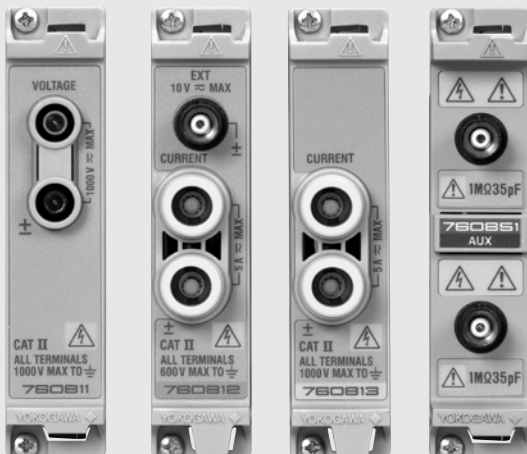


Specifications

PX8000 Precision Power Scope



Specifications of PX8000, 760811, 760812, 760813 and 760851

Input

| Item | Specification |
|------------------------|--|
| Shape | Plug-in Input module Style |
| Module structure | Voltage module, Current module and Auxiliary (AUX) module Power measurement element: each one Voltage module and one Current module Maximum 8 modules (maximum 4 power measurement elements) can be installed AUX module can be installed maximum 3 (at least one power measurement element must be installed). |
| Maximum channel number | 8 ch, combination of Voltage/Current modules and AUX module |
| Maximum record length | Standard 10 M points for each voltage and current regardless of the installed number of modules. The memory cannot be combined, each memory of module is individual. 50 M points for each voltage and current regardless of the installed number of input modules when /M1 option is installed. 100 M points for each voltage and current regardless of the installed number of input modules when /M2 option is installed. |

Voltage/Current input modules (760811/760812) Specifications

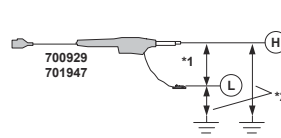
| Item | Specification |
|---|---|
| Input terminal type | Voltage: Plug-in terminal (Female) Current: Direct input: Plug-in terminal (male) External current sensor input: isolated BNC (760812) |
| Input format | Voltage: Floating input, resistive voltage divider Current: Floating input through shunt |
| Measurement range | Voltage: 1.5/3/6/10/15/30/60/100/150/300/600/1000 Vrms (crest factor=2 at rated range input) Current: Direct input (5 A) 10 m/20 m/50 m/100 m/200 m/500 m/1/2/5 Arms (Crest factor=2 at rated range input) Current: External current sensor input (760812) 50 m/100 m/200 m/500 m/1/2/5/10 Vrms (Crest factor=2 at rated range input) |
| Input impedance | Voltage: Input resistance : Approx. 2 M Ohm Input capacitance: Approx. 10 pF Current: - Direct input: 5 A input element: approx. 100 m Ohm + approx. 0.19 uH - External current sensor input: approx. 1 M Ohm + approx. 17 pF (760812) |
| Instantaneous maximum allowable input (less than 20 ms) | Voltage: peak value of 2.2 kV or 1.5 kVrms, whichever is less. Current: - Direct input (5 A input element): peak value of 30 A or rms value of 15 A, whichever is less - External current sensor input (760812): peak value less than or equal to 10 times the range (1 M Ohm) |
| Instantaneous maximum allowable input (less than 1 s) | Current: - Direct input (5 A input element): peak value of 8.5 A or rms value of 6 A, whichever is less. - External current sensor input (760812): peak value less than or equal to 10 times the range (1 M Ohm) |
| Continuous maximum allowable input | Voltage: peak value of 2 kV or 1.1 kVrms, whichever is less. If input frequency is higher than 100 kHz: less than (1100 - f) Vrms, f is the frequency in kHz. However, continuous maximum allowable input voltage is bigger than 3 Vrms. Current: - Direct input (5 A input element): peak value of 8.5 A or rms value of 6 A, whichever is less. - External current sensor input (760812): peak value less than or equal to 4 times the range (1 M Ohm) |
| Continuous maximum common mode voltage | Maximum allowable voltage that can be measured Voltage input terminals: 1000 Vrms Current input terminals: 1000 Vrms Rated voltage of EN61010-2-030 standard: 600 Vrms External current sensor input connector: 600 Vrms |
| Safety Note | Do not touch the inside of the BNC connector of the External Current Sensor input for safety reasons. Current Module (760813) 1000 V CAT II: Rated voltage of EN61010-2-030 |
| Rated voltage to ground | Maximum allowable voltage that can be measured Voltage input terminals: 1000 V Current input terminals: 1000 V Rated voltage of EN61010-2-030 standard: 600 V External current sensor input connector: 600 V |
| Safety Note | Do not touch the inside of the BNC connector of the External Current Sensor input for safety reasons. |
| CMRR (Influence from common mode voltage) | When 1000 Vrms is applied between the input terminal and case with the voltage input terminals shorted, the current input terminals open, and the external current sensor input terminals shorted. • 50/60 Hz: $\pm(0.01\% \text{ of range} + 5 \text{ mV})$ or less. • Reference value for up to 100 kHz: $\pm[(\text{maximum rated range})/(\text{rated range}) \times 0.001 \times f + 0.001 \times f]\%$ of range + 5 mV) or less 0.01% or greater. The unit of f is kHz. The maximum rated range in the equation is 1000 V. When 1000 Vrms is applied between the input terminal and case with the current input terminals open, and the external current sensor input terminals shorted. • 50/60 Hz: Direct input $\pm(0.01\% \text{ of range} + 10 \mu\text{A})$ or less. Sensor input $\pm(0.01\% \text{ of range} + 25 \mu\text{V})$ or less (760812) • Reference value for up to 100 kHz: $\pm[(\text{maximum rated range})/(\text{rated range}) \times 0.002 \times f \times 2^{\wedge} (0.5 + f/1000)] + 0.002 \times f$ of range + 10 uA) or less For external current sensor input, add maximum rated range/rated range $\times (0.003 \times f \times 2^{\wedge} (0.5 + f/5000) + 0.003 \times f$ of range + 25 uV) to the value above. 0.01% or greater. The unit of f is kHz. The maximum rated range in the equation is 5 A, or 10 V. |
| Line filter | Select from OFF, 500 Hz, 2 kHz, 20 kHz, and 1 MHz. |
| Frequency filter | Select from OFF, 100 Hz, 500 Hz, 2 kHz and 20 kHz. |
| A/D converter | Resolution: 12 bit Conversion ratio (sampling period): Approx. 10 ns. For harmonic measurement, please refer to harmonic function. |
| Maximum sample rate | 100 MS/s |
| Range change | You can set it each module individually. |

| | |
|-----------------------|---|
| Auto ranging function | Range up - When input rms level is more than 110% of the range or the peak is more than 200%. Range down - When input rms level is lower than 30% of the range rating and peak is less than below range 180% of the range rating of the lower range. |
|-----------------------|---|

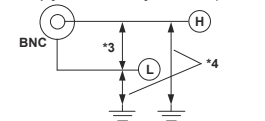
Auxiliary (AUX) module (760851) Specification

| Item | Specification |
|---|--|
| Effective measurement range | 20 div, two times of measurement range |
| Number of input channels | 2, switchable analog or pulse input |
| Input coupling | AC, DC, or GND |
| Input connector | Isolated BNC |
| Input format | Isolated unbalanced |
| Frequency characteristics | DC to 20 MHz (-3 dB point when sine wave of amplitude ± 3 div is applied) |
| Voltage-axis sensitivity setting | 50 mV to 100 V (1-2.5-5 steps) (when using 1:1 probe attenuation) |
| Input impedance | 1 M Ohm, $\pm 1\%$ Approx. 35 pF |
| -3 dB point when AC coupled low frequency attenuation point | 10 Hz or less (1 Hz or less when using the 700929, 0.1 Hz or less when using the 701947) |
| Maximum input voltage | Combined with the 700929 (10:1) or 701947 (100:1): ¹ 1000 V (DC+ACpeak) CAT II Direct input or cable not complying with the safety standard: ³ 200 V (DC+ACpeak) |
| Maximum allowable common mode voltage | Working voltage of safety standard Combined with the 700929 (10:1) or 701947 (100:1): ² 1000 Vrms (CAT II) Direct input or cable not complying with the safety standard: ⁴ 42 V (DC+ACpeak) (0 and CAT II, 30 Vrms) |
| Influence of common mode voltage (CMRR) | -80 dB at 50/60 Hz (with input terminal shorten and 1000 Vrms (50/60 Hz) applies between input and case) |
| Bandwidth limit | Select from Full, 2 MHz, 1.28 MHz, 640 kHz, 320 kHz, 160 kHz, 80 kHz, 40 kHz, 20 kHz, and 10 kHz Cut-off characteristics: -18 dB/OCT (when 2 MHz, Typical) |
| Probe attenuation setting | Voltage probe: 1:1, 10:1, 100:1, 1000:1 |
| Auto ranging function | Range up When one of following conditions is satisfied, range is changed to higher - DC input level is more than 110% of selected range rating - Input peak level is more than 200% of selected range rating (when motor mode is OFF) - Input peak level is more than 145% of selected range rating (when motor mode is ON) Range down When following all conditions are satisfied, range is changed to lower - DC input level is less than 30% of selected range rating - Input peak level is less than 180% of less range rating (when motor mode is OFF) - Input peak level is less than 140% of less range rating (when motor mode is ON) |
| A/D conversion resolution | 12 bit |
| Withstand voltage | 1500 Vrms for 1 minute (across each terminal and earth) (60 Hz) |
| Insulation resistance | 500 VDC, 10 M Ohm or more (across each input terminal and earth) |
| Accuracy (analog) | DC: $\pm 1\%$ of range (typical) Measured under the standard operating conditions. See page 5, Accuracy |
| Temperature coefficient (analog) | $\pm(0.1 \text{ of range}/^{\circ}\text{C})$ (typical) |
| Amplitude Input range (analog) | $\pm 110\%$ of range rated |
| Amplitude input range (pulse) | ± 5 Vpeak |
| Frequency measurement range (pulse) | 2 Hz to 1 MHz |
| Judged input amplitude (pulse) | H level: -9.9 V to +10.0 V, L level: -10.0 V to +9.9 V |
| Input waveform (pulse) | 50% duty cycle square wave |
| Pulse width (pulse) | 500 ns or wider |
| Accuracy (pulse) | $\pm(0.05\% \text{ of reading}) \pm 1$ count error (10 ns), Except, the observation time is greater than or equal to 300 times the period of the pulse. |

In combination with the 700929/701947



Direct input (using a cable that does not comply with the safety standards)



Withstand voltage: 1500 Vrms (1 minute)

Allowable transient surge voltage (between the input terminals and earth): ± 2100 Vpeak

Trigger Function

| Item | Specification |
|-----------------------------------|---|
| Trigger mode | Auto, Auto Level, Normal, Single, N Single, or On Start |
| Selectable trigger level range | ± 5 div of center 0 div; when trigger source is set to voltage, current or power of a power measurement element. ± 10 div of center 0 div; when trigger source is set to AUX module voltage input. |
| Trigger hysteresis | Select from ± 0.1 div, ± 0.5 div, ± 1 div |
| Selectable trigger position range | 0 to 100% (of the display record length; resolution: 0.1%) |
| Selectable trigger delay range | 0 to 10 s (resolution: 10 ns) |
| Selectable hold-off time range | 0 to 10 s (resolution: 10 ns) |
| Manual trigger key | A dedicated manual trigger key can be used. |

Simple Trigger

| | |
|----------------|---|
| Trigger source | Un, In, Pn, AUXn, EXT, or Time n=channel number (not when pulse input is selected) |
| Trigger slope | Rising, falling or rising or falling |
| Time Trigger | Date (year, month, and day), time (hour and minute), and time interval (10 seconds to 24 hours) |

Enhanced trigger

| | |
|----------------|--|
| Trigger source | Un, In, Pn, AUXn or EXT (not when pulse input is selected) |
|----------------|--|

Specifications of PX8000, 760811, 760812, 760813 and 760851

| | |
|--------------|---|
| Trigger type | A → B(N): After the trigger A conditions are met, the PX8000 triggers when the trigger B conditions are met N times. Count: 1 to 1000 Condition A: Enter/Exit Condition B: Enter/Exit |
| | A Delay B: After the specified amount of time elapses after the trigger A conditions are met, the PX8000 triggers when the trigger B conditions are first met. Time: 0 to 10 s (resolution: 10 ns) Condition A: Enter/Exit Condition B: Enter/Exit |
| | Edge on A: While the trigger A conditions are met, the period triggers on the OR of multiple trigger source edges. |
| | AND: The PX8000 triggers on the AND of multiple state conditions. |
| | OR: The PX8000 triggers on the OR of multiple trigger source edges or states (or Window triggers) |
| | Pulse Width: B<Time: The PX8000 triggers when the time from when the trigger B conditions are met to when they change from being met to not being met is greater than the specified time. Time: 20 ns to 10 s (resolution: 10 ns) |
| | B>Time: The PX8000 triggers when the time from when the trigger B conditions are met to when they change from being met to not being met is less than the specified time. Time: 20 ns to 10 s (resolution: 10 ns) |
| | B Time Out: The PX8000 triggers when the trigger B conditions continue to be met for the specified period of time. Time: 20 ns to 10 s (resolution: 10 ns) |
| | B Between: The PX8000 triggers when the period during which the trigger B conditions continue to be met is within the specified time range. Time: T1: 10 ns to 9.99999999 s T2: 20 ns to 10 s (resolution: 10 ns) |
| | Period: The PX8000 triggers when the period during which the trigger B conditions continue to be met is within the specified time range. |
| | T>Time: The PX8000 triggers when the period of the trigger T conditions is longer than the specified time. Time: 20 ns to 10 s (resolution: 10 ns) |
| | T<Time: The PX8000 triggers when the period of the trigger T conditions is shorter than the specified time. Time: 20 ns to 10 s (resolution: 10 ns) |
| | T1<T<T2: The PX8000 triggers when the period of the trigger T conditions is within the specified time range. Time T1: 20 ns to 10 s (resolution: 10 ns) T2: 30 ns to 10 s (resolution: 10 ns) |
| | T<T1, T<T2: The PX8000 triggers when the period of the trigger T conditions is within the specified time range. Time T1: 20 ns to 10 s (resolution: 10 ns) T2: 30 ns to 10 s (resolution: 10 ns) |
| | Wave Window: The PX8000 triggers when the period of the trigger T conditions is within the specified time range. |

- The trigger A and B conditions can be set to High, Low, or Don't Care for each channel. The AND of the conditions (the parallel pattern) is used to determine the result.
- For OR and AND, the condition can be set to High, Low, IN, OUT, or Don't Care for each channel.

Time Base

| Item | Specification |
|---------------------------------|---|
| Time axis setting "Time/div" | Time/div setting: 100 ns/div to 1 s/div (1-2-5 step), 2 s/div, 3 s/div, 4 s/div, 5 s/div, 6 s/div, 8 s/div, 10 s/div, 20 s/div, 30 s/div, 1 min/div and 2 min/div |
| Accuracy of time scale | ±0.005% |
| External Clock | Connector style BNC Input level TTL level Effective edge Rising edge Frequency bandwidth Maximum 9.5 MHz, Mimi. pulse width Longer than 50 ns for both High/Low level |

Display

| Item | Specification |
|------------------------------|---|
| Display | 10.4 inch TFT LCD display |
| Number of dots | 1024 x 768 XGA |
| Waveform displaying dot size | 801 x 656 (Waveform Display) |
| Displaying format | Combination: Maximum 2 types of format can be displayed Numeric 4 items/ 8 items/ 16 items/Matrix/All/Single List/Dual List/ Custom Wave 1/2/3/4/6/8/12/16 Bar Single/Dual/Triad Vector Single/Dual ZOOM1 and ZOOM2 (divided lower display area) FFT1 and FFT2 (divided lower display area) XY1 and XY2 (divided lower display area) |
| Display update | Depends on setting of observation time and record length |

* Relative to the total number of pixels, 0.002% of the LCD screen may be defective.

Numerical Display

| | |
|----------------------------------|---|
| Maximum digit of numeric display | Selected full 5 digits (displaying 99999), or 6 digits (999999) |
| Number of displayed items | Select from 4, 8, 16, Matrix, All, Single List, Dual List, and Custom |

Waveform Display

| | |
|------------------|--|
| Displaying items | Maximum 16 waveforms Voltage, current and power of Element 1 Voltage, current and power of Element 2 (or AUX3 and AUX4 of Element 2) Voltage, current and power of Element 3 (or AUX5 and AUX6 of Element 3) Voltage, current and power of Element 4 (or AUX7 and AUX8 of Element 4) MATH 1 to MATH 8 |
|------------------|--|

Vector Bar Graph Display (option)

| | |
|-------------------|---|
| Vector display | Display the phase angle between the fundamental voltage signal and fundamental current signal as a vector |
| Bar graph display | Display a bar graph of the amplitude of each harmonics when it is harmonic measurement. |

Zoom Display

| | |
|------|---|
| Zoom | Expand the displayed waveform along with the time axis (up to 2 separate locations). The zoom position can be automatically scrolled. |
|------|---|

FFT Display

| | |
|-----|---|
| FFT | Power spectrum of input waveform, Maximum two windows |
|-----|---|

X-Y display

| | |
|-------------|---|
| X-Y Display | The X and Y axes can be selected from Un/In/Pn/AUXn, MATHn, (Maximum four traces, two windows). |
|-------------|---|

Functionalities

Measurement Function and Conditions

| | |
|-------------------------------|--|
| Crest Factor | Up to 200 (effective minimum input). Up to 2 (at the rated range input) CfU: Voltage crest factor, CfI: Current crest factor |
| Measurement period | Measurement period to calculate numerical values - Period of measurement update cycle based on zero crossing or external gate signal source signal - 8192 points for harmonic measurement from specified start cursor |
| Wiring method | 1P2W (Single phase 2 wire), 1P3W (Single phase 3 wire), 3P3W (3 phase 3 wire), 3V3A (3 phase 3 wire, 3 power meter method), 3P4W (3 phase 4 wire) It depends on the quantity and type of the installed modules. |
| Scaling | 0.0001 to 99999.9999 can be set for scaling of VT ratio, CT ratio and power ratio when external current sensor, VT or CT are used for the input Linear scaling function is available for AUX module (760851). |
| Averaging of numeric value | Normal measurement items, Using one of the following methods perform averaging on the normal measurement items; - Urms, Umn, Udc, Urms, Imn, Idc, Imn, lac, P, S, Q - Power factor Lambda, Phase angle Phi, Crest Factor CfU/CfI, Corrected Power Pc, Efficiency Eta 1to Eta 4 are determined from the averaged Urms, Irms, P, S, and Q - Select either exponential averages or moving averages - Exponential average: Select the attenuation constant from a value between 2 to 64 (Harmonic measurement items, U (k), I (k), P (k), S (k), and Q (k) Power factor Lambda(k), Phase angle Phi(k) are determined from the averaged P (k) and Q (k)). - Moving average: Select the average count from a value between 8 and 64 - Parameters of Z, Rs, Xs, Rp, Xp, Uhd, Ihd, Phd, Uthd, Ithd, Pthd, Uthf, Ithf, Uth, Ith, hvf, hcf, and K-factor are determined from the averaged U (k), I (k), and P (k) - Only Exponential averaging is available for harmonic measurement items Select the attenuation constant from a value between 2 to 64. |
| Zero level compensation /Null | Zero level can be compensated individually by module Following range can be compensated. Power element: Voltage/Current ±14% of range AUX module: Analog input ±60% of range; Pulse input |

Frequency measurement

| Item | Specification |
|------------------------------|--|
| Measurement item | Normal measurement item; Voltage or current frequencies of all power measurement elements can be measured |
| Measurement method | Reciprocal method |
| Measurement range | 10 Hz to 5 MHz, input amplitude is more than 30% of range |
| Maximum frequency | 5.0000 MHz |
| Accuracy | ±(0.1% of reading) Conditions; - Time/div setting is more than 50 µS - At least 5 cycles input should be measured. - "Sampling frequency setting/input frequency" is more than 2.5 - 20 kHz frequency filter should be ON when input frequency is lower than 20 kHz. - 2 kHz frequency filter should be ON when input frequency is lower than 2 kHz. - 500 Hz frequency filter should be ON when input frequency is lower than 500 Hz. - 100 Hz frequency filter should be ON when input frequency is lower than 100 Hz. |
| Number of displayed digits | Full 5 digits (99999) |
| Frequency Measurement filter | Select of OFF/100 Hz/500 Hz/2 kHz/20 kHz |

Harmonics measurement

| Item | Specification | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-------------------|--------------------------|--------------|--------------------------|--------------------|----------|----------|-----------|----------------------|---------|-----------|-----------|-----------------------|---------|-----------|-----------|-----------------------|---------|-----------|----------|-------------------------|--------|------------|----------|
| Measurement items | All installed Power measurement elements | | | | | | | | | | | | | | | | | | | | | | | | |
| Method | PLL synchronization method (not available for external sampling clock function) | | | | | | | | | | | | | | | | | | | | | | | | |
| Frequency range | The range for the fundamental frequency of the PLL source is 20 Hz to 6.4 kHz, and sampling frequency is more than 2 MS/s. Time/div is longer than 2 m seconds/div and Acquisition Time Base is set to "Int". | | | | | | | | | | | | | | | | | | | | | | | | |
| PLL source | The range of the fundamental frequency of the PLL source is 20 Hz to 409.6 kHz, or 20 Hz to 6.4 kHz when the PLL source is EXT TRIG IN input. Sampling frequency is higher than 2 MS/s. Time/div is longer than 100 µ seconds/div and Acquisition Time Base is set to "Int". | | | | | | | | | | | | | | | | | | | | | | | | |
| FFT data length | 8192, the analysis (calculation) start point can be set freely in the acquisition memory data. The length of the acquisition data must be twice that of the window. | | | | | | | | | | | | | | | | | | | | | | | | |
| Window function | Rectangular | | | | | | | | | | | | | | | | | | | | | | | | |
| Anti-aliasing filter | Set as Line filter | | | | | | | | | | | | | | | | | | | | | | | | |
| FFT Sample rate, window width and upper limits of harmonic analysis | <table border="1"> <thead> <tr> <th>Fundamental freq.</th> <th>FFT Sample rate</th> <th>Window width</th> <th>Upper limit of harmonics</th> </tr> </thead> <tbody> <tr> <td>20 Hz ≤ f ≤ 600 Hz</td> <td>f × 1024</td> <td>8 cycles</td> <td>500 order</td> </tr> <tr> <td>600 Hz < f ≤ 1200 Hz</td> <td>f × 512</td> <td>16 cycles</td> <td>255 order</td> </tr> <tr> <td>1200 Hz < f ≤ 2600 Hz</td> <td>f × 256</td> <td>32 cycles</td> <td>100 order</td> </tr> <tr> <td>2600 Hz < f ≤ 6400 Hz</td> <td>f × 128</td> <td>64 cycles</td> <td>50 order</td> </tr> <tr> <td>6.4 kHz < f ≤ 409.6 kHz</td> <td>f × 64</td> <td>128 cycles</td> <td>30 order</td> </tr> </tbody> </table> <p>When PLL source is EXT TRIG IN, fundamental frequency should be lower than 6.4 kHz.</p> | Fundamental freq. | FFT Sample rate | Window width | Upper limit of harmonics | 20 Hz ≤ f ≤ 600 Hz | f × 1024 | 8 cycles | 500 order | 600 Hz < f ≤ 1200 Hz | f × 512 | 16 cycles | 255 order | 1200 Hz < f ≤ 2600 Hz | f × 256 | 32 cycles | 100 order | 2600 Hz < f ≤ 6400 Hz | f × 128 | 64 cycles | 50 order | 6.4 kHz < f ≤ 409.6 kHz | f × 64 | 128 cycles | 30 order |
| Fundamental freq. | FFT Sample rate | Window width | Upper limit of harmonics | | | | | | | | | | | | | | | | | | | | | | |
| 20 Hz ≤ f ≤ 600 Hz | f × 1024 | 8 cycles | 500 order | | | | | | | | | | | | | | | | | | | | | | |
| 600 Hz < f ≤ 1200 Hz | f × 512 | 16 cycles | 255 order | | | | | | | | | | | | | | | | | | | | | | |
| 1200 Hz < f ≤ 2600 Hz | f × 256 | 32 cycles | 100 order | | | | | | | | | | | | | | | | | | | | | | |
| 2600 Hz < f ≤ 6400 Hz | f × 128 | 64 cycles | 50 order | | | | | | | | | | | | | | | | | | | | | | |
| 6.4 kHz < f ≤ 409.6 kHz | f × 64 | 128 cycles | 30 order | | | | | | | | | | | | | | | | | | | | | | |

Specifications of PX8000, 760811, 760812, 760813 and 760851

| | | |
|--|--|---|
| Minimum sample rate | Fundamental frequency | Minimum Sample rate |
| | 20 Hz $\leq f \leq$ 6.4 kHz 6.4 kHz $< f \leq$ 12.8 kHz 12.8 kHz $< f \leq$ 25.6 kHz 25.6 kHz $< f \leq$ 51.2 kHz 51.2 kHz $< f \leq$ 102.4 kHz 102.4 kHz $< f \leq$ 204.8 kHz 204.8 kHz $< f \leq$ 409.6 kHz | 2 MS/S 5 MS/S 5 MS/S 10 MS/S 20 MS/S 50 MS/S 100 MS/S |
| When PLL source is EXT TRIG IN fundamental frequency should be lower than 6.4 kHz. | | |
| Harmonic Accuracy | <p>Conditions; PLL source signal is sine wave and DC component is stable PF=1.</p> <p>Accuracy range of voltage/current and frequency is same as normal measurement Accuracy range.</p> <p>Line filter OFF</p> <p>Add below expression/value to normal measurement accuracy</p> <p>Voltage & current: $(0.001 \times f + 0.001 \times n)\%$ of reading + 0.1% of range</p> <p>Power: $(0.002 \times f + 0.002 \times n)\%$ of reading + 0.2% of range</p> <p>n: order, f: frequency of the nth order</p> <p>When it is voltage input, following values are added.</p> <p>When voltage range is set to 1.5 V to 10 V</p> <p>Voltage: 1.5 mV</p> <p>Power: $(1.5 \text{ mV/voltage rated range}) \times 100\%$ of range</p> <p>When voltage range is set to 15V to 100 V</p> <p>Voltage: 15 mV</p> <p>Power: $(15 \text{ mV/voltage rated range}) \times 100\%$ of range</p> <p>When it is direct current input, following values are added.</p> <p>Current: 50 μA</p> <p>Power: $(50 \mu\text{A/sensor current rated range}) \times 100\%$ of range</p> <p>When sensor current range is set to 50 mV to 500 mV, following values are added.</p> <p>Current: 100 μV</p> <p>Power: $(100 \mu\text{V/sensor current rated range}) \times 100\%$ of range</p> <p>When input frequency is over 100 kHz, following values are added.</p> <p>Voltage & current : 0.3% of reading</p> <p>Power: 0.6% of reading</p> <p>When input is nth component input, add $(\{n/(m+1)\}/50)\%$ of the nth order reading to the $(n+m)$th order and $(n-m)$th order of the voltage and current. And add $(\{n/(m+1)\}/25)\%$ of the nth order reading to the $(n+m)$th order and $(n-m)$th order of the power.</p> <p>When the frequency of the PLL source is less than 40 Hz, for nth order component input, add following values.</p> <p>Voltage & current: $(0.003 \times n)\%$ of reading</p> <p>Power: $(0.006 \times n)\%$ of reading</p> <p>When Line filter is ON, add influence of Line filter to accuracy of Line filter OFF.</p> <p>Power accuracy of over 6.5 kHz is designed Values.</p> | |

Waveform data acquisition and display

| Item | Specification |
|--------------------------|---|
| Acquisition mode | Normal: Normal waveform data acquisition Envelope: The peak values are held at the maximum sample rate regardless of the Time/div setting. Averaging: The number of times to average can be set to 2 to 65536 in 2 nd steps. |
| Record length | Selection of 100 kpoint/250 kpoint/500 kpoint/1 Mpoint/2.5 Mpoint/5 Mpoint/10 Mpoint/25 Mpoint (when /M1 or /M2 installed)/50 Mpoint (when /M1 or /M2 installed)/100 Mpoint (when /M2 installed) |
| Zoom | Expand the displayed waveform along time axis (up to 2 separate locations). The zoom position can be automatically scrolled. |
| Display format | 1/2/3/4/6/8/12, and 16 analog waveform windows |
| Display interpolation | Sampled points can be displayed through the use of dots (OFF), sine interpolation, linear interpolation or pulse interpolation. |
| Graticule | Select of three types of graticule |
| Auxiliary display ON/OFF | Scale values, waveform labels, the extra window, the level indicator, and the numeric display can be turned ON and OFF. |
| X-Y Display | The X and Y axes can be selected from Un/In/Pn/AUXn, MATHn (Maximum four traces, two windows). |
| Snapshot | The currently displayed waveforms can be retained on the screen. The Snapshot waveforms can be saved and loaded. |
| Clear trace | The displayed waveform can be cleared. |
| History | Maximum 1000 waveforms, depending on record length Arbitrary one waveform, all waveform or averaged waveform can be displayed. |

Vertical and Horizontal Control

| Item | Specification |
|---------------------------|---|
| Channel ON/OFF | Un, In, Pn, AUXn or MATHn can be turned ON and OFF separately |
| ALL CH menu | The setting of the all channels while waveforms are displayed. A USB keyboard or mouse |
| Vertical axis zooming | $\times 0.1$ to $\times 100$ Upper and lower limits can be used to set the scale. |
| Vertical position setting | Waveform can be moved in the range of ± 5 divs from the center of the waveform display frame. |
| Scaling | 0.0001 to 99999.9999 can be set for scaling of VT ratio, CT ratio and power ratio when external current sensor, VT or CT are used for the input. |
| Linear scaling | The linear scaling mode can be set separately for each channels (CHn). It can be set to AX+B or P1-P2 for AUX modules. Only when motor measurement is off for an AUX module. |
| Roll Mode | Roll mode is enabled automatically when the trigger mode is set to Auto, Auto Level, Single, or On Start, and the time axis setting is greater than or equal to 100 ms/div. |

Analysis Functions

| Item | Specification |
|------------------------------|--|
| Power parameters calculation | Calculate Voltage, Current, Power, Delta parameters, frequency and AUX values from captured waveforms Apparent power, reactive power and power factor and those Sigma values are calculated from the Voltage, Current and Power values |
| Zooming and Searching | Can search for and then expand and display a portion of the displayed waveform Can choose from the following search methods Edge: Searches for rising or falling edges Time: Searches for data and time |
| History search feature | Can search through history waveforms for specified conditions Zone search: Displays waveforms that pass through or do not pass through a specified area on the screen. Parameters search: Displays a waveform when the result of the automated measurement of its parameters meet the specified conditions |

| | |
|--|---|
| Cursor measurement | Horizontal, Vertical, H&V, Degree (only T-Y waveform display), and Marker. |
| Cursor measurement (Harmonic measurement) | Re-calculate harmonic parameters using 8192 points data from point of start cursor according to the input frequency |
| Automated measurement of waveform parameters | Automated measurement of waveform parameters Up to 24 items can be displayed P-P, Amp, Max, Min, High, Low, Avg, Mid, Rms, Sdev, +OvrShoot, -OvrShoot, Rise, Fall, Freq, Period, +Width, -Width, Duty, Pulse, Burst1, Burst2, AvgFreq, AvgPeriod, Int1TY, Int2TY, Int1XY, Int2XY, Int1hXY (IntegPower/IntegCurrent) Int2hXY (IntegPower/IntegCurrent) |
| Statistical processing | Application items: Automated measurement values of waveform parameters Statistical items: Max, Min, Avg, Sdv, and Cnt Maximum number of cycles: 64000 cycles (when the number of parameters is 1) Maximum total number of parameters: 64000 Maximum measurement range: 100 M points |
| Normal statistical processing | Statistical processing is performed while waveforms are acquired. |
| Cyclic statistical processing | Automatically measures the waveform parameters of the data in the acquisition memory and performs statistical processing on the parameters once per cycle period. |
| Statistical processing of the history data | Automatically measures the waveform parameters of each history waveform and performs statistical processing on the parameters. |
| User defined computation (MATH) | Maximum 8 expressions for waveforms MATH1 to MATH8, Maximum 4 M points of total, Regarding Digital filter function, please refer to waveform calculation (digital filter) Expressions can be created through the combination of the following operations and constants for waveforms. +, -, *, /, SHIFT, ABS, SQRT, LOG, EXP, NEG, SIN, COS, TAN, ATAN, PH, DIF, DDIF, INTG, IINTG, BIN, SQ, CUBE, F1, F2, FV, PWHH, PWHL, PWLH, PWLL, PWXX, DUTYH, DUTYL, FILT1, FILT2, HLB, MEAN, LS-, PS-, PSD-, CS-, TF-, CH-, MAG, LOGMAG, PHASE, REAL, IMAG, TREND, TRENDM, TRENDND, TRENDF, _HH, _LL, _XX and ZC |
| User defined computation (numeric) | Expressions can be created through the combination of the following operations for numeric values, Maximum 20 expressions, F1 to F20. +, -, *, /, ABS, SQRT, SQ, LOG, LOG10, EXP and NEG |
| Efficiency equation | Up to 4 efficiencies can be displayed by setting the items to measure with the efficiency equations |
| De-skew function | Compensate the phase difference between voltage and current modules of a power measurement element |
| GO/NO-GO determination | The following two types of GO/NO-GO determination are available - Determination using zones on the screen - Determination using the automated measurement values of waveform parameters The following operations can be performed at the time of determination: Output of screen, WDF binary capture data, saving of waveform data (to binary, ASCII, or floating-point), or sounding of a notification buzzer. |
| Recalculation of numeric parameters | Recalculation of numeric parameters can be done after changing the calculation condition |

File Functions

| Item | Specification |
|------|---|
| Save | Setup data, Waveform data (including History data), numeric data and image data can be saved external media |
| Read | Waveform data (including History data up to 1000 waveform) and setup data |

FFT Function

| Item | Specification |
|-------------------------|---|
| Waveform to be computed | Un, In, Pn, AUXn and MATHn |
| Number of channels | 2 |
| Computation range | From the specified computation start point until the specified number of points have been computed. |
| Computed points | 1 k, 2 k, 5 k, 10 k, 20 k, 50 k, or 100 k |
| Time windows | Rectangular, Hanning, Hamming, Flat top, or Exponential When the Exponential time window is selected, the following settings must be configured. Damping rate: The weight of the last data point, with the weight of the first data point in the specified number of FFT points taken to be 100% Selectable range: 1 to 100% Resolution: 1% Forc1: Set the area over which computation is performed in terms of a percentage from the first FFT point, taking the number of FFT points to be 100% Selectable range: 1 to 100% Resolution: 1% Forc2: The setting applies to the output (response) signal (second parameter) of a two-waveform FFT Selectable range: 1 to 100% Resolution: 1% |
| Displaying window | The FFT computation results are displayed in a separate window independent from the normal waveform display. Display range: Set the display range by setting Center and Sensitivity |

Built-in Printer (/B5 Option)

| Item | Specification |
|-----------------------|-------------------------------------|
| Print system | Thermal line dot system |
| Dot density | 8 dot/mm |
| Sheet width | 112 mm |
| Effective print width | 104 mm (832 dots) |
| Used for | Producing a hard copy of the screen |

Storage Functions

| SD Card | |
|--------------------------------|--|
| Item | Specification |
| Number of slot | 1 |
| Maximum capacity | 16 GB |
| Supported cards | SD and SDHC compliant memory card |
| Compatible USB storage devices | Mass storage devices that are compliant with USB Mass Storage Class Ver. 1.1 Maximum capacity: 2 TB, Format of partition: MBR, File format: FAT32/FAT16 |

USB Peripheral Interface

| Item | Specification |
|-----------------|---------------|
| Number of ports | 2 |

Specifications of PX8000, 760811, 760812, 760813 and 760851

| | |
|--|---|
| Connector type | USB type A (receptacle) |
| Electrical and mechanical specifications | USB Rev. 2.0 compliant |
| Supported transfer mode | HS (High Speed, 480 Mbps), FS Full Speed, 12 Mbps), and LS Low Speed, 1.5 Mbps) |
| Power supply | 5 V, 500 mA for each port |

Input/Output EXT TRIG IN

| Item | Specification |
|---------------------|--------------------------|
| Connector type | BNC |
| Input level | TTL |
| Minimum pulse width | 100 ns |
| Detected edge | Rising or falling |
| Trigger delay time | Within 100 ns + 1 sample |

EXT TRG OUT

| Item | Specification |
|--------------------|--|
| Connector type | BNC |
| Output level | 5 V CMOS |
| Logic | Low when a trigger occurs and high after acquisition is completed. |
| Trigger delay time | Within 100 ns + 1 sample |
| Output hold time | 100 ns or more |

EXT CLK IN

| Item | Specification |
|---------------------|--------------------------|
| Connector type | BNC |
| Input level | TTL |
| Minimum pulse width | 50 ns |
| Detected edge | Rising |
| Sampling jitter | Within 100 ns + 1 sample |
| Frequency range | Maximum 9.5 MHz |

Video Output

| | |
|-------------------|---|
| Connector type | D-Sub 15 pin receptacle |
| Output format | Analog RGB |
| Output resolution | XGA-compliant output 1024 x 768 dots Approx. 60 Hz Vsync (dot clock frequency: 66 MHz) |

GO/NO-GO Determination I/O

| | |
|----------------|--------------------|
| Connector type | RJ-11 modular jack |
| Input level | TTL or contact |
| Output level | 5 V CMOS |

External Start/Stop Input

| | |
|----------------|--------------------|
| Connector type | RJ-11 modular jack |
| Input level | TTL or contact |

Comp Output

| | |
|-------------------------|------------------|
| Output signal frequency | 1 kHz \pm 1% |
| Output amplitude | 1 Vp-p \pm 10% |

Probe Power Output (/P4 Option)

| | |
|----------------------------|----------------------|
| Number of output terminals | 4 |
| Output voltage | \pm 12 Vdc |
| Output current | Total maximum of 1 A |

Sensor Power Output (/PD2 option)

| | |
|----------------------------|---------------------|
| Number of output terminals | 4 |
| Output voltage | \pm 15 V |
| Output current | Maximum of 1.8 A/CH |

Time Sync Signal Input (IRIG: /C20 option)

| | |
|----------------------------|---|
| Input connector | BNC |
| Number of input connectors | 1 |
| Supported IRIG signals | A002, B002, A132 and B122 |
| Input impedance | Can be switched between 50 Ohm and 5 k Ohm. |
| Maximum input voltage | \pm 8 V |
| Used for | Synchronizing the PX8000 time Synchronizing the sample clock |
| Clock sync range | \pm 80 ppm |
| Post-sync accuracy | No drift from the input signal |

Safety terminal adapter (Voltage/Current)

| | |
|---------------------------|--|
| Allowable maximum current | 36 A |
| Withstand voltage | 1000 V CAT III |
| Contact resistance | Less than 10 m Ohm |
| Material of contact | Brass and bronze with Nickel surface coat |
| Insulator | Polyamide (Voltage), polypropylene (Current) |
| Diameter of wire | Maximum 1.8 mm (Voltage), 2.5 mm (Current) |
| thickness of covering | Maximum 3.9 mm (Voltage), 4.0 mm (Current) |

GP-IB

| | |
|--------------------------|---|
| Usable devices | National Instruments Corporation PCI-GPIB or PCI-GPIB+ PCle-GPIB or PCIe-GPIB+ PCMCIA-GPIB or PCMCIA-GPIB+ GPIB-USB-HS Use driver NI-488.2M Ver. 1.60 or later |
| Connector type | 24-pin connector |
| Electrical specification | Complies with IEEE Std 488-1978 (JIS C 1901-1987) |

| | |
|--------------------------|--|
| Functional specification | SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT0, and C0 |
| Protocol | IEEE Std 488.2-1992 |
| Code | ISO (ASCII) |
| Mode | Addressable mode |
| Address | Talker and listener addresses can be specified from 0 to 30. |
| Remote mode release | Remote mode can be cleared with the SHIFT + CLEAR TRACE key (except during Local Lockout). |

Ethernet

| | |
|--|--|
| Ports | 1 |
| Connector type | RJ-45 modular jack |
| Electrical and mechanical specifications | IEEE802.3 |
| Transmission system | Ethernet (1000BASE-T, 100BASE-TX or 10BASE-T) |
| Communication protocols | TCP/IP |
| Supported services | DHCP, DNS, SNMP, FTP server and client, and VXI-11 |

USB

| | |
|--|--|
| Number of ports | 1 |
| Connector type | USB type B receptacle |
| Electrical and mechanical specifications | USB Rev. 2.0 compliant |
| Supported transfer modes | HS (High Speed, 480 Mbps) and FS (Full Speed, 12 Mbps) |
| Supported protocols | USBTMC-USB488 (USB Test and Measurement Class Ver. 1.0) |
| PC system requirements | A PC with a USB port, running the English or Japanese version of Windows7 (32 bit), Windows Vista (32 bit) |

Display Items

Numerical Values

| | |
|---------------------------------------|--|
| Normal | Measurement functions for each channel (Power measurement element) |
| Voltage (V) | Urms: true rms value, Umn: rectified mean value calibrated rms value, Udc: simple average value, Urmn: rectified mean value, Uac: AC component |
| Current (A) | Irms: true rms value, Imn: rectified mean value calibrated rms value, Idc: simple average value, Irmn: rectified mean value, Iac: AC component |
| Active Power (W) | P |
| Apparent Power (VA) | S: selectable of Urms \times Irms, Umn \times Imn, Udc \times Idc, Urmn \times Irmn or Umn \times Irms |
| Reactive Power (Var) | Q |
| Power Factor | Lambda (P/S) |
| Phase Angle (deg) | Phi (cos ⁻¹ P/S) |
| Frequency (Hz) ¹ | fU: Voltage frequency fI: Current frequency (when it is lower frequency of the range, customer can select Error or 0 for the data) |
| Voltage Peak value of \pm (V) | U+pk: Voltage maximum +peak value during one update period U-pk: Voltage maximum -peak value during one update period |
| Current Peak value of \pm (A) | I+pk: Current maximum +peak value during one update period I-pk: Current maximum -peak value during one update period |
| Instant Power Peak value of \pm (W) | P+pk: Instant Power maximum +peak value during one update period P-pk: Instant Power maximum -peak value during one update period |
| Crest Factor | CfU: Voltage crest factor, CfI: Current crest factor |
| Corrected Power (W) | Pc: IEC76-1 (1976), IEEE C57.12.90-1993, or IEC76-1 (1993) |

¹ Not available for External Clock input

Sigma Items

| Item | Symbol and meaning |
|----------------------|---|
| Normal | Sigma Measurement functions for both A and B wiring systems (power element combination) |
| Voltage (V) | UrmsSigma: true rms value, UmnSigma: rectified mean value calibrated rms value, UdcSigma: simple average value, UrmnSigma: rectified mean value, UacSigma: AC component |
| Current (A) | IrmsSigma: true rms value, ImnSigma: rectified mean value calibrated rms value, IdcSigma: simple average value, IrmnSigma: rectified mean value, IacSigma: AC component |
| Active Power (W) | PSigma |
| Apparent Power (VA) | SSigma (depends on Type, 1, 2 or 3) |
| Reactive Power (Var) | QSigma (depends on Type, 1, 2 or 3) |
| Power Factor | LambdaSigma |
| Phase Angle (deg) | PhiSigma |
| Corrected Power (W) | PcSigma: IEC76-1 (1976), IEEE C57.12.90-1993, or IEC76-1(1993) |
| Efficiency 1 to 4 | Eta 1 to Eta 4 by setting of user |

Harmonic analysis function (/G5 Option)

| Item | Symbol and meaning |
|---------------------------------|---|
| Harmonics | Measuring functions of Harmonic analysis |
| Voltage (V) | U (k): k-th order ¹ voltage true rms value, U: total ² voltage true rms value |
| Current (A) | I (k): k-th order current true rms value, I: total current true rms value When k=0, it shows DC component |
| Active Power (W) | P (k): k-th order active power value, P: total active power value When k=0, it shows DC component |
| Apparent Power (VA) | S (k): k-th order apparent power value, S: total apparent power value When k=0, it shows DC component |
| Reactive Power (Var) | Q (k): k-th order reactive power value, Q: total reactive power value When k=0, it shows 0 |
| Power Factor | Lambda(k): k-th order power factor value, Lambda: total power factor value |
| Phase Angle (deg) | Phi (k): Phase angle between k-th order voltage and current, Phi: Phase angle of current refers to voltage waveform PhiU (k): Phase angle of k-th order voltage refers to the fundamental voltage U (1) PhiI (k): Phase angle of k-th order current refers to the fundamental current I (1) |
| Impedance of load circuit (Ohm) | Z(k): Impedance of load circuit of th k-th order harmonic waveform |

Specifications of PX8000, 760811, 760812, 760813 and 760851

| | |
|---|--|
| Resistance and reactance of load circuit (Ohm) | Rs (k): Resistance of load circuit of k-th order harmonic waveform when resistor R, inductor L and capacitor C are connected in series Xs (k): Reactance of load circuit of k-th order harmonic waveform when resistor R, inductor L and capacitor C are connected in series Rp (k): Resistance of load circuit of k-th order harmonic waveform when resistor R, inductor L and capacitor C are connected in parallel Xp (k): Reactance of load circuit of k-th order harmonic waveform when resistor R, inductor L and capacitor C are connected in parallel |
| Harmonic distortion factor [%] | Uhdf (k): Ratio of k-th order voltage value of the voltage value, U (1) or U Ihdf (k): Ratio of k-th order current value of the current value, I (1) or I Phdf (k): Ratio of k-th order power value of the power value, P (1) or P |
| Total harmonic distortion [%] | Uthd: Ratio of the total harmonic voltage ² of the voltage value, U (1) or U Ithd: Ratio of the total harmonic current of the current value, I (1) or I Pthd: Ratio of the total harmonic power of the power value, P (1) or P |
| Telephone harmonic factor ⁴ (IEC34-1 (1996)) | Uthf: Telephone harmonic factor of voltage Ithf: Telephone harmonic factor of current |
| Telephone influence factor ⁴ (IEEE Std 100 (1996)) | Utif: Telephone influence factor of voltage Itif: Telephone influence factor of current |
| Harmonic voltage factor ⁴ (IEC34-1 (1996)) | hvf: Harmonic voltage factor |
| Harmonic current factor ⁴ (similar method of hvf) | hcf: Harmonic current factor |
| Frequency of PLL source | fU or fI, frequency of PLL source, voltage (fU) or current (fI) Shows [-----] when the PLL source is not set. |
| K-factor | K-factor |

¹ Harmonic order k is an integer from 0 to the upper limit of harmonic analysis. The 0-th order is the DC component. The upper limit is determined automatically according to the PLL source frequency. It can go up to the 500th harmonic order.
² The total value is determined from the fundamental waveform (1st order) and all harmonic components (2nd order to the upper limit of harmonic analysis). The DC component can also be included.
³ Total harmonic values are determined from all harmonic components (2nd order to the upper limit of harmonic analysis)
⁴ The expression may vary depending on the definitions in the standard IEC or IEEE. Please refer to the Function sheet.

Sigma Items

| Item | Symbol and the meaning |
|----------------------|---|
| Harmonic | Sigma Measurement functions for both A and B wiring systems (power element combination) |
| Voltage (V) | USigma (k): k is 1, fundamental voltage true rms value, or k is total, total voltage true rms value |
| Current (A) | ISigma (k): k is 1, fundamental current true rms value, or k is total, total current true rms value |
| Active Power (W) | PSigma (k): k is 1, fundamental active power value, or k is total, total active power value |
| Apparent Power (VA) | SSigma (k): k is 1, fundamental apparent power value, or k is total apparent power value |
| Reactive Power (Var) | QSigma (k): k is 1, fundamental reactive power value, or k is total, total reactive power value |
| Power Factor | LambdaSigma (k): k is 1, fundamental power factor value, or k is total, total power factor value |

^{*} The total value is determined from the fundamental waveform (1st order) and all harmonic components (2nd order to the upper limit of harmonic analysis). The DC component can also be included. As for Sigma values, only Total values and fundamental value are calculated.

Phase items

| Item | Symbol and the meaning |
|-------------------------|--|
| Harmonic | Measurement functions of phase angles among power elements |
| Phase angle U1-U2 (deg) | PhiU1-U2: Phase angle of power element 2 fundamental voltage (U2 (1)) refers to the power element 1 fundamental voltage (U1 (1)) |
| Phase angle U1-U3 (deg) | PhiU1-U3: Phase angle of power element 3 fundamental voltage (U3 (1)) refers to the power element 1 fundamental voltage (U1 (1)) |
| Phase angle U1-I1 (deg) | PhiU1-I1: Phase angle of power element 1 fundamental current (I1 (1)) refers to the power element 1 fundamental voltage (U1 (1)) |
| Phase angle U2-I2 (deg) | PhiU2-I2: Phase angle of power element 2 fundamental current (I2 (1)) refers to the power element 2 fundamental voltage (U2 (1)) |
| Phase angle U3-I3 (deg) | PhiU3-I3: Phase angle of power element 3 fundamental current (I3(1)) refers to the power element 3 fundamental voltage (U3(1)) |
| Phase angle I1-I2 (deg) | PhiI1-I2: Phase angle of power element 2 fundamental current (I2(1)) refers to the power element 1 fundamental voltage (U1(1)) |
| Phase angle I2-I3 (deg) | PhiI2-I3: Phase angle of power element 3 fundamental current (I3 (1)) refers to the power element 2 fundamental voltage (U2 (1)) |
| Phase angle I3-I1 (deg) | PhiI3-I1: Phase angle of power element 1 fundamental current (I1 (1)) refers to the power element 3 fundamental voltage (U3 (1)) |

Delta Function

| Item | Symbol and the meaning |
|-------------|--|
| Delta | Measurement function of Delta calculation by each Sigma wiring system |
| Voltage [V] | Delta U1 to Delta U3, and Delta Usigma Difference: differential voltage calculation of U1 to U2, 3P3W -> 3V3A: Line to Line voltage calculation between U1 and U2 DELTA -> STAR: Phase voltages calculation by Line to Line voltages STAR -> DELTA: Line to Line voltage calculation by Phase voltages |
| Current [A] | Delta I Difference: differential current calculation of I1 to I2, 3P3W -> 3V3A: Phase current calculation excepting I1 and I2 DELTA -> STAR: Neutral current calculation by Phase currents STAR -> DELTA: Neutral current calculation by Phase currents |
| Power [W] | Delta P1 to Delta P3, and Delta P Sigma DELTA -> STAR: Phase powers calculation by 3V3A wiring [*] Calculate each Sigma function |

AUX analysis function

Torque and Speed input

When motor mode is on

| Item | Symbols and Meanings |
|--------------------|--|
| Rotating speed | Speed: Motor rotating speed |
| Torque | Torque: Motor torque |
| Monitor output (W) | Pm: Motor's mechanical output (mechanical power) |

When motor mode is off

| Item | Symbols and Meanings |
|-----------------|----------------------|
| Auxiliary input | Aux3 to Aux8 |

Maximum display (OL conversion)

Analogue: Displays up to 140% of the range rating
Overload display [-OL] appears if 140% is exceeded.
Pulse: Displays up to 2 MHz (OF display at 10 GHz or higher if scaling is used)

Minimum display (zero suppression)

Analogue: None
Pulse: Displays pulse frequency down to 1.8 Hz
Frequencies less than 1.8 Hz are suppressed to zero.

| | |
|------------|--|
| AUX1, AUX2 | A(X × NULL) + B A: slope of the external signal X: average value of the external signal's input voltage (AVG [AUX_input1(n)]) B: offset NULL: null value A(X × NULL) + B A: slope of the external signal X: Pulse [Hz] B: offset NULL: null value [Hz] If the pulse level is lower than the measurement lower limit, "Error" or "0" can be selectable. |
|------------|--|

Accuracy

| Accuracy (at 6 months) | Conditions | Accuracy: Within 6 months after calibration - Standard operating conditions (Temperature: 23°C ±5°C. Humidity: 30%RH to 75%RH.) - After the warm-up time has elapsed. - Input signal: Sine wave - Common mode voltage: 0 V - Time/div is set to longer than 50 μs - Frequency filter ON when input frequency is lower than 1 kHz - Line filter: OFF - Sampling points: 5 points/cycle at least - f is the frequency. - Input signal is 5 cycles or less and there are 10 k points of sampled data or more observation time. - If input signal is not 5 cycles and number of sampling data is not 10 k points, add following values (reference value) (Reading error/10) × (5/measured cycle number) × (10 k/sampling point number)% of reading |
|------------------------|---------------------------------|---|
| Voltage: | Frequency | Accuracy DC: ±(0.2% of reading + 0.2% of range) 0.1 Hz ≤ f < 10 Hz: ±(0.2% of reading + 0.2% of range) 10 Hz ≤ f < 45 Hz: ±(0.2% of reading + 0.1% of range) 45 Hz ≤ f ≤ 1 kHz: ±(0.1% of reading + 0.1% of range) 1 kHz < f ≤ 10 kHz: ±(0.1% of reading + 0.1% of range) 10 kHz < f ≤ 50 kHz: ±(0.2% of reading + 0.2% of range) 50 kHz < f ≤ 100 kHz: ±(0.6% of reading + 0.4% of range) 100 kHz < f ≤ 200 kHz: ±(0.6% of reading + 0.4% of range) 200 kHz < f ≤ 400 kHz: ±(1% of reading + 0.4% of range) 400 kHz < f ≤ 500 kHz: ±((0.1 + 0.003 × f) ² % of reading + 0.4% of range) 500 kHz < f ≤ 1 MHz: ±((0.1 + 0.003 × f) ² % of reading + 4% of range) 1 MHz < f ≤ 10 MHz: ±((0.1 + 0.003 × f) ² % of reading + 4% of range) [*] Measurement bandwidth 20 MHz (-3 dB, Typical) [*] Accuracy over 1 MHz is design value |
| Current: | Direct (up to 5 A) Frequency | Accuracy DC: ±(0.2% of reading + 0.2% of range) + 20 μA 0.1 Hz ≤ f < 10 Hz: ±(0.2% of reading + 0.2% of range) 10 Hz ≤ f < 45 Hz: ±(0.2% of reading + 0.1% of range) 45 Hz ≤ f ≤ 1 kHz: ±(0.1% of reading + 0.1% of range) 1 kHz < f ≤ 10 kHz: ±(0.1% of reading + 0.1% of range) 10 kHz < f ≤ 50 kHz: ±(0.2% of reading + 0.2% of range) 50 kHz < f ≤ 100 kHz: ±(0.6% of reading + 0.4% of range) 100 kHz < f ≤ 200 kHz: ±(0.6% of reading + 0.4% of range) 200 kHz < f ≤ 400 kHz: ±(1% of reading + 0.4% of range) 400 kHz < f ≤ 500 kHz: ±((0.1 + 0.004 × f) ² % of reading + 0.4% of range) 500 kHz < f ≤ 1 MHz: ±((0.1 + 0.004 × f) ² % of reading + 4% of range) [*] Measurement bandwidth 10 MHz (-3 dB, Typical) |
| | Sensor Frequency | Accuracy (760812) DC: ±(0.2% of reading + 0.2% of range) + 50 μV 0.1 Hz ≤ f < 10 Hz: ±(0.2% of reading + 0.2% of range) 10 Hz ≤ f < 45 Hz: ±(0.2% of reading + 0.1% of range) 45 Hz ≤ f ≤ 1 kHz: ±(0.1% of reading + 0.1% of range) 1 kHz < f ≤ 10 kHz: ±(0.1% of reading + 0.1% of range) 10 kHz < f ≤ 50 kHz: ±(0.2% of reading + 0.2% of range) 50 kHz < f ≤ 100 kHz: ±(0.6% of reading + 0.4% of range) 100 kHz < f ≤ 200 kHz: ±(0.6% of reading + 0.4% of range) 200 kHz < f ≤ 400 kHz: ±(1% of reading + 0.4% of range) 400 kHz < f ≤ 500 kHz: ±((0.1 + 0.003 × f) ² % of reading + 0.4% of range) 500 kHz < f ≤ 1 MHz: ±((0.1 + 0.003 × f) ² % of reading + 4% of range) 1 MHz < f ≤ 10 MHz: ±((0.1 + 0.003 × f) ² % of reading + 4% of range) [*] Measurement bandwidth 20 MB (-3 dB, Typical) [*] Accuracy over 1 MHz is design value |
| Power: | Direct (up to 5 A) Frequency | Accuracy DC: ±(0.2% of reading + 0.4% of range) + 20 μA × U 0.1 Hz ≤ f < 10 Hz: ±(0.2% of reading + 0.2% of range) 10 Hz ≤ f < 45 Hz: ±(0.2% of reading + 0.1% of range) 45 Hz ≤ f ≤ 1 kHz: ±(0.1% of reading + 0.1% of range) 1 kHz < f ≤ 10 kHz: ±(0.1% of reading + 0.16% of range) 10 kHz < f ≤ 50 kHz: ±(0.2% of reading + 0.2% of range) 50 kHz < f ≤ 100 kHz: ±(0.6% of reading + 0.4% of range) 100 kHz < f ≤ 200 kHz: ±(1.5% of reading + 0.6% of range) 200 kHz < f ≤ 400 kHz: ±(1.5% of reading + 0.6% of range) 400 kHz < f ≤ 500 kHz: ±((0.1 + 0.006 × f) ² % of reading + 0.6% of range) 500 kHz < f ≤ 1 MHz: ±((0.1 + 0.006 × f) ² % of reading + 6% of range) Sensor Frequency Accuracy (760812) DC: ±(0.2% of reading + 0.4% of range) + 50 μV × U 0.1 Hz ≤ f < 10 Hz: ±(0.2% of reading + 0.2% of range) 10 Hz ≤ f < 45 Hz: ±(0.2% of reading + 0.1% of range) 45 Hz ≤ f ≤ 1 kHz: ±(0.1% of reading + 0.1% of range) 1 kHz < f ≤ 10 kHz: ±(0.1% of reading + 0.16% of range) 10 kHz < f ≤ 50 kHz: ±(0.2% of reading + 0.2% of range) 50 kHz < f ≤ 100 kHz: ±(0.6% of reading + 0.4% of range) 100 kHz < f ≤ 200 kHz: ±(1.5% of reading + 0.6% of range) 200 kHz < f ≤ 400 kHz: ±(1.5% of reading + 0.6% of range) 400 kHz < f ≤ 500 kHz: ±((0.1 + 0.004 × f) ² % of reading + 0.6% of range) 500 kHz < f ≤ 1 MHz: ±((0.1 + 0.004 × f) ² % of reading + 6% of range) [*] The unit of f in the equation for the reading error is (kHz). [*] U is voltage reading value. |

Specifications of PX8000, 760811, 760812, 760813 and 760851

Conditions;

- Add $\pm(0.2\%$ of reading) to Current accuracy when Sensor current input range is 50 mV to 500 mV, Direct current input range is 10 mA to 200 mA and input signal frequency is 1 kHz to 50 kHz.
- Add $\pm(0.2\%$ of reading) to Power accuracy when Sensor current input range is 50 mV to 500 mV and input signal frequency is 1 kHz to 50 kHz.
- Add (Rated range/Maximum rated range) $\times 0.005 \times f$ of reading, when input voltage is over 400 Vrms (f unit: kHz)
- Influence of input level
When input level is 110% to 140% of range with sine waveform, reading error is twice.
When input level is $\pm(110\%$ to 200%) of range with DC waveform, reading error is twice.
- Influence of temperature changes after zero-level compensation or range change
Add 0.02% of range/ $^{\circ}\text{C}$ to Voltage accuracy for DC
Add 20 $\mu\text{A}/^{\circ}\text{C}$ to Direct current accuracy for DC
Add 50 $\mu\text{V}/^{\circ}\text{C}$ to Sensor current accuracy
Add additional voltage value (V) \times additional current value (A) to Power accuracy for DC
- Influence of self-generated heat caused by voltage input
Add the following values to the voltage and power accuracies:
AC input signal: $0.0000001 \times U^2\%$ of reading
DC input signal: $0.0000001 \times U^2\%$ of reading + $0.0000001 \times U^2\%$ of range
U is the voltage reading (V).
Even if the voltage input decreases, the influence from self-generated heat continues until the temperature of the input resistor decreases.
- Influence of self-generated heat caused by current input
Add the following values to the current and power accuracies.
AC input signal: $0.006 \times I^2\%$ of reading
DC input signal: $0.006 \times I^2\%$ of reading + $0.004 \times I^2\%$ mA
I is the current reading (A).
Add the following values to the current and power accuracies.
AC input signal: $0.0000001 \times U^2\%$ of reading
 $0.006 \times I^2\%$ of reading
DC input signal: $0.0000001 \times U^2\%$ of reading + $0.0000001 \times U^2\%$ of range
 $0.006 \times I^2\%$ of reading + $0.004 \times I^2 \times U$ mW
U is the voltage reading (V), I is the current reading (A).
Even if the voltage input decreases, the influence from self-generated heat continues until the temperature of the input resistor decreases
- Guaranteed accuracy ranges for frequency, voltage, and current
All accuracy figures for 0.1 Hz to 10 Hz are design values.
The voltage and power accuracy figures for DC and 30 kHz to 100 kHz when the voltage exceeds 750 V are design values.
The current and power accuracy figures for 100 kHz to 1 MHz when the current exceeds 5 A are reference values.
- Effective input range
Udc, Idc: 0% to $\pm 110\%$ of the measurement range
Urms, Irms: 1% to 110% of the measurement range
Umn, Imn: 10% to 110% of the measurement range
Urn, Irmn: 10% to 110% of the measurement range
Power:
DC measurement: 0% to $\pm 110\%$
AC measurement: 1% to 110% of the voltage and current ranges; up to $\pm 110\%$ of the power range
However, the synchronization source level must meet the frequency measurement input signal level.
- Line filter influence
Voltage and current (Direct and Sensor)
45 Hz to 66 Hz: Add 0.2% of reading
Lower than 45 Hz: Add 0.5% of reading
At (Cutoff frequency of Line filter) /10 Hz: Add 0.8% of reading
Power
45 Hz to 66 Hz: Add 0.3% of reading
Lower than 45 Hz: Add 1% of reading
At (Cutoff frequency of Line filter) /10 Hz: Add 1.5% of reading
- Temperature coefficient (lower than 10 kHz input)
Add $\pm 0.02\%$ of reading/ $^{\circ}\text{C}$ within the range of 5°C to 18°C or 28°C to 40°C
- Power factor (λ) influence
When $\lambda = 0$ (S is Apparent power)
 $\pm 0.15\%$ of S for 45 Hz to 66 Hz.
For other frequency ranges, below figures are reference values.
 $\pm(0.017 \times f)$ of S (f is kHz).
Input level is 0.15% or more of apparent power
When $0 < \lambda < 1$
(Power reading) \times [(power reading error%) + (power range error%) \times (power range/indicated apparent power value) + $\{\tan \Phi \times (\text{influence when } \lambda = 0)\}$],
where Φ is the phase angle between the voltage and current.
- Accuracy of apparent power S Voltage accuracy + current accuracy
- Accuracy of reactive power Q Accuracy of apparent power + $(\sqrt{(1.0004 - \lambda^2)} - \sqrt{(1 - \lambda^2)}) \times 100\%$ of range
- Accuracy of power factor λ
 $\pm[\lambda - \lambda/1.0002] + [\cos\Phi - \cos(\Phi + \sin^{-1}(\text{influence from the power factor when } \lambda = 0\% / 100))] \pm 1$ digit.
The voltage and current signals are rated range inputs.
- Accuracy of phase angle Φ
 $\pm[\Phi - [\cos^{-1}(\lambda/1.0002)]] + \sin^{-1}(\text{influence from the power factor when } \lambda = 0\% / 100)] \text{ deg} \pm 1$ digit.
The voltage and current signals are rated range inputs.
- Lead and lag detection (Phase angle Φ 's D (lead) and G (lag))
The lead and lag of the voltage and current inputs can be detected correctly for the following:
Sine wave input
When the measured value is 50% or more of measurement range.
Frequency: 10 Hz to 10 kHz
Phase difference: ± 5 degree to 175 degree
When frequency filter is ON, it is specified range of lower frequency of half of the cut off frequency.
However, Cutoff frequency is 100 Hz filter, it is specified lower than 60 Hz.
- Accuracy at 1 year 1.5 times the reading errors for the accuracy at 6 months

6

| | |
|---------------------------|---|
| Maximum power consumption | 200 VA, 400 VA (with /B5 is used, when /PD2 is installed) |
| Withstand voltage | 1500 VAC for one minute between the power supply and case |
| Insulation resistance | 10 M Ohm or more for 500 VDC between the power supply and case |
| External dimensions | 355 mm (W) \times 259 mm (H) \times 180 mm (D), not including the handle and protrusions. Approx. 355 mm (W) \times 259 mm (H) \times 245 mm (D), excluding the handle and protrusions (when /PD2 is installed) |
| Weight | Approx. 6.5 kg (weight of the PX8000 only without paper and with the /M2, /B5, /C20, /M2, /G5 and /P4 options installed) Approx. 7.5 kg (main unit only with /B5/C20/G5/M2/P4/PD2 installed, excluding recording paper) |
| Instrument cooling method | Forced air cooling. Exhaust on the left side and top panel. Forced air Air vents on the left and top panels, and back (when /PD2 is installed) |
| Battery backup | The settings and clock are backed up with an internal lithium battery. |
| Backup battery life | Approx. 5 years (at an ambient temperature of 25 $^{\circ}\text{C}$) |
| Standard Accessories | Front panel protection cover 1 Cover panel 8 Rubber stoppers 4 Power cord 1 Printer roll paper 1 (/B5 only) Getting started Guide 1 CD manual 1 Voltage Input Adapter 4 Current Input Adapter 4 Wrench 1 |
| Safety standard | Compliance standards EN61010-1, EN61010-2-030, EN61010-031, EN 60825-1 - Over voltage category (installation category) II - Measurement Category II - Pollution degree 2 |
| Emissions | Compliance standards EN61326-1 Class A, EN61326-2-1, EN55011 Class A Group 1, RCM EN55011 Class A, Group1 - Class A Korean KC Standard *Warning for Class A instruments This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment. Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause. |
| Test items | Power supply: EN61326: Class A Radiated emissions: EN61326: Class A Harmonics: EN61000-3-2 Voltage fluctuation and flicker: EN61000-3-3 |
| Immunity | Compliance standards EN61326-1 Table 2 (for industrial locations), EN61326-2-1 Test items Electrostatic discharge: EN61000-4-2 Radiated immunity: EN61000-4-3 Conducted immunity: EN61000-4-6 Fast transient/burst: EN61000-4-4 Power frequency magnetic field: EN61000-4-8 Surge immunity: EN6100-4-5 Voltage dip and interruption: EN61000-4-11 |

General Specifications

| Item | Specification |
|--|--|
| Standard operating conditions | Ambient Temperature: 23 \pm 5 $^{\circ}\text{C}$ Ambient humidity: 20 to 80%RH Supply Voltage and frequency Within $\pm 1\%$ of rating After the PX8000 has been warmed up and then calibration has been performed. |
| Warm up time | At least 30 mins |
| Storage environment | Temperature: -25 to 60 $^{\circ}\text{C}$ Humidity: 20 to 80% RH (no condensation) Altitude: 3000 m or less |
| Operation environment | Temperature: 5 to 40 $^{\circ}\text{C}$ normal position, 5 to 35 $^{\circ}\text{C}$ when the rear panel is parallele to the flower Humidity: 20 to 80% RH without using the printer, no condensation Humidity: 35 to 80% RH when the printer is used, no condensation Altitude: 2000m or less |
| Rated supply voltage | 100 to 120 VAC/220 to 240 VAC (Auto switching) |
| Rated supply voltage range | 90 to 132 VAC/198 to 264 VAC |
| Rated supply frequency | 50/60 Hz |
| Permitted supply voltage frequency range | 48 to 63 Hz |

| Model | Suffix Code | Description |
|------------|-------------|--|
| PX8000 | | Precision Power Scope |
| Power Cord | -D | UL/CSA Standard |
| | -F | VDE standard |
| | -H | GB standard |
| | -N | NBR standard |
| | -Q | BS standard |
| Languages | -HE | English menu |
| | -HG | German menu |
| | -HJ | Japanese menu |
| Options | /B5 | Built-in printer (112 mm) |
| | /C20 | IRIG function |
| | /G5 | Harmonic measurement |
| | /M1 | 50 M memory expansion ¹ |
| | /M2 | 100 M memory expansion ¹ |
| | /P4 | 4 Outputs of probe power |
| | /PD2 | 4 Outputs of sensor power ² |

¹: Only one can be selected.

²: When use Shunt Resistor Box for measurement, /PD2 option and Current module 760812 are required. The /PD2 option requires Firmware version Ver. 3.2 or later.

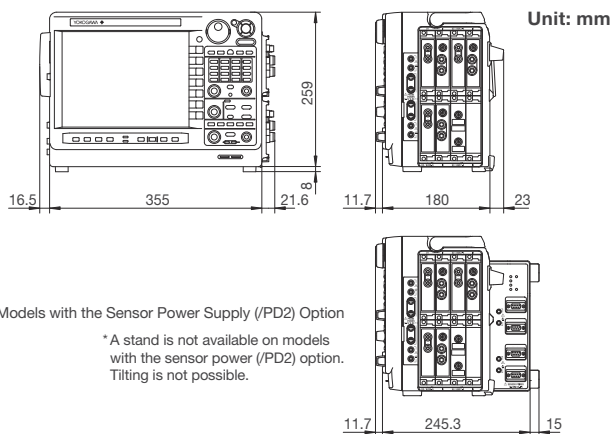
| Name | Model | Description |
|------------------|--------|--|
| Voltage Module | 760811 | Current module 760812 or 760813 must be ordered together |
| Current Module | 760812 | Voltage module 760811 must be ordered together |
| Current Module | 760813 | Voltage module 760811 must be ordered together |
| Auxiliary Module | 760851 | Auxiliary (AUX) module for sensor input, Torque/Speed |

| Name | Model | Description |
|-----------------|--------|--------------------------------------|
| PowerViewerPlus | 760881 | Viewer software dedicated for PX8000 |

- The German language menu will be released soon.
- Selection of both /M1 and /M2 is not available for one main frame. The standard memory length is 10 M points/CH.
- The power value will be calibrated using a pair of Voltage (760811) and Current (760812/760813) modules, therefore an equal quantity of these must be ordered together.
- A test Certificate of the Voltage Module includes the test results of the voltage and power values which are calibrated with one paired Current Module. Also the test Certificate of the Current Module includes the test results of the current and power values which are calibrated with one paired Voltage Module.

Standard Accessories;

Power cord (1 set), Front cover (1 set), Rubber foot (4 sets), Cover plate assy (8 sets), Current terminal adapter (4 sets), Voltage terminal adapter (4 sets), Printer chart (1 set for /B5), Getting started guide (1 set), CD (Getting started guide, Futures guide, User's Manual, Communication interface manual by PDF data)



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Safety Precautions for Laser Products

The voltage module (760811), the current modules (760812/760813) and the AUX module (760851) uses laser light sources internally. These modules or respond to Class 1 laser product as defined in the IEC60825-1: 2007 Safety of Laser Products-Part 1: Equipment Classification and Requirements.

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| Mode number | Product | Description |
|-------------|---|---|
| 366924 | Δ^1 BNC-BNC Cable | 1 m |
| 366925 | Δ^1 BNC-BNC Cable | 2 m |
| 366926 | Δ^1 1:1 BNC-Alligator Cable | Non-isolated 42 V or less 1 m |
| 366961 | Δ^1 1:1 Banana-Alligator Cable | Non-isolated 42 V or less 1.2 m |
| 700924 | Differential Probe | 1400 Vpk, 1000 Vrms-CAT II |
| 700929 | 10:1 Probe (for isolation BNC input) | 1000 V (DC+ACpeak) CAT I |
| 701901 | 1:1 Safety BNC Adapter Lead (in combination with followings) | 1000 Vrms-CAT II |
| 701902 | Safety BNC-BNC Cable (1 m) | 1000 Vrms-CAT II (BNC-BNC) |
| 701903 | Safety BNC-BNC Cable (2 m) | 1000 Vrms-CAT II (BNC-BNC) |
| 701906 | Long Test Clip | For 700924 and 701926 |
| 701926 | Differential Probe | Maximum 7000 Vpk, 5000 Vrms |
| 701947 | 100:1 Isolation Probe | 1000 V (DC+ACpeak) CAT I |
| 701948 | Plug-On Clip | For 700929 and 701947 |
| 701954 | Large Alligator-Clip (Dolphin type) | 1000 Vrms-CAT II, 1 set each of red and black |
| 701959 | Safety Mini-Clip (Hook type) | 1000 Vrms-CAT II, 1 set each of red and black |
| 701963 | Soft Carrying Case | For PX8000 |
| 720911 | External I/O Cable | For external I/O connection |
| 758917 | Test Lead Set | A set of 0.8 m long, red and black test leads |
| 758921 | Δ Fork Terminal Adapter | Banana-fork adapter, Two adapters to a set |
| 758922 | Δ Small Alligator-clip | Rated at 300 V and used in a pair |
| 758923 | Safety Terminal Adapter | (spring-hold type) Two adapters to a set |
| 758929 | Δ Large Alligator-clip | Rated at 1000 V and used in a pair |
| CT60 | AC/DC Current Sensor | Maximum 60 Apk, DC to 800 kHz (-3 dB) |
| CT200 | AC/DC Current Sensor | Maximum 200 Apk, DC to 500 kHz (-3 dB) |
| CT1000 | AC/DC Current Sensor | Maximum 1000 Apk, DC to 300 kHz (-3 dB) |
| CT2000A | AC/DC Current Sensor | Maximum 2000 Arms, DC to 40 kHz (-3 dB) |

| Parts number | Product | Description | Order Q'ty |
|--------------|--------------------------------|---|------------|
| A1323EZ | Shunt Resistor Box | 5 Ω \pm 0.05% | 1 |
| A1324EZ | Shunt Resistor Box | 10 Ω \pm 0.02% | 1 |
| A1325EZ | Shunt Resistor Box | 20 Ω \pm 0.02% | 1 |
| A1559WL | Current sensor cable | Cable length 3 m for Shunt Resistor Box | 1 |
| A1560WL | Current sensor cable | Cable length 5 m for Shunt Resistor Box | 1 |
| A1589WL | Current Sensor Direct Cable | Cable length 3 m (Burden resistor 2.7 Ω) | 1 |
| A1628WL | Current Sensor Direct Cable | Cable length 5 m (Without Burden resistor) | 1 |
| B8213ZA | Safety Terminal Adapter | (screw-fastened type) Two adapters to a set for current | 4 |
| B8213ZD | Safety Terminal Adapter | (screw-fastened type) Two adapters to a set for voltage | 4 |
| B9284LK | Δ External Sensor Cable | Current sensor input connector, Length 0.5 m | 1 |
| B9317WD | Wrench | For B8213ZD and B8213ZA | 1 |
| B9988AE | Printer Roll Paper | For PX8000, 10 m \times 10 | 1 |

Δ Due to the nature of this product, it is possible to touch its mental parts. Therefore, there is a risk of electric shock, so the product must be used with caution.

*1: Use these products with low-voltage circuits (42 V or less).

Yokogawa's approach to preserving the global environment

- Yokogawa's electrical products are developed and produced in facilities that have received ISO14001 approval.
- In order to protect the global environment, Yokogawa's electrical products are designed in accordance with Yokogawa's Environmentally Friendly Product Design Guidelines and Product Design Assessment Criteria.

Notice

- Before operating the product, read the user's manual thoroughly for proper and safe operation.
- If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa offices.
- Warranty period of the PX8000 and modules is three years.

This is a Class A instrument based on Emission standards EN61326-1 and EN55011, and is designed for an industrial environment. Operation of this equipment in a residential area may cause radio interference, in which case users will be responsible for any interference which they cause.

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