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

POWER METER PW3335

AC/DC POWER HITESTER 3334

POWER HITESTER 3333
Advancing the Standard for Power Measurement

The best performing instruments for power measurement on production lines, in laboratories, and in research facilities. Hioki delivers the optimal power testing solutions based on use case conditions, practical application, and accuracy.

Three-phase Power Meter

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

Single-phase Power Meter

The PW3335 provides highly accurate measurements for everything from standby power to operating power. Compliant with the IEC62301 measurement standard for standby power, it is capable of measuring current as low as 10 μA. Designed for power consumption testing, the 3334 and 3333 are guaranteed for accuracy for up to 3 years.
### Basic Accuracy and Frequency Bands

**Frequency Band [Hz]**
- DC, 0.1 Hz to 100 kHz
- DC, 45 Hz to 5 kHz

**Effective measurement range, voltage**
- PW3337/PW3336: 0.15 V to 1000 V
- PW3335: 0.06 V to 1000 V
- PW3334: 0.15 V to 300 V
- PW3333: 20 V to 300 V

**Effective measurement range, current**
- PW3337/PW3336: 2 mA to 65 A
- PW3335: 10 μA to 30 A
- PW3334: 1 mA to 30 A
- PW3333: 5 mA to 30 A

**Frequency band**
- PW3337/PW3336: DC, 0.1 Hz to 100 kHz
- PW3335: DC, 45 Hz to 5 kHz
- PW3334: 45 Hz to 5 kHz
- PW3333: 45 Hz to 5 kHz

**Basic accuracy, AC (Voltage, current, power)**
- PW3337/PW3336: ±0.1% rdg. ±0.05% f.s.
- PW3335: ±0.1% rdg. ±0.1% f.s.
- PW3334: ±0.1% rdg. ±0.1% f.s.
- PW3333: ±0.1% rdg. ±0.2% f.s.

**Basic accuracy, DC (Voltage, current, power)**
- PW3336: ±0.1% rdg. ±0.1% f.s.
- PW3335: ±0.1% rdg. ±0.1% f.s.
- PW3334: ±0.1% rdg. ±0.2% f.s.
- PW3333: -

**Integrated power measurement**
- PW3337/PW3336: Yes
- PW3335: Yes
- PW3334: -
- PW3333: -

**Harmonic measurement**
- PW3337/PW3336: IEC61000-4-7 compliant
- PW3335: -
- PW3334: -
- PW3333: -

**Current sensor input**
- PW3337/PW3336: Yes
- PW3335: PW3335-03, -04
- PW3334: -
- PW3333: -

**Interface**
- PW3337/PW3336: Yes
- PW3335: PW3335-02, -03, -04
- PW3334: 3334-01
- PW3333: 3333-01

### Effective Measurement Range

**Voltage**
- PW3337/PW3336: 0.15 V to 1000 V
- PW3335: 0.06 V to 1000 V
- PW3334: 0.15 V to 300 V
- PW3333: 20 V to 300 V

**Current**
- PW3337/PW3336: 2 mA to 65 A
- PW3335: 10 μA to 30 A
- PW3334: 1 mA to 30 A
- PW3333: 5 mA to 30 A

*Power analyzer accuracy only.

---

**Comparison Chart**

<table>
<thead>
<tr>
<th></th>
<th>PW3337</th>
<th>PW3336</th>
<th>PW3335</th>
<th>3334</th>
<th>3333</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of channels</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Supported connections</td>
<td>Three-phase, three-phase + single-phase, single-phase x 3, DC x 3</td>
<td>Three-phase, single-phase x 2, DC x 2</td>
<td>Single-phase, DC</td>
<td>Single-phase, DC</td>
<td>Single-phase</td>
</tr>
<tr>
<td>Effective measurement range, voltage</td>
<td>0.15 V to 1000 V</td>
<td>0.06 V to 1000 V</td>
<td>0.15 V to 300 V</td>
<td>20 V to 300 V</td>
<td>-</td>
</tr>
<tr>
<td>Effective measurement range, current</td>
<td>2 mA to 65 A</td>
<td>10 μA to 30 A</td>
<td>1 mA to 30 A</td>
<td>5 mA to 30 A</td>
<td>-</td>
</tr>
<tr>
<td>Frequency band</td>
<td>DC, 0.1 Hz to 100 kHz</td>
<td>DC, 45 Hz to 5 kHz</td>
<td>45 Hz to 5 kHz</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Basic accuracy, AC (Voltage, current, power)</td>
<td>±0.1% rdg. ±0.05% f.s.</td>
<td>±0.1% rdg. ±0.1% f.s.</td>
<td>±0.1% rdg. ±0.1% f.s.</td>
<td>±0.1% rdg. ±0.2% f.s.</td>
<td>-</td>
</tr>
<tr>
<td>Basic accuracy, DC (Voltage, current, power)</td>
<td>±0.1% rdg. ±0.1% f.s.</td>
<td>±0.1% rdg. ±0.1% f.s.</td>
<td>±0.1% rdg. ±0.2% f.s.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Integrated power measurement</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Harmonic measurement</td>
<td>IEC61000-4-7 compliant</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Current sensor input</td>
<td>Yes</td>
<td>PW3335-03, -04</td>
<td>PW3335-03, -04</td>
<td>3334-01</td>
<td>3333-01</td>
</tr>
<tr>
<td>Interface</td>
<td>LAN</td>
<td>Yes</td>
<td>PW3335-02, -03, -04</td>
<td>PW3335-02, -03, -04</td>
<td>PW3335-02, -03, -04</td>
</tr>
<tr>
<td></td>
<td>RS-232C</td>
<td>Yes</td>
<td>PW3335-02, -03, -04</td>
<td>PW3335-02, -03, -04</td>
<td>PW3335-02, -03, -04</td>
</tr>
<tr>
<td></td>
<td>GP-IB</td>
<td>PW3337-01, -03</td>
<td>PW3336-01, -03</td>
<td>PW3335-01, -04</td>
<td>3334-01</td>
</tr>
<tr>
<td></td>
<td>D/A output</td>
<td>PW3337-02, -03</td>
<td>PW3336-02, -03</td>
<td>PW3335-02, -04</td>
<td>3333-01</td>
</tr>
</tbody>
</table>
Features

POWER METER PW3337/PW3336
Accurate measurement of power for three-phase equipment, through direct input up to 1000 V AC/DC / 65 A.

- Voltage/current/power basic accuracy of ±0.1% *
- Direct input up to 1000 V AC/DC / 65 A
- Harmonic measurement as standard feature, IEC61000-4-7 compliant
- Little instrument loss, even with large currents. DCCT input with an input resistance of 1 mΩ or less.
- Power factor effect of ±0.1% f.s. delivers highly accurate measurements even for no-load testing of transformers with a low power factor
- Measurement of multiple connections in the optimal range for each due to independent ranges for each channel
- Measure up to 5000 A AC with optional current sensor

POWER METER PW3335
Highly accurate AC/DC measurements from standby power to operating power

- 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
• Accuracy guaranteed up to 3 years

Dimensional Drawings

PW3337
PW3336

PW3335

3334

3333
Applications

Inspection of Electrical Equipment Production Lines

Key features
- Best-in-class basic accuracy
- Extensive interfaces
- Long-term accuracy guarantee

Best-in-class Accuracy ±0.1% *

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.

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 ±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.

Basic accuracy, AC

±0.1% *

* 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.

3 years

1-year guarantee of accuracy ±0.2% rdg.

3-year guarantee of accuracy ±0.3% rdg.
Standby Power Measurement

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 (excerpt)

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

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 no-load 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.

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.

Example of Standby Current Waveform (CF = Peak Value, RMS = 4.8)

Accurately measure operating power (Max. 210 W) and standby power (Min. 3 W) in a single range

Peak value 4.8 mA
RMS 1 mA

Cannot be measured accurately because the peak value exceeds the range

Effective measurement range 1.5 W to 225 W

150 W range

Example of Report Output

Measurement target information
Measurement values, uncertainty of results
Data in chronological order
Test conditions, measurement instrument information
Test details

Example of Standby Current Waveform (CF = Peak Value, RMS = 4.8)
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.

Key features
- Auto range integration
- Time average active power
- AC/DC power measurement

Intermittent Power Supply

Devices that perform intermittent operation and cycle control repeat a cycle of stopped states and operating states. Therefore, with normal power measurement, it is not possible to determine a value for rated power consumption. Time average active power (current) is a function that allows the measurement of the time average for power (current) that experiences fluctuations.

AC/DC Measurement

For equipment that uses rectifiers and control devices, it might not be possible to accurately measure voltage or current without an AC/DC power meter.
- Half-wave rectified waveforms used for dryers and fans
- Full-wave rectified waveforms used for AC adapters
- Cycle control waveforms used for voltage and temperature adjustment heaters
- DC waveforms with superimposed ripple components
Inverter Efficiency Measurement

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 3P3A, but also a variety of three-phase connections such as 3P4W, 3P3W2M, and 3P3W3M.

Accuracy Guaranteed for Currents Up to 65 A

Because DCCT allows a current with an input resistance of 1 mΩ 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.

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.

PW3330 Series Frequency Characteristics (Typical)

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.

* This software can be downloaded from the HIOKI website.
PV Power Conditioner (PCS) Efficiency Measurements

**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.

**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.

**Setting Optimal Range According to Target to be Measured**
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.

**I/O Efficiency Calculation with a Single Unit**

**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.
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.*

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.

### 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.*

### 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 adapter recommended by Hioki. Please inquire with your Hioki distributor.
No-load Loss Measurements for Transformers

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 ±0.1% f.s. or less, allowing active power to be measured with a high level of accuracy at low power factors.

Support for Crest Factor 6

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

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.

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.

<table>
<thead>
<tr>
<th>Wiring method</th>
<th>External appearance</th>
<th>Product name/ model no.</th>
<th>Rated current</th>
<th>Frequency band</th>
<th>Diameter of measurable conductors</th>
<th>Basic accuracy (amplitude)</th>
<th>Basic accuracy (phase)</th>
<th>Cord lengths</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clamp method</td>
<td></td>
<td>CLAMP ON SENSOR 9660</td>
<td>100 A</td>
<td>40 Hz to 5 kHz</td>
<td>Ø 15 mm (0.59 in)</td>
<td>±0.05% rdg. ±0.01% f.s.</td>
<td>Within ±0.2°</td>
<td>3 m (9.84 ft)</td>
<td>Not used</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLAMP ON SENSOR 9661</td>
<td>500 A</td>
<td>40 Hz to 5 kHz</td>
<td>Ø 46 mm (1.81 in)</td>
<td>±0.03% rdg. ±0.01% f.s.</td>
<td>Within ±0.5°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CLAMP ON SENSOR 9669</td>
<td>1000 A</td>
<td>40 Hz to 5 kHz</td>
<td>Ø 55 mm (2.17 in), 80 mm (3.15 in) x 20 mm (0.79 in) BUS BAR</td>
<td>±0.10% rdg. ±0.01% f.s.</td>
<td>Within ±1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>FLEXIBLE CLAMP ON SENSOR CT9667-01</td>
<td>500 A / 5000 A</td>
<td>10 Hz to 20 kHz</td>
<td>Ø 100 mm (3.94 in)</td>
<td>±0.2% rdg. ±0.3% f.s.</td>
<td>Within ±1°</td>
<td>3 m (9.84 ft)</td>
<td>AA (LR6) Alkaline Batteries x 2 (approx. 7 days) or AC ADAPTER 9445-02 (optional)</td>
</tr>
</tbody>
</table>

### Options for CT9667-01/-02/-03

<table>
<thead>
<tr>
<th>External appearance</th>
<th>Product name/ model no.</th>
<th>Functions</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC ADAPTER 9445-02</td>
<td>For supplying power to CT9667-01/-02/-03</td>
<td>100 to 240 V AC</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>Wiring method</th>
<th>External appearance</th>
<th>Product name/ model no.</th>
<th>Rated current</th>
<th>Frequency band</th>
<th>Diameter of measurable conductors</th>
<th>Basic accuracy (amplitude)</th>
<th>Basic accuracy (phase)</th>
<th>Cord lengths</th>
<th>Power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through method</td>
<td></td>
<td>CT6862-05</td>
<td>50 A</td>
<td>DC to 1 MHz</td>
<td>Ø 24 mm (0.94 in)</td>
<td>±0.05% rdg. ±0.01% f.s.</td>
<td>Within ±0.2°</td>
<td>3 m (9.84 ft)</td>
<td>CT9555 or CT9557</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6863-05</td>
<td>200 A</td>
<td>DC to 500 kHz</td>
<td>Ø 24 mm (0.94 in)</td>
<td>±0.05% rdg. ±0.01% f.s.</td>
<td>Within ±0.2°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6875</td>
<td>500 A</td>
<td>DC to 2 MHz</td>
<td>Ø 36 mm (1.42 in)</td>
<td>±0.04% rdg. ±0.008% f.s.</td>
<td>Within ±0.1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6876</td>
<td>1000 A</td>
<td>DC to 1.5 MHz</td>
<td>Ø 36 mm (1.42 in)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6877</td>
<td>2000 A</td>
<td>DC to 1 MHz</td>
<td>Ø 80 mm (3.15 in)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamp method</td>
<td></td>
<td>CT6841-05</td>
<td>20 A</td>
<td>DC to 1 MHz</td>
<td>Ø 20 mm (0.79 in)</td>
<td>±0.3% rdg. ±0.01% f.s.</td>
<td>Within ±0.1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6843-05</td>
<td>200 A</td>
<td>DC to 500 kHz</td>
<td>Ø 20 mm (0.79 in)</td>
<td>±0.3% rdg. ±0.01% f.s.</td>
<td>Within ±0.1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6844-05</td>
<td>500 A</td>
<td>DC to 200 kHz</td>
<td>Ø 20 mm (0.79 in)</td>
<td>±0.3% rdg. ±0.01% f.s.</td>
<td>Within ±0.1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6845-05</td>
<td>500 A</td>
<td>DC to 100 kHz</td>
<td>Ø 50 mm (1.97 in)</td>
<td>±0.3% rdg. ±0.01% f.s.</td>
<td>Within ±0.1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>CT6846-05</td>
<td>1000 A</td>
<td>DC to 20 kHz</td>
<td>Ø 50 mm (1.97 in)</td>
<td>±0.3% rdg. ±0.01% f.s.</td>
<td>Within ±0.1°</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9272-05</td>
<td>20 A / 200 A</td>
<td>1 Hz to 100 kHz</td>
<td>Ø 46 mm (1.81 in)</td>
<td>±0.3% rdg. ±0.01% f.s.</td>
<td>Within ±0.2°</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Options for Current Sensor TYPE 2

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

### Rack Mount Hardware

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

### Printing with a Printer

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

**Printing example**

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

AC ADAPTER 9443-02 For printer, 9442, EU type

PRINTER 9442
Thermal serial dot method, 112 mm (4.41 in) paper width
Pw/12200, Pw/13200, Pw/14200, Pw/15200, Pw/16200, Pw/17200
Dimensions, mass: 160 mm W × 67 mm H × 170 mm D
580 g (20.5 oz)
Power supply: AC ADAPTER 9443-02, or the included nickel hydride batteries
Dimensions, mass: 112 mm (4.41 in) × 25 m (82.03 ft), 10-roll set
```
Software

PW Communicator

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

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

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

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

Synchronous 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.
• The measured values for the 3333/3334 are displayed in real time on the PC screen. Save data as a CSV file.
"Standby Power Measurement Software" is an application software exclusively designed for the Power Meter PW3335. This software lets you to view PW3335 measurement data and also save them as reports or in CSV format via a LAN, GP-IB, or RS-232C. Measure standby power consumption in accordance with IEC62301. Download the software free of charge from the HIOKI website.

**Workflow for Standby Power Test**

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

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

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

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

5. **Run test**
   The consumed power is measured according to the configured settings.

6. **Create report**
   Create a report of the test results. Output either a PDF report or CSV file.
### PW3337 and PW3336 Specifications

#### Input Specifications

<table>
<thead>
<tr>
<th>Measurement type</th>
<th>PW3337 series</th>
<th>PW3336 series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase 2-wire (1P2W), Single-phase 3-wire (1P3W), Three-phase 3-wire (3P3W), Three-phase 4-wire (3P4W)</td>
<td>1P2W</td>
<td>1P2W</td>
</tr>
<tr>
<td>1P3W</td>
<td>1P3W</td>
<td></td>
</tr>
<tr>
<td>3P3W</td>
<td>3P3W</td>
<td></td>
</tr>
<tr>
<td>3P4W</td>
<td>3P4W</td>
<td></td>
</tr>
<tr>
<td>3P3W/3M</td>
<td>3P3W/3M</td>
<td></td>
</tr>
<tr>
<td>PW3337: from 3.0000W to 150.00kW (also applies to VA, var)</td>
<td>PW3336: from 3.0000W to 100.00kW (also applies to VA, var)</td>
<td></td>
</tr>
</tbody>
</table>

**Input methods**
- Voltage: Isolated input, resistance voltage division method
- Current: Isolated input, DCCT method
- Voltage input terminal: 2 MΩ
- PW3337 series: 1MΩ or less
- PW3336 series: 1 mΩ or less

**Voltage measurement ranges**
- 600 V/50 Hz 
- 50 kHz < f ≤ 100 kHz

**Power ranges**
- Isolation current from current sensors
- 10 kHz < f ≤ 100 kHz

**Input resistance (50/60 Hz)**
- 2 MΩ
- Current direct input terminal: 1 mΩ or less

**Basic Measurement Specifications**

- **Measurement method**
  - Simultaneous voltage and current digital sampling, zero-cross simultaneous calculation

- **Sampling frequency**
  - 700 kHz

- **Add converter**
  - 6-bit resolution

- **Synchronization**
  - U1, U2, U3, I1, I2, I3 (fixed at 200 ms)

- **Measurement items**
  - Voltage: Current
  - Current: Voltage
  - Active power: Power factor
  - Harmonic parameters:
    - Harmonic voltage RMS value
    - Harmonic current RMS value
  - Effective measuring range: 50 Hz < f ≤ 100 kHz
  - Total harmonic distortion: 50 kHz < f ≤ 100 kHz
  - Power factor fundamental waveform

- **Effective measuring range**
  - Voltage: ±0.1% f.s.
  - Current: ±0.2% f.s.
  - Active power: ±0.3% f.s.
  - Harmonic voltage RMS value: ±0.1% f.s.
  - Harmonic current RMS value: ±0.2% f.s.
  - Total harmonic distortion: ±10% f.s.

- **Calibration**
  - Frequency (f): Input < 50% f.s.

#### Rectifiers

- **Rectifiers**
  - AC → DC measurement
  - DC measurement
  - AC → DC measurement
  - DC measurement
  - Power factor measurement
  - Harmonic parameters:
    - Harmonic voltage RMS value
    - Harmonic current RMS value
  - Total harmonic distortion: ±0.5% f.s.
  - Power factor fundamental waveform

#### Efficiency

- **Efficiency**
  - Voltage: ±0.3% f.s.
  - Current: ±0.2% f.s.
  - Active power: ±0.3% f.s.
  - Harmonic voltage RMS value: ±0.2% f.s.
  - Harmonic current RMS value: ±0.5% f.s.

#### Display of values calculated by for both voltage and current

- **Display of values calculated by for both voltage and current**
  - Voltage: ±0.3% f.s.
  - Current: ±0.3% f.s.

#### Harmonic parameters

- **Harmonic parameters**
  - Voltage: ±0.3% f.s.
  - Current: ±0.3% f.s.
  - Active power: ±0.3% f.s.

#### Active power

- **Active power**
  - Voltage: ±0.3% f.s.
  - Current: ±0.3% f.s.
  - Active power: ±0.3% f.s.

### PW3337 and PW3336 Summary Calculation Formulas

- **Xsum = (X(1) + X(2))**
- **Psum = (P(1) + P(2))**

### Voltage Waveform Peak Value / Current Waveform Peak Value Measurement Specifications

- **Voltage Waveform Peak Value / Current Waveform Peak Value Measurement Specifications**
  - **Measurement method**
    - Measures the waveform’s peak value (for both positive and negative polarity) based on sampled instantaneous voltage values.
  - **Measurement accuracy**
    - ±0.1% f.s. or ±0.05% f.s.

### Voltage/Current/Active power measurement specifications

- **Voltage/Current/Active power measurement specifications**
  - **Effective measuring range**
    - ±0.3% f.s.
  - **Voltage display range**
    - ±0.3% to ±102% of voltage peak range or current peak range.
Voltage Ripple Rate / Current Ripple Factor Measurement Specifications

- **Measurement method**: Calculates the AC component (peak to peak width) as a proportion of the voltage or current DC component.
- **Effective measuring range**: As per voltage and voltage waveform peak value or current and current waveform peak value effective measuring ranges.
- **Display range**: ±0.01 % to ±0.05 %
- **Polarity**: None

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

**Measurement types**
- Reactive Power
- Apparent Power
- Reactive Power/ Reactive Power Factor
- AC, DC, AC+DC/Um
- AC, P, N, DC

- **Effective measuring range**: As per voltage, current, and active power effective measuring ranges.
- **Display range**: Apparent Power / Reactive Power (0% to 196% of the range, no zero-suppression)
- **Polarity**: Reactive Power

Power channel and sum value calculation formulas

- **Wiring**
  - Apparent power: \( S = \sqrt{S_1^2 + S_2^2} \)
  - Reactive power: \( Q = \sqrt{Q_1^2 + Q_2^2} \)
- **When \( P \neq 0 \)**
  - \( \theta = \arccos \left( \frac{P}{S} \right) \)
  - \( \phi = \arccos \left( \frac{Q}{S} \right) \)

Frequency Measurement Specifications

- **Number of measurement channels**: 3
- **Measurement source**: select from (U Hz) or (I Hz) by channel
- **Measurement method**: Calculated from input waveform period (reciprocal method)
- **Measurement range**: 1 Hz to 100 kHz (linked to the AC frequency filter)
- **Measurement accuracy**: ±1% ± 1 Hz (within -1 Hz to 40 Hz)

- **Effective measuring range**: 0.1 Hz to 1000 kHz
  - For sine wave input that is at least 20% of the maximum voltage source measurement range.
  - **Measurement source limit frequency setting**: 0.1 sec / 1 sec / 10 sec

- **Display format**: 0.1 Hz to 9999 Hz, 9.900 Hz to 99.999 Hz, 99.00 Hz to 220.00 kHz

Efficiency Measurement Specifications

- **Measurement method**: Calculates the efficiency from the ratio of active power value for channels and areas.
- **Wiring model calculation equations**: Calculated based on the AC-DC rectifier active power input, PW3336

Harmonic Measurement Specifications (Built-in function)

- **Measurement method**: Calculates harmonic contents (separate waves) by channel according to the wire model.
- Uniform thinning between zero-cross events after processing with a digital anti-aliasing filter
- Interpolation calculations (Lagrange interpolation)
- When the synchronization frequency falls within the 45 Hz to 66 Hz range
  - 10 Hz ≤ f < 45 Hz: 185.92 Hz to 214.08 Hz (12 cycles)
  - 45 Hz ≤ f < 66 Hz: 181.82 Hz to 214.29 Hz (12 cycles)
  - 56 Hz ≤ f < 66 Hz: 185.92 Hz to 214.08 Hz (12 cycles)
  - 66 Hz ≤ f ≤ 100 Hz: 181.82 Hz to 214.29 Hz (12 cycles)
  - Gaps and overlaps may occur if the measurement frequency is not 50 Hz or 60 Hz
  - No gaps or overlaps will occur

- **Total harmonic current distortion**
  - Harmonic current phase difference
  - Total harmonic voltage distortion
  - Voltage fundamental waveform
  - Current fundamental waveform
  - Active power fundamental waveform
  - Reactive fundamental waveform
- **Power factor fundamental waveform
  - Voltage current phase difference fundamental waveform
  - Voltage voltage fundamental waveform
  - Interchannel current fundamental waveform
  - Interchannel voltage fundamental waveform

The following parameters can be downloaded as data during PC communication but not displayed:
- Harmonic voltage phase angle
- Harmonic current phase angle
- Harmonic voltage current phase angle
### D/A Output Specifications (PW3336-02/-03 and PW3337-02/-03)

#### Number of output channels
- 6-bit D/A converter (polarity = ±10 bits)

#### Output parameters
- **6-bit** (voltage level) or **4-bit** (instantaneous voltage level) (selectable)
  - P1 to P3 (active power level) or P1 to P3 (instantaneous power level) (selectable)
  - Pnum and Hi-Pnum output is not available (0 V) when using the 192W wiring mode.P12 is output when using 193W, P39W, or 3P39W, and P12 is output when using 33A3, 3P39W, or 39W4.

#### Display Specifications
- The instrument can display measurement results and control functions in an analog waveform.
- **Display resolution**: 4 digits, except the display for numerical values.

#### Harmonic measurement accuracy
- **(4-level current)**
  - | Frequency | Voltage | Current | Active power |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>50 Hz</td>
<td>±0.08% f.s.</td>
<td>±0.4% f.s.</td>
<td>±0.4% f.s.</td>
</tr>
<tr>
<td>1 kHz</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
</tr>
<tr>
<td>2 kHz</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
</tr>
<tr>
<td>3 kHz</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
</tr>
<tr>
<td>20 kHz</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
<td>±0.2% f.s.</td>
</tr>
</tbody>
</table>

#### Display update rate
- **200 ms to 20 s**: varies with number of averaging iterations setting.

#### General Specifications
- **Dimensions**: Approx. 235 W (9.26") × 132 H (5.20") × 256 D (10.08") mm
- **Temperature limits**: 0 to 40°C (32 to 104°F), 80% RH or less (non-condensing)
- **Humidity limits**: 10 to 90% (25°C to 90°F), 90% RH or less (non-condensing)

#### Accessories
- Instruction manual × 1, Measurement guide × 1, Power cord × 1

---

**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, P00, DC1, DT1, C0
- **Remote control by controller**

#### RS-232C interface (built-in feature)
- **Communication method**: Full-duplex, Start-stop synchronization, Start bits: 1 (fixed), Data bits: 8 (fixed), Parity: None
- **Remote control by controller** (REMOTE, LAMP will light up)

#### General Specifications (product guaranteed for 3 year)
- **Power input**: 100 to 480 VAC ±10% (50/60 Hz), 1800 VA max.
- **Environmental conditions**: Temperature: -10°C to 55°C (14°F to 131°F), Humidity: 85% RH or less (non-condensing)
- **Storage temperature**: 10 to 50°C (14 to 122°F), 80% RH or less (non-condensing)
- **Dielastic strength**: 2900 Vrms Ac (sensed current: 1 mA)
- **Max rated voltage to earth**: 600 VAC (sensed current: 1 mA)
- **Max input voltage**
  - Between voltage input terminals and case, interface terminals
  - Between input voltage terminals and case, interface terminals
  - Between voltage input terminals and case, interface terminals
- **Rated input power**
  - 660 WAC (sensed current: 1 mA)
- **Remote control by controller**
  - **Remote control by controller**
  - **Remote control by controller**
  - **Remote control by controller**
  - **Remote control by controller**
  - **Remote control by controller**

---

**D/A Output Specifications**
- **Output accuracy**: ±10% of the rated output voltage range; ±15% of the rated output parameter level range.
- **Output parameter measurement accuracy**: ±0.2% f.s.
- **Instantaneous waveform output**: 
  - **Output parameter measurement accuracy**: ±10% f.s.
  - Instantaneous voltage, instantaneous current, RMS value level
  - Instantaneous average power level
  - Average value level
- **Output frequency**: Instantaneous waveform output, high-speed active power level output
  - 10 to 15 kHz: 15 kHz, 40 kHz, 100 kHz, 400 kHz

---

**Overview**
- **Overview**: Overview of the PW3337 series
- **Features**
  - Functionality: 
    - Synchronized control function
    - Measurement accuracy
    - Measurement range
    - Measurement configuration
  - Output parameters: 
    - P1 to P3 (active power level)
    - P1 to P3 (instantaneous power level)
- **Specifications**
  - **Output power specifications**: 
    - PW3336-02/-03 and PW3337-02/-03
  - **D/A output specifications**: 
    - PW3336-02/-03 and PW3337-02/-03
Input Specifications

### Basic Measurement Specifications

#### Instrumentation Specifications

- **Input resistance**: Voltage input terminal: 2 MΩ; Isolated input terminal: 200 kΩ

#### Power ranges

- **Voltage**: Depends on the combination of voltage and current ranges; From 6.000 mV to 20.000 mV (also applies to VA, var)

- **Current**: Depends on the combination of voltage and current ranges; 1 mA to 100 mA range: 5±20 mΩ or less; 200 mA to 20.000 mA range: 1±100 mΩ or less

- **Voltage measurement accuracy**
  - **Zero-cross Filter**
    - 100 Hz: ±0.1% rdg. ±0.2%f.s.
    - 500 Hz: ±0.1% rdg. ±0.2%f.s.

#### Synchronization sources

- **DC**: 0.1 Hz to 100 kHz
- **AC**: 0.1 Hz to 100 kHz

#### Sampling frequency

- Approx. 700 kHz

### Active power

- **Frequency (f)**
  - Input < 50%f.s.: ±0.1% rdg. ±0.2%f.s.
  - 50%f.s. ≤ Input < 100%f.s.: ±0.3%f.s.
  - 100%f.s. ≤ Input: ±(0.3+0.05×F)% rdg.

- **Harmonic content for voltage and current**: ±(0.03+0.07×F)% rdg.

### Rectifiers

- **AC**: 50 Hz/60 Hz

### Effect of power frequency

- **Temperature coefficient**: ±0.03%/°C or less.

### Effect of temperature

- **Warm-up time**: 30 minutes

### Effects of power supply changes

- **Operating conditions**: Warm-up time: 30 minutes

### Effect of magnetic field

- **Effective measurement range**: ±0.1% rdg. ±0.1%f.s. or less

### Measurement accuracy

#### Frequency (f)

- **Input < 50%f.s.**: ±0.1% rdg. ±0.2%f.s.
- **50%f.s. ≤ Input < 100%f.s.**: ±0.3%f.s.
- **100%f.s. ≤ Input**: ±(0.3+0.05×F)% rdg.

#### Current

- **Frequency (f)**
  - Input < 50%f.s.: ±0.1% rdg. ±0.2%f.s.
  - 50%f.s. ≤ Input < 100%f.s.: ±0.3%f.s.
  - 100%f.s. ≤ Input: ±(0.3+0.05×F)% rdg.

#### Voltage

- **Frequency (f)**
  - Input < 50%f.s.: ±0.1% rdg. ±0.2%f.s.
  - 50%f.s. ≤ Input < 100%f.s.: ±0.3%f.s.
  - 100%f.s. ≤ Input: ±(0.3+0.05×F)% rdg.

### Effect of self-heating

- **Effect of self-heating**: ±(5±0.05%×I)°Fdg. or less

### Effect of magnetic field

- **Effect of magnetic field**: ±0.1% rdg. or less

### Post-adjustment

- **Accuracy guaranteed**: 1 year

### Post-adjustment accuracy guaranteed

- **Input**: ±0.05%/°C or less
Voltage/Current/Active Power Measurement Specifications

Measurement types: Rectifiers: AC+DC, DC, AC, FND, AC+DC Unm

Effective measuring range
- Voltage: ±1% to ±15% of the range.
- Current: ±1% to ±15% of the range.
- Active Power: ±0% to ±23.1% of the range (no zero-suppression)

Display range
- Voltage: Up to ±52% 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 ±9 μA.
- Active Power: ±0% to ±23.1% of the range (no zero-suppression)

Polarity
- Voltage: Displayed when using DC rectifier
- Active Power: Positive: Power consumption (no polarity display)
- Negative: Generation or regenerated power

Voltage Waveform Peak Value/Current Waveform Peak Value Measurement Specifications

Measurement method
- Measures the voltage waveform’s peak value (for both positive and negative polarity) based on sampled instantaneous voltage values.
- Effective measuring range
  - Voltage: 500.00 V
  - Current: 30.00 A
- Display range
  - Voltage: 1.0000 V to 612.00 V
  - Current: 1.0000 mA to 6.0000 A
- Effective measuring range
- Display range
- Voltage RMS value

Frequency Measurement Specifications

Measurement method
- Calculates from input waveform period (reciprocal method)
- Measurement method
- Measurement accuracy
- Measurement range
- Time Average Current/Time Average Active Power Measurement Specifications
- Measurement accuracy
- Effective measuring range
- Display range
- Time Average Current: ±0% to ±3745.4% of the range (Has polarity when using the DC rectifier)
- Time Average Active Power: ±0% to ±3745.4% of the range (Has polarity)

Functional Specifications

Auto-range (AUTO)
- Automatically changes the voltage and current range according to the input.
- Range up: The range is increased when input exceeds 150% of the range or when the peak is exceeded.
- Range down: The range is decreased when input falls below 15% of the range. However, the range is not decreased when the peak is exceeded at the lower range.
- The input level is monitored, and the range is switched over multiple ranges. Range select can only be used to disable ranges that are not selected.
- Ranges cannot be selected with the range keys. Range switching does not occur during auto-range integration.
- Ranges cannot be selected with the range keys. Range switching does not occur using auto-range operation.
- Range switching occurs using auto-range operation. Range switching occurs during auto-range integration.
- Range can be selected with the range keys. Range switching does not occur during auto-range integration.

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

Method: Simple averaging

Number of averaging iterations and display update interval

<table>
<thead>
<tr>
<th>Number of averaging iterations</th>
<th>Display update interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (OFF)</td>
<td>20 ms</td>
</tr>
<tr>
<td>2</td>
<td>400 ms</td>
</tr>
<tr>
<td>5</td>
<td>1 s</td>
</tr>
<tr>
<td>10</td>
<td>2 s</td>
</tr>
<tr>
<td>25</td>
<td>5 s</td>
</tr>
<tr>
<td>50</td>
<td>10 s</td>
</tr>
<tr>
<td>100</td>
<td>20 s</td>
</tr>
</tbody>
</table>

Scaling
- Applies user-defined VT and CT ratio settings to measured values.
- VT ratio setting range: OFF (1:0), 0.001 to 1000
- CT ratio setting range: OFF (1:0), 0.001 to 1000

Hold
- Stops display updates for all measured values and fixes the display value 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.

Apparent Power/Reactive Power/Power Factor/Phase Angle Measurements

Measurement types
- Apparent Power/Reactive Power/Power Factor: AC+DC, AC, FND, AC+DC Unm
- Phase Angle: AC, FND

Effective measuring range
- All per voltage, current, and active power effective measurement ranges
- Display range
- Apparent Power/Reactive Power: 0% to 231.04% of the range (no zero-suppression)
- Power Factor: ±0.0000 to ±1.0000
- Phase Angle: ±180.00° to ±180.00°

Power Calculation Formulas

\[ S = (V \times I) \]

\[ Q = S \times \sin \phi \]

\[ \varphi = \pi - \tan^{-1} \frac{Q}{P} \]

The above measurement accuracy is multiplied by 2 for the 1 mA range.

\[ \pm 2.0\% \text{ f.s. at DC and when } 10 \text{ Hz} \leq f \leq 1 \text{ kHz (f.s.: current peak range).} \]

\[ \pm 0.1\% \text{ rdg. } \pm 1 \text{ dgt. However, for 1 mA range, } \pm 0.3\% \text{ rdg. } \pm 1 \text{ dgt.} \]

Effective measuring range
- 0.1 Hz to 100 kHz
- For one wave input that is at least 20% of the measurement source’s measurement range
- Measurement lower limit frequency setting: 0.1 sec. / 1 sec. / 10 sec. (linked to synchronization timeout setting)

Display format
- 0.1000 Hz to 9.9999 Hz
- 9.9900 Hz to 99.999 Hz
- 99.990 Hz to 999.999 Hz
- 999.990 Hz to 100.000 Hz

Maximum Current Ratio Measurement Specifications (MCR)

Measurement method
- Calculates the ratio of the current crest factor to the power factor.
- (MCR) = (Current Crest Factor) / (Power Factor)

Effective measuring range
- As per power factor (voltage, current, active power, and current crest factor) (current, current waveform peak value) effective measurement ranges
- Display range
- 1.0000 to 6.1200 M (no polarity)

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

- **Integration operation modes**
  - Switchable between fixed-range integration and auto-range integration.
  - 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.

- **Measurement items and display**
  - Simultaneous integration of the following 6 parameters: Harmonic voltage RMS value, Harmonic voltage content percentage, Harmonic voltage phase angle, Harmonic current RMS value, Harmonic current content percentage, and Harmonic current phase angle.

- **Measurement types**
  - Resistors: DC, AC-DC, AC+DC
  - Current: Displays the result of integrating current RMS value data (display values) once every display update interval as an integrated value.

- **Synchronization types**
  - Synchronized control function on/off (signals input to the external synchronization terminal (EXT.SYNC) are ignored)
  - Synchronized control function off (slave, display hold operation; key lock operation; and zero-adjustment operation for the slave PW3335 series is synchronized with the master PW3335 series. Synchronization with the PW3336 series and PW3337 series is also supported)

- **Harmonic Measurement Specifications**
  - **Measurement method**
    - Zero-cross simultaneous calculation method
    - Uniform thinking between zero-cross events after processing with a digital anti-aliasing filter.
  - **Measurement items**
    - Harmonic voltage RMS value
    - Harmonic voltage phase angle
    - Harmonic current RMS value
    - Harmonic current phase angle
    - Harmonic active power
    - Harmonic active power content percentage
    - Harmonic voltage content percentage
    - Harmonic current content percentage
    - Total harmonic voltage distortion
    - Total harmonic current distortion
    - Fundamental wave voltage
    - Fundamental wave current
    - Fundamental wave reactive power
    - Fundamental wave power factor
    - (The following parameters can be downloaded as data with communications)
      - Harmonic voltage phase angle
      - Harmonic current phase angle

- **Display Specifications**
  - **Display resolution**
    - Other than integrated values: 99999 count (6 digits)

- **Synchronized control**
  - Functions
    - The timing of calculations, display updates, data updates, integration stop, and reset events; display hold operation; key lock operation; and zero-adjustment operation for the slave PW3335 series is synchronized with the master PW3335 series. Synchronization with the PW3336 series and PW3337 series is also supported.
  - **Terminal**
    - BNC terminal x 1 (not isolated)

- **External Current Sensor Input Specifications (PW3335-03 and PW3335-04)**
  - **Terminal**
    - Isolated BNC terminals
  - **Current sensor type**
    - When set to off, input from the external current sensor is ignored.
### D/A Output Specifications (PW3335-02 and PW3335-04)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of output channels</td>
<td>7 channels</td>
</tr>
<tr>
<td>Configuration</td>
<td>16-bit D/A converter (polarity +16 bits)</td>
</tr>
<tr>
<td>Output voltage</td>
<td>The output level, output speed, and waveform output can be selected. Level output: 2 VIL or 5 VIL, linked to display updates High-speed level output: 2 VIL or 5 VIL, linked to synchronization interval Waveform output: 1 VIL, linked to sampling</td>
</tr>
<tr>
<td>Output parameters</td>
<td>Output parameters for all channels Available selections vary with the output parameter. Level output/High-speed level output: Waveform output Voltage, current, active power Only Level output: Apparent power, reactive power, power factor, phase angle, total harmonic voltage distortion, total harmonic current distortion, voltage ripple rate, current ripple rate, voltage crest factor, current crest factor, time average current, time average active power, maximum current ratio Only Level output: 5 VIL Frequency, current integration, active power integration The rectifier can be selected. Harmonic-order output is not supported.</td>
</tr>
<tr>
<td>Output accuracy</td>
<td>f.s.: Relative to the output voltage rated value for each output parameter Level output: (Output parameter measurement accuracy) ± (±0.2% FS) High-speed level output: (Output parameter measurement accuracy) ± (±0.2% FS) Waveform output: (Output parameter measurement accuracy) ± (±1.0% FS)</td>
</tr>
<tr>
<td>Frequency response</td>
<td>Waveform output, high-speed level output: At DC or 10 Hz to 30 kHz, accuracy is as defined above. Maximum output voltage: Approx. ±12 V DC Output update rate: Same as the data update period. High-speed level output: AC Updated once every cycle for the input waveform set as the synchronization source. However, voltage and current are only updated once every cycle for input signals from 45 to 66 Hz. Waveform output: Approx. 1.43 μs (approx. 700 kHz)</td>
</tr>
<tr>
<td>Response time</td>
<td>Level output: 0.6 μs or less High-speed level output: 2 ms or less waveform</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±0.05%/°C or less</td>
</tr>
<tr>
<td>Output resistance</td>
<td>Approx. 100 Ω</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)</td>
</tr>
<tr>
<td>Humidity</td>
<td>10°C to 30°C (14°F to 86°F), 80% RH or less (no condensation)</td>
</tr>
<tr>
<td>Output current</td>
<td>200 mA to 20 A range 30 A, ±100 A peak</td>
</tr>
<tr>
<td>Vol. measured</td>
<td>420 V rms AC (current sensitivity: 1 mA) Between the voltage input terminals and a connection consisting of chassis, interfaces, and output terminals Between the current input terminals and a connection consisting of chassis, interfaces, and output terminals Between the voltage input terminals and current input terminals</td>
</tr>
<tr>
<td>Maximum rated voltage to earth</td>
<td>Measurement category III 600 V (anticipated transient overvoltage: 600 V) Measurement category II 1000 V (anticipated transient overvoltage: 600 V)</td>
</tr>
<tr>
<td>Voltage input terminal</td>
<td>Rated voltage: 30 VA or less Rated supply voltage: 100 V AC to 240 V AC 50 Hz/60 Hz</td>
</tr>
<tr>
<td>Maximum rated current</td>
<td>30 A or less</td>
</tr>
<tr>
<td>Product warranty</td>
<td>3 year</td>
</tr>
<tr>
<td>Operating environment</td>
<td>Indoors, altitude up to 2000 m (6562 ft.), pollution degree 2</td>
</tr>
<tr>
<td>Storage temperature and humidity</td>
<td>-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)</td>
</tr>
<tr>
<td>Cables</td>
<td>2.5 mm² or larger</td>
</tr>
<tr>
<td>Accessories</td>
<td>Instruction manual x1 Power cord x1 Voltage and current input terminal safety cover x2</td>
</tr>
</tbody>
</table>
# 3334 Specifications

## Basic Specifications

<table>
<thead>
<tr>
<th>Measurable lines</th>
<th>Single-phase, two-wire (AL/DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement parameters</td>
<td>Voltage, current, active power, apparent power, power factor, frequency, integrated current and active power, waveform peak (voltage and current)</td>
</tr>
<tr>
<td>Measurement method</td>
<td>Simultaneous digital sampling of voltage and current, True RMS</td>
</tr>
<tr>
<td>Sampling Frequency</td>
<td>Approx. 74.4 kHz</td>
</tr>
</tbody>
</table>

### Measured Current Ranges

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Current Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.0 mA</td>
<td>0.0 mA to 100.0 A</td>
</tr>
<tr>
<td>500.0 mA</td>
<td>0.0 mA to 500.0 A</td>
</tr>
<tr>
<td>1.00 A</td>
<td>0.0 mA to 1.00 A</td>
</tr>
<tr>
<td>5.00 A</td>
<td>0.0 mA to 5.00 A</td>
</tr>
<tr>
<td>20.0 A</td>
<td>0.0 mA to 20.0 A</td>
</tr>
<tr>
<td>100.0 A</td>
<td>0.0 mA to 100.0 A</td>
</tr>
<tr>
<td>500.0 A</td>
<td>0.0 mA to 500.0 A</td>
</tr>
<tr>
<td>1.00 kA</td>
<td>0.0 mA to 1.00 kA</td>
</tr>
<tr>
<td>5.00 kA</td>
<td>0.0 mA to 5.00 kA</td>
</tr>
<tr>
<td>20.0 kA</td>
<td>0.0 mA to 20.0 kA</td>
</tr>
<tr>
<td>100.0 kA</td>
<td>0.0 mA to 100.0 kA</td>
</tr>
</tbody>
</table>

### Frequency bandwidth

- DC: 50 Hz to 5 kHz
- AC: 50 Hz to 60 Hz

## Measurement accuracy

<table>
<thead>
<tr>
<th>Rated supply voltage</th>
<th>100 to 240 VAC, 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage environment</td>
<td>-10 to 50 ºC, 80% RH or less, non-condensating</td>
</tr>
<tr>
<td>Operating environment</td>
<td>0 to 40 ºC, 80% RH or less, non-condensating</td>
</tr>
<tr>
<td>Safety</td>
<td>EN61010 Pollution Factor 2, ≤2000 pC (excluding foots and projections)</td>
</tr>
</tbody>
</table>

### Input specifications

- Measurable lines: Single-phase, 2-wire (AC/DC)
- Guaranteed Period: 1 year ±0.1 %rdg. ±0.2 %f.s. ±0.3 %rdg. (at 23°C ±5, max. 80%rh, sine wave input, power factor=1, in-phase voltage =0V, accuracy specifications differ depending on usage period of 1 or 3 years)
- Rectification method: Full-wave rectification
- Frequency Guaranteed: 45 Hz ≤ f < 66 Hz ±3 years ±0.1 %rdg. ±0.2 %f.s. ±0.3 %rdg.
- Frequency Guaranteed: 66 Hz < f < 1 kHz ±1 year ±0.1 %rdg. ±0.1 %fs |
- Frequency Guaranteed: 1 kHz < f < 5 kHz ±1 year ±0.1 %rdg. ±0.1 %fs |

### Output specifications

- Simple averaging of specified number of samples: 1, 2, 5, 10, 25, 50 or 100
- Frequency measurement: Maximum ±0.5% f.s. + individual measurement accuracy
- Voltage output: ±2 VDC f.s. for each range
- Voltage and current: 0.5% to 105% of range
- Active power: 0% to 231.04% of range
- Voltage, current, and active power: 3 simultaneous channels
- Analog output (D/A output): Voltage, Current and Active power (3 simultaneous channels)
- Ratio: 1 to 20, 30, 60, 100, 200, 300, 500, 1000, 2000, 3000, 5000, 10000

### Functional Specifications

- Integration measurement: 6 digits
- Current Integration: 0.000000mWh
- Active power Integration: 0.000000Wh
- Integration time: Minimum 1 min
- Measurement accuracy: ±0.1 %rdg. ±0.5% f.s.
- Waveform measurement: Maximum value of positive and negative waveform of voltage/ current (up to 300% of full scale range)
- Measurement accuracy: ±1.3 %rdg. ±1.3% f.s.
- Rectification method: Six-pulse
- Frequency delay after input change in input (0 to 90% or 10% to 10% range)
- Average function: Average of specified number of samples: 1, 2, 5, 10, 25, 50 or 100
- VT or CT ratio: 1, 2, 4, 10, 20, 30, 60, 100, 200, 300, 500, 1000, 2000, 3000, 5000, 10000
- Power factor: 0 to 230.0% of range
- Power: 0% to 231.04% of range
- Dimensions and mass: 190 mm (B) x 98 mm (H) x 50 mm (D) with 1.9 kg (67.0 oz)

### General Specifications

- Safety: EN61010 Pollution Factor 2, Measurement Category III (4000 V anticipated overvoltage)
- EMC: EN61326, EN61000-3-2, EN61000-3-3
- Operating environment: 0 to 40 ºC, 80% RH or less, non-condensing
- Storage environment: -50 to 60 ºC, 80% RH or less, non-condensing
- Rated supply voltage: 100 to 240 VAC, 50/60 Hz
- Maximum rated power: 20 VA
- Back-up function: Display hold, Maximum value hold, Peak value hold, Key lock, Backup function (reserves settings, integration data)
## 3-phase Power Meter

<table>
<thead>
<tr>
<th>Model &amp; Appearance</th>
<th>Model No. (Order Code)</th>
<th>Number of Channels</th>
<th>AC/ DC</th>
<th>Harmonic Measurement</th>
<th>LAN</th>
<th>RS-232C</th>
<th>GP-IB</th>
<th>D/A output</th>
<th>Current Sensor Input</th>
<th>Synchronized Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER METER PW3337</td>
<td>PW3337</td>
<td>3</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3337-01</td>
<td>3</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3337-02</td>
<td>3</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3337-03</td>
<td>3</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>POWER METER PW3336</td>
<td>PW3336</td>
<td>2</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3336-01</td>
<td>2</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3336-02</td>
<td>2</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3336-03</td>
<td>2</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

**Accessories:** Instruction manual x1, Measurement guide x1, Power cord x1

## Single-phase Power Meter

<table>
<thead>
<tr>
<th>Model &amp; Appearance</th>
<th>Model No. (Order Code)</th>
<th>Number of Channels</th>
<th>AC/ DC</th>
<th>Harmonic Measurement</th>
<th>LAN</th>
<th>RS-232C</th>
<th>GP-IB</th>
<th>D/A output</th>
<th>Current Sensor Input</th>
<th>Synchronized Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER METER PW3335</td>
<td>PW3335</td>
<td>1</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3335-01</td>
<td>1</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3335-02</td>
<td>1</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3335-03</td>
<td>1</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>PW3335-04</td>
<td>1</td>
<td>AC/ DC</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>AC/ DC POWER HITESTER 3334</td>
<td>3334</td>
<td>1</td>
<td>AC/ DC</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>3334-01</td>
<td>1</td>
<td>AC/ DC</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>POWER HITESTER 3333</td>
<td>3333</td>
<td>1</td>
<td>AC</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td></td>
<td>3333-01</td>
<td>1</td>
<td>AC</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td></td>
<td>×</td>
</tr>
</tbody>
</table>

**Accessories:** Instruction manual x1, Power cord x1

**Communications and control options**

- **RS-232C Cable 9637**
  - Cable length: 1.8 m (5.91 ft)
  - 9pin to 9pin
- **GP-IB Connector Cable 9151-02**
  - Cable length: 2 m (6.56 ft)
- **LAN Cable 9642**
  - Cable length: 5 m (16.41 ft) supplied with straight to cross conversion cable
- **Connection Cord 9165**
  - 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.*