

Product Datasheet - Technical Specifications



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PW4001

POWER ANALYZER

4-channel compact power analyzer featuring:

- DC & 50/60 Hz power accuracy $\pm 0.03\%$ of reading $\pm 0.01\%$ of range
- Wide operating temperature range from -20°C to $+50^{\circ}\text{C}$ (-4°F to 122°F)
- Lightweight at 4.6 kg (162.26 oz.)
- 600 kHz measurement frequency band
- 2.5 MHz, 16-bit sampling performance
- 15 GB internal memory
- CAN input/output functionality
- AC power supply input from 100 to 240 V
- DC power supply input from 10.8 to 28 V ^{*1}

^{*1} option



Features

- Easy power measurement with clamp current sensors
- 4 voltage channels and 4 current channels
- Accuracy of DC and 50/60 Hz that meets WLTP and SAE J1634 requirements
- Excellent environmental durability suitable for low-temperature testing of EVs and batteries (e.g., -10°C , -20°C , respectively)
- Weight: 4.6 kg(162.26 oz.), small and light enough to be held with one hand
- 15 GB internal memory for storing setting files, measured data, and screenshots
- Measured data can be converted to CAN format and output, enabling easy data integration with CAN analysis software (CAN output function)
- CAN data and measured data can be saved simultaneously (CAN input function)
- CAN data can be acquired via vehicle diagnostic communication using OBD-II/OBDOnUDS (CAN input function)
- Data can be saved at intervals as fast as 1 ms
- Simultaneous parallel calculation of all parameters such as RMS, harmonics, instantaneous waveforms, and efficiency

Applications

- Type approval testing to measure EV range (km), energy consumption (Wh/km), and fuel consumption (l/km)
- EV's real drive testing
- Efficiency measurement on inverter/motor test bench
- Evaluation of transient power and torque response of motors
- Recharge/discharge energy measurement of ESSs (Energy Storage Systems)
- Efficiency measurement on DC-DC converter, AC-DC converter
- Input/output power measurement and efficiency evaluation of high-voltage power conditioners

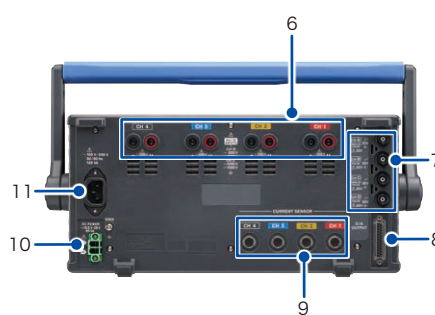
POWER ANALYZER

Parts Names and Functions

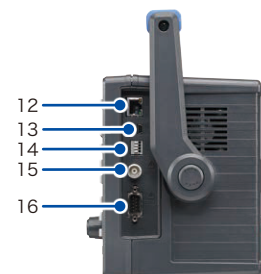
Front



Rear side



Left side



- | | | | |
|----------------|------------------------------------|--|----------------------------------|
| 1 Handle | 5 USB port | 9 Current input terminals | 13 USB port (mini-B type) |
| 2 Display area | 6 Voltage input terminals | 10 DC power supply (option: operates on 10.5 V to 28 V DC) | 14 External control terminal |
| 3 Control area | 7 Motor analysis (option) | 11 Power supply inlet | 15 BNC synchronization connector |
| 4 Power key | 8 Waveform and D/A output (option) | 12 RJ-45 connector | 16 CAN/CAN FD connector |

Software

GENNECT One

(free download software)

- Logging
- Dashboard
- Remote control
- File acquisition
- Automatic data collection



Operating environment: Windows 11, Windows 10 (32-bit or 64-bit edition), Windows 8.1 (32-bit or 64-bit edition)

PW Data Receiver

(free download software)

- Measured data saving
- Waveform data saving
- Remote control
- File acquisition

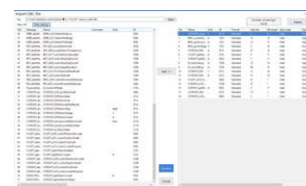


Operating environment: Windows 11(64-bit edition), Windows 10 (64-bit edition) Version 21H2 or later

CAN Editor(for PW)

(free download software)

- Setting up CAN input/output function
- CAN IDs can be set from CAN definition file (DBC file)



Operating environment: Windows 11(64-bit edition), Windows 10 (32-bit or 64-bit edition)



Measurement System Construction

LabVIEW Drivers and MATLAB Toolkit

Simple GUI operation on LabVIEW and the use of MATLAB functions allow you to quickly build your measurement system. (LabVIEW is a trademark of NATIONAL INSTRUMENTS CORP., MATLAB is a trademark of MathWorks, Inc.)



Basic Specifications

| Model | | PW4001 | PW3390 |
|--------------------------------|---|--|---|
| Appearance | |  |  |
| Measurement parameters | Measurement frequency band | DC, 0.1 Hz to 600 kHz | DC, 0.5 Hz to 200 kHz |
| | Basic accuracy for 50/60 Hz power | ± (0.03% of reading + 0.01% of range) | ± (0.04% of reading + 0.05% of range) |
| | Accuracy for DC power | ± (0.03% of reading + 0.01% of range) | ± (0.05% of reading + 0.07% of range) |
| | Accuracy for 10 kHz power | ± (0.2% of reading + 0.05% of range) | ± (0.2% of reading + 0.1% of range) |
| | Accuracy for 50 kHz power | ± (0.4% of reading + 0.1% of range) | ± (0.4% of reading + 0.3% of range) |
| | Number of power measurement channels | 4 channels | 4 channels |
| | Voltage, current ADC sampling | 16-bit, 2.5 MHz | 16-bit, 500 kHz |
| | Voltage range | 6 V, 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1500 V | 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1500 V |
| | Current range | 40 mA to 8000 A (6 ranges, based on sensor) | 40 mA to 8000 A (6 ranges, based on sensor) |
| | Common-mode voltage rejection ratio | 50 Hz/60 Hz: 80 dB or greater | 50/60 Hz: 80 dB or greater |
| | Temperature coefficient | 0.005%/°C | 0.01%/°C |
| | Voltage input method | Isolated input, resistor voltage division | Isolated input, resistor voltage division |
| | Current input method | Isolated input from current sensor | Isolated input from current sensor |
| | External current sensor input | Yes (ME15W) | Yes (ME15W) |
| | Power supplied to external current sensor | Yes | Yes |
| | Data update rate | 1 ms, 10 ms, 50 ms, 200 ms | 50 ms |
| Voltage input | Maximum input voltage | AC 1000 V, DC 1500 V, ± 2000 V peak | 1500 V, ± 2000 V peak |
| | Maximum rated line-to-ground voltage | AC 600 V/DC 1000 V CAT III AC 1000 V/DC 1500 V CAT II | 600 V CAT III 1000 V CAT II |
| Analysis | Number of motor analysis channels | Maximum 2 motors *1 | 1 motor *1 |
| | Motor analysis input format | Analog DC, frequency, pulse | Analog DC, frequency, pulse |
| Function | Current sensor phase shift calculation | Yes (Auto) | Yes |
| | Harmonics measurement | Yes (4 for each channel) | Yes |
| | Maximum harmonics analysis order | 500th | 100th |
| | Harmonics synchronization frequency range | 0.1 Hz to 600 kHz | 0.5 Hz to 5 kHz |
| | User-defined calculations | Yes | - |
| | Delta conversion | Yes (Δ-Y, Y-Δ) | Yes (Δ-Y) |
| | D/A output | Yes *1 16ch (waveform output, analog output) | Yes *1 16ch (waveform output, analog output) |
| Display | Display | 10.1" WXGA TFT color LCD | 9" WVGA TFT color LCD |
| | Touch screen | Yes | - |
| Interface | External storage media | USB 3.0 | USB 2.0, CF card |
| | LAN (100BASE-TX, 1000BASE-T) | Yes | Yes (10BASE-T and 100BASE-TX only) |
| | RS-232C | - | Yes (maximum 38,400 bps) |
| | External control | Yes | Yes |
| | Synchronization of multiple instruments | Yes (up to 8 instruments) | Yes (up to 8 instruments) |
| | CAN or CAN FD | Yes | - |
| Dimensions, weight (W × H × D) | | 361 mm (14.21 in.) × 176 mm (6.93 in.) × 135 mm (5.31 in.), 4.6 kg (162.26 oz.) | 340 mm (13.39 in.) × 170 mm (6.69 in.) × 156 mm (6.14 in.), 4.6 kg (162.26 oz.) |
| Internal Memory | | 15 GB | - |

*1: Sold separately

Basic Specifications

Input specifications

(1) Voltage, current, and power measurement shared specifications

| | |
|--|---|
| No. of PW4001 input channels | Voltage 4 channels (U1 to U4) Current 4 channels (I1 to I4) |
| Measurement lines | Single-phase 2-wire (1P2W) Single-phase 3-wire (1P3W) 3-phase 3-wire (3P3W2M, 3V3A, 3P3W3M) 3-phase 4-wire (3P4W) |
| Measurement method | Voltage/current simultaneous digital sampling with zero-crossing synchronized calculation |
| Sampling | 2.5 MHz, 16-bit |
| Measurement frequency band | DC, 0.1 Hz to 600 kHz |
| Frequency flatness | $\pm 0.1\%$ amplitude band: 50 kHz (typical) $\pm 0.1^\circ$ phase band: 100 kHz (typical) |
| Effective measurement range | Voltage, current, and active power For DC: 0% to 110% of the range For AC: 1% to 110% of the range |
| Measurement modes | Wideband measurement mode |
| Data update rate | 1ms, 10 ms, 50 ms, 200 ms Average and user-defined operations are unavailable when the data update interval is set to 1 ms. |
| LPF | Cutoff frequency f_c 500 Hz, 1 kHz, 5 kHz, 10 kHz, 50 kHz, 100 kHz, OFF Add $\pm 0.05\%$ of the reading to the accuracy except if the LPF is set to off. The accuracy specifications are specified for frequencies less than or equal to one tenth the set cutoff frequency. The peak value is based on the LPF-processed values, whereas the peak-over judgment uses not-digital-LPF processed values. |
| Synchronization source | U1 to U4, I1 to I4, DC (fixed at the data update interval for DC only) PW4001-03, PW4001-05 only Ext1 to 2, Zph1, CH B, D Can be selected for each wiring configuration. (U and I of the same channel are measured in sync with the same synchronization source.) The zero-crossing point of the waveform after passing through the zero-cross filter is used as the reference when U or I is selected. |
| Synchronization source effective frequency range | DC, 0.1 Hz to 200 kHz |
| Synchronization source effective input range | 1% to 110% of range |
| Zero-cross filter | Used in zero-crossing detection for voltage and current waveforms. Does not affect measured waveforms. Consists of a digital LPF and HPF filters. Cutoff frequencies are automatically determined based on the settings of the measurement upper and lower frequency limits as well as measurement frequencies. HPF is selectable between on and off. |
| Lower measurement frequency limit | Choose from the following frequency values for each wiring configuration: 0.1 Hz, 1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz |
| Upper measurement frequency limit | Choose from the following frequency values for each wiring configuration: 100 Hz, 500 Hz, 1 kHz, 5 kHz, 10 kHz, 50 kHz, 100 kHz, 500 kHz, 1 MHz |
| Polarity detection | Voltage/current zero-crossing timing comparison method |
| Measurement parameters | Voltage (U), current (I), active power (P), apparent power (S), reactive power (Q), power factor (λ), phase angle (ϕ), voltage frequency (fU), current frequency (fI), efficiency (η), loss (Loss), voltage ripple factor (Urf), current ripple factor (Irf), current integration (Ih), power integration (WP), voltage peak (Upk), current peak (Ipk) |

(2) Voltage measurement specifications

| | |
|--------------------------------------|--|
| Input terminal profile | Plug-in terminal (safety terminal) |
| Input method | Isolated input, resistance voltage division |
| Display range | RMS, DC: 0% to 150% of range (1500 V range: 0% to 135%) Waveform peak: 0% to 300% of range (1500 V range: 0% to 135%) |
| Range | 6 V, 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1500 V |
| Crest factor | 3 relative to voltage range rating (however, 1.35 for 1500 V range) |
| Input resistance, input capacitance | 3 M Ω \pm 30 k Ω , 1 pF typical |
| Maximum input voltage | 1000 V AC, 1500 V DC or \pm 2000 V peak |
| Maximum rated line-to-ground voltage | 600 V AC, 1000 V DC in measurement category III Anticipated transient overvoltage: 8000 V 1000 V AC, 1500 V DC in measurement category II Anticipated transient overvoltage: 8000 V |

(3) Current measurement specifications

| | |
|---|---|
| Input terminal profile | Dedicated connector (ME15W) |
| Input method | Current sensor input method |
| Display range | RMS, DC: 0% to 150% of range Waveform peak: 0% to 300% of range |
| Range | 2 A sensor : 40 mA, 80 mA, 200 mA, 400 mA, 800 mA, 2 A |
| | 20 A sensor : 400 mA, 800 mA, 2 A, 4 A, 8 A, 20 A |
| | 200 A sensor : 4 A, 8 A, 20 A, 40 A, 80 A, 200 A |
| | 2000 A sensor : 40 A, 80 A, 200 A, 400 A, 800 A, 2 kA |
| | 5 A sensor : 100 mA, 200 mA, 500 mA, 1 A, 2 A, 5 A |
| | 50 A sensor : 1 A, 2 A, 5 A, 10 A, 20 A, 50 A |
| | 500 A sensor : 10 A, 20 A, 50 A, 100 A, 200 A, 500 A |
| | 5000 A sensor : 100 A, 200 A, 500 A, 1 kA, 2 kA, 5 kA |
| | 1000 A sensor : 20 A, 40 A, 100 A, 200 A, 400 A, 1 kA |
| | Selectable for each wiring (Only when the same sensors are used for all channels of the same wiring configuration) |
| | 1 V/A : 40 mA, 80 mA, 200 mA, 400 mA, 800 mA, 2 A |
| | 100 mV/A : 400 mA, 800 mA, 2 A, 4 A, 8 A, 20 A |
| | 10 mV/A : 4 A, 8 A, 20 A, 40 A, 80 A, 200 A |
| | 1 mV/A : 40 A, 80 A, 200 A, 400 A, 800 A, 2 kA |
| CT9920: The sensor output rate can be selected | 0.1 m A : 400 A, 800 A, 2 k A, 4 kA, 8 kA, 20 kA |
| | Selectable for each wiring (Only when the same sensors are used for all channels of the same wiring configuration) |
| | |
| | |
| Crest factor | 3 relative to current range rating |
| Input resistance | 1 M Ω \pm 50 k Ω |
| Maximum input voltage | 8 V, \pm 12 V peak (10 ms or less) |
| Maximum number of connected channels | Up to 4 |
| | Up to three CT6877A, CT6876A, or CT6904A series current sensors can be connected when using an AC or DC power supply (power supply voltage: 10.5 V to 20 V) and with an operating temperature of 40° C to 50° C. Up to three CT6877A, CT6876A, or CT6904A series current sensors can be connected when using a DC power supply (power supply voltage: 20 V to 28 V) and with an operating temperature of 30° C to 40° C. |

(4) Frequency measurement

| | |
|--------------------------------|---|
| Number of measurement channels | 4 channels (fU1 to fU4, fI1 to fI4) |
| Measurement method | Reciprocal method The waveforms processed with the zero-cross filter are measured. |
| Measurement range | 0.1 Hz to 500 kHz (The display shows 0.00000 Hz or ----- Hz if measurement was not possible.) The range is limited by the measurement lower frequency limit setting. |
| Measurement accuracy | \pm 0.005 Hz Assuming all the following conditions are met: • Measurement parameter: voltage/frequency • Data update interval: 50 ms or more • Voltage range: 15 V range or higher • Inputted waveform: a sine wave with a magnitude of at least 50% of the range • Frequency range: 45 Hz to 66 Hz Under conditions other than listed above: \pm 0.05% of the reading (With a sine wave at least 30% of the measurement range of the measurement source. However, add \pm 0.05 % of the reading for the data update interval of 1 ms.) |
| Display resolution | 0.10000 Hz to 9.99999 Hz, 9.9000 Hz to 99.9999 Hz, 99.000 Hz to 999.999 Hz, 0.99000 kHz to 9.99999 kHz, 9.9000 kHz to 99.9999 kHz, 99.000 kHz to 999.999 kHz |

(5) Integration measurement

| | |
|---------------------------|--|
| Measurement modes | Can be chosen between RMS and DC for each wiring. (The DC mode is selectable for the 1P2W wiring configuration only.) |
| Measurement parameters | Current integration (Ih+, Ih-, Ih), Active power integration (WP+, WP-, WP) The instrument measures Ih+ and Ih- only in DC mode; Ih only in RMS mode. |
| Measurement method | Digital calculation based on current and active power. (Calculations are performed using not-averaged values during averaging.) In DC mode: Integrates current values and instantaneous power values for each polarity at every sampling point. In RMS mode: Integrates current RMS values and active power values at the measurement intervals. |
| Measurement interval | Same as the data update interval |
| Display resolution | 999999 (6 digits + decimal point), Starts from the resolution assuming 1% of each range to be 100% of the range. |
| Measurement range | 0 Ah / Wh to \pm 99.9999 PAh / PWh |
| Integration time | 0 s to 9999 h 59 min. 59 s Integration stops if the integration time exceeds the range. |
| Integration time accuracy | \pm 0.02% of reading (-20° C to 50° C) (-4° F to 122° F) |
| Integration accuracy | \pm (Current or active power) \pm (Integration time accuracy) |
| Integration control | All-channel synchronized integration: Manual control, Real time control, Timer control |
| | Connection-specific independent integration: Manual control, Real time control, Timer control • No data will be saved. |

(6) Harmonics measurement

| | |
|--------------------------------|---|
| Number of measurement channels | Up to 4 |
| Synchronization source | Based on the synchronization source setting of the voltage, current, and power measurement selected for each wiring configuration. |
| Measurement modes | Wideband measurement mode |
| Measurement parameters | Harmonic voltage RMS value, harmonic voltage content percentage, harmonic voltage phase angle, harmonic current RMS value, harmonic current content percentage, harmonic current phase angle, harmonic active power, harmonic power content percentage, harmonic voltage-vs.-current phase difference, total harmonic voltage distortion, total harmonic current distortion, voltage unbalance rate, current unbalance rate |
| FFT processing word length | 32-bit |
| Antialiasing | Digital filter (automatically set based on synchronization frequency) |
| Window function | Rectangular |
| Grouping | OFF, Type 1 (harmonic sub-group), Type 2 (harmonic group) (Setting common to all channels) |
| THD calculation method | THD_F, THD_R Select the calculation order from between 2nd and 500th. (However, limited to the maximum analysis order of each mode.) (Setting common to all channels) |

(7) Wideband measurement mode: wideband harmonic measurement

| | | | |
|---|---|---|--|
| Measurement method | Zero-crossing sync calculation method (the same window for each synchronization source), with gaps Fixed sampling interpolation calculation method | | |
| Synchronization frequency range | 0.1 Hz to 600 kHz | | |
| Data update rate | Fixed at 50 ms. When it is set to 10 ms, only harmonic data is updated at 50 ms intervals. When it is set to 200 ms, values are obtained by averaging four sets of 50 ms data. | | |
| Maximum analysis order and Window wave number | Fundamental wave frequency | Window wave number | Maximum analysis order |
| | $0.1 \text{ Hz} \leq f \leq 2 \text{ kHz}$ | 1 | 500th |
| | $2 \text{ kHz} < f \leq 5 \text{ kHz}$ | 1 | 300th |
| | $5 \text{ kHz} < f \leq 10 \text{ kHz}$ | 2 | 150th |
| | $10 \text{ kHz} < f \leq 20 \text{ kHz}$ | 4 | 75th |
| | $20 \text{ kHz} < f \leq 50 \text{ kHz}$ | 8 | 30th |
| | $50 \text{ kHz} < f \leq 100 \text{ kHz}$ | 16 | 15th |
| | $100 \text{ kHz} < f \leq 200 \text{ kHz}$ | 32 | 7th |
| | $200 \text{ kHz} < f \leq 300 \text{ kHz}$ | 64 | 5th |
| | $300 \text{ kHz} < f \leq 500 \text{ kHz}$ | 128 | 3th |
| | $500 \text{ kHz} < f \leq 600 \text{ kHz}$ | 256 | 1th |
| Phase zero-adjustment | Phase zero-adjustment can be started by using keys or communications commands. (Only available when the synchronization source is set to Ext) Phase zero-adjustment values can be set automatically or manually. Valid setting range of the phase zero-adjustment: 0.000° to $\pm 180.000^\circ$ (in 0.001° increments) | | |
| No. of FFT points | Automatically selected from among 2048, 4096, and 8192 points. | | |
| Measurement accuracy | Add the following values to the voltage, current, power, and phase difference accuracy. When the fundamental frequency is 100 Hz or more, add another $\pm 0.1\%$ of the range to the following voltage, current, and power accuracies, and add $\pm 0.1^\circ$ to the phase difference accuracy. When the fundamental frequency is 2 kHz or more, add another $\pm 0.05\%$ of the reading and $\pm 0.1\%$ of the range to the following voltage, current, and power accuracies, and add $\pm 0.1^\circ$ to the phase difference accuracy. | | |
| | Frequency | Voltage, current, power \pm (% of reading) | Phase difference \pm ($^\circ$) |
| | DC | 0.05% | - |
| | $0.1 \text{ Hz} \leq f \leq 100 \text{ Hz}$ | 0.01% | 0.1° |
| | $100 \text{ Hz} < f \leq 1 \text{ kHz}$ | 0.03% | 0.1° |
| | $1 \text{ kHz} < f \leq 10 \text{ kHz}$ | 0.08% | 0.6° |
| | $10 \text{ kHz} < f \leq 50 \text{ kHz}$ | 0.15% | $(0.020 \times f) \pm 0.5^\circ$ |
| | $50 \text{ kHz} < f \leq 200 \text{ kHz}$ | 0.20% | $(0.030 \times f) \pm 2.0^\circ$ |
| | <ul style="list-style-type: none"> In the expressions listed above, the unit of frequency (f) is kilohertz (kHz). The figures for voltage, current, power, and phase difference for frequencies over 200 kHz are values for reference purposes. When the fundamental wave has a frequency within the range of 16 Hz to 850 Hz, the figures for voltage, current, power, and phase difference over 6 kHz are values for reference purposes. When the fundamental wave has a frequency outside the range of 16 Hz to 850 Hz, the figures for voltage, current, power, and phase difference for frequencies other than the fundamental wave are values for reference purposes. Accuracy values for phase difference are specified for input with the voltage and current of the same order that have an amplitude of at least 10% of the range. | | |
| | | | |

Measurement accuracy

| | |
|-------------------------------|--|
| Accuracy guarantee conditions | <p>Accuracy guarantee duration: 12 months (The accuracy guarantee duration for voltage, current, and power measurements, as well as for voltage accuracy of the motor analysis option, is either 6 months or 12 months. Accuracy is calculated by multiplying the reading error specified in each accuracy specification by 1.5.)</p> <p>Accuracy guarantee temperature and humidity range: 23° C ± 3° C (73° F ± 5° F), 80% RH or less</p> <p>Warm-up time: 30 minutes or longer</p> <p>Other conditions: Within the effective measurement ranges, sine waveforms or DC input, a line-to-earth voltage of 0 V</p> <p>After zero adjustment has been performed and a change in ambient temperature does not exceed ± 1° C after zero adjustment.</p> |
|-------------------------------|--|

Voltage (U) and Current (I)

| Accuracy | ± (% of reading + % of range) |
|-----------------------|-------------------------------|
| DC | 0.03% + 0.01% |
| 0.1 Hz ≤ f ≤ 30 Hz | 0.10% + 0.20% |
| 30 Hz < f ≤ 45 Hz | 0.10% + 0.10% |
| 45 Hz < f ≤ 440 kHz | 0.03% + 0.01% |
| 440 Hz < f ≤ 1 kHz | 0.05% + 0.05% |
| 1 kHz < f ≤ 10 kHz | 0.20% + 0.05% |
| 10 kHz < f ≤ 50 kHz | 0.40% + 0.10% |
| 50 kHz < f ≤ 100 kHz | 0.01*f % + 0.20% |
| 100 kHz < f ≤ 200 kHz | 0.025*f % + 0.30% |
| Frequency Band | 600 kHz (-3 dB typical) |

Active power (P) and Power phase angle (φ)

| Accuracy | Active power (P) ± (% of reading + % of range) | Power phase angle (φ) ° |
|-----------------------|---|----------------------------|
| DC | 0.03% + 0.01% | — |
| 0.1 Hz ≤ f ≤ 30 Hz | 0.10% + 0.20% | ± 0.05° |
| 30 Hz < f ≤ 45 Hz | 0.10% + 0.10% | ± 0.05° |
| 45 Hz < f ≤ 440 kHz | 0.03% + 0.01% | ± 0.05° |
| 440 Hz < f ≤ 1 kHz | 0.05% + 0.05% | ± 0.05° |
| 1 kHz < f ≤ 10 kHz | 0.20% + 0.05% | ± 0.20° |
| 10 kHz < f ≤ 50 kHz | 0.40% + 0.10% | ± (0.02*f)° |
| 50 kHz < f ≤ 100 kHz | 0.01*f % + 0.20% | ± (0.02*f)° |
| 100 kHz < f ≤ 200 kHz | 0.025*f % + 0.30% | ± (0.02*f)° |

- Unit for "f" in accuracy calculations as mentioned in the table above: kHz
- Voltage and current DC values are defined for U_{dc} and I_{dc}, while frequencies other than DC are defined for U_{rms} and I_{rms}.
- When U or I is selected as the synchronization source, accuracy is defined for source input of at least 5% of range.
- Power phase angle accuracy is defined at a power factor of zero with 100% input.
- Add the current sensor accuracy to the above accuracy figures for current, active power, and phase difference.
- The accuracy figures for voltage, current, active power, and phase difference for 0.1 Hz ≤ f < 10 Hz are reference values.
- The accuracy figures for voltage, active power, and phase difference in excess of 220 V from 10 Hz ≤ f < 16 Hz are reference values.
- The accuracy figures for voltage, active power, and phase difference in excess of 1000 V from 16 Hz ≤ f < 30 kHz are reference values.
- The accuracy figures for voltage, active power, and phase difference in excess of 750 V from 30 kHz < f ≤ 100 kHz are reference values.
- The accuracy figures for voltage, active power, and phase difference in excess of (22000/f [kHz]) V from 100 kHz < f ≤ 1 MHz are reference values.
- For the voltage 6 V range, add ± 0.02% of range to voltage and active power accuracy.
- For the voltage 15 V range, add ± 0.005% of range to voltage and active power accuracy.
- When using probe 1 and the sensor's rated 1/25 and 1/50 range, add ± 0.02% of range to current and active power accuracy.
- When using probe 1 and the sensor's rated 1/10 range, add ± 0.01% of range to current and active power accuracy.
- The effective measurement range of the current sensor (9272-05, CT7642, CT7742, CT7044, CT7045, CT7046) is between 0.5% of full scale and 100% of full scale.
- When measuring DC 1000 V or greater, add ± 0.05% of reading to voltage and active power accuracy.
- When 100% of range < input ≤ 110% of range, range error × 1.1.
- If a voltage is over 600 V, add the following values to the power phase angle accuracy:
0.1 Hz < f ≤ 500 Hz ± 0.1°, 500 Hz < f ≤ 5 kHz ± 0.3°, 5 kHz < f ≤ 20 kHz ± 0.5°, 20 kHz < f ≤ 200 kHz ± 1°
- Add the following value to the accuracy figures for voltage and active power if a voltage of 600 V or more is measured.
± (0.003 × V²)% of the reading ± (1 × V²) mV (V is input voltage [kV])
- Even when the voltage input value decreases, the effect of self-heating persists until the input resistance temperature drops.
- If the input voltage is over 900 V, other measurement channels (up to 600 V) will also have half the influence.
- If zero adjustment is performed with a warm-up time of less than 60 minutes, add ± 0.02% of the range to the voltage, current, and active power accuracy.
- When the data update interval is 1 ms, add ± 0.1% of the range to the voltage, current, and active power accuracy.

| | |
|--|--|
| Apparent power (S) Measurement accuracy | (voltage accuracy) + (current accuracy) ± 10 digits |
| Reactive power (Q) Measurement accuracy | <p>For any condition except if φ = 0° or ± 180° (Apparent power accuracy) ± {1 - sin[φ + (Power phase angle accuracy)] / sin φ} × (100% of the reading)</p> <p>± [√(1.001 - λ²) - √(1 - λ²)] × (100% of the range)</p> <p>For φ = 0° and ± 180° (Apparent power accuracy) ± [sin(Power phase angle accuracy)] × (100% of the range) ± (3.16% of the range)</p> <p>The symbol λ designates the display value of the power factor.</p> |
| Power factor (λ) Measurement accuracy | <p>For any condition except if φ = ± 90° ± {1 - cos[φ + (Power phase angle accuracy)] / cos φ} × (100% of the reading) ± 50 digits</p> <p>For φ = ± 90° ± cos[φ + (Power phase angle accuracy)] × (100% of the range) ± 50 digits</p> <p>The symbol φ designates the display value of the power phase angle.</p> <p>Both of the above are specified at voltage/current range rating input.</p> |
| Waveform peak measurement accuracy | Voltage and current RMS value accuracy ± 1% of the range (300% of the range is applied as a peak range) |
| Effects of temperature | <p>Add ± 0.005% of the reading/° C to the voltage, current, and active power accuracy within the range of - 20° C to 20° C or 26° C to 50° C.</p> <p>Add ± 0.005% of the range/° C to DC accuracy of the voltage, current, and active power if a change in operating temperature range reaches or exceeds ± 1° C after zero adjustment.</p> <p>For the 6 V range, add another ± 0.005% of the reading/° C to the DC accuracy of the voltage, current and active power.</p> |

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| | |
|--|---|
| Common-mode rejection ratio (effects of commonmodevoltage) | 50 Hz/60 Hz: 80 dB or more Specified for CMRR when the maximum input voltage is applied between the voltage input terminals and the enclosure for all measurement ranges. |
| Effects of external magnetic fields | ± 1% of the range or less (in a magnetic field of 400 A/m, DC or 50 Hz/60 Hz) |
| Effects of power factor on active power | For any condition except if $\phi = \pm 90^\circ$ $\pm \{1 - \cos[\phi + (\text{Phase accuracy})] / \cos \phi\} \times (100\% \text{ of the reading})$ For $\phi = \pm 90^\circ$ $\pm \cos[\phi + (\text{Phase accuracy})] \times (100\% \text{ of VA})$ |
| Effect of conducted radio frequency electromagnetic field | For current and active power measurement, 6% of full scale or less at 10 V Current full scale means the sensor's rated current Active power full scale means the voltage range \times current sensor rating |
| Effect of radiated radio frequency electromagnetic field | For current and active power measurement, 6% of full scale or less at 10 V/m Current full scale means the current sensor rating Active power full scale means the voltage range \times current sensor rating |

Waveform recording

| | |
|--------------------------------|---|
| Number of measurement channels | Voltage and current waveforms: Up to 4 channels (up to 8 waveforms can be displayed) Motor waveform: Up to 2 analog DC channels + up to 4 pulse channels |
| Recording capacity | (5 megawords) \times [(Number of measured items, including voltage and current) \times (Number of channels, up to 4) + (Number of motor waveforms)] No memory segmentation function |
| Waveform resolution | 16-bit |
| Sampling speed | <ul style="list-style-type: none"> Voltage and current waveform Motor waveform (analog DC)* (1 MS/s is interpolated with 0th held when 2.5 MS/s of data is sampled.) <ul style="list-style-type: none"> Motor waveform (pulse)* 2.5 MS/s, 1.0 MS/s, 500 kS/s, 250 kS/s, 100 kS/s, 50 kS/s, 25 kS/s, 10 kS/s |
| Recording length | 1 kiloword, 5 kilowords, 10 kilowords, 50 kilowords, 100 kilowords, 500 kilowords, 1 megaword, 5 megawords |
| Storage mode | Peak-to-peak compression |
| Trigger mode | SINGLE / NORMAL(auto-trigger setting available) |
| Pre-trigger | 0% to 100% of the recording length, in 10 percent increments |
| Trigger detection method | <ul style="list-style-type: none"> Level trigger (detects triggers based on fluctuations in the level of storage waveforms) Trigger source: Voltage and current waveforms, voltage and current waveforms processed by the zero-cross filter, manual trigger, motor waveform, motor pulse Trigger slope: Rising edge, falling edge Trigger level: $\pm 300\%$ of the range for waveforms in 0.1 percent increments Event trigger Triggers are detected based on fluctuations in the values of basic measurement items. The trigger-detecting conditions are determined based on the logical OR and AND of the following four events. The logical AND takes precedence over the logical OR. Events: Composed of basic measurement items, inequality signs (<, >), and numerical values (0 to $\pm 99999.9T$). Ev n:Item \square X.XXXXX y (n: 1 to 4, Item: basic measurement item, \square: inequality signs, X.XXXXX: six-digit constant, y: SI prefix) |

*PW4001-03 and -05 models with motor analysis option only.

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Motor Analysis (Option)

(PW4001-03, -05 only)

(1) Analog DC, frequency, pulse input shared specifications

| | | | |
|--------------------------------------|---|---|---------------------------------------|
| Number of input channels | 4 channels | | |
| | Channel | | Input parameter |
| | CH A, CH C | | Analog DC, frequency, pulse |
| | CH B, CH D | | Frequency, pulse |
| Operating mode | Motor analysis mode | | |
| | | Measurement or detection item (input type) | Maximum number of analysis parameters |
| | Pattern 1 | Torque(Analog/Freq), Speed(Pulse) | 2 motors |
| | Pattern 2 | Torque(Analog/Freq), Speed(Pulse), Direction, Origin(Pulse) | 1 motor |
| | Pattern 3 | Torque(Analog/Freq), Speed(Pulse), Direction | 1 motor |
| | Pattern 4 | Torque(Analog/Freq), Speed(Pulse), Origin(Pulse) | 1 motor |
| | Pattern 5 | Torque(Analog/Freq), Speed(Analog) | 1 motor |
| Input terminal profile | Individual input mode | | |
| | Ch. A, Ch. C: DC voltage measurement, frequency measurement Ch. B, Ch. D: Frequency measurement | | |
| Input method | Function-isolated input and single-end input Between-channels function isolation | | |
| Input resistance (DC) | 1 MΩ ± 50 kΩ | | |
| Maximum input voltage | 20 V | | |
| Maximum rated line-to-ground voltage | 30 V (50 Hz / 60 Hz) | | |
| Measurement parameters | Voltage, torque, RPM, frequency, slip, motor power | | |
| Synchronization source | Same as described in "Voltage, current, and power measurement shared specifications" in the basic specifications | | |
| Lower measurement frequency limit | Select from among the following frequency values for each motor synchronization source: 0.1 Hz, 1 Hz, 10 Hz, 100 Hz | | |
| Upper measurement frequency limit | Select from among the following frequency values for each motor synchronization source: 100 Hz, 500 Hz, 1 kHz, 5 kHz, 10 kHz, 50 kHz, 100 kHz, 500 kHz, 1 MHz, 2 MHz | | |
| Input frequency source | Selectable between fU1 to fU4 and fI1 to fI4. The frequency for slip calculation can be set. | | |
| No. of motor poles | 2 to 254 | | |
| Z-phase pulse detection reference | The reference for detecting Zph of the synchronization source can be set in operating mode 2 or 4. Rising edge, falling edge | | |

(2) Analog DC input (CH A, CH C)

| | |
|-------------------------------------|---|
| Measurement range | 1 V, 5 V, 10 V |
| Crest factor | 1.5 |
| Effective input range | 1% to 110% of range |
| Sampling | 1 MHz, 16-bit |
| LPF | 1 kHz / OFF (20 kHz) |
| Response speed | 0.2 ms (when the LPF is disabled) |
| Measurement method | Simultaneous digital sampling, zero-crossing synchronization calculation method (Between-zero-crossing averaging) |
| Measurement accuracy | ± 0.03% of reading ± 0.03% of range |
| Effects of temperature | Add ± 0.005% of the reading/°C within the range of -20° C to 20° C or 26° C to 50° C. Also, add ± 0.005% of the range/°C for temperature changes of ± 1° C or more after zero adjustment. |
| Effects of commonmode voltage | ± 0.01% of the range or less When a voltage of 30 V (DC, 50 Hz/60 Hz) is applied between the input terminals and the enclosure |
| Effects of external magnetic fields | ± 0.1% of the range or less (in a magnetic field of 400 A/m, DC or 50 Hz/60 Hz) |
| Display range | 0 to ± 150% |
| Scaling | For torque: ± 0.01 to 9999.99 For RPM: ± 0.00001 to 99999.9 |
| Zero-adjustment | Scaled input offsets less than or equal to ± 10% of the range are compensated for to zero. When the torque meter correction is enabled, input offsets are compensated to zero after adding the calibration values. |
| Torque meter correction | OFF/ON (selectable by motor) • Nonlinearity correction Torque values are corrected using an 11-point (at a maximum) correction table of torque calibration points (N • m) vs. torque calibration values (N • m). |
| | • Friction correction Torque values are corrected using an 11-point (at a maximum) correction table of RPM values (r/min.) with consideration of rotation directions vs. torque calibration values (N • m). Each interval between torque calibration values are linearly interpolated. The unit for the correction table depends on the setting. Enter a 6-digit calibration value. The signs of torque calculation are used for detecting rotation directions: forward (plus sign) and backward (minus sign). |
| Torque calculations and correction | OFF : (Torque value) = S × [X - (Zero-correction value)] ON : (Torque value) = S × [X - (Zero-correction value)] - At - Bt S : Scaling X : Input signal-to-torque converted value At : Nonlinearity correction value Bt : Friction correction value |

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(3) Frequency input (CH A, CH B, CH C, CH D)

| | |
|------------------------------------|---|
| Detection level | Low: approx. 0.8 V or less; High: approx. 2.0 V or more |
| Measurement frequency band | 0.1 Hz to 2 MHz (when the duty ratio is set at 50%) |
| Minimum detection width | 0.25 μ s or more |
| Measurement range | The zero-point frequency f_c and frequency f_d at rated torque in $f_c \pm f_d$ (Hz) can be set. Set f_c and f_d using 7-digit figures in the range of 1 kHz to 500 kHz. However, values must be set so that both the inequalities $(f_c + f_d) \leq 500$ kHz and $(f_c - f_d) \geq 1$ kHz are met. |
| Measurement accuracy | $\pm 0.01\%$ of the reading When the data update interval is set to 1 ms, add $\pm 0.01\%$ of the reading to the measuring accuracy. |
| Display range | 1.000 kHz to 500.000 kHz |
| Scaling | ± 0.01 to 9999.99 |
| Zero-adjustment | Offsets of input within the range of $f_c \pm 1$ kHz can be compensated to zero. When the torque meter correction is ON, calibration values are added to compensate for offsets to zero. |
| Units | mN \cdot m, N \cdot m, kN \cdot m |
| Torque meter correction | Same as torque meter correction with analog DC input |
| Torque calculations and correction | Same as torque meter correction with analog DC input |

(4) Pulse input (CH A, CH B, CH C, CH D)

| | |
|-----------------------------------|--|
| Detection level | Low: approx. 0.8 V or less; High: approx. 2.0 V or more |
| Measurement frequency band | 0.1 Hz to 2 MHz (when the duty ratio is set at 50%) |
| Minimum detection width | 0.25 μ s or more |
| Pulse filter | OFF / Weak / Strong positive/negative pulses of less than 0.25 μ s are ignored with the Weak setting, as are those less than 5 μ s with the Strong setting) |
| Measurement range | 2 MHz |
| Measurement accuracy | $\pm 0.01\%$ of reading When the data update interval is set to 1 ms, add $\pm 0.01\%$ of the reading to the measuring accuracy. |
| Display range | 0.1 Hz ~ 2.00000 MHz |
| Units | Hz, r / min |
| Frequency division setting range | ± 1 to 60000 |
| Rotation direction detection | Individually settable in [A-D] Pattern 2 to Pattern 5 of motor analysis mode Detects direction based on lead/lag of Ch. B and Ch. C in [A-D]. |
| Mechanical angle origin detection | Individually settable in [A-D] Pattern 2 to Pattern 5 of motor analysis mode Ch. B frequency division is cleared at the Ch. D rising or falling edge in [A-D]. |

Waveform & D/A output (Option)

(PW4001-02, 05 only)

| | |
|---------------------------|---|
| Number of output channels | 16 channels |
| Output terminal profile | D-sub 25-pin connector \times 1 |
| Output details | Switchable between waveform output and analog output (selectable from basic measurement) |
| D/A conversion resolution | 16-bit (polarity + 15 bits) |
| Output refresh rate | Waveform output: 1 MHz Analog output: 1 ms, 10 ms, 50 ms, 200 ms (depending on data update intervals of selected items, with an error of ± 1 ms) |
| Output voltage | Waveform output: Switchable between ± 2 V f.s. and ± 1 V f.s., crest factor: 2.5 or more The settings affect all channels. Analog output: ± 5 V DC f.s. (approx. up to ± 12 V DC) |
| Maximum output voltage | Approx. ± 12 V |
| Output resistance | 100 $\Omega \pm 5 \Omega$ |
| Output accuracy | Waveform output: Add $\pm 0.5\%$ f.s. to measurement accuracy with the ± 2 V f.s. setting. Add $\pm 1.0\%$ f.s. to measurement accuracy at the ± 1 V f.s. setting. Specified assuming DC to 50 kHz output. Analog output: Add $\pm 0.2\%$ f.s. to the measurement accuracy of output measurement items (DC level). |
| Temperature coefficient | $\pm 0.05\%$ f.s. / $^{\circ}$ C |

Display section

| | |
|--------------------------|--|
| Display characters | Japanese, English, Simplified Chinese, Traditional Chinese |
| Display | 10.1" WXGA TFT color LCD (1280 \times 800 dots) |
| Dot pitch | 0.1695 (V) mm \times 0.1695 (H) mm |
| Display value resolution | 999999 count (including integrated values) |
| Display refresh rate | Measured values: Approx. 200 ms (independent of internal data update interval) Waveforms: Based on waveform recording settings |
| Screens | Measurement screen, Input Settings screen, System Settings screen, File Operation screen |
| Warning display | When an input-channel voltage or current peak-over condition is detected, when no synchronization source is detected. Warning icons for all channels will be displayed on any page of the screen. |

Instrument controls

| | |
|-----------------|--|
| Control devices | Power button × 1, rubber keys × 23, rotary knobs × 2, touchscreen |
| Touch panel | Analog resistive film |
| File operations | Displaying data list stored on a USB flash drive, formatting a USB flash drive, creating new folders, renaming folders/files, copying/deleting files, updating the firmware, displaying screenshots, creating/loading settings files |

External interface

| | |
|--|---|
| (1) USB flash drive interface | |
| Connector | USB Type A receptacle connector × 1 |
| Electrical specifications | USB 3.0 (SuperSpeed) |
| Connected device | USB flash drive |
| Recorded data | Saving/loading settings files Saving measured values and automatically recorded data Saving waveform data and screenshots |
| (2) LAN interface | |
| Connector | RJ-45 connector × 1 |
| Electrical specifications | IEEE 802.3 compliant |
| Transmission method | 100Base-TX, 1000Base-T (automatic detection) |
| Protocol | TCP/IP (with DHCP function) |
| Functions | HTTP server (remote operation) Dedicated port (data transfer, command control) FTP server (file transfer) FTP client Modbus/TCP server XCP on Ethernet (compliant with ASAM e.V.MCD-1 v 1.5.0) |
| Recommended cable | Category 6A or higher STP cable, max. cable length 5 m |
| (3) USB (function) | |
| Connector | Series Mini B receptacle × 1 |
| Electrical specifications | USB2.0 (Full Speed / High Speed) |
| Class | Proprietary (USB488h) |
| Connected device | Computer (Windows 10 (32-bit, 64-bit) / Windows 11 (64-bit)) |
| Functions | Data transfer, command control, USB mass storage LAN cannot be used simultaneously. If connected simultaneously, the USB connection will take priority. Operation and communication are not possible during USB mass storage |
| (4) External control interface | |
| Connector | 4-terminal screwless terminal block × 1 |
| Pin assignments | No. 1 pin: Ground No. 2 pin: Data reset No. 3 pin: Hold No. 4 pin: Start/stop |
| Electrical specifications | Logic signal of 0 / 5 V (2.5 V to 5 V) or contact signals by shorting/opening the terminal |
| Functions | Same operation as the START/STOP key, DATA RESET key, or HOLD key on the control panel |
| (5) BNC sync. interface | |
| Connector | BNC |
| Number of instruments that can be synchronized | 8 (one primary and seven secondary) |
| Functionality | Primary instrument Transmitting control signals to secondary instruments Secondary instruments Synchronizing the following functions and operations with those of the primary instrument <ul style="list-style-type: none"> • Timing of internal calculations and data updating • Starting and stopping integration and resetting integration data • Freezing displays (HOLD/PEAK HOLD) and updating data during the display freeze • Zero adjustment • Operating the instrument using the SAVE and SCREEN SHOT keys • Present time (Synchronizable items cannot be controlled; their settings cannot be change during synchronization) The primary and secondary instruments can synchronize only when they have the same settings of the measurement mode and data update interval; those with a data update interval of 10 ms or less cannot. |

(6) CAN/CAN FD interface

| | | | |
|--------------------------|--|---|--|
| Protocol | CAN (classical) CAN FD (in conformity with ISO 11898-1:2015) CAN FD (not in conformity with ISO) | | |
| Functionality | Data output Data input | | |
| CAN ports | 1 port | | |
| CAN transceiver | MCP2544 FD | | |
| Communications connector | D-sub 9-pin connector (male) Locking screw (hexagonal pillar): Inch screw #4-40 UNC | | |
| Common data I/O settings | Baud rate | CAN 125 k, 250 k, 500 k, 1 Mbps CAN FD Arbitration area: 500 k, 1 M bps Data area: 500 k, 1 M, 2 M, 4 M bps | |
| | Sample point setting | 0.0% to 99.9% | |
| | Terminal resistance | ON/OFF Resistance value: 120 Ω± 10 Ω | |
| | ISO15765-2 | ON/OFF | |
| Data output settings | Data frame output | Continuous | |
| | Output interval | 1 ms, 10 ms, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 5 s, 10 s, 15 s, 30 s, 1 min, 5 min, 10 min, 15 min, 30 min, 60 min With an error of ± 1 ms from each data update interval setting However, the interval cannot be set to less than the data update interval. The output interval of 500 ms is unavailable with the data update interval of 200 ms. | |
| | Repeated output count | 0 to 10000 (0: infinite) | |
| | Format | Standard, extended | |
| | Setting ID | Standard format: 0x000 to 0x7FF Extended format: 0x00000000 to 0x1FFFFFFF | |
| | Data conversion | Measured data: Floating-point type (IEEE Float: 4 bytes) Output count, output time: Unsigned integer | |
| | Byte order (Endianness) | Intel (little-endian) | |
| Data input settings | Number of receiving channels: Up to 20 | | |
| | Receiving channel definition | Format | Standard / Extended |
| | | ID | Standard format: 0x000 to 0x7FF Extended format: 0x00000000 to 0x1FFFFFFF |
| | | Name | |
| | | Unit | |
| | | Factor / offset | |
| | | Start bit | 0 to 5119 (bit) |
| | | Bit length | 1 to 64 (bit) |
| | | Data type | Unsigned integer/signed integer/single-precision floating-point/ doubleprecision floating-point |
| | Byte order | Motorola (big)/Intel (little) | |
| | No. of transmitted arbitrary frames: Up to 20 | | |
| | Arbitrary frame transmission definition | Cyclic transmission | ON/OFF |
| | | Cyclic transmission interval | 10 ms, 50 ms, 200 ms, START, STOP |
| | | Format | Standard / extended |
| | | ID | Standard format: 0x000 to 0x7FF Extended format: 0x00000000 to 0x1FFFFFFF |
| | | DLC(ISO15765-2 OFF) | CAN: 0 to 8 bytes CAN FD (ISO-compliant / ISO-non-compliant): 0 to 8 bytes, 12, 16, 20, 24, 32, 48, 64 bytes |
| | | Bit length (ISO15765-2 ON) | 0 to 41 bytes |
| Transmitted data | | Entered in hexadecimal | |

Functional specifications

AUTO-range function

| | |
|----------------|---|
| Functions | The voltage and current ranges for each wiring configuration are automatically switched in response to the input. (excluding motor input ranges) |
| Operating mode | OFF / ON (selectable for each wiring configuration) |

Time control function

| | |
|---------------------|---|
| Functions | Other functions are controlled based on the time. Timer control, real time control |
| Operation | Timer control: Stops once the set amount of time has elapsed. Real time control: Starts at the specified time and stops at the specified time. |
| Timer control | OFF, 1 s to 9999 h 59 m 59 s (in 1 s increments) |
| Actual time control | OFF, start time, stop time (in 1 s increments) |

Hold function

| (1) Hold | |
|---------------|--|
| Functions | Stops updating display of all measured values, freezing the presently on-screen figures. However, updating continues for waveforms, the clock, and on-screen peak-over conditions. Internal calculations, for example integration and averaging, continue. Cannot be used in combination with the peak hold function. |
| Output data | Hold data is output for analog output and save data during hold operation. However, waveform output continues. |
| (2) Peak hold | |
| Functions | The display is updated by replacing all measured values with the maximum values obtained by comparing the absolute values for each measured value. However, the waveform display and integrated values continue to be updated by being replaced with instantaneous data. During average operation, the maximum value affects values measured after averaging. Cannot be used in combination with the hold function. |
| Output data | Peak hold data is output for analog output and save data during peak hold operation. However, waveform output continues. |

Calculation function

| (1) Rectifier | | | | |
|-------------------------------------|--|-------|-------|-------|
| Functions | The voltage and current values used to calculate apparent and reactive power and power factor can be selected. | | | |
| Operating mode | rms / mean (Can be selected for each wiring configuration's voltage and current.) | | | |
| (2) Scaling | | | | |
| Functions | The VT ratio and CT ratio can be set so that they can affect measured values. | | | |
| VT (PT) ratio | Can be set for each wiring configuration. 0.00001 to 9999.99 (The settings cannot be configured such that (VT × CT) is greater than 1.0E+06.) | | | |
| CT ratio | Can be set for each channel. 0.00001 to 9999.99 (The settings cannot be configured such that (VT × CT) is greater than 1.0E+06.) | | | |
| (3) Averaging (AVG) | | | | |
| Functions | All instantaneous measured values, including harmonics, are averaged. (except peak values, integrated values, and harmonic data updated every 10 ms. When the data update rate is set to 1 ms, all averaging is not performed.) | | | |
| Operating mode | Off, exponential average, moving average | | | |
| Exponential averaging response rate | Averaging count | FAST | MID | SLOW |
| | 10 ms | 0.1 s | 0.8 s | 5 s |
| | 50 ms | 0.5 s | 4 s | 25 s |
| | 200 ms | 2.0 s | 16 s | 100 s |
| | These values indicate the time required for the final stabilized value to converge on the range of ± 1% when the input changes from 0% to 90% of the range. Although harmonic data is not averaged when the data update interval is set at 10 ms, harmonic data contained in basic measurement items is averaged using the exponential average coefficient every 10 ms. The speed is fixed in IEC measurement mode. | | | |
| No. of moving average iterations | 2, 4, 8, 16, 32, 64 times | | | |

(4) Efficiency and loss calculations

| | |
|--|--|
| Functions | The efficiency η (%) and loss (W) of each channel are calculated between wiring configurations' active power values. |
| Calculated items | Active power value (P), fundamental wave active power (P _{fnd}), motor power (P _m), and userdefined formula (UDF) of each channel and wiring configuration |
| Number of calculations that can be performed | Four for each efficiency and loss |
| Modes | Fixed mode: In the case of items set on the input and output sides, the position in the equation is fixed, regardless of the measured value. Auto mode: In the case of items set on the input and output sides, the position in the equation changes according to the positive and negative of the measured value. |
| Equations | Fixed mode: Calculation items can be substituted for Pin(n) and Pout(n). Pin = Pin1 + Pin2 + Pin3 + Pin4 + Pin5 + Pin6 Pout = Pout1 + Pout2 + Pout3 + Pout4 + Pout5 + Pout6 $\eta = 100 \times Pout / Pin $, Loss = Pin - Pout Auto mode: Pin = (Sum of the absolute values of the positive parameter of the input and that of the negative parameter of the output) Pout = (Sum of the absolute values of the positive parameter of the output and that of the negative parameter of the input) $\eta = 100 \times Pout / Pin $, Loss = Pin - Pout |

(5) User-defined calculations

| | |
|-----------------------|--|
| Functions | Calculates specified equations into which set basic measurement items are substituted. No calculation can be performed if the data update interval is set to 1 ms. |
| Calculation terms | Basic measurement items or 16 terms of constants with up to 6 digits, where the operators are the four fundamental operations UDFn = ITEM1 □ ITEM2 □ ITEM3 □ ITEM4 □ ... □ ITEM16 ITEMn: Basic measurement items (including UDFn) or constants of up to six digits The □ characters indicate one of the following operators: plus sign (+), minus sign (-), multiplication sign (*), and division sign (/). ITEMn functions: Neg (negative sign), sin, cos, tan, abs, log10 (common logarithm), log (logarithm), exp, sqrt, asin, acos, atan, sqr Equations UDFns are calculated in the order of letters n; if a letter n on the right-hand side of an equation is more than that on the left-hand side, the previously calculated value is substituted. |
| Number of equations | 20 (UDF1 to UDF20) |
| Maximum value setting | Set Fixed or Auto for each UDFn. Fixed: Can be set within the range of 1.000 n to 999.999 T. Auto: The first 6 digits are always displayed. (effective display range: 0 to ± 999.999 Y) The maximum value operates as a range of the UDFn. |
| UDF name and units | Up to 8 ASCII characters per UDFn |
| Integration | OFF/Positive/Negative/Total Can be set for each UDFn Off: Displays the calculated value of the UDFn. Positive: Displays the integrated value of the polarity (+) of the UDFn calculation value in UDFn. Negative: Displays the integrated value of the polarity (-) of the UDFn calculation value in UDFn. Total: Displays the integrated value of the UDFn equation in UDFn. (effective display range: 0 to ± 999.999 Y) Other values are not added if the integrated value exceeds the effective display range. |

(6) Delta conversion

| | | |
|-----------|-------------|---|
| Functions | Δ -Y | When using a 3P3W3M or 3V3A wiring method, it converts the line voltage waveform to a phase voltage waveform using a virtual neutral point. |
| | Y- Δ | When using a 3P4W wiring method, it converts the phase voltage waveform to a line voltage waveform. Voltage RMS values and all voltage parameters, including harmonics, are calculated using the post-conversion voltage. However, peak-exceeded events are judged using pre-conversion values. |

(7) Power formula selection

| | |
|-----------|--|
| Functions | Equations for reactive power, power factor, and power phase angle can be selected. |
| Formula | Type 1, Type 2, Type 3 Type 1: Compatible with the Type 1 for each of the PW3390, 3193 and 3390. Type 2: Compatible with the Type 2 for each of the 3192 and 3193. Type 3: The active power's sign can be used as the power factor's sign. (Type 1, Type 2, and Type 3 are compatible with each equation of the PW8001, PW6001.) |

(8) Current sensor phase shift calculation

| | |
|-----------------------------|---|
| Functions | Current sensor harmonic phase characteristics can be compensated using calculations. |
| Operating modes | OFF / ON / AUTO (set for each channel) Automatic mode can be selected when a current sensor with the automatic recognition function is connected. |
| Compensation value settings | Compensation points can be set using frequencies and phase differences. Frequency: 0.1 kHz to 5000.0 kHz (in 0.1 kHz increments) Phase difference: 0.000° to ± 180.000° (in 0.001° increments) The compensation value is automatically set when the current sensor is connected in the automatic operation mode. |
| Max. correction range | Approx. 60 μ s |

(9) Voltage probe phase shift calculation

| | |
|-----------------------------|--|
| Functions | Voltage probes harmonic phase characteristics can be compensated using calculations. |
| Operating modes | OFF / ON (can be set for each channel) |
| Compensation value settings | Compensation points can be set using frequencies and phase differences. Frequency: 0.1 kHz to 5000.0 kHz (in 0.1 kHz increments) Phase difference: 0.000° to ± 180.000° (in 0.001° increments) |
| Max. correction range | Approx. 60 μ s |

Display function

(1) Wiring method confirmation screen

| | |
|-----------------|--|
| Functions | Wiring diagrams as well as vector diagrams of voltage and current (for wiring configurations other than the singlephase wiring configuration only) can be displayed based on the selected measured line patterns. The on-screen vector diagram shows the vector ranges for correct connections, enabling the operator to check for proper connections. |
| Mode at startup | The setting can be made so that the instrument always show the wiring configuration confirmation screen at startup (startup screen setting). |
| Simple settings | Settings can be switched over those appropriate for objects under measurement selected for each wiring configuration. 50/60 Hz, DC/WLTP, PWM, HIGH FREQ, GENERAL. |

(2) Vector display screen

| | |
|------------------|--|
| Functions | The screen can display wiring-specific vector graphs along with associated level values and phase angles. The display orders and vector magnification can be selected. |
| Display patterns | 1-vector-diagram: Vectors can be drawn for up to four channels. 2-vector-diagram, 4-vector-diagram: Vectors can be drawn for each selected wiring configuration. |

(3) Numerical display screen

| | |
|------------------|--|
| Functions | The screen can display measured power values and motor values for up to four installed channels. |
| Display patterns | Basic display for each wiring configuration: The screen can display measured values of the lines under measurement and motors connected to the instrument. In addition to the four patterns, U, I, P, and Integ as well as motor is available. On-screen values are linked to the channel indicators. Selective display: The screen can display values of any measurement items selected from all basic measurement items at any positions. There are 8-, 16-, 36-, and 64-display patterns available. |

(4) Harmonic display screen

| | |
|------------------|---|
| Functions | The screen can display measured harmonic values. |
| Display patterns | Bar-graph display: The screen can display measured harmonic items for user-specified channels as bar graphs. (up to 500th) List display: The screen can display numerical values for user-specified parameters of user-specified channels. |

(5) Waveform display screen

| | |
|------------------|---|
| Functions | The screen can display the motor waveform as well as the voltage and current waveforms. |
| Display patterns | All-waveform display Waveform+numerical value display Zoom-display cursor measurement supported |

Trend graph function

| | |
|---------------|--|
| Functions | Displays a graph of measured values selected as output parameters in a time series. The waveform is plotted by compressing the data at the data update interval using peak-topeak compression based on the time axis setting, and without the data being stored |
| Operation | Use the START/STOP key to start or stop plotting. Display values are plotted during hold or peak hold. Plotted data can be cleared by pressing the DATA RESET key after stopping using the STOP key, or by changing the time axis setting. |
| Plotted items | Up to 8 items |
| Time axis | 50 ms/div to 24 h/div, plotting area: 20 div |
| Vertical axis | Auto scale (adjusts to fit data within the time axis display range within the screen), Manual (maximum and minimum display values are set by the user) |

Automatic data save function

| | |
|-------------------|---|
| Functions | Saves the user-specified measured values every user-specified interval |
| Auto-save control | OFF/ON |
| Save destination | USB flash drive, internal memory (capacity approx.: 15 GB) Select the media to be used for saving when auto-save control is on. If there is no USB flash drive, saving will take place on the internal memory. A folder created on a USB flash drive or in the internal memory can be specified as the destination to save data. |
| Saved parameters | Selectable from all measured values, including measured harmonic values. Harmonic readings are not saved automatically when the interval is set to 1 ms. |
| Interval | OFF, 1 ms, 10 ms, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 5 s, 10 s, 15 s, 30 s, 1 min, 5 min, 10 min, 15 min, 30 min, 60 min However, the interval cannot be set to less than the data update interval. |
| Max. savable data | Approx. 500 MB per file (automatically segmented) × 1000 files |
| Data format | CSV: Measured data is delimited with commas (,) and periods (.) represent decimal points. SSV: Measured data is delimited with semicolons (;) and commas (,) represent decimal points. BIN: Common file-format that can be loaded by GENNECT One |
| Filename | Automatically generated based on the time and date at which measurement started. |

Manual data save function

(1) Measurement data

| | |
|------------------|---|
| Functions | Pressing the SAVE key can save values measured at the moment. The data is outputted to the same file until the setting is changed, or the DATA RESET key is pressed. |
| Save destination | USB flash drive, internal memory |
| Saved parameters | Selectable from all measured values, including measured harmonic values. |
| Max. save data | 500 MB per file (automatically segmented) |
| Data format | CSV, SSV |

(2) Waveform data

| | |
|------------------|--|
| Functions | When the Save button is tapped on the waveform screen of the touchscreen, the waveform is saved in the specified format. |
| Save destination | USB flash drive, internal memory |
| Saved parameters | Waveform data on the waveform screen |
| Max. save data | Approx. 400 MB (in binary format) Approx. 2 GB (in text format) |
| Data format | CSV, SSV, BIN, MAT |

(3) Screenshots

| | |
|------------------|---|
| Functions | Pressing the SCREEN SHOT key can save the screen displayed at the moment in PNG format. Setting list screenshot function Comment entering function Free drawing function |
| Save destination | USB flash drive, internal memory, FTP server |
| Saved parameters | Screenshot data |
| Data format | PNG |

(4) Settings data

| | |
|------------------|---|
| Functions | Saves various settings information as settings files using the [FILE] screen. In addition, loading a settings file saved using the [FILE] screen can restore settings. However, the language and communications settings are not restored. Settings data can be opened with the image viewer because it is inserted into an image that displays a settings list. |
| Save destination | USB flash drive, internal memory, FTP server |
| Saved parameters | Setting data |
| Data format | SET |

(5) CAN output settings data

| | |
|------------------|--|
| Functions | Data-output settings can be saved as DBC-files using the [CAN] screen. |
| Save destination | USB flash drive, internal memory, FTP server |
| Saved parameters | Output settings data |
| Data format | DBC |

(6) User-defined equation data

| | |
|------------------|--|
| Functions | User-defined formulas can be saved as JSON files using the [UDF] screen. Loading a JSON file saved using the [UDF] or [FILE] screen can restore the equations. Calculation is not possible if the loaded equations include calculation items that are invalid (items that cannot be selected according to the module, option configuration, or other setting). ([-----] is displayed) |
| Save destination | USB flash drive, internal memory, FTP server |
| Saved parameters | User-defined formula |
| Data format | JSON |

PW4001

Other functions

| | |
|---------------------------|--|
| Clock function | Auto-calendar, automatic leap-year detection, 24-hour clock |
| Actual time accuracy | When the instrument is turned on: ± 100 ppm When the instrument is turned off: Within ± 3 s/day (at 25° C) |
| Sensor identification | Current sensors connected to input modules can be identified automatically. The instrument can detect sensor ranges and the connection/disconnection of sensors, displaying warning dialog boxes. Data compensation values provided by current sensors affect phase compensation data. |
| Zero suppression function | Selectable between OFF and ON. ON: 0.01 ~ 1.00 % of full scale When this function is ON, values of measurement items less than the set value are replaced with zero. |

Environment and safety specifications

| | |
|------------------------------------|--|
| Operating environment | Indoor use, pollution level 2, altitude up to 2000 m |
| Operating temperature and humidity | -20° C to 50° C (-4° F to 122° F), 80% RH or less (after warm-up, non-condensing) If used at temperatures below 0° C (32° F), warm up in a 0° C to 50° C (32° F to 122° F) environment prior to use. |
| Storage temperature and humidity | -20° C to 50° C (-4° F to 122° F), 80% RH or less (non-condensing) |
| Standards | Safety EN61010 EMC EN 61326 Class A |
| Vibration resistance | JIS D 1601:1995 5.3 (1) Type 1: Passenger cars, Condition: Equivalent to Type A Vibration acceleration: 45 m/s ² (4.6 G) for 4 h in the X direction and 2 h in the Y and Z directions |
| Power supply | Commercial power supply Rated supply voltage: 100 V to 240 V AC (Assuming voltage fluctuation of $\pm 10\%$) Rated power-supply frequency: 50 Hz, 60 Hz Anticipated transient overvoltage: 2500 V Maximum rated power: 120 VA Typical power consumption (reference value): 47 W (Conditions: Power supply voltage of 100 V/60 Hz. Voltage of 800 V DC and current of 200 A DC (CT6834) measured on all channels.) DC power supply (optional) Rated supply voltage: 10.5 V to 28 V DC (Operating temperature range: -20° C to 40° C) 10.5 V to 20 V DC (Operating temperature range: 40° C to 50° C) Maximum rated power: 95 VA |
| Backup battery life | Lithium battery About 10 years (Reference value at 23° C) Time and setting conditions |
| Dimensions | 361 \pm 2 (W) \times 176 \pm 2 (H) \times 135 \pm 2 (D) mm (14.21 \pm 0.08 (W) \times 6.93 \pm 0.08 (H) \times 5.31 \pm 0.08 (D) in) (excluding protruding parts) |
| Weight | Approx. 4.6 kg (162.26 oz.) (for PW4001-05) |
| Product warranty period | 3 years |

High-accuracy
clamp current sensors

Product warranty period: 3 year Guaranteed accuracy period: 1 year (CT6831, CT6830)






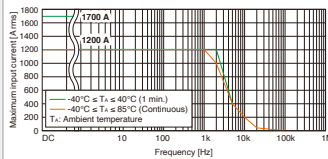
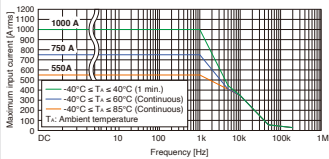
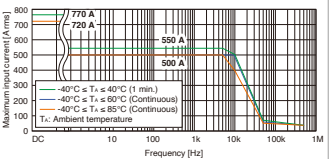
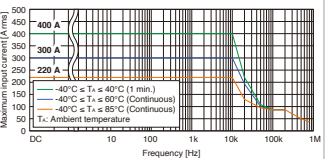
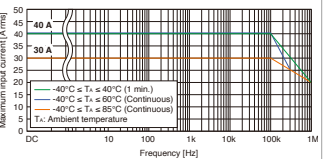
Product warranty period: 1 year Guaranteed accuracy period: 1 year (CT6834, CT6834-01, CT6833, CT6833-01)

| Model | CT6831 | CT6830 | CT6834, CT6834-01 | CT6833, CT6833-01 |
|--------------------------------------|---|---|---|---|
| Appearance | NEW  | NEW  | NEW  | NEW  |
| Rated current | 20 A AC/DC | 2 A AC/DC | 500 A AC/DC | 200 A AC/DC |
| Frequency band | DC to 100 kHz | DC to 100 kHz | DC to 50 kHz | DC to 50 kHz |
| Diameter of measurable conductors | Max. ϕ 5 mm (0.20 in.) | Max. ϕ 5 mm (0.20 in.) | Max. ϕ 20 mm (0.79 in.) | Max. ϕ 20 mm (0.79 in.) |
| Accuracy | PW4001 Combined Current (I), Active power (P) | PW4001 accuracy + Sensor accuracy | PW4001 accuracy + Sensor accuracy | PW4001 accuracy + Sensor accuracy |
| | DC | $\pm 0.1\% \pm 0.02\%^{*1}$ | DC | $\pm 0.1\% \pm 0.02\%^{*1}$ |
| | 45 Hz $\leq f \leq$ 66 Hz | $\pm 0.1\% \pm 0.017\%^{*1}$ | 45 Hz $\leq f \leq$ 66 Hz | $\pm 0.1\% \pm 0.017\%^{*1}$ |
| | DC | $\pm 0.3\% \pm 0.10\%$ | DC | $\pm 0.3\% \pm 0.10\%$ |
| | DC < f \leq 66 Hz | $\pm 0.3\% \pm 0.01\%$ | DC < f \leq 66 Hz | $\pm 0.3\% \pm 0.01\%$ |
| | 66 Hz < f \leq 500 Hz | $\pm 0.3\% \pm 0.02\%$ | 66 Hz < f \leq 500 Hz | $\pm 0.3\% \pm 0.02\%$ |
| | 500 Hz < f \leq 1 kHz | $\pm 0.5\% \pm 0.05\%$ | 500 Hz < f \leq 1 kHz | $\pm 0.5\% \pm 0.05\%$ |
| Sensor only (amplitude)*2 | DC | $\pm 0.3\% \pm 0.10\%$ | DC | $\pm 0.3\% \pm 0.10\%$ |
| | DC < f \leq 66 Hz | $\pm 0.3\% \pm 0.01\%$ | DC < f \leq 66 Hz | $\pm 0.3\% \pm 0.01\%$ |
| | 66 Hz < f \leq 500 Hz | $\pm 0.3\% \pm 0.02\%$ | 66 Hz < f \leq 500 Hz | $\pm 0.3\% \pm 0.02\%$ |
| | 500 Hz < f \leq 1 kHz | $\pm 0.5\% \pm 0.05\%$ | 500 Hz < f \leq 1 kHz | $\pm 0.5\% \pm 0.05\%$ |
| | 1 kHz < f \leq 5 kHz | $\pm 1.0\% \pm 0.10\%$ | 1 kHz < f \leq 5 kHz | $\pm 1.0\% \pm 0.10\%$ |
| | 5 kHz < f \leq 10 kHz | $\pm 5.0\% \pm 0.10\%$ | 5 kHz < f \leq 10 kHz | $\pm 5.0\% \pm 0.10\%$ |
| | 10 kHz < f \leq 100 kHz | $\pm 30\% \pm 0.10\%$ | 10 kHz < f \leq 100 kHz | $\pm 30\% \pm 0.10\%$ |
| Common-Mode Rejection Ratio (CMRR) | 140 dB or greater (DC to 100 Hz) 130 dB or greater (100 Hz to 1 kHz) (effect on output voltage and common mode voltage) | 140 dB or greater (DC to 100 Hz) 125 dB or greater (100 Hz to 1 kHz) (effect on output voltage and common mode voltage) | 150 dB or greater (DC to 1 kHz) 130 dB or greater (1 kHz to 10 kHz) 120 dB or greater (10 kHz to 50 kHz) (effect on output voltage and common mode voltage) | 150 dB or greater (DC to 1 kHz) 130 dB or greater (1 kHz to 10 kHz) 120 dB or greater (10 kHz to 50 kHz) (effect on output voltage and common mode voltage) |
| Frequency derating |  |  |  |  |
| Output voltage | 0.1 V/A (= 2 V/20 A) | 1 V/A | 4 mV/A | 10 mV/A |
| Operating temperature and humidity*3 | Sensor: -40° C to 85° C (-40° F to 185° F), 80% RH or less Relay box: -25° C to 50° C (-77° F to 122° F), 80% RH or less | Sensor: -40° C to 85° C (-40° F to 185° F), 80% RH or less Relay box: -25° C to 50° C (-77° F to 122° F), 80% RH or less | Sensor, cable: -40° C to 85° C (-40° F to 185° F), 80% RH or less Relay box: -25° C to 50° C (-13° F to 122° F), 80% RH or less | Sensor, cable: -40° C to 85° C (-40° F to 185° F), 80% RH or less Relay box: -25° C to 50° C (-13° F to 122° F), 80% RH or less |
| Storage temperature and humidity*3 | Sensor and relay box: -25° C to 50° C (-77° F to 122° F), 80% RH or less | Sensor and relay box: -25° C to 50° C (-77° F to 122° F), 80% RH or less | Sensor and relay box: -25° C to 50° C (-13° F to 122° F), 80% RH or less | Sensor and relay box: -25° C to 50° C (-13° F to 122° F), 80% RH or less |
| Standards | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 |
| Cable length | Between sensor to relay box: approx. 4 m (13.12 ft.) Between relay box to output connector: approx 0.2 m (0.66 ft.) | Between sensor to relay box: approx. 4 m (13.12 ft.) Between relay box to output connector: approx 0.2 m (0.66 ft.) | CT6834: approx. 5 m (16.40 ft.) including relay box CT6834-01: approx 10 m (32.81 ft.) including relay box | CT6833: approx. 5 m (16.40 ft.) including relay box CT6833-01: approx 10 m (32.81 ft.) including relay box |
| Dimensions | Sensor: Approx. 76.5 W \times 23.4 H \times 14.2 D mm (approx. 3.00 W \times 0.92 H \times 0.56 D in.) Relay box: Approx. 80 W \times 20 H \times 26.5 D mm (approx. 3.15 W \times 0.79 H \times 1.04 D in.) | Sensor: Approx. 76.5 W \times 23.4 H \times 14.2 D mm (approx. 3.00 W \times 0.92 H \times 0.56 D in.) Relay box: Approx. 80 W \times 20 H \times 26.5 D mm (approx. 3.15 W \times 0.79 H \times 1.04 D in.) | Sensor: approx. 149 W \times 46 H \times 16.5 D mm (approx. 5.87 W \times 1.81 H \times 0.65 D in.) Relay box: approx. 126 W \times 57 H \times 20.5 D mm (approx. 4.96 W \times 2.24 H \times 0.81 D in.) | Sensor: approx. 149 W \times 46 H \times 16.5 D mm (approx. 5.87 W \times 1.81 H \times 0.65 D in.) Relay box: approx. 126 W \times 57 H \times 20.5 D mm (approx. 4.96 W \times 2.24 H \times 0.81 D in.) |
| Weight | Approx. 160 g (5.64 oz.) | Approx. 160 g (5.64 oz.) | CT6834: approx. 500 g (17.64 oz.) CT6834-01: approx. 710 g (25.05 oz.) | CT6833: approx. 500 g (17.64 oz.) CT6833-01: approx. 710 g (25.05 oz.) |

*1: \pm (% of reading + % of range) , range is PW4001 *2: \pm (% of reading + % of full scale) , full scale is rated current of sensor *3: Non-condensing





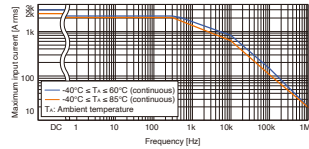
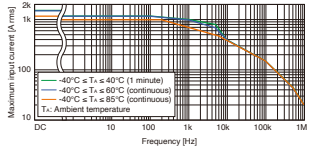
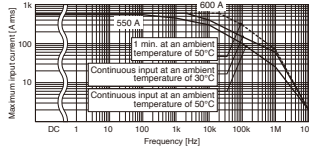
High-accuracy clamp current sensors

Product warranty period: 3 year Guaranteed accuracy period: 1 year

| Model | | CT6846A | CT6845A | CT6844A | CT6843A | CT6841A | | |
|-----------------------------------|--|---|--|--|---|---|--|--|
| Appearance | |  |  |  |  |  | | |
| Rated current | | 1000 A AC/DC | 500 A AC/DC | 500 A AC/DC | 200 A AC/DC | 20 A AC/DC | | |
| Frequency band | | DC to 100 kHz | DC to 200 kHz | DC to 500 kHz | DC to 700 kHz | DC to 2 MHz | | |
| Diameter of measurable conductors | | Max. φ 50 mm (1.97 in.) | Max. φ 50 mm (1.97 in.) | Max. φ 20 mm (0.79 in.) | Max. φ 20 mm (0.79 in.) | Max. φ 20 mm (0.79 in.) | | |
| Accuracy | PW4001 Combined* ^{†1} Current (I) , Active power (P) | DC : ± 0.23% ± 0.03% 45Hz ≤ f ≤ 66Hz : ± 0.23% ± 0.02% | DC : ± 0.23% ± 0.03% 45Hz ≤ f ≤ 66Hz : ± 0.23% ± 0.02% | DC : ± 0.23% ± 0.03% 45Hz ≤ f ≤ 66Hz : ± 0.23% ± 0.02% | DC : ± 0.23% ± 0.03% 45Hz ≤ f ≤ 66Hz : ± 0.23% ± 0.02% | DC : ± 0.23% ± 0.06% 45Hz ≤ f ≤ 66Hz : ± 0.23% ± 0.02% | | |
| | Sensor only (amplitude)* ^{†2} | DC : ± 0.2% ± 0.02% DC < f ≤ 100 Hz : ± 0.2% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.5% ± 0.02% 500 Hz < f ≤ 1 kHz : ± 1.0% ± 0.02% 1 kHz < f ≤ 5 kHz : ± 2.0% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 5.0% ± 0.02% 10 kHz < f ≤ 50 kHz : ± 30% ± 0.02% - : - - : - - : - | DC : ± 0.2% ± 0.02% DC < f ≤ 100 Hz : ± 0.2% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.3% ± 0.02% 500 Hz < f ≤ 1 kHz : ± 0.5% ± 0.02% 1 kHz < f ≤ 5 kHz : ± 1.0% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 1.5% ± 0.02% 10 kHz < f ≤ 20 kHz : ± 5.0% ± 0.02% 20 kHz < f ≤ 50 kHz : ± 10% ± 0.05% 50 kHz < f ≤ 100 kHz : ± 30% ± 0.05% - : - - : - | DC : ± 0.2% ± 0.02% DC < f ≤ 100 Hz : ± 0.2% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.3% ± 0.02% 500 Hz < f ≤ 1 kHz : ± 0.5% ± 0.02% 1 kHz < f ≤ 5 kHz : ± 1.0% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 1.5% ± 0.02% 10 kHz < f ≤ 50 kHz : ± 5.0% ± 0.02% 50 kHz < f ≤ 100 kHz : ± 15% ± 0.05% 100 kHz < f ≤ 300 kHz : ± 30% ± 0.05% - : - - : - | DC : ± 0.2% ± 0.02% DC < f ≤ 100 Hz : ± 0.2% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.3% ± 0.02% 500 Hz < f ≤ 1 kHz : ± 0.5% ± 0.02% 1 kHz < f ≤ 5 kHz : ± 1.0% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 1.5% ± 0.02% 10 kHz < f ≤ 50 kHz : ± 5.0% ± 0.02% 50 kHz < f ≤ 100 kHz : ± 10% ± 0.05% 100 kHz < f ≤ 300 kHz : ± 15% ± 0.05% 300 kHz < f ≤ 500 kHz : ± 30% ± 0.05% - : - - : - | DC : ± 0.2% ± 0.05% DC < f ≤ 100 Hz : ± 0.2% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.3% ± 0.02% 500 Hz < f ≤ 1 kHz : ± 0.5% ± 0.02% 1 kHz < f ≤ 5 kHz : ± 1.0% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 1.5% ± 0.02% 10 kHz < f ≤ 50 kHz : ± 2.0% ± 0.02% 50 kHz < f ≤ 100 kHz : ± 5.0% ± 0.05% 100 kHz < f ≤ 300 kHz : ± 10% ± 0.05% 300 kHz < f ≤ 500 kHz : ± 15% ± 0.05% 500 kHz < f < 1 MHz : ± 30% ± 0.05% - : - - : - | | |
| | | Common-Mode Rejection Ratio (CMRR) | | 150 dB or greater (DC to 1 kHz) 130 dB or greater (1 kHz to 10 kHz) 100 dB or greater (10 kHz to 50 kHz) (effect on output voltage and common mode voltage) | 150 dB or greater (DC to 1 kHz) 130 dB or greater (1 kHz to 10 kHz) 100 dB or greater (10 kHz to 100 kHz) (effect on output voltage and common mode voltage) | 150 dB or greater (DC to 1 kHz) 135 dB or greater (1 kHz to 10 kHz) 120 dB or greater (10 kHz to 100 kHz) 100 dB or greater (100 kHz to 300 kHz) (effect on output voltage and common mode voltage) | 150 dB or greater (DC to 1 kHz) 135 dB or greater (1 kHz to 10 kHz) 115 dB or greater (10 kHz to 100 kHz) 95 dB or greater (100 kHz to 500 kHz) (effect on output voltage and common mode voltage) | 140 dB or greater (DC to 1 kHz) 125 dB or greater (1 kHz to 10 kHz) 100 dB or greater (10 kHz to 100 kHz) 80 dB or greater (100 kHz to 1 MHz) (effect on output voltage and common mode voltage) |
| | | Linearity errors (typical) | | ± 20 ppm | ± 20 ppm | ± 20 ppm | ± 20 ppm | ± 20 ppm |
| | | Frequency derating | |  |  |  |  |  |
| | | Output voltage | | 2 mV/A (= 2 V/1000 A) | 4 mV/A (= 2 V/500 A) | 4 mV/A (= 2 V/500 A) | 10 mV/A (= 2 V/200 A) | 100 mV/A (= 2 V/20 A) |
| | | Operating temperature and humidity* ³ | | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less |
| | | Storage temperature and humidity* ³ | | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less |
| | | Withstand voltage | | 4260 V AC Withstand test current of 1 mA, 50/60 Hz, 1 min., between jaws and cable output terminal | 4260 V AC Withstand test current of 1 mA, 50/60 Hz, 1 min., between jaws and cable output terminal | 4260 V AC Withstand test current of 1 mA, 50/60 Hz, 1 min., between jaws and cable output terminal | 4260 V AC Withstand test current of 1 mA, 50/60 Hz, 1 min., between jaws and cable output terminal | 4260 V AC Withstand test current of 1 mA, 50/60 Hz, 1 min., between jaws and cable output terminal |
| | | Standards | | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 |
| | | Cable length | | Approx. 3 m (9.84 ft.) | Approx. 3 m (9.84 ft.) | Approx. 3 m (9.84 ft.) | Approx. 3 m (9.84 ft.) | Approx. 3 m (9.84 ft.) |
| | | Dimensions | | Approx. 238 W × 116 H × 35 D mm (approx. 9.37 W × 4.57 H × 1.38 D in.) | Approx. 238 W × 116 H × 35 D mm (approx. 9.37 W × 4.57 H × 1.38 D in.) | Approx. 153 W × 67 H × 25 D mm (approx. 6.02 W × 2.64 H × 0.98 D in.) | Approx. 153 W × 67 H × 25 D mm (approx. 6.02 W × 2.64 H × 0.98 D in.) | Approx. 153 W × 67 H × 25 D mm (approx. 6.02 W × 2.64 H × 0.98 D in.) |
| | | Weight | | Approx. 990 g (34.9 oz.) | Approx. 860 g (30.3 oz.) | Approx. 400 g (14.1 oz.) | Approx. 380 g (13.4 oz.) | Approx. 370 g (13.1 oz.) |

*1: \pm (% of reading + % of range), range is PW4001 *2: \pm (% of reading + % of full scale), full scale is rated current of sensor *3: Non-condensing

High-accuracy pass-through current sensors





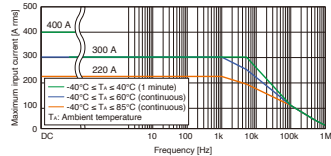
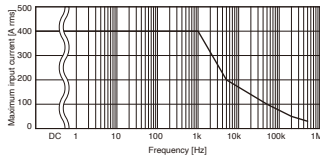
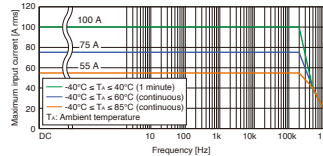
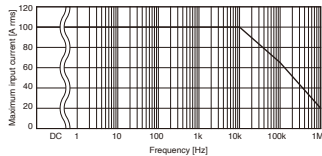
| Model | CT6877A, CT6877A-1 | CT6876A, CT6876A-1 | CT6904A | CT6875A, CT6875A-1 |
|-----------------------------------|---|--|---|--|
| Appearance |  |  |  |  |
| Rated current | AC/DC 2000 A | AC/DC 1000 A | AC/DC 500 A | AC/DC 500 A |
| Frequency band | DC ~ 1 MHz | CT6876A: DC ~ 1.5 MHz CT6876A-1: DC ~ 1.2 MHz | CT6904A: DC ~ 4 MHz CT6904A-1: DC ~ 2 MHz | CT6875A: DC ~ 2 MHz CT6875A-1: DC ~ 1.5 MHz |
| Diameter of measurable conductors | Max. ϕ 80 mm (3.14 in.) | Max. ϕ 36 mm (1.41 in.) | Max. ϕ 32 mm (1.25 in.) | Max. ϕ 36 mm (1.41 in.) |
| Accuracy | PW4001 Combined*1 Current (I), Active power (P) | DC : $\pm 0.07\% \pm 0.018\%$ 45Hz $\leq f \leq 66$ Hz : $\pm 0.07\% \pm 0.018\%$ | DC : $\pm 0.055\% \pm 0.017\%$ 45Hz $\leq f \leq 66$ Hz : $\pm 0.05\% \pm 0.017\%$ | DC : $\pm 0.07\% \pm 0.018\%$ 45Hz $\leq f \leq 66$ Hz : $\pm 0.07\% \pm 0.018\%$ |
| | Sensor only (amplitude)*2 | DC : $\pm 0.04\% \pm 0.008\%$ DC < f < 16 Hz : $\pm 0.1\% \pm 0.02\%$ 16 Hz $\leq f < 45$ Hz : $\pm 0.05\% \pm 0.01\%$ 45 Hz $\leq f \leq 66$ Hz : $\pm 0.04\% \pm 0.008\%$ 66 Hz < f ≤ 100 Hz : $\pm 0.05\% \pm 0.01\%$ 100 Hz < f ≤ 500 Hz : $\pm 0.1\% \pm 0.02\%$ 500 Hz < f ≤ 1 kHz : $\pm 0.2\% \pm 0.02\%$ 1 kHz < f ≤ 10 kHz : $\pm 0.5\% \pm 0.02\%^{*4}$ 10 kHz < f ≤ 50 kHz : $\pm 1.5\% \pm 0.05\%^{*4}$ 50 kHz < f ≤ 100 kHz : $\pm 2.5\% \pm 0.05\%^{*4}$ 100 kHz < f ≤ 700 kHz : $\pm (0.025 \times f)\% \pm 0.05\%^{*4}$ - : - | DC : $\pm 0.025\% \pm 0.007\%$ DC < f < 16 Hz : $\pm 0.2\% \pm 0.02\%$ 16 Hz $\leq f < 45$ Hz : $\pm 0.1\% \pm 0.02\%$ 45 Hz $\leq f \leq 65$ Hz : $\pm 0.02\% \pm 0.007\%$ 65 Hz < f ≤ 850 Hz : $\pm 0.05\% \pm 0.007\%$ 850 Hz < f ≤ 1 kHz : $\pm 0.1\% \pm 0.01\%$ 1 kHz < f ≤ 5 kHz : $\pm 0.4\% \pm 0.02\%$ 5 kHz < f ≤ 10 kHz : $\pm 0.4\% \pm 0.02\%$ 10 kHz < f ≤ 50 kHz : $\pm 1\% \pm 0.02\%$ 50 kHz < f ≤ 100 kHz : $\pm 1\% \pm 0.05\%^{*5}$ 100 kHz < f ≤ 300 kHz : $\pm 2\% \pm 0.05\%^{*5}$ 300 kHz < f ≤ 1 MHz : $\pm 5\% \pm 0.05\%^{*5}$ | DC : $\pm 0.04\% \pm 0.008\%$ DC < f < 16 Hz : $\pm 0.1\% \pm 0.02\%$ 16 Hz $\leq f < 45$ Hz : $\pm 0.05\% \pm 0.01\%$ 45 Hz $\leq f \leq 66$ Hz : $\pm 0.04\% \pm 0.008\%$ 66 Hz < f ≤ 100 Hz : $\pm 0.05\% \pm 0.01\%$ 100 Hz < f ≤ 500 Hz : $\pm 0.1\% \pm 0.02\%$ 500 Hz < f ≤ 1 kHz : $\pm 0.2\% \pm 0.02\%$ 1 kHz < f ≤ 10 kHz : $\pm 0.4\% \pm 0.02\%^{*4}$ 10 kHz < f ≤ 50 kHz : $\pm 1.5\% \pm 0.05\%^{*4}$ 50 kHz < f ≤ 100 kHz : $\pm 2.5\% \pm 0.05\%^{*4}$ 100 kHz < f ≤ 1 MHz : $\pm (0.025 \times f)\% \pm 0.05\%^{*4}$ - : - |
| | | DC : $\pm 0.04\% \pm 0.008\%$ DC < f < 16 Hz : $\pm 0.1\% \pm 0.02\%$ 16 Hz $\leq f < 45$ Hz : $\pm 0.05\% \pm 0.01\%$ 45 Hz $\leq f \leq 66$ Hz : $\pm 0.04\% \pm 0.008\%$ 66 Hz < f ≤ 100 Hz : $\pm 0.05\% \pm 0.01\%$ 100 Hz < f ≤ 500 Hz : $\pm 0.1\% \pm 0.02\%$ 500 Hz < f ≤ 1 kHz : $\pm 0.2\% \pm 0.02\%$ 1 kHz < f ≤ 10 kHz : $\pm 0.5\% \pm 0.02\%^{*4}$ 10 kHz < f ≤ 50 kHz : $\pm 2\% \pm 0.05\%^{*4}$ 50 kHz < f ≤ 100 kHz : $\pm 3\% \pm 0.05\%^{*4}$ 100 kHz < f ≤ 1 MHz : 100 kHz < f ≤ 1 MHz | DC : $\pm 0.025\% \pm 0.007\%$ DC < f < 16 Hz : $\pm 0.2\% \pm 0.02\%$ 16 Hz $\leq f < 45$ Hz : $\pm 0.1\% \pm 0.02\%$ 45 Hz $\leq f \leq 65$ Hz : $\pm 0.02\% \pm 0.007\%$ 65 Hz < f ≤ 850 Hz : $\pm 0.05\% \pm 0.007\%$ 850 Hz < f ≤ 1 kHz : $\pm 0.1\% \pm 0.01\%$ 1 kHz < f ≤ 5 kHz : $\pm 0.4\% \pm 0.02\%$ 5 kHz < f ≤ 10 kHz : $\pm 0.4\% \pm 0.02\%$ 10 kHz < f ≤ 50 kHz : $\pm 1\% \pm 0.02\%$ 50 kHz < f ≤ 100 kHz : $\pm 1\% \pm 0.05\%^{*5}$ 100 kHz < f ≤ 300 kHz : $\pm 2\% \pm 0.05\%^{*5}$ 300 kHz < f ≤ 1 MHz : $\pm 5\% \pm 0.05\%^{*5}$ | DC : $\pm 0.04\% \pm 0.008\%$ DC < f < 16 Hz : $\pm 0.1\% \pm 0.02\%$ 16 Hz $\leq f < 45$ Hz : $\pm 0.05\% \pm 0.01\%$ 45 Hz $\leq f \leq 66$ Hz : $\pm 0.04\% \pm 0.008\%$ 66 Hz < f ≤ 100 Hz : $\pm 0.05\% \pm 0.01\%$ 100 Hz < f ≤ 500 Hz : $\pm 0.1\% \pm 0.02\%$ 500 Hz < f ≤ 1 kHz : $\pm 0.2\% \pm 0.02\%$ 1 kHz < f ≤ 10 kHz : $\pm 0.4\% \pm 0.02\%^{*4}$ 10 kHz < f ≤ 50 kHz : $\pm 1.5\% \pm 0.05\%^{*4}$ 50 kHz < f ≤ 100 kHz : $\pm 2.5\% \pm 0.05\%^{*4}$ 100 kHz < f ≤ 1 MHz : $\pm (0.025 \times f)\% \pm 0.05\%^{*4}$ - : - |
| | | 140 dB or greater (50/60 Hz) 120 dB or greater (100 kHz) (effect on output voltage and common mode voltage) | 140 dB or greater (50/60 Hz) 120 dB or greater (100 kHz) (effect on output voltage and common mode voltage) | 140 dB or greater (50/60 Hz) 120 dB or greater (100 kHz) (effect on output voltage and common mode voltage) |
| | | ± 10 ppm | ± 5 ppm | ± 5 ppm |
| | | ± 5 ppm | ± 10 ppm | ± 5 ppm |
| | | (DC) ± 15 ppm, (10 ~ 100 Hz) $\pm 0.01\%$, (100 ~ 1 kHz) $\pm 0.04\%$, (1 k ~ 10 kHz) $\pm 0.25\%$, (10 k ~ 100 kHz) $\pm 1\%$, (100 k ~ 300 kHz) $\pm 2\%$, (300 k ~ 700 kHz) $\pm 10\%$ | (DC) ± 10 ppm, (10 ~ 100 Hz) $\pm 0.005\%$, (100 ~ 1 kHz) $\pm 0.03\%$, (1 k ~ 10 kHz) $\pm 0.2\%$, (10 k ~ 100 kHz) $\pm 1\%$, (100 k ~ 300 kHz) $\pm 3\%$, (300 k ~ 1 MHz) $\pm 15\%$ | (DC) ± 10 ppm, (10 ~ 100 Hz) $\pm 0.005\%$, (100 ~ 1 kHz) $\pm 0.02\%$, (1 k ~ 20 kHz) $\pm 0.08\%$, (20 k ~ 100 kHz) $\pm 0.5\%$, (100 k ~ 300 kHz) $\pm 1\%$, (300 k ~ 1 MHz) $\pm 5\%$ |
| | |  |  |  |
| | | Output voltage 1 mV/A (=2 V/2000 A) | 2 mV/A (=2 V/1000 A) | 4 mV/A (=2 V/500 A) |
| | | Operating temperature and humidity*3 -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -10° C to 50° C (-14° F to 122° F), 80% RH or less |
| | | Storage temperature and humidity*3 -40° C to 85° C (-40° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -20° C to 60° C (-4° F to 140° F), 80% RH or less |
| | | Maximum rated voltage to earth 1000 V CATIII anticipated transient overvoltage: 8000 V | 1000 V CATIII anticipated transient overvoltage: 8000 V | 1000 V CATIII anticipated transient overvoltage: 8000 V |
| | | Standards Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 |
| | | Cable length CT6877A: approx. 3 m (9.84 ft.) CT6877A-1: approx. 10 m (32.81 ft.) | CT6876A: approx. 3 m (9.84 ft.) CT6876A-1: approx. 10 m (32.81 ft.) | CT6904A: approx. 3 m (9.84 ft.) (including relay box) CT6904A-1: approx. 10 m (32.81 ft.) (including relay box) |
| | | Dimensions Approx. 229 W \times 232 H \times 112 D mm (approx. 9.02 W \times 9.13 H \times 4.41 D in.) | Approx. 160 W \times 112 H \times 50 D mm (approx. 6.30 W \times 4.41 H \times 1.97 D in.) | Approx. 139 W \times 120 H \times 52 D mm (approx. 5.47 W \times 4.72 H \times 2.05 D in.) |
| | | Weight CT6877A: approx. 5 kg (176.4 oz.) CT6877A-1: approx. 5.3 kg (187.0 oz.) | CT6876A: approx. 0.97 kg (34.2 oz.) CT6876A-1: approx. 1.3 kg (45.9 oz.) | CT6904A: approx. 1.05 kg (37.0 oz.) CT6904A-1: approx. 1.35 kg (47.6 oz.) |

*1: \pm (% of reading + % of range), range is PW4001 *2: \pm (% of reading + % of full scale), full scale is rated current of sensor *3: Non-condensing

*4: When 1 kHz < f \leq 700 kHz (CT6877A-1), 1 kHz < f \leq 1 MHz (CT6876A-1/CT6875A-1), add $\pm (0.005 \times f [\text{kHz}])\%$ of reading to amplitude accuracy *5: When 50 kHz < f \leq 1 MHz (CT6904A-3, CT6904A-1), add $\pm (0.015 \times f)\%$ of reading to amplitude accuracy

High-accuracy pass-through current sensors

Product warranty period: 3 year Guaranteed accuracy period: 1 year

| Model | CT6873, CT6873-01 | CT6863-05 | CT6872, CT6872-01 | CT6862-05 | | |
|--------------------------------------|--|---|---|---|---|--|
| Appearance |  |  |  |  | | |
| Rated current | 200 A AC/DC | 200 A AC/DC | 50 A AC/DC | 50 A AC/DC | | |
| Frequency band | DC to 10 MHz | DC to 500 kHz | DC to 10 MHz | DC to 1 MHz | | |
| Diameter of measurable conductors | Max. φ 24 mm (0.94 in.) | Max. φ 24 mm (0.94 in.) | Max. φ 24 mm (0.94 in.) | Max. φ 24 mm (0.94 in.) | | |
| Accuracy | PW4001 Combined*1 Current (I) , Active power (P) | PW4001 accuracy + Sensor accuracy | | PW4001 accuracy + Sensor accuracy | | |
| | Sensor only (amplitude)*2 | DC : ± 0.06% ± 0.012% 45Hz ≤ f ≤ 66Hz : ± 0.06% ± 0.017% | DC : ± 0.05% ± 0.01% DC < f ≤ 16 Hz : ± 0.10% ± 0.02% 16 Hz < f ≤ 400 Hz : ± 0.05% ± 0.01% | DC : ± 0.06% ± 0.012% 45Hz ≤ f ≤ 66Hz : ± 0.06% ± 0.017% | DC : ± 0.05% ± 0.01% DC < f ≤ 16 Hz : ± 0.10% ± 0.02% 16 Hz < f ≤ 400 Hz : ± 0.05% ± 0.01% | |
| | | DC : ± 0.03% ± 0.002% DC < f ≤ 16 Hz : ± 0.1% ± 0.01% 16 Hz < f ≤ 45 Hz : ± 0.05% ± 0.01% 45 Hz < f ≤ 66 Hz : ± 0.03% ± 0.007% | DC : ± 0.05% ± 0.01% DC < f ≤ 16 Hz : ± 0.10% ± 0.02% 16 Hz < f ≤ 400 Hz : ± 0.05% ± 0.01% | DC : ± 0.03% ± 0.002% DC < f ≤ 16 Hz : ± 0.1% ± 0.01% 16 Hz < f ≤ 45 Hz : ± 0.05% ± 0.01% | DC : ± 0.05% ± 0.01% DC < f ≤ 16 Hz : ± 0.10% ± 0.02% 16 Hz < f ≤ 400 Hz : ± 0.05% ± 0.01% | |
| | | 66 Hz < f ≤ 100 Hz : ± 0.04% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.05% ± 0.01% | 1 kHz < f ≤ 5 kHz : ± 0.7% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 1% ± 0.02% | 66 Hz < f ≤ 100 Hz : ± 0.04% ± 0.01% 100 Hz < f ≤ 500 Hz : ± 0.06% ± 0.01% | 1 kHz < f ≤ 5 kHz : ± 0.7% ± 0.02% 5 kHz < f ≤ 10 kHz : ± 1% ± 0.02% | |
| | | 500 Hz < f ≤ 3 kHz : ± 0.1% ± 0.01% 3 kHz < f ≤ 10 kHz : ± 0.2% ± 0.02% 10 k Hz < f ≤ 1 MHz : ± (0.018 × f kHz)% ± 0.05% | 10 kHz < f ≤ 50 kHz : ± 2% ± 0.02% 50 kHz < f ≤ 100 kHz : ± 5% ± 0.05% 100 kHz < f ≤ 300 kHz : ± 10% ± 0.05% | 500 Hz < f ≤ 1 kHz : ± 0.1% ± 0.01% 1 kHz < f ≤ 10 kHz : ± 0.15% ± 0.02% 10 k Hz < f ≤ 1 MHz : ± (0.012 × f kHz)% ± 0.05% | 10 kHz < f ≤ 50 kHz : ± 1% ± 0.02% 50 kHz < f ≤ 100 kHz : ± 2% ± 0.05% 100 kHz < f ≤ 300 kHz : ± 5% ± 0.05% | |
| | | - - | 300 kHz < f ≤ 500 kHz : ± 30% ± 0.05% | - - | 300 kHz < f ≤ 700 kHz : ± 10% ± 0.05% | |
| | | - - | - - | - - | 700 kHz < f < 1 MHz : ± 30% ± 0.05% | |
| | | | | | | |
| | | Common-Mode Rejection Ratio (CMRR) *3 | 150 dB or greater (DC to 1 kHz) 140 dB or greater (1 kHz to 10 kHz) 120 dB or greater (10 kHz to 100 kHz) 100 dB or greater (100 kHz to 1 MHz) (effect on output voltage and common mode voltage) | 0.05% f.s. or less (1000 V rms, DC to 100 Hz) | 150 dB or greater (DC to 1 kHz) 140 dB or greater (1 kHz to 10 kHz) 120 dB or greater (10 kHz to 100 kHz) 100 dB or greater (100 kHz to 1 MHz) (effect on output voltage and common mode voltage) | 0.05% f.s. or less (1000 V rms, DC to 100 Hz) |
| | | Linearity errors (typical) | ± 2 ppm | - | ± 2 ppm | - |
| Offset errors (typical) | ± 5 ppm | - | ± 5 ppm | - | | |
| Amplitude errors (typical) | (DC) ± 7 ppm, (10 to 500 Hz) ± 0.005%, (500 Hz-3 kHz) ± 0.01%, (3 k to 30 kHz) ± 0.1%, (30 k to 100 kHz) ± 0.4%, (100 k to 400 kHz) ± 1%, (400 kHz to 1 MHz) ± 3% | - | (DC) ± 7 ppm, (10 to 100 Hz) ± 0.005%, (100 Hz to 1 kHz) ± 0.01%, (1 k to 50 kHz) ± 0.1%, (50 k to 100 kHz) ± 0.3%, (100 k to 300 kHz) ± 1%, (300 kHz to 1 MHz) ± 3% | - | | |
| Frequency derating |  |  |  |  | | |
| Output voltage | 10 mV/A (= 2 V/200 A) | 10 mV/A (= 2 V/200 A) | 40 mV/A (= 2 V/50 A) | 40 mV/A (= 2 V/50 A) | | |
| Operating temperature and humidity*4 | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -30° C to 85° C (-22° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -30° C to 85° C (-22° F to 185° F), 80% RH or less | | |
| Storage temperature and humidity*4 | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -30° C to 85° C (-22° F to 185° F), 80% RH or less | -40° C to 85° C (-40° F to 185° F), 80% RH or less | -30° C to 85° C (-22° F to 185° F), 80% RH or less | | |
| Maximum rated voltage to earth | 1000 V CATIII anticipated transient overvoltage: 8000 V | 1000 V AC/DC CATIII (50/60 Hz) anticipated transient overvoltage: 8000 V | 1000 V CATIII anticipated transient overvoltage: 8000 V | 1000 V AC/DC CAT III (50/60 Hz) anticipated transient overvoltage: 8000 V | | |
| Standards | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | Safety: EN 61010, EMC: EN 61326 | | |
| Cable length | CT6873: approx. 3 m (9.84 ft.) CT6873-01: approx. 10 m (32.81 ft.) | Approx. 3 m (9.84 ft.) | CT6872: approx. 3 m (9.84 ft.) CT6872-01: approx. 10 m (32.81 ft.) | Approx. 3 m (9.84 ft.) | | |
| Dimensions | Approx. 70 W × 110 H × 53 D mm (approx. 2.76 W × 4.33 H × 2.09 D in.) | Approx. 70 W × 100 H × 53 D mm (approx. 2.76 W × 3.94 H × 2.09 D in.) | Approx. 70 W × 110 H × 53 D mm (approx. 2.76 W × 4.33 H × 2.09 D in.) | Approx. 70 W × 100 H × 53 D m (approx. 2.76 W × 3.94 H × 2.09 D in.) | | |
| Weight | CT6873: approx. 370 g (13.1 oz.) CT6873-01: approx. 690 g (24.3 oz.) | Approx. 350 g (12.3 oz.) | CT6872: approx. 370 g (13.1 oz.) CT682-01: approx. 690 g (24.3 oz.) | Approx. 340 g (12.0 oz.) | | |


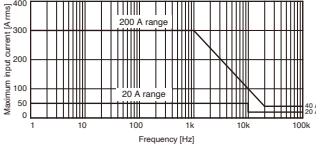
*1: \pm (% of reading + % of range) , range is PW4001 *2: \pm (% of reading + % of full scale) , full scale is rated current of sensor *3: Figures for CT6862-05 and CT6863-05 reflect effects of common-mode voltage. *4: Non-condensing

PW4001

Overview of supported current sensors and specifications

General use clamp sensor


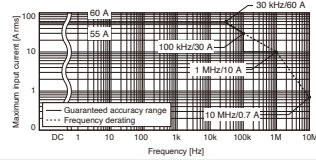
Product warranty period: 3 year Guaranteed accuracy period: 1 year

| Model | 9272-05 | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-----------------|------------------|------------------|------------------|-------------------|------------------|-------------------|------------------|--------------------|------------------|--------------------|------------------|-------------------|------------------|--------------------|------------------|---------------------|---------------|---------------------|---------------|----------------------|----------------|
| Appearance |  | | | | | | | | | | | | | | | | | | | | | | |
| Rated current | 20 A AC, 200 A AC (2 range) | | | | | | | | | | | | | | | | | | | | | | |
| Frequency band | 1 Hz ~ 100 kHz | | | | | | | | | | | | | | | | | | | | | | |
| Diameter of measurable conductors | φ 46 mm or less | | | | | | | | | | | | | | | | | | | | | | |
| Accuracy (amplitude) ± (% of reading + % of full scale) | <table> <tr><td>1 Hz ≤ f < 5 Hz</td><td>: ± 2.0% ± 0.10%</td></tr> <tr><td>5 Hz ≤ f < 10 Hz</td><td>: ± 1.0% ± 0.05%</td></tr> <tr><td>10 Hz ≤ f < 45 Hz</td><td>: ± 0.5% ± 0.02%</td></tr> <tr><td>45 Hz ≤ f ≤ 66 Hz</td><td>: ± 0.3% ± 0.01%</td></tr> <tr><td>66 Hz < f ≤ 500 Hz</td><td>: ± 0.5% ± 0.02%</td></tr> <tr><td>500 Hz < f ≤ 1 kHz</td><td>: ± 0.5% ± 0.02%</td></tr> <tr><td>1 kHz < f ≤ 5 kHz</td><td>: ± 1.0% ± 0.05%</td></tr> <tr><td>5 kHz < f ≤ 10 kHz</td><td>: ± 2.5% ± 0.10%</td></tr> <tr><td>10 kHz < f ≤ 20 kHz</td><td>: ± 5% ± 0.1%</td></tr> <tr><td>20 kHz < f ≤ 50 kHz</td><td>: ± 5% ± 0.1%</td></tr> <tr><td>50 kHz < f ≤ 100 kHz</td><td>: ± 30% ± 0.1%</td></tr> </table> | 1 Hz ≤ f < 5 Hz | : ± 2.0% ± 0.10% | 5 Hz ≤ f < 10 Hz | : ± 1.0% ± 0.05% | 10 Hz ≤ f < 45 Hz | : ± 0.5% ± 0.02% | 45 Hz ≤ f ≤ 66 Hz | : ± 0.3% ± 0.01% | 66 Hz < f ≤ 500 Hz | : ± 0.5% ± 0.02% | 500 Hz < f ≤ 1 kHz | : ± 0.5% ± 0.02% | 1 kHz < f ≤ 5 kHz | : ± 1.0% ± 0.05% | 5 kHz < f ≤ 10 kHz | : ± 2.5% ± 0.10% | 10 kHz < f ≤ 20 kHz | : ± 5% ± 0.1% | 20 kHz < f ≤ 50 kHz | : ± 5% ± 0.1% | 50 kHz < f ≤ 100 kHz | : ± 30% ± 0.1% |
| 1 Hz ≤ f < 5 Hz | : ± 2.0% ± 0.10% | | | | | | | | | | | | | | | | | | | | | | |
| 5 Hz ≤ f < 10 Hz | : ± 1.0% ± 0.05% | | | | | | | | | | | | | | | | | | | | | | |
| 10 Hz ≤ f < 45 Hz | : ± 0.5% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | |
| 45 Hz ≤ f ≤ 66 Hz | : ± 0.3% ± 0.01% | | | | | | | | | | | | | | | | | | | | | | |
| 66 Hz < f ≤ 500 Hz | : ± 0.5% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | |
| 500 Hz < f ≤ 1 kHz | : ± 0.5% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | |
| 1 kHz < f ≤ 5 kHz | : ± 1.0% ± 0.05% | | | | | | | | | | | | | | | | | | | | | | |
| 5 kHz < f ≤ 10 kHz | : ± 2.5% ± 0.10% | | | | | | | | | | | | | | | | | | | | | | |
| 10 kHz < f ≤ 20 kHz | : ± 5% ± 0.1% | | | | | | | | | | | | | | | | | | | | | | |
| 20 kHz < f ≤ 50 kHz | : ± 5% ± 0.1% | | | | | | | | | | | | | | | | | | | | | | |
| 50 kHz < f ≤ 100 kHz | : ± 30% ± 0.1% | | | | | | | | | | | | | | | | | | | | | | |
| Frequency derating |  | | | | | | | | | | | | | | | | | | | | | | |
| Output voltage | 20 A range: 100 mV/A (= 2 V/20 A) 200 A range: 10 mV/A (= 2 V/200 A) | | | | | | | | | | | | | | | | | | | | | | |
| Operating temperature and humidity ^{*1} | 0° C to 50° C (32° F to 122° F), 80% RH or less | | | | | | | | | | | | | | | | | | | | | | |
| Storage temperature and humidity ^{*1} | -10° C to 60° C (14° F to 140° F), 80% RH or less | | | | | | | | | | | | | | | | | | | | | | |
| Withstand voltage | AC 600 V CATIII (50/60 Hz) anticipated transient overvoltage: 6000 V | | | | | | | | | | | | | | | | | | | | | | |
| Standards | Safety: EN 61010, EMC: EN 61326 Class A | | | | | | | | | | | | | | | | | | | | | | |
| Cable length | Approx. 3 m (9.84 ft.) | | | | | | | | | | | | | | | | | | | | | | |
| Dimensions | Approx. 78 W × 188 H × 35 D mm (approx. 3.07 W × 7.40 H × 1.38 D in.) | | | | | | | | | | | | | | | | | | | | | | |
| Weight | Approx. 450 g (15.9 oz.) | | | | | | | | | | | | | | | | | | | | | | |

*1: Non-condensing

Direct-wiring type high-accuracy current sensors

Product warranty period: 3 year Guaranteed accuracy period: 1 year

| Model | PW9100A-3, PW9100A-4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|-----------------------|--|------------------------------------|--|-----------------------|--|---------------------------------|--|------------------------------------|--|--------------------------------------|--|-------------------------------------|--|-------------------------------------|--|------------------------------------|--|-----------------------------------|--|------------------------------------|--|-------------------------------------|--|--------------------------------------|--|--------------------------------------|--|-------------------------------------|
| Appearance |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rated current | 50 A AC/DC | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Frequency band | DC to 3.5 MHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurement terminals | Isolated input, DCCT input Terminal block (with safety cover), M6 screws | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Accuracy | <table> <tr><td>PW4001 Combined^{*1} Current (I_I) , Active power (P)</td><td>DC : ± 0.05% ± 0.017%</td></tr> <tr><td></td><td>45Hz ≤ f ≤ 66Hz : ± 0.05% ± 0.015%</td></tr> <tr><td></td><td>DC : ± 0.02% ± 0.007%</td></tr> <tr><td></td><td>DC < f < 30 Hz : ± 0.1% ± 0.02%</td></tr> <tr><td></td><td>30 Hz ≤ f < 45 Hz : ± 0.1% ± 0.02%</td></tr> <tr><td></td><td>45 Hz ≤ f ≤ 65 Hz : ± 0.02% ± 0.005%</td></tr> <tr><td></td><td>65 Hz < f ≤ 500 Hz : ± 0.1% ± 0.01%</td></tr> <tr><td></td><td>500 Hz < f ≤ 1 kHz : ± 0.1% ± 0.01%</td></tr> <tr><td></td><td>1 kHz < f ≤ 5 kHz : ± 0.5% ± 0.02%</td></tr> <tr><td></td><td>5 kHz < f ≤ 20 kHz : ± 1% ± 0.02%</td></tr> <tr><td></td><td>20 kHz < f ≤ 50 kHz : ± 1% ± 0.02%</td></tr> <tr><td></td><td>50 kHz < f ≤ 100 kHz : ± 2% ± 0.05%</td></tr> <tr><td></td><td>100 kHz < f ≤ 300 kHz : ± 5% ± 0.05%</td></tr> <tr><td></td><td>300 kHz < f ≤ 700 kHz : ± 5% ± 0.05%</td></tr> <tr><td></td><td>700 kHz < f ≤ 1 MHz : ± 10% ± 0.05%</td></tr> </table> | PW4001 Combined ^{*1} Current (I _I) , Active power (P) | DC : ± 0.05% ± 0.017% | | 45Hz ≤ f ≤ 66Hz : ± 0.05% ± 0.015% | | DC : ± 0.02% ± 0.007% | | DC < f < 30 Hz : ± 0.1% ± 0.02% | | 30 Hz ≤ f < 45 Hz : ± 0.1% ± 0.02% | | 45 Hz ≤ f ≤ 65 Hz : ± 0.02% ± 0.005% | | 65 Hz < f ≤ 500 Hz : ± 0.1% ± 0.01% | | 500 Hz < f ≤ 1 kHz : ± 0.1% ± 0.01% | | 1 kHz < f ≤ 5 kHz : ± 0.5% ± 0.02% | | 5 kHz < f ≤ 20 kHz : ± 1% ± 0.02% | | 20 kHz < f ≤ 50 kHz : ± 1% ± 0.02% | | 50 kHz < f ≤ 100 kHz : ± 2% ± 0.05% | | 100 kHz < f ≤ 300 kHz : ± 5% ± 0.05% | | 300 kHz < f ≤ 700 kHz : ± 5% ± 0.05% | | 700 kHz < f ≤ 1 MHz : ± 10% ± 0.05% |
| PW4001 Combined ^{*1} Current (I _I) , Active power (P) | DC : ± 0.05% ± 0.017% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 45Hz ≤ f ≤ 66Hz : ± 0.05% ± 0.015% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | DC : ± 0.02% ± 0.007% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | DC < f < 30 Hz : ± 0.1% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 30 Hz ≤ f < 45 Hz : ± 0.1% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 45 Hz ≤ f ≤ 65 Hz : ± 0.02% ± 0.005% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 65 Hz < f ≤ 500 Hz : ± 0.1% ± 0.01% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 500 Hz < f ≤ 1 kHz : ± 0.1% ± 0.01% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1 kHz < f ≤ 5 kHz : ± 0.5% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5 kHz < f ≤ 20 kHz : ± 1% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 20 kHz < f ≤ 50 kHz : ± 1% ± 0.02% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 50 kHz < f ≤ 100 kHz : ± 2% ± 0.05% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 100 kHz < f ≤ 300 kHz : ± 5% ± 0.05% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 300 kHz < f ≤ 700 kHz : ± 5% ± 0.05% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 700 kHz < f ≤ 1 MHz : ± 10% ± 0.05% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Effects of common mode voltage | 120 dB or greater (50/60 Hz, 100 kHz) (effect on output voltage and common mode voltage) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Frequency derating |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Output voltage | 40 mV/A (= 2 V/50 A) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operating temperature and humidity ^{*3} | 0° C to 40° C (32° F to 104° F), 80% RH or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Storage temperature and humidity ^{*3} | -10° C to 50° C (14° F to 122° F), 80% RH or less | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Withstand voltage | 600 V CATIII, 1000 V CATII anticipated transient overvoltage: 6000 V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Standards | Safety: EN 61010, EMC: EN 61326 Class A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cable length | Approx. 0.8 m (2.62 ft.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimensions | Approx. 430 W × 88 H × 260 D mm (approx. 16.9 W × 3.46 H × 10.23 D in.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eight | PW9100A-3: approx. 3.7 kg (130.5 oz.) PW9100A-4: approx. 4.3 kg (151.7 oz.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

*1: ± (% of reading + % of range) , range is PW4001

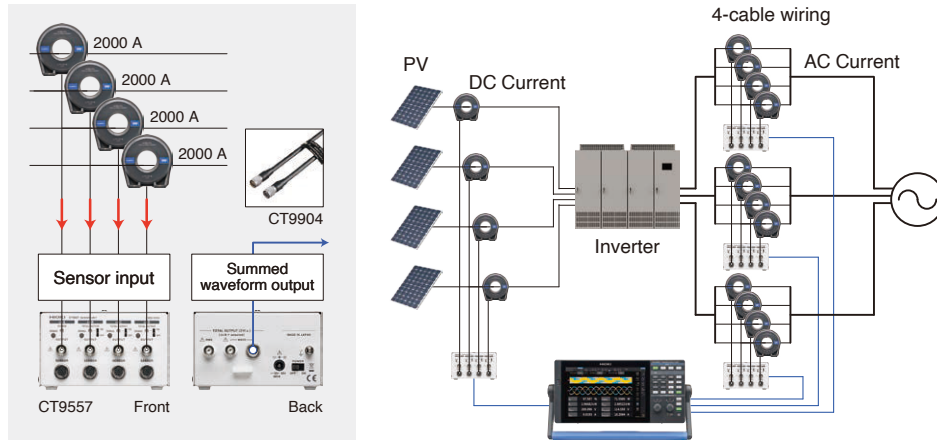
*2: ± (% of reading + % of full scale) , full scale is rated current of sensor

*3: Non-condensing

PW4001

Measure Large Currents of up to 8000 A

The **Sensor Unit CT9557** adds and outputs current sensor output from multi-wire lines. With the PW4001, the CT9557 can be used to accurately measure large currents of up to 8000 A (on a 4-wire line).



CT9557 specifications

| | |
|---|---|
| Connectable current sensor | Current sensors are listed on p. 26 - p. 29 |
| Summed waveform output accuracy ± (% of reading + % of full scale) | DC : $\pm 0.06\% \pm 0.03\%$ to 1 kHz : $\pm 0.06\% \pm 0.03\%$ to 10 kHz : $\pm 0.10\% \pm 0.03\%$ to 100 kHz : $\pm 0.20\% \pm 0.10\%$ to 300 kHz : $\pm 1.0\% \pm 0.20\%$ to 700 kHz : $\pm 5.0\% \pm 0.20\%$ to 1 MHz : $\pm 10.0\% \pm 0.50\%$ |
| Operating temperature and humidity | -10° C to 50° C (14° F to 122° F), 80% RH or less |
| Power supply | 100 V to 240 V AC (50 Hz/60 Hz) |
| Output connector | HIOKI ME15W (male connector) |
| Dimensions (W x H x D) | Approx. 116 × 67 × 132 mm (approx. 4.57 × 2.64 × 5.20 in.) |
| Weight | Approx. 420 g (14.8 oz.) |
| Included accessories | AC ADAPTER Z1002, Power cord |

| Wiring | Current | Using sensors |
|--------------------------------|---------|---------------------------------------|
| Single-cable or bundled wiring | 1000 A | CT6876A CT6846A |
| | 2000 A | CT6877A |
| 2-cable wiring | 2000 A | CT9557+CT6876A×2/ CT9557+CT6846A×2 |
| | 4000 A | CT9557+CT6877A×2 |
| 3-cable wiring | 3000 A | CT9557+CT6876A×3/ CT9557+CT6846A×3 |
| | 6000 A | CT9557+CT6877A×3 |
| 4-cable wiring | 4000 A | CT9557+CT6876A×4/ CT9557+CT6846A×4 |
| | 8000 A | CT9557+CT6877A×4 |



SENSOR UNIT CT9557



Option

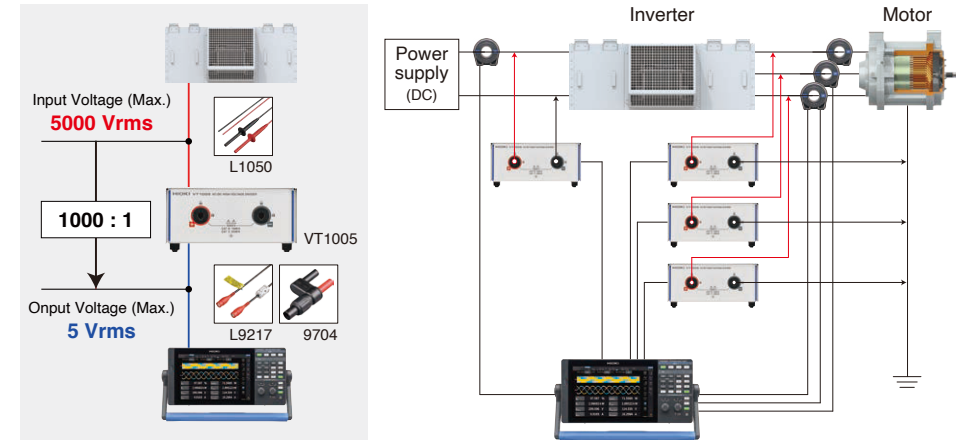
CONNECTION CABLE CT9904

Cable length: 1 m (3.28 ft)

CT9904 required to connect to PW4001.

Measure High Voltages of up to 5000 V

The **AC/DC High Voltage Divider VT1005** divides and outputs voltages of up to 5000 V. With the PW4001, the VT1005 can accurately measure high voltages of up to 5000 V.

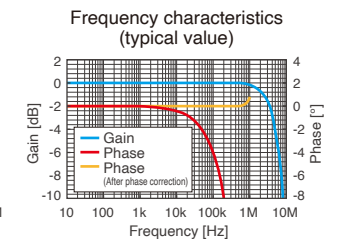
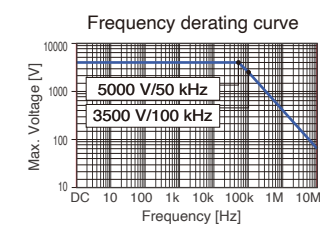


VT1005 specifications

| | |
|--|---|
| Maximum rated voltage | 5000 V rms, ± 7100 V peak (Provided this falls within the frequency derating curve illustrated) |
| Maximum rated voltage (line-to-ground) | No measurement category: 5000 V AC/DC (7100 V peak, Anticipated transient overvoltage 0 V) Measurement category II: 2000 V AC/DC (Anticipated transient overvoltage 12000 V) Measurement category III: 1500 V AC/DC (Anticipated transient overvoltage 10000 V) |
| Measurement accuracy | $\pm 0.08\%$ (DC), $\pm 0.04\%$ (50 Hz/60 Hz), $\pm 0.17\%$ (50 kHz) |
| Frequency flatness | Band where amplitude falls within $\pm 0.1\%$ range: 200 kHz (typical) Band where phase falls within $\pm 0.1^\circ$ range: 500 kHz (typical) ^(*) |
| Measurement bandwidth | DC to 4 MHz (Amplitude and phase accuracy specified up to 1 MHz) |
| Voltage dividing ratio | 1000 : 1 |
| Common-mode voltage rejection ratio (CMRR) | 50 Hz/60 Hz: 90 dB (typical), 100 kHz: 80 dB (typical) |
| Operating temperature and humidity range | -10° C to 50° C (14° F to 122° F), 80% RH or less (non-condensing) |
| Power supply | 100 V to 240 V AC (50/60 Hz) |
| Dimensions (W x H x D) | Approx. 195.0 × 83.2 × 346.0 mm (approx. 7.68 × 3.28 × 13.62 in.) |
| Weight | Approx. 2.2 kg (77.6 oz.) |
| Measurement method | Differential input |
| Included accessories | - L1050-01 Voltage Cord (1.6 m/5.25 ft) - L9217 Connection Cord (insulated BNC, 1.6 m/5.25 ft) - 9704 Conversion Adapter (insulated-female BNC-to-banana plug) - Power cord |



AC/DC HIGH VOLTAGE DIVIDER
VT1005



PW4001

Model: POWER ANALYZER PW4001

| Model No. (Order Code) | D/A output | Motor analysis | DC power operation(10.5 to 28 V DC) |
|------------------------|------------|----------------|--------------------------------------|
| PW4001-01 | — | — | — |
| PW4001-02 | ✓ | — | — |
| PW4001-03 | — | ✓ | — |
| PW4001-04 | — | — | ✓ |
| PW4001-05 | ✓ | ✓ | ✓ |



Accessories: Startup guide × 1, power cord × 1, USB cable × 1, D-sub 25-pin connector × 1, DC power supply connector (PW4001-04, -05)

- The separately sold voltage cords and current sensors are required for taking measurements.
- Specify whether to include the Motor Analysis, D/A Output, and DC power operation options upon order for factory installation.

Current measurement options (High accuracy: clamp type)

| Model No. (Order Code) | Model | Rated Current | Frequency band | Cable length |
|------------------------|---------------------|-------------------|----------------|--------------|
| CT6834 | AC/DC CURRENT PROBE | 500 A rms | DC to 50 kHz | 5 m |
| CT6834-01 | AC/DC CURRENT PROBE | 500 A rms | DC to 50 kHz | 10 m |
| CT6833 | AC/DC CURRENT PROBE | 200 A rms | DC to 50 kHz | 5 m |
| CT6833-01 | AC/DC CURRENT PROBE | 200 A rms | DC to 50 kHz | 10 m |
| CT6831 | AC/DC CURRENT PROBE | 20 A rms | DC to 100 kHz | 4.2 m |
| CT6830 | AC/DC CURRENT PROBE | 2 A rms | DC to 100 kHz | 4.2 m |
| CT6846A | AC/DC CURRENT PROBE | 1000 A rms | DC to 100 kHz | 3 m |
| CT6845A | AC/DC CURRENT PROBE | 500 A rms | DC to 200 kHz | 3 m |
| CT6844A | AC/DC CURRENT PROBE | 500 A rms | DC to 500 kHz | 3 m |
| CT6843A | AC/DC CURRENT PROBE | 200 A rms | DC to 700 kHz | 3 m |
| CT6841A | AC/DC CURRENT PROBE | 20 A rms | DC to 2 MHz | 3 m |
| 9272-50 | CLAMP ON SENSOR | AC 20 A/200 A rms | DC to 100 kHz | 3 m |

Current measurement options (High accuracy: pass-through, direct connection type)

| Model No. (Order Code) | Model | Rated Current | Frequency band | Cable length or number of channels |
|------------------------|----------------------|---------------|----------------|------------------------------------|
| CT6877A | AC/DC CURRENT SENSOR | 2000 A rms | DC to 1 MHz | 3 m |
| CT6877A-1 | AC/DC CURRENT SENSOR | 2000 A rms | DC to 1MHz | 10 m |
| CT6876A | AC/DC CURRENT SENSOR | 1000 A rms | DC to 1.5 MHz | 3 m |
| CT6876A-1 | AC/DC CURRENT SENSOR | 1000 A rms | DC to 1.2 MHz | 10 m |
| CT6904A | AC/DC CURRENT SENSOR | 500 A rms | DC to 4 MHz | 3 m |
| CT6875A | AC/DC CURRENT SENSOR | 500 A rms | DC to 2 MHz | 3 m |
| CT6875A-1 | AC/DC CURRENT SENSOR | 500 A rms | DC to 1.5 MHz | 10 m |
| CT6873 | AC/DC CURRENT SENSOR | 200 A rms | DC to 10 MHz | 3 m |
| CT6873-01 | AC/DC CURRENT SENSOR | 200 A rms | DC to 10 MHz | 10 m |
| CT6863-05 | AC/DC CURRENT SENSOR | 200 A rms | DC to 500 kHz | 3 m |
| CT6872 | AC/DC CURRENT SENSOR | 50 A rms | DC to 10 MHz | 3 m |
| CT6872-01 | AC/DC CURRENT SENSOR | 50 A rms | DC to 10 MHz | 10 m |
| CT6862-05 | AC/DC CURRENT SENSOR | 50 A rms | DC to 1 MHz | 3 m |
| PW9100A-3 | AC/DC CURRENT BOX | 50 A rms | DC to 3.5 MHz | 3 ch |
| PW9100A-4 | AC/DC CURRENT BOX | 50 A rms | DC to 3.5 MHz | 4 ch |

Current measurement options (Standard Sensor)

| Model No. (Order Code) | Model | Rated Current | Frequency band | cable length |
|------------------------|--|---------------|-----------------|--------------|
| CT7742** | AC/DC AUTO ZERO CURRENT SENSOR | 2000 A rms | DC to 5 kHz | 2.5 m |
| CT7642** | AC/DC CURRENT SENSOR | 2000 A rms | DC to 10 kHz | 2.5 m |
| CT7044** | AC FLEXIBLE CURRENT SENSOR (Φ100 mm(3.94 in.)) | 6000 A rms | 10 Hz to 50 kHz | 2.5 m |
| CT7045** | AC FLEXIBLE CURRENT SENSOR (Φ180 mm(7.09 in.)) | 6000 A rms | 10 Hz to 50 kHz | 2.5 m |
| CT7046** | AC FLEXIBLE CURRENT SENSOR (Φ254mm(10.00 in.)) | 6000 A rms | 10 Hz to 50 kHz | 2.5 m |

** CONVERSION CABLE CT9920 is required to connect to the PW4001.

CONVERSION CABLE CT9920



Required to connect PW4001 to the current sensor with HIOKI PL14 on the output connector.

[Applicable products]
CT7742, CT7642, CT7044, CT7045, CT7046

CONVERSION CABLE CT9904



Cable length: 1 m (3.28 ft) Required to connect the summing waveform output terminal of CT9557 to PW4001.

[Applicable products]
CT9557

PW4001

Voltage measurement options

| | | | |
|----|---------------|----------------------------|--|
| 1 | L1025 | VOLTAGE CORD | 1500 V DC CATII, 1 A, 1000 V CATIII, 1 A banana-banana (red, black, 1 each), alligator clip, approx. 3 m (9.84 ft.) length |
| 2 | L9438-50 | VOLTAGE CORD | 1000 V CATIII, 10 A, 600 V CATIV, 10 A banana-banana (red, black, 1 each), alligator clip, spiral tube, approx. 3 m (9.84 ft.) length |
| 3 | L1000 | VOLTAGE CORD | 1000 V CATIII, 10 A, 600 V CATIV, 10 A banana-banana (red, yellow, blue, gray, 1 each, black × 4), alligator clip, approx. 3 m (9.84 ft.) length |
| 4 | L9257 | CONNECTION CORD | 1000 V CATIII, 10 A, 600 V CATIV, 10 A banana-banana (red, black, 1 each), alligator clip, approx. 1.2 m (3.94 ft.) length |
| 5 | L1021-01 | PATCH CORD | 1000 V CATIII, 10 A, 600 V CATIV, 10 A for branching voltage input, banana branch to banana clip (red × 1), 0.5 m (1.64 ft.) length |
| 6 | L1021-02 | PATCH CORD | 1000 V CATIII, 10 A, 600 V CATIV, 10 A for branching voltage input, banana branch to banana clip (black × 1), 0.5 m (1.64 ft.) length |
| 7 | L9243 | GRABBER CLIP | 1000 V CATII, 1 A, (red, black, 1 each) |
| 8 | L4940 | CONNECTION CORD | 1000 V CATIII, 10 A, 600 V CATIV, 10 A banana-banana (red, black, 1 each), approx. 1.5 m (4.92 ft.) length |
| 9 | L4935 | ALLIGATOR CLIP SET | 1000 V CATIII, 10 A, 600 V CATIV, 10 A, (red, black, 1 each) |
| 10 | VT1005 | AC/DC HIGH VOLTAGE DIVIDER | Voltage divider up to 5000 V and output to PW4001 Accessories: 9704, L1050-01(1.6m), L9217(1.6m) |
| 11 | L1050-01, -03 | VOLTAGE CORD | For VT1005, 1.6 m (L1050-01), 3 m (L1050-03) |
| 12 | L9217-01, -02 | CONNECTION CORD | For VT1005 connection, insulated BNC, CAT II 600 V, 0.2 A, CAT III 300 V, 0.2 A, 3.0 m(L9217-01), 10.0 m(L9217-02) |

Connection options

| | | | |
|----|---------|------------------|---|
| 13 | L9217 | CONNECTION CORD | For motor analysis input, insulated BNC, CAT II 600 V, 0.2 A, CAT III 300 V, 0.2 A, 1.6 m |
| 14 | 9165 | CONNECTION CABLE | For BNC synchronization, metal BNC by metal BNC, 1.5 m (4.92 ft.) length |
| 15 | 9713-01 | CAN CABLE | One end terminating in bare wires, 2 m (6.56 ft.) length |
| 16 | CT9902 | EXTENSION CABLE | For extension of current sensor cable, ME15W-ME15W, 5 m (16.40 ft.) length |
| 17 | CT9557 | SENSOR UNIT | Adds output waveforms from up to 4 current sensors to 1 channel and outputs it to the PW4001. |
| 18 | CT9904 | CONNECTION CORD | Cable length 1 m; required in order to connect the CT9557's added waveform output terminal to the PW4001. |

Others

| | | | |
|----|-----------|------------------------|---|
| 19 | SP7001-95 | NON-CONTACT CAN SENSOR | Acquires CAN or CAN FD signals, simply by pinching probes over wire insulation. It connects to the CAN connector of the PW4001, supports CAN or CAN FD communication, and can be powered via a USB connector. |
| 20 | L3000 | D/A OUTPUT CABLE | D-sub 25-pin by BNC (male) 20-channel conversion cable |
| 21 | Z5200 | BNC TERMINAL BOX | D-sub 25-pin by BNC (female) 20-channel conversion box |
| 22 | C4001 | CARRYING CASE | Hard-trunk type, with casters |
| 23 | Z5302 | RACKMOUNT FITTINGS | For EIA standard rack |
| 24 | Z5303 | RACKMOUNT FITTINGS | For JIS standard rack |

