WT210/WT230 Digital Power Meters

Digital Sampling Power Meters with Superior Cost Performance

- Low power measurement (IEC62301)
- Harmonic measurement
- Compact design (half-rack size)
- Line filter function
- User calibration capability

Basic Power Accuracy

±0.2% 

Crest factor

6 at rated input

Frequency range

DC 0.5 Hz to 100 kHz

Low current (WT210)

5 mA range

3-Year Warranty

Bulletin 7604-00E
The WT230’s advanced specifications and its wide range of functions let you handle all your measurement applications from low-frequency equipment to three phase equipments using a single power meter. One unit also handles standby low-power measurements and rated-power measurements (functions available with the WT210 only).

**Wide range of 5 mA to 20 A**

The built-in 5 mA range lets you measure currents as low as 25 µA. This makes it possible to measure very low currents on such things as intermittent control equipment. The wide current range (5 mA to 20 A) means a single power meter can be used for applications such as Energy Star® measurements, to measure everything from standby-power to rated-power.

**Free Software**

**WTViewer for the WT210/WT230**

Easily Acquire and Manage Power Measurement Data from Your PC

**Power Consumption Measurement Software for IEC62301**

**Functions and Features of the WT210 and WT230**

- **A Wide Frequency Range Lets You Work on a Variety of Different Applications**
  - **LEDs**
  - **Low-frequency Equipment**
    - Low-frequency measurements starting at 55 Hz
    - Power accuracy is even better than in former WT series.
  - **Commercial Power Supplies**
    - Power accuracy is assured between 1% and 130%
  - **Intermittent Control Equipment Applications**
    - Average active power display
  - **Accuracy Is Assured Between 1% and 130%**

- **Capture a Variety of Signal Types**
  - **Surge current and maximum load state**
    - MAX hold function for voltage, current, and power
  - **Constantly changing signals**
    - With measurement intervals as short as 0.1 second, you can capture transient phenomena with a fine level of detail. You can also reduce the time per measurement for increased throughput in production testing.
  - **Noisy Signals**
    - This function lets you measure fundamental wave rms values for inverter output voltages.
  - **Half-wave Rectification, Intermittent Control, Distortion Waves**
    - Measurement of DC components
    - In addition to using DC inputs, you can obtain precise measurements of signals containing DC components, such as intermittent signals and half-wave rectification signals.
  - **Clamp probe**
    - This function lets you measure fundamental wave rms values for inverter output voltages.

- **Applications for a Variety of Add-on Options**
  - **D/A output**
    - This option lets you output a variety of measurement signals.
  - **ScopeCorder**
    - A 4-channel relay contact output (normal-open and normal-close pair) lets you do GO/NO-GO evaluations on production and testing lines.
  - **Comparator output**
    - A 4-channel relay contact output (normal-open and normal-close pair) lets you do GO/NO-GO evaluations on production and testing lines.
  - **GO/NO-GO Evaluations on Testing Lines**
    - A 4-channel relay contact output (normal-open and normal-close pair) lets you do GO/NO-GO evaluations on production and testing lines.

- **Measurement According to Each Standard**
  - **Battery equipment applications**
    - Integrating power measurement by polarity
  - **For Requirements for IEC and Other Standards**
    - Crest factor (CF) is 6 mode
    - This mode allows easy measurement using instruments for which crest factors (CF) of 5 and above are required, as is with most standards including IEC62018.

- **Extended Energy Measurement Applications**
  - Maximum integration time: 10,000 hours

- **Power Supply Harmonic Measurements**
  - Calculate voltage, current, reactive power, content ratio, and phase angle relative to fundamental frequency for up to 50 orders. Measurement time is approximately 90% shorter than in former models.

Information on the features and functions of Yokogawa’s WT210, WT230, accessories, and related products is also available at our web site. [http://www.yokogawa.com/tm/](http://www.yokogawa.com/tm/)

The specifications in facing pages are for crest factor 3 setting. See page 5 for the specifications of crest factor 6 setting.
Basic Characteristics (for crest factor 3)

Example of Frequency-power Accuracy Characteristics

Example of WT210 Current Accuracy

Current Input Surge Withstanding Ability

Example of Influence of Common Mode Voltage

Example of D/A Output Response

Comparison with Former Models

WT230/WT130
WT210/WT230
Voltage input terminal
Binding post
Plug-in terminal (safety terminal)
External input terminal
Plug-in terminal (safety terminal)
BNC
Voltage and current basic accuracy
0.25% of rng
0.2% of rng
Power basic accuracy
0.2% of rng (WT230)
0.25% of rng
Frequency range
DC, 10 Hz to 20 kHz
DC, 0.5 Hz to 100 kHz
Assured accuracy range
10% to 130% of range rating
1% to 130% of range rating
Display updating interval
0.25 second (fixed)
0.1/0.25/0.5/1/2/5 seconds
V, A, W display digits
4 digits
5 digits
Line filter function
No
Yes (fc = 500 Hz)
Frequency filter function
Yes (fc = 300 Hz)
Yes (fc = 500 Hz)
Key lock
No
Yes
Harmonic measurement display
Approximately 3 seconds
0.05/0.01/0.005 seconds
Remote signals when compared to Nothing
displayed
EXT STOP EXT REC EXT BUS EXT SIM EXT 50Hz
EXT STOP, EXT REC, EXT BUS, EXT SIM are on display
Display digits (factory default)
4 digits
5 digits
Remote data transmission protocol
ASCII
ASCII, binary
Addressable module 5 bits
Yes
Yes
Display digit (factory default)
4 digits
5 digits
Remote data transmission protocol
ASCII
ASCII, binary

Functions included with the WT230 but not included with the WT210

- MAX hold function
- Moving decimal point display based on integrated power value
- 12,800 hour maximum integration time
- Integration with live data omission
- Average active power display

WT230

WT210
## Specifications

The latest product information is available at our web site [http://www.yokogawa.com/tm]. Review the specifications to determine which model is right for you.

### Input Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input type</td>
<td>Resistance voltage divider</td>
<td>Direct input: 5/10/20/50/100/500 mA (WT210 only)</td>
</tr>
</tbody>
</table>

#### Rated values (ranges)

<table>
<thead>
<tr>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cref 3</td>
<td>12/20/45/150/300/500 V</td>
</tr>
<tr>
<td>Cref 6</td>
<td>7.5/35/75/150/300 V</td>
</tr>
</tbody>
</table>

#### Measurement input (Input resistance)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Input resistance</th>
<th>Input capacitance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximately 2 MΩ</td>
<td>Approximately 10 pF</td>
<td></td>
</tr>
</tbody>
</table>

#### Accuracy (1 year)

<table>
<thead>
<tr>
<th>Measurement frequency ranges</th>
<th>Measurement inputs</th>
<th>± Accuracy</th>
<th>± Accuracy (1 year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>V1, V2, V3, A1, A2, or A3 (select one)</td>
<td>Direct input: 5/10/20/50/100/500 mA (WT210 only)</td>
<td>0.5/1.0/2.0 A (WT210/WT230)</td>
<td>2.5/5.5/10/20 V(1X) or 5/50/100 mA(MX)</td>
</tr>
</tbody>
</table>

#### Measurement Lower Limit Frequency

<table>
<thead>
<tr>
<th>Measurement lower limit frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 Hz</td>
</tr>
</tbody>
</table>

#### Input Specifications Table

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>0.5 Hz ≤ f ≤ 45 Hz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>45 Hz ≤ f &lt; 5 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>5 kHz ≤ f ≤ 50 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>50 kHz ≤ f ≤ 100 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>100 kHz ≤ f ≤ 20 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>20 kHz ≤ f ≤ 100 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
</tbody>
</table>

#### Input Specifications Table (continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power factor</td>
<td>+0.04% (+14%) of rdg</td>
</tr>
</tbody>
</table>

### Measurement Functions

#### System

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range</td>
<td>DC and 0.5 Hz to 100 kHz</td>
</tr>
<tr>
<td>Cref 3</td>
<td>3 or 6 (with rated input) 300 (minimum effective input)</td>
</tr>
</tbody>
</table>

#### Accuracy (three months after calibration)

<table>
<thead>
<tr>
<th>Condition</th>
<th>± Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>0.5 Hz ≤ f ≤ 45 Hz:</td>
<td>1% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 5 kHz:</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>5 kHz ≤ f ≤ 50 kHz:</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>50 kHz ≤ f ≤ 100 kHz:</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>100 kHz ≤ f ≤ 20 kHz:</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>20 kHz ≤ f ≤ 100 kHz:</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
</tbody>
</table>

#### Power factor effect

<table>
<thead>
<tr>
<th>Condition</th>
<th>± Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>+0.1% of VA to the power DC accuracy</td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 66 Hz:</td>
<td>±0.2% of VA (VA is a reading value of apparent power)</td>
</tr>
<tr>
<td>Reference data (up to 100 kHz)</td>
<td>(i) (0.2 + 0.2 cos f)% of VA</td>
</tr>
<tr>
<td>Indicated value tolerance for cos f &lt; 1</td>
<td>(ii) (0.077 + 0.1%) of VA</td>
</tr>
</tbody>
</table>

#### Effective input range (Cref 3)

<table>
<thead>
<tr>
<th>Condition</th>
<th>± Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>0.1% of voltage/current range</td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 66 Hz:</td>
<td>±0.2% of VA (VA is a reading value of apparent power)</td>
</tr>
<tr>
<td>Reference data (up to 100 kHz)</td>
<td>(i) (0.2 + 0.2 cos f)% of VA</td>
</tr>
<tr>
<td>Indicated value tolerance for cos f &lt; 1</td>
<td>(ii) (0.077 + 0.1%) of VA</td>
</tr>
<tr>
<td>Power factor correction</td>
<td>±0.1% of VA to the power DC accuracy</td>
</tr>
</tbody>
</table>

#### Accuracy (12 months after calibration)

<table>
<thead>
<tr>
<th>Condition</th>
<th>± Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>0.5 Hz ≤ f ≤ 45 Hz:</td>
<td>0.3% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 5 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>5 kHz ≤ f ≤ 50 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>50 kHz ≤ f ≤ 100 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>100 kHz ≤ f ≤ 20 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
<tr>
<td>20 kHz ≤ f ≤ 100 kHz:</td>
<td>±0.5% of rdg + 0.2% of rating</td>
</tr>
</tbody>
</table>

### Communication Functions

#### GP-89 or serial interface (RS-232-C) (select one)

- **GP-89**: Electrical and mechanical specifications.

#### Functional specifications:

- **ISO (ASCII) code**
- **Address**: Standards for implementing standard addresses can be set.

#### Serial interface (RS-232-C)

- **Transmission mode**: Asynchronous
- **Baud rates**: 1200, 2400, 4800, 9600 bps

### Frequency Measurements

<table>
<thead>
<tr>
<th>Measurement inputs</th>
<th>1. V1, V2, V3, A1, A2, or A3 (select one)</th>
</tr>
</thead>
</table>

#### Measurement System

- **Receivable system**
- **Measurement frequency ranges**
  - 100 m/sec 25 Hz ≤ f ≤ 100 kHz
  - 250 m/sec 10 Hz ≤ f ≤ 250 kHz
  - 500 m/sec 5 Hz ≤ f ≤ 50 kHz
  - 1 sec 2.5 Hz ≤ f ≤ 25 Hz
  - 5 sec ≤ f ≤ 20 Hz
  - 0.30 talker/listener addresses can be set.

#### Frequency (Cref 3)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Frequency range</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±0.06% of rdg</td>
</tr>
<tr>
<td>Voltage</td>
<td>±0.06% of voltage/current range</td>
</tr>
<tr>
<td>Frequency</td>
<td>Frequency filter function ON at 250 Hz and below</td>
</tr>
<tr>
<td>Frequency</td>
<td>Frequency filter cutoff frequency: 500 Hz</td>
</tr>
</tbody>
</table>

### Floating Input

- **Input type**
  - DC: Resistance voltage divider
  - AC: Line filter function

#### Input Terminal Type

<table>
<thead>
<tr>
<th>Condition</th>
<th>Input terminal type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±10 μA to the current DC accuracy</td>
</tr>
<tr>
<td>AC</td>
<td>±10 μA to voltage reading to the power DC accuracy</td>
</tr>
</tbody>
</table>

#### Note

- Current direct input and external input cannot both be used at the same time. When you operate current input terminals and external input terminals, please be careful.
- Since these terminals are electrically connected inside the instrument:
  1. Connect wires that match the size of the input terminal current. 2. Factory setting: 3.5-10 mA for crest factor 6

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## Communication Functions (Optional for the WT210)

### GP-89 or serial interface (RS-232-C) (select one)

- **GP-89**: Electrical and mechanical specifications.

#### Functional specifications:

- **ISO (ASCII) code**
- **Address**: Standards for implementing standard addresses can be set.

#### Serial interface (RS-232-C)

- **Transmission mode**: Asynchronous
- **Baud rates**: 1200, 2400, 4800, 9600 bps

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## Frequency Measurements

### Measurement inputs

- V1, V2, V3, A1, A2, or A3 (select one)

#### Measurement System

- **Receivable system**

#### Measurement frequency ranges

- 100 m/sec 25 Hz ≤ f ≤ 100 kHz
- 250 m/sec 10 Hz ≤ f ≤ 250 kHz
- 500 m/sec 5 Hz ≤ f ≤ 50 kHz
- 1 sec 2.5 Hz ≤ f ≤ 25 Hz
- 5 sec ≤ f ≤ 20 Hz
- 0.30 talker/listener addresses can be set.

#### Accuracy (1 year)

<table>
<thead>
<tr>
<th>Condition</th>
<th>± Accuracy</th>
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<tbody>
<tr>
<td>DC</td>
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<td>Frequency</td>
<td>Frequency filter cutoff frequency: 500 Hz</td>
</tr>
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## Frequency Measurements

### Measurement inputs

- V1, V2, V3, A1, A2, or A3 (select one)

#### Measurement System

- **Receivable system**

#### Measurement frequency ranges

- 100 m/sec 25 Hz ≤ f ≤ 100 kHz
- 250 m/sec 10 Hz ≤ f ≤ 250 kHz
- 500 m/sec 5 Hz ≤ f ≤ 50 kHz
- 1 sec 2.5 Hz ≤ f ≤ 25 Hz
- 5 sec ≤ f ≤ 20 Hz
- 0.30 talker/listener addresses can be set.

#### Accuracy (1 year)

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</tr>
</tbody>
</table>
## Specifications

### Calculation Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>Single-phase 3-wave</th>
<th>Threephase 3-waves</th>
<th>Three-phase 4-waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage 3V</td>
<td>$</td>
<td>V1 - V2</td>
<td>/3$, $</td>
</tr>
<tr>
<td>Current 3A</td>
<td>$</td>
<td>I1 - I2</td>
<td>/3$, $</td>
</tr>
</tbody>
</table>

### Display Functions

- **Display unit:** 7-segment LED (light-emitting diode)
- **Display areas:** 3
- **Display digits:** 4 or 5 digits (selectable by user)
- **Display updating interval:** Same as the equipment's display updating interval
- **Response time:** Maximum 2 times the display updating interval (time required for display value to enter accuracy range of final value with line

### Notes

1. **Accuracy:**
   - ±0.01% for 140% of rating
   - ±0.02% for 99% of range
   - ±0.2% of range to normal measurement accuracy.

2. **Display scaling function:**
   - 4 modes (selectable by user)
   - Factory default setting is 5 digits.

3. **Display updating interval:**
   - 0.1 to 2.5 hours (selectable by user)

4. **Response time:**
   - Maximum 2 times the display updating interval (time required for display value to enter accuracy range of final value with line filter off, when range rating abruptly changes from 0% to 100%, and from 100% to 0%)

5. **Maximum display:**
   - 140% of voltage/current range rating

6. **Minimum display:**
   - About 0.5% for crest factor 3

7. **Setting range:**
   - 0.001 to 9999

### Integration Functions

- **Display resolution:**
  - Decimal accuracy: 5 digits

- **Accuracy:**
  - ±1% of range

- **Remote control:**
  - Starting, stopping, and resetting can be controlled through external contact signals.

### Harmonic Measurement Function (/HRM Option)

- **System:**
  - PILL synchronization
- **Measurement frequency range:**
  - Fundamental frequency in range of 40-440 Hz

### Internal Memory Functions

<table>
<thead>
<tr>
<th>Measurement data</th>
<th>Stored data</th>
<th>Normal measurement</th>
<th>Harmonic measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT230 (76049)</td>
<td>Data for 600 samples</td>
<td>Data for 30 samples</td>
<td>Data for 30 samples</td>
</tr>
<tr>
<td>WT230 (76050)</td>
<td>Data for 300 samples</td>
<td>Data for 200 samples</td>
<td>Data for 30 samples</td>
</tr>
</tbody>
</table>

### D/A Output (/DA4 or /DA12 Option)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
<td>±5 V FS (maximum approximately ±7.5 V) for each rated value</td>
</tr>
<tr>
<td>Output data selection</td>
<td>12 parameters with /DA12 option; 4 parameters with /DA4 option</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±(equipment accuracy + 0.2% of FS) (FS=5 V)</td>
</tr>
<tr>
<td>D/A converter</td>
<td>10-Bit resolution</td>
</tr>
<tr>
<td>Response time</td>
<td>Maximum 2 times the display updating interval</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±0.05% of FS</td>
</tr>
</tbody>
</table>

### D/A Output (D/A4 or D/A12 Option)

- **Display output:**
  - For input equal to 140% of rating

### Other parameters

- **Accuracy:**
  - ±1% of range

- **Remote control:**
  - Starting, stopping, and resetting can be controlled through external contact signals.

- **Display value:**
  - For normal measurement range

---

### Calculation Functions

- **Accuracy:**
  - ±0.01% for 140% of rating

- **Response time:**
  - Maximum 2 times the display updating interval (time required for display value to enter accuracy range of final value with line filter off, when range rating abruptly changes from 0% to 100%, and from 100% to 0%)

### Display Functions

- **Display unit:** 7-segment LED (light-emitting diode)
- **Display areas:** 3
- **Display digits:** 4 or 5 digits (selectable by user)
- **Display updating interval:** Same as the equipment's display updating interval

### Notes

1. **Accuracy:**
   - ±0.01% for 140% of rating
   - ±0.02% for 99% of range
   - ±0.2% of range to normal measurement accuracy.

2. **Display scaling function:**
   - 4 modes (selectable by user)
   - Factory default setting is 5 digits.

3. **Display updating interval:**
   - 0.1 to 2.5 hours (selectable by user)

4. **Response time:**
   - Maximum 2 times the display updating interval (time required for display value to enter accuracy range of final value with line filter off, when range rating abruptly changes from 0% to 100%, and from 100% to 0%)

5. **Maximum display:**
   - 140% of voltage/current range rating

6. **Minimum display:**
   - About 0.5% for crest factor 3

7. **Setting range:**
   - 0.001 to 9999

### Integration Functions

- **Display resolution:**
  - Decimal accuracy: 5 digits

- **Accuracy:**
  - ±1% of range

- **Remote control:**
  - Starting, stopping, and resetting can be controlled through external contact signals.

### Harmonic Measurement Function (/HRM Option)

- **System:**
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- **Measurement frequency range:**
  - Fundamental frequency in range of 40-440 Hz

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<td>Data for 300 samples</td>
<td>Data for 200 samples</td>
<td>Data for 30 samples</td>
</tr>
</tbody>
</table>

### D/A Output (/DA4 or D/A12 Option)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
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</tr>
<tr>
<td>Output data selection</td>
<td>12 parameters with /DA12 option; 4 parameters with /DA4 option</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±(equipment accuracy + 0.2% of FS) (FS=5 V)</td>
</tr>
<tr>
<td>D/A converter</td>
<td>10-Bit resolution</td>
</tr>
<tr>
<td>Response time</td>
<td>Maximum 2 times the display updating interval</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>±0.05% of FS</td>
</tr>
</tbody>
</table>

### D/A Output (D/A4 or D/A12 Option)

- **Display output:**
  - For input equal to 140% of rating

### Other parameters

- **Accuracy:**
  - ±1% of range

- **Remote control:**
  - Starting, stopping, and resetting can be controlled through external contact signals.

- **Display value:**
  - For normal measurement range
Immunity
Complying standard EN61326 Annex A

Emission
Complying standard EN61326 Class A

■
Weight: Approximately 3 kg for WT210, approximately 5 kg for WT230

External dimensions for WT210:
Consumed power: Max 35 VA for WT210, max 55 VA for WT230

Insulating withstand voltage:
Insulating resistance: 50 MΩ

Maximum operating elevation: 2000 meters

Storage temperature: -25-60˚C (no condensation)

Warmup time: Approximately 30 minutes

Input: TTL level negative pulse

General Specifications
Warmpup time: Approximately 30 minutes
Operating temperature and humidity ranges: 5-40°C, 20-80% RH (no condensation)
Maximum operating elevation: 2000 meters
Insulating resistance: 50 MΩ or higher at 500 V DC across all of the following areas:
Voltage input terminals (ganged) and case
Current input terminals (ganged) and case
Voltage input terminals (ganged) and current input terminals (ganged)
Voltage input terminals (ganged) of each element
Current input terminals (ganged) of each element
Voltage input terminals (ganged) and power plug
Current input terminals (ganged) and power plug
Case and power plug

Insulating withstand voltage:
3700 V for one minute at 50/60 Hz across all of the following areas:
Voltage input terminals (ganged) and case
Current input terminals (ganged) and case
Voltage input terminals (ganged) and current input terminals (ganged)
Voltage input terminals (ganged) of each element
Current input terminals (ganged) of each element
Voltage input terminals (ganged) and power plug
Current input terminals (ganged) and power plug
Voltage input terminals (ganged) and case
Current input terminals (ganged) and case
Voltage input terminals (ganged) and power plug

Power supply:
Free power supply (100-240 V), 50/60 Hz frequency
Consumed power:
Max 35 VA for WT210, max 55 VA for WT230

External dimensions for WT210:
External dimensions for WT230:
Approximately 213 × 88 × 379 mm (WHD) (excluding projections)
Approximately 230 × 132 × 379 mm (WHD) (excluding projections)

Weight:
Approximately 3 kg for WT210, approximately 5 kg for WT230

Safety standard:
Complying standard EN61010-1

Overvoltage category (Installation category) II
Pollution degree 2
Immunity
Complying standard EN61326 Annex A

■ Exterior View

Unit: mm

■ Wiring Types and Model Numbers

<table>
<thead>
<tr>
<th>Wiring</th>
<th>Model</th>
<th>780401</th>
<th>780502</th>
<th>780503</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase 2-wire</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Single-phase 3-wire</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Three-phase 3-wire (2-voltages, 2-currents)</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Three-phase 3-wire (3-voltages, 3-currents)</td>
<td>–</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Three-phase 4-wire</td>
<td>–</td>
<td>–</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

■ Model Numbers and Suffix Codes

<table>
<thead>
<tr>
<th>Model number</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>780401</td>
<td>WT210 single-input element model</td>
<td></td>
</tr>
<tr>
<td>780502</td>
<td>WT230 single-input element model</td>
<td></td>
</tr>
</tbody>
</table>

■ Standard Accessories

Power cord, Power fuse, Current input protective cover, Rubber feet for the hind feet, 24-pin connector (provided only on options/DA4, /DA12, and /CMP). User's manual

When using the WT210/WT230 with WTViewer (for the WT210/WT230) for waveform display on the PC screen or harmonic measurement, the IHRM option must be installed on the WT210/WT230.

■ Rack mounts

<table>
<thead>
<tr>
<th>Product</th>
<th>Model or part number</th>
<th>Specification</th>
<th>Order quan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rack mounting kit</td>
<td>751533-E2</td>
<td>For WT210 EIA standalone installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-J2</td>
<td>For WT230 JIS standalone installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-E2</td>
<td>For WT210 EIA connected installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751533-J2</td>
<td>For WT230 JIS connected installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-E3</td>
<td>For WT210 EIA standalone installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-J3</td>
<td>For WT230 JIS standalone installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-E3</td>
<td>For WT210 EIA connected installation</td>
<td>1</td>
</tr>
<tr>
<td>Rack mounting kit</td>
<td>751534-J3</td>
<td>For WT230 JIS connected installation</td>
<td>1</td>
</tr>
</tbody>
</table>

Ask Yokogawa for information on rack mounts in which WT210 and WT230 are combined.

■ Accessories (sold separately)

<table>
<thead>
<tr>
<th>Model number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B9284LK</td>
<td>External sensor cable for external input, 50 cm</td>
</tr>
<tr>
<td>B9317WD</td>
<td>1.5 mm hex wrench</td>
</tr>
</tbody>
</table>

Note: Crest Factor

The crest factor is the ratio of the waveform peak value and the RMS value.

Crest factor (CF, peak factor) = waveform peak RMS value

About the measurable crest factor of our power measuring instruments, please refer to the following equation.

Crest factor (CF) = (measuring range x CF setting (3 or 6))

* However, the peak value of the measured signal must be less than or equal to the continuous maximum allowed input.

* The crest factor on a power meter is specified by how many times peak input value is allowed relative to rated input value. Therefore, even if some measured signals exist whose crest factors are larger than the specifications of the instrument (the crest factor standard at the rated input), you can measure signals having crest factors larger than the specifications by setting a measurement range that is large relative to the measured signal. For example, even if you set CF = 3, CFS or higher measurements are possible if the measured value (RMS) is 60% or less than the measuring range. Also, for a setting of CF = 3, measurements of CF = 300 are possible with the minimum effective input (1% of measuring range).