WT Series & PZ
Power Analyzer WT series & PZ

WT3000
Accuracy: 0.02%
Frequency range: DC, 0.1 Hz to 1 MHz

WT1600
Accuracy: 0.1%
Frequency range: DC, 0.5 Hz to 1 MHz

WT230
Accuracy: 0.1%
Frequency range: DC, 0.5 Hz to 100 kHz

WT210
Accuracy: 0.1%
Frequency range: DC, 0.5 Hz to 100 kHz

PZ4000
Accuracy: 0.1%
Frequency range: DC, 0.1 Hz to 1 MHz

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Yokogawa’s WT Series & PZ Power Analyzers and PZ: Advanced Technology and High Reliability for a Wide Range of Power Measurement Solutions

**Effect of Common Mode Voltage on Readings**
- Industrial electronics (power supplies, motors, air conditioners, etc.)
- Power measurement on manufacturing & testing lines
- Inverters (R&D, testing)

**Total Power Accuracy (%)**

- Total Active Power Error [as a % of range]
- Total Error [as a % of range]
- Total Power Accuracy [%]

**Power Frequency Range [Hz]**

- DC 10 100 1k 10k 100k 1MHz

**Specifications of WT Series and PZ4000**
- Frequency vs. Power Accuracy at Unity Power Factor
- Total power error with rated range input for an arbitrary power factor (50/60Hz, 20A input element)

**Effect of Common Mode Voltage on Readings**

**Total Power Accuracy**

- Total Active Power Error:
  - WT3000: 100V/5A range
  - PZ4000: 300Vpk/1Apk range (5 A input terminal)

**Battery**

- WT1600: 150V/1A range (5 A input element)
- WT3000: 100V/5A range

**Power Measurement Bandwidth**

- WT1600: 0.15% 1MHz
- WT210/WT230: 0.2% 100kHz

- PZ4000: Power Analyzer
  - High end model with world-class accuracy and stability that also offers support for IEC/JIS standards testing
  - Power measurement bandwidth: DC, 0.1 Hz to 1 MHz
  - Basic power accuracy: 0.02%
  - Harmonic analysis and voltage fluctuation/flicker measurement conforming to IEC standards (optional)
  - Select a current input element of 5mA to 2A or 0.5A to 30A
  - A variety of options available for FFT analysis, cycle-by-cycle measurement, and other functions.

- WT1600: Vivid waveform and vector display and a wide range of features for a variety of applications
  - Power measurement frequency range: DC and 0.5 Hz to 1 MHz
  - Basic power accuracy: 0.1%
  - High-voltage measurement (1.5 to 1000 Vrms)
  - Wide current input range (10mA to 5A or 1A to 50A range)
  - As many as six input elements can be installed to enable simultaneous three-phase power measurements on two separate systems.
  - Motor evaluation function (torque, rotating speed inputs) enables computation of total motor efficiency.

- WT230: Compact three-phase model with optional harmonic measurement function
  - Three-phase model (three-phase, three-wire: two input elements; three-phase, four-wire: three input elements)
  - Power measurement frequency range: DC and 0.5 Hz to 100 kHz
  - Basic power accuracy: 0.1%
  - Four-channel DA output and four-channel comparator output enabling GO/NO-GO evaluations on production and testing lines (optional)
  - A variety of other features, including line filter, maximum hold, and integration function with categorization of positive and negative polarity, and average active power function.

- WT210: Low-priced model providing mobility for standalone measurement of standby consumed power and rated power
  - Single-phase model
  - Power measurement frequency range: DC and 0.5 Hz to 100 kHz
  - Basic power accuracy: 0.1%
  - Wide current input range (5mA to 20A)
  - A variety of other features, including line filter, maximum hold, and integration function with categorization of positive and negative polarity, and average active power function.

- PZ4000: Power Analyzer
  - Analyzer with wide frequency range and waveform analysis functions
  - Frequency characteristics: DC and 0.1 Hz to 1 MHz
  - Basic power accuracy: 0.1%
  - Wide variety of waveform analysis functions, including zoom, cursor measurement, and waveform computation
  - Harmonic measurement function (up to 500 orders) and FFT Math function
  - As many as four input elements can be installed to enable simultaneous three-phase power measurements on two separate systems.
  - Motor evaluation function (torque, rotating speed inputs) enables computation of total motor efficiency.

There are limitations on some specifications and functions. See the individual product catalogs for details.
Select the Best Model for Your Applications

### Specifications for WT Series and PZ

<table>
<thead>
<tr>
<th>Model</th>
<th>WT3000</th>
<th>WT1600</th>
<th>WT210/WT230</th>
<th>PZ4000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input elements</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td>Current measurement range</td>
<td>500/1000/5000/10000 A</td>
<td>500/1000/5000/10000 A</td>
<td>500/1000/5000/10000 A</td>
<td>500/1000/5000/10000 A</td>
</tr>
<tr>
<td>Power measurement range</td>
<td>50/60Hz</td>
<td>50/60Hz</td>
<td>50/60Hz</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.02% of reading + 0.05% of range</td>
<td>±0.02% of reading + 0.05% of range</td>
<td>±0.02% of reading + 0.05% of range</td>
<td>±0.02% of reading + 0.05% of range</td>
</tr>
<tr>
<td>Frequency</td>
<td>2ch (up to 8 channels with option /FQ)</td>
<td>3ch</td>
<td>1ch</td>
<td>2ch/module</td>
</tr>
<tr>
<td>Measurement functions</td>
<td>Voltage, current, energy, power, power factor, frequency, phase angle, crest factor</td>
<td>Voltage, current, energy, power, power factor, frequency, phase angle, crest factor</td>
<td>Voltage, current, energy, power, power factor, frequency, phase angle, crest factor</td>
<td>Voltage, current, energy, power, power factor, frequency, phase angle, crest factor</td>
</tr>
<tr>
<td>Display format</td>
<td>Numerical values, waveforms, trends, bar graphs, vectors</td>
<td>Numerical values, waveforms, trends, bar graphs, vectors</td>
<td>Numerical values (3 values)</td>
<td>Numerical values, waveforms, trends, bar graphs, vectors, X-Y</td>
</tr>
<tr>
<td>Storage (internal memory for storing data)</td>
<td>Approximately 30MB</td>
<td>Approximately 11MB</td>
<td>Maximum 600 samples (WT210)</td>
<td>Maximum 600 samples (WT210)</td>
</tr>
<tr>
<td>Interfaces</td>
<td>USB (3A rating, 5V max)</td>
<td>USB (3A rating, 5V max)</td>
<td>USB (3A rating, 5V max)</td>
<td>USB (3A rating, 5V max)</td>
</tr>
<tr>
<td>Cycle by cycle measurement</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RS-232C (Option)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>D/A Output (Option)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

There are limitations on some specifications and functions. See the individual product catalogues for details.

### Application

#### Power measurement for motors and inverters (with WT3000, WT1600, and PZ4000).
Select the model that fits your measurement application.

**Power measurement for motors and inverters:**

- **Input signal example:**
  - WT or PZ
  - Motor
  - Voltage
  - Current
  - Load

- **Output signal example:**
  - WT or PZ
  - Motor
  - Voltage
  - Current
  - Load
  - T: 75/1274 can measure large current up to 600A peak

**Current Transformer:**
- 75/1274 DC to 150 MHz (AC)
- Wide dynamic range: 0 to 600 A
- Selectable input: 0 to 150 A, 0 to 300 A, 0 to 600 A

**Voltage Fluctuation/Flicker Measurement:**
- Example of judgments and report on conformance to IEC61000-3-2 limit values

**Wiring Types and Model Numbers:**

- **WT3000**
- **WT1600**
- **PZ4000**

**Large Current Measurement Using Current Clamp for External Input for current sensor:**
- Select other 75/1274 or 25/503. A current clamp lets you measure currents without needing to disconnect the power supply circuit wires.

**Power Data Acquisition for the Pursuit of Cost-Performance (WT210 and WT230):**

- Select direct input or clamp input measurement

**Example of judgments and report on conformance to IEC61000-3-2 limit values**

**Harmonic/Flicker Measurement Software:**
- Model 761922 offers support for IEC standards compliance tests of harmonics and voltage fluctuation/flicker in a single program.

**Application Software:**
- WWinfer for the WT210/WT230 and PZ4000 is a software application that allows you to load harmonic and waveform data measured with the WT210 on a PC to perform CPF analysis on-site.

**Compliance with the IEC Standard:**
- IEC61000-3-2:2004 (Ger and software for testing standards compliance)
- IEC61000-3-2:2004 (Japanese Standards Compliance, with the VL option)
- IEC61000-3-3:2000 (Japanese Standards Compliance, with the VL option)

**Example of CPF analysis on-site:**
- Example of judgments and CPF analysis on-site using a model 761922.

**Support for IEC Standards Testing:**
- IEC61000-3-2 limit values
- IEC61000-3-2:2004 limit values

**D/A Output (Option):**
- Yes | Yes | Yes | Yes | Yes

**RS-232C (Option):**
- Yes | Yes | Yes | Yes | Yes

**Example of judgments and report on conformance to IEC61000-3-2 limit values**

**Example of judgments and CPF analysis on-site using a model 761922:**
- Requires DC 5 V power supply, connectors, and load resistors.

**Wide Range Precision Multi-range Digital Power Meter:**
- Model offers high precision digital power measurements.
- High-precision digital power measurements, with an accuracy of ±0.02%.
- Voltage and current ranges of 1.5 V to 1000 V, 5A to 50 A.
- Offers high precision digital power measurements.
- Voltage and current ranges of 1.5 V to 1000 V, 5A to 50 A.
- Requires DC 5 V power supply, connectors, and load resistors.

**Wiring Types and Model Numbers:**

- **WT210**: Single phase 3-wire (3 voltages, 3 currents) *1
- **WT230**: Single phase 2-wire
- **PZ4000**: Single phase 2-wire

*1 Measured using the 3-parameter method.
Related Products for Power Measurement

### Current sensor Units
- **751521** and **751523**
  - DC to 100 kHz/600 Acp
  - Combined Calibration
  - Wide dynamic range: 0 to 600 A (DC)/600 Apeak (AC)
  - Wide measurement frequency range: DC to 100 kHz (-3 dB)
  - High-precision basic accuracy: ±(0.05% of reading ± 40 µA)
  - Innovative casing design for superior noise characteristics
  - Can be combined with WT series of P24000 for assured accuracy and combined calibration.
- **751574**
  - DC to 100 kHz/600 Apeak
  - Wide dynamic range: 0 to 600 A (DC)/600 Apeak (AC)
  - Wide measurement frequency range: DC to 100 kHz (-3 dB)
  - Highly precise basic accuracy: ±(0.05% of reading ± 40 µA)
  - Requires DC ±15 V power supply, connectors, and lead resistors.

### Connectors and Cables
- **758917**
  - Test lead set
  - Two leads (red and black) in one set.
  - Length: 0.75 meter
  - Rating: 1000 V
- **758922**
  - Alligator clip adapters (small)
  - Two adapters to a set.
  - Connected to model 758917 measurement leads.
  - Rating: 300 V
- **758929**
  - Alligator clip adapters (large)
  - Two adapters to a set.
  - Connected to model 758917 measurement leads.
  - Rating: 1000 V
- **758924**
  - Conversion adapter
  - For conversion between male BNC and female banana plug
- **758931**
  - Safety terminal adapter set
  - Two adapters to a set.
  - 1.5 mm hex wrench is attached to fasten cable.
- **701959**
  - Safety mini-clip set (hook Type)
  - 2 pieces (red and black) in one set.
  - Rating: 1000 V
- **366924/25**
  - BNC cable (BNC-BNC 1m/2m)
  - For connection to simultaneously measurement with 2 units, or for input external trigger signal.
- **B9284LK**
  - External Sensor Cable
  - For connection the external input of the WT3000 to current sensor.
  - Length: 50 cm

#### Accessory Set
- **758921**
  - Conversion adapter (BNC-BNC 1m/2m)
  - Use with model 758922 or 758930.
  - Total length: 0.75 meter
  - Rating: 1000 V

### Connecting Diagrams
- **Connecting the Measurement Cables and Adapters**
- **Connecting Diagram for Current Transducer**
- **Connecting Diagram for Clamp-on Probe**

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*These models don’t conform with CE Marking.*

See the power meter accessories catalog (Bulletin 7515-52E) for detailed specifications and a product selection guide.

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*Don’t connect and use the current input terminal and EXT terminal simultaneously.*
Data Acquisition and Remote Control Using a PC

Software

- **WTViewer760122 (WT3000/WT1600)**
  - WTViewer is a software application that allows you to load numerical and waveform data measured by the WT3000 Precision Power Analyzer or WT1600 Digital Powermeter onto a PC via GP-IB, serial (RS-232), Ethernet, or USB (WT3000 only) communications for waveform display and analysis/saving of the data.

- **PowerViewer Software 253734 (PZ4000)**
  - PowerViewer is a software package that can load measurement data from a PZ4000 power analyzer into a PC, through a communication interface or from a file. PowerViewer can display or analyze the loaded data, or can use math functions to simultaneously compute and display up to 4 megawords of captured multichannel data.

- **LabView Driver**
  - Data acquisition possible using LabVIEW. LabVIEW drivers can be downloaded from our Web site.

Please check our Web site for details on the various software programs.

Model and Suffix Codes

**WT200 Series**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>76001</td>
<td>D</td>
<td>WT210, 1-input element model</td>
</tr>
<tr>
<td>76002</td>
<td>D</td>
<td>WT210, 2-input element model</td>
</tr>
<tr>
<td>76003</td>
<td>D</td>
<td>WT210, 3-input element model</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Interface</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-IB communications function</td>
<td></td>
</tr>
<tr>
<td>RS-232 communications function</td>
<td></td>
</tr>
<tr>
<td>Ethernet communications function</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power cord</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL/CSA standard</td>
<td></td>
</tr>
<tr>
<td>UL/CSA standard</td>
<td></td>
</tr>
<tr>
<td>UL/CSA standard</td>
<td></td>
</tr>
</tbody>
</table>

Options

- External input 50/100/200 mV
- 4-channel D/A output
- Comparator & D/A, each of 4 channels

**WT1600**

<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT1600</td>
<td>-C1</td>
<td>WT1600 digital power meter main unit</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
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<tr>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>6</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element types and quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>50: 50 A input element</td>
</tr>
<tr>
<td>50: 5 A input element Bank 1</td>
</tr>
<tr>
<td>50: 5 A input element Bank 2</td>
</tr>
<tr>
<td>50: 5 A input element Bank 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication function</th>
</tr>
</thead>
<tbody>
<tr>
<td>GP-IB</td>
</tr>
</tbody>
</table>

Options

- Internal printer
- GSP interface
- Ethernet, HDMI, BCSI
- 8-channel DA output
- Motor evaluation function

Note: The WT200 communications feature cannot be modified or provided later after delivery of the product.
Precision Power Analyzer WT3000

Model | Suffix Code | Description
---|---|---
760301 | WT3000 1 input element model
760302 | WT3000 2 input elements model
760303 | WT3000 3 input elements model
760304 | WT3000 4 input elements model

Element number | Description
---|---
-61 | 30A input element for 760301 model
-63 | 20A input element for 760303 model
-66 | 10A input element for 760304 model

Version | Description
---|---
-JS | Standard Version
-M | Master Version

Power cord | Description
---|---
-D | UL/CSA standard
-F | VDE standard
-I | SAS standard
-Q | BS standard
-T | GB standard

Options | Description
---|---
AG6 | Advanced Computation (IEC standard testing, harmonic, FFT, Waveform computation)
BS | Built-in Printer
EQ | Add-on Frequency Measurement
FA | Digital Operator
G2 | RS-422 Serial Interface
G3 | USB port (Peripheral)
G5 | USB port (PC)
G6 | Select one/C12
HL | Voltage Fluctuation, Flicker

Accessory (sold separately)

Model | Part number | Description
---|---|---
761922 | Harmonic/Voltage fluctuation/Flicker Measurement Software | Standard-compliant measurement
751521 | Single-phase | DC to 100 kHz (3-dB), -400 A to 2 A to +400 A (DC)
751522 | Three-phase U, V, W | Basic accuracy: ±0.05% of rdg* + 40 mA Superior noise withstanding ability and CMRR characteristics due to optimized casing design.

Supply voltage | Description
---|---
-1 | 100 V AC (50/60 Hz)
-2 | 75 V AC(50/60 Hz)
-3 | 40 V AC(50/60 Hz)

Power cord | Description
---|---
-D | UL/CSA standard
-F | VDE standard
-I | SAS standard
-Q | BS standard
-T | GB standard

PZ4000

Model | Suffix Code | Description
---|---|---
253710 | PZ4000 Power Analyzer | Power measurement module Voltage: 1000 V

Power card | Description
---|---
-D | UL-CSA standard
-F | VDE standard
-I | SAS standard
-Q | BS standard
-T | GB standard

Options | Description
---|---
A3 | Memory extension to 4 M word/CH
A4 | Memory extension to 1 M word/CH
B8 | Add-on Frequency Measurement
A9 | USB port (Peripheral)
C7 | USB port (PC)

Model Suffix Code | Description
---|---
253751 | Power measurement module Voltage: 1000 V, Current: 5 A, current sensor: 500 mV
253752 | Power measurement module Voltage: 1000 V, Current: 20 A, current sensor: 500 mV
253771 | Sensor input module torque/rotating speed input

Sensor input module can be used element 4 slot only.

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NOTICE

- Before operating the product, read the instruction manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly involve personnel safety, please consult the Yokogawa sales offices.

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