed at 23°C±5, max. 80%)	accuracy	factor=1, in-phase vo	ltage =0V, accuracy s	pecifications differ de	pending on usage per	iod of 1 or 3 years)		
Warm-up time	10 minutes	;						
Period of guaranteed accura Post-adjustment accuracy guarant					or 1-year per 1-year peric			
Effective measurement range	Voltage, cu	urrent, powe	er: 10% to 1	50%	will be zero su			
Effect of power factor (at pf=0			. (45 to 66H					
Temperature Coefficient		±0.03%f.s./		,				
Frequency	Guarant	teed Period	Volt	age, curren	t and active	power		
	1	year		<u> </u>	g. ±0.1 %f.s			
45 Hz ≤ f ≤ 66 Hz		years			g. ±0.2 %f.s			
	1	year	_		g. ±0.2 %f.s			
66 Hz < f ≤ 1 kHz	^	years			g. ±0.35 %f.			
	1	year			0 %f.s.			
1 kHz < f ≤ 5 kHz	^	years		±4.	5 %f.s.			
	* Accuracy	not defined	for current	input excee	dina 20A			
Input specifica					g			
Input impedance			nΩ or bette	r (50/60 Hz)	) for current			
Maximum input voltage		425 Vpeak						
Maximum input curren								
Maximum effective peak volta Maximum effective peak curre	-		A service and AAC	10 F A	a a a la			
Maximum elective peak curre Max. rated voltage to eart			it range, Wi	(1111) ±42.5A	реак			
· · · ·		0002)						
Display specifi		d current: 1	% to 152% (	of range				
range	active pow	er: 0% to 23	31.04% of ra	ange				
Displacement power facto			arity display	/)				
Display refresh rat Response time	within 0.5 s	<u>imes per se</u> s (Time to ra 100 to 10%	ated accura	cy after abr	upt change	in input [0		
Functional Spe			orrangej)					
Rectification method								
Analog output		output repr	esentation.					
(D/A output)	voltage, ci	urrent and a			neous chan	nels)		
					asurement a			
Average function	50 or 100				nples: 1, 2, 5	5, 10, 25,		
VT or CT ratio	CT ratios: 1	1, 2, 3, 4, 5, 6,		6, 20, 24, 25,	30, 40, 50, 60,	75, 80, 100		
External Interfaces			cluded as s					
			munication rate: 9600					
			el 3333-01 d					
	IEEE-48	8.1 1987 co	mpliant, IEB	EE-488.2 19	987 referenc			
Miscellaneous	Display ho	ld, Key lock	, Settings b	ackup (pre	serves settir	ngs)		
General Speci	fications							
Safety	EN61010 F	ollution Fac	ctor 2,					
-	Measurem	ent Categor	y III (4000 )		d overvolta	ge)		
EMC			-2, EN6100					
Operating environmen			less, non-c					
Storage environment			or less, nor	n-condensa	ting			
Rated supply voltage Maximum rated power	20 VA	VAC, 50/60	/ 112					
Dimensions and mass		.30 in)W × <sup>-</sup>	100 mm (3.9	94 in)H x 22	27 mm (8.94	in)D		
			ojections),					

#### Calculation formulas (3333 & 3334)

Measurement	Formula
Parameters	
Apparent Power (S)	$S = U \times I$
Power Factor (X)	$\lambda = I P / S I$
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	<b>v</b>	~	~	~	×	~	~
	PW3337-02	3	AC/ DC	<b>v</b>	~	•	×	~	~	~
	PW3337-03	3	AC/ DC	<b>v</b>	~	•	~	~	~	~
	PW3336	2	AC/ DC	~	~	~	х	×	~	~
POWER METER PW3336	PW3336-01	2	AC/ DC	<b>v</b>	~	V	~	×	~	~
	PW3336-02	2	AC/ DC	<b>v</b>	~	•	×	~	~	~
	PW3336-03	2	AC/ DC	<b>v</b>	~	~	~	~	~	~

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
POWER METER PW3335	PW3335	1	AC/ DC	~	~	~	×	×	×	~
	PW3335-01	1	AC/ DC	✓	~	×	~	×	~	~
	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 9000 120000 += 4% 9600	3334-01	1	AC/ DC	×	×	~	~	~	×	×
POWER HITESTER 3333	3333	1	AC	×	×	~	×	~	×	×
3000 3000	3333-01	1	AC	×	×	~	~	~	×	×

#### Communications and control options



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



DISTRIBUTED BY

CABLE 9151-02 CAble length: 2 m (6.56 ft)



LAN CABLE 9642 Cable length: 5 m (16.41 ft) supplied with straight to cross conversion cable Accessories : Instruction manual  $\times 1$ , Power cord  $\times 1$ 



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

Note: Company names and Product names appearing in this catalog are trademarks or registered trademarks of various companies

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