HIOKI

# AC/DC CURRENT SENSOR
# CT6877, CT6876, CT6875

NEW

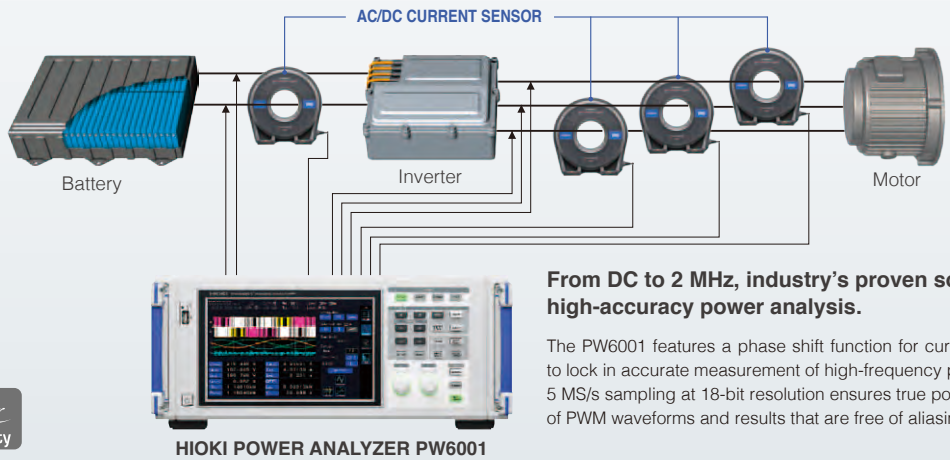
**Introducing the CT6877**

# 2000 A AC/DC, 1 MHz

Attain greater accuracy when measuring the efficiency of increasingly high-current, high-speed EV/HEV inverters


## Raising the Bar for High-Accuracy Measurement

**Example of the CT6877 being used with the Power Analyzer PW6001** **Evaluate inverter power conversion efficiency**






HIOKI POWER ANALYZER PW6001

**From DC to 2 MHz, industry's proven solution for high-accuracy power analysis.**

The PW6001 features a phase shift function for current sensors to lock in accurate measurement of high-frequency power. 5 MS/s sampling at 18-bit resolution ensures true power analysis of PWM waveforms and results that are free of aliasing error.

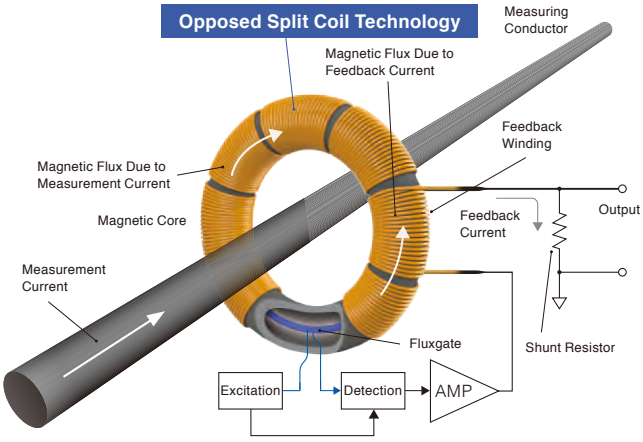
CE

3 year Warranty

# Unparalleled technology driving the evolution of current measurement

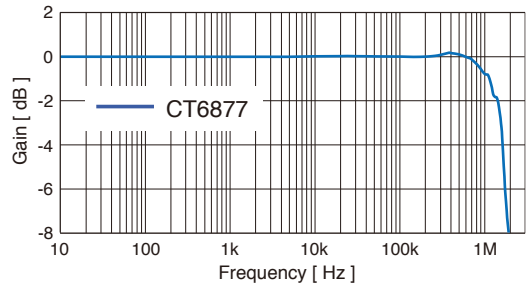
## Broadband Flux Gate Zero-Flux Method Sensor with New Opposed Split Coil*

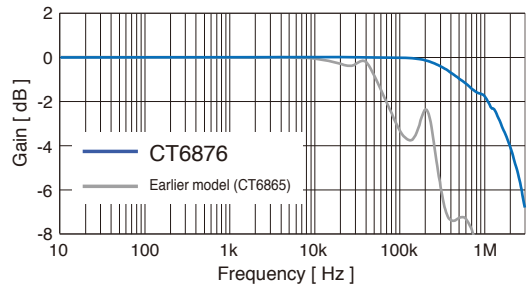
Current sensor performance is maximized with the “Zero Flux (Fluxgate Detection)” measurement method. High frequency current is detected with windings (CT method), and direct to low frequency current is detected with fluxgates. Use of a newly developed opposed split coil* for the winding (CT) makes possible a broad measurement band, while strengthened shielding boosts anti-noise performance.

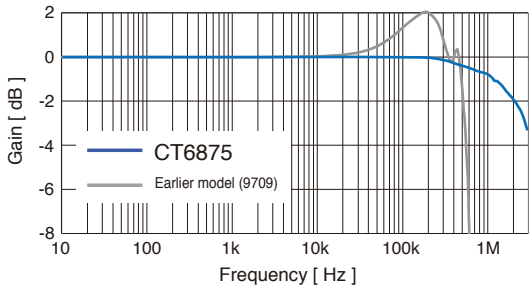



*Opposed Split Coil: Coil in which divided windings are arranged opposite each other on a magnetic core to broaden the range of current detection

**Frequency Characteristics (Typical)**

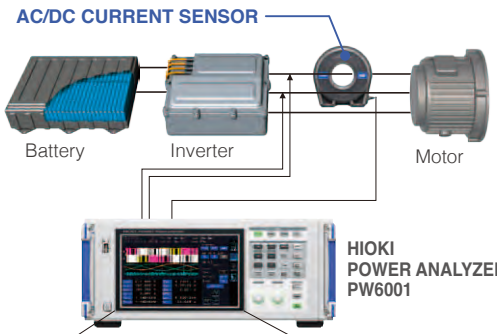



# Excellent noise resistance

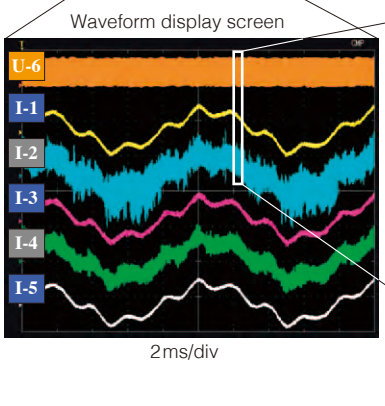
Featuring a significantly improved common-mode rejection ratio compared to earlier models and improved noise performance across a wide frequency band

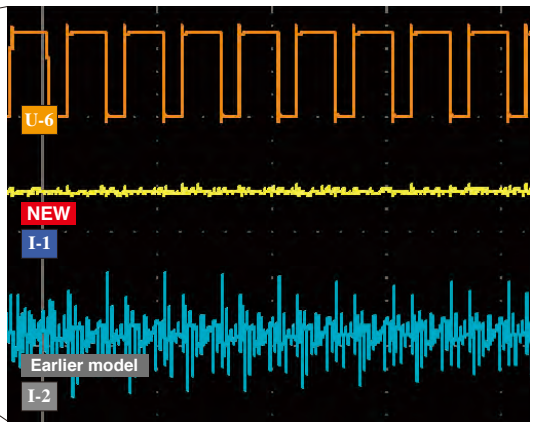



**Comparison of 3-phase motor U-phase voltage waveforms from an SiC inverter**

The following current sensors were installed on the same phase and their output compared on the Power Analyzer PW6001’s waveform display screen:

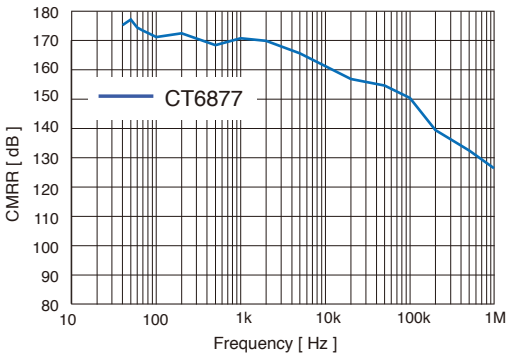
| NEW | | Earlier model | | |
|---|---|---|---|---|
| I-1 | CT6875 | I-2 | 9709 | U-6 U-phase voltage waveform |
| I-3 | CT6876 | I-4 | CT6865 | |
| I-5 | CT6877 | | | |

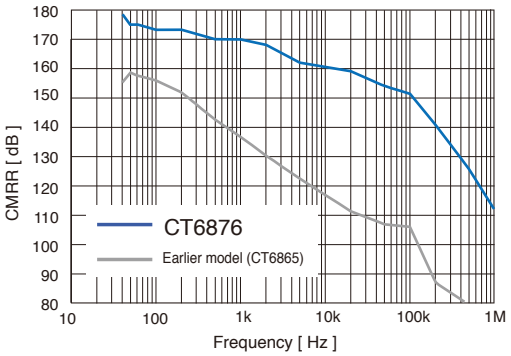


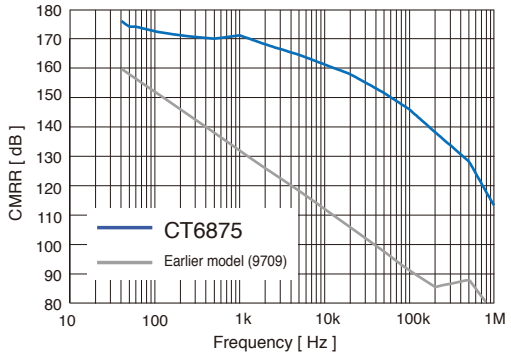




CT687x current sensors can accurately measure currents that were hidden by noise when observed with earlier models because they are not affected by noise that accompanies switching at a high carrier frequency (FSW: 100 kHz).

## Common-Mode Voltage Rejection Ratio (Typical)




## POWER ANALYZER PW6001: Combined Accuracy

| Frequency | Current | Power | Phase |
|---|---|---|---|
| DC | ±0.06% rdg. ±0.038% f.s. (f.s.=PW6001 Range) | ±0.06% rdg. ±0.058% f.s. (f.s.=PW6001 Range) | PW6001 accuracy + sensor accuracy |
| 45 Hz ≤ f ≤ 66Hz | ±0.06% rdg. ±0.028% f.s. (f.s.=PW6001 Range) | ±0.06% rdg. ±0.038% f.s. (f.s.=PW6001 Range) | |
| Bandwidths other than 45 Hz ≤ f ≤ 66 Hz and DC | PW6001 accuracy + sensor accuracy (Consider sensor rating when calculating f.s. error.) | PW6001 accuracy + sensor accuracy (Consider sensor rating when calculating f.s. error.) | |

For other measurement parameters, add the PW6001 accuracy and the sensor accuracy (and consider the sensor rating when calculating the f.s. error).

## POWER ANALYZER PW3390: Combined Accuracy

| Frequency | Current | Power | Phase |
|---|---|---|---|
| DC | ±0.09% rdg. ±0.078% f.s. (f.s.=PW3390 Range) | ±0.09% rdg. ±0.078% f.s. (f.s.=PW3390 Range) | PW3390 accuracy + sensor accuracy |
| 45 Hz ≤ f ≤ 66Hz | ±0.08% rdg. ±0.058% f.s. (f.s.=PW3390 Range) | ±0.08% rdg. ±0.058% f.s. (f.s.=PW3390 Range) | |
| Bandwidths other than 45 Hz ≤ f ≤ 66 Hz and DC | PW3390 accuracy + sensor accuracy (Consider sensor rating when calculating f.s. error.) | PW3390 accuracy + sensor accuracy (Consider sensor rating when calculating f.s. error.) | |

For other measurement parameters, add the PW3390 accuracy and the sensor accuracy (and consider the sensor rating when calculating the f.s. error).

## Options for the CT6877/CT6876/CT6875

**CONVERSION CABLE CT9901**

Converts the sensor's ME15W output cable terminal to PL23

**EXTENSION CABLE CT9902**

Cable length: 5 m

Extends sensor's output cable 5 m (16.41 ft); combine for maximum additional length of 10 m (32.81 ft).

# CT6877, CT6877-01

NEW

## 2000 A AC/DC

**Frequency band: DC to 1 MHz**
(±3 dB Typical)

Output connector: ME15W

**Diameter of measurable conductors: ϕ 80 mm (3.15 in) or less**

The CT6877 can accommodate four cables with a cross-sectional area of 250 mm² each (600V MLFC C250 mm²).

## Specifications

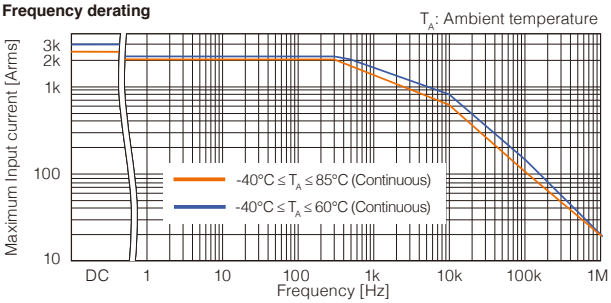
Accuracy (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

| Frequency | Amplitude | Phase |
|---|---|---|
| DC | ±0.04% rdg. ±0.008% f.s. | - |
| DC < f < 16 Hz | ±0.1% rdg. ±0.02% f.s. | ±0.1° |
| 16 Hz ≤ f < 45 Hz | ±0.05% rdg. ±0.01% f.s. | ±0.1° |
| 45 Hz ≤ f ≤ 66 Hz | ±0.04% rdg. ±0.008% f.s. | ±0.1° |
| 66 Hz < f ≤ 100 Hz | ±0.05% rdg. ±0.01% f.s. | ±0.1° |
| 100 Hz < f ≤ 500 Hz | ±0.1% rdg. ±0.02% f.s. | ±0.2° |
| 500 Hz < f ≤ 1 kHz | ±0.2% rdg. ±0.02% f.s. | ±0.4° |
| 1 kHz < f ≤ 5 kHz | ±0.5% rdg. ±0.02% f.s. | ±(0.3+0.1 × f kHz)° |
| 5 kHz < f ≤ 10 kHz | ±0.5% rdg. ±0.02% f.s. | ±(0.3+0.1 × f kHz)° |
| 10 kHz < f ≤ 50 kHz | ±1.5% rdg. ±0.05% f.s. | ±(0.3+0.1 × f kHz)° |
| 50 kHz < f ≤ 100 kHz | ±2.5% rdg. ±0.05% f.s. | ±(0.3+0.1 × f kHz)° |
| 100 kHz < f ≤ 700 kHz | ±(0.025 × f kHz)% rdg. ±0.05% f.s. | ±(0.3+0.1 × f kHz)° |
| Frequency band | 1 MHz (±3 dB Typical) | – |

- With sine wave input and centrally positioned conductor; does not reflect various effects.
- When connected to instrument with an input resistance of at least 1 MΩ.
- Amplitude accuracy and phase accuracy are defined for input of 110% f.s. or less that falls within the derating range.
- Values provided for frequencies of DC < f < 10 Hz are design values.
- Add ±0.01% rdg. to the amplitude accuracy for input from 100% f.s. to 110% f.s.
- For the CT6877-01, add the following for frequencies of 1 kHz < f ≤ 700 kHz:
- Amplitude accuracy: ±(0.005 × f kHz)% rdg. Phase accuracy: ±(0.015 × f kHz)°

| | |
|---|---|
| Temperature and humidity range for guaranteed accuracy | 0°C to 40°C (32°F to 104°F), 80% RH or less |
| Effect of temperature | In ranges from -40°C to 0°C (-40°F to 32°F) and 40°C to 85°C (104°F to 185°F)<br>Amplitude sensitivity: ±15 ppm of rdg./ °C<br>Offset voltage: ±0.5 ppm of f.s./ °C |
| Magnetic susceptibility | 10 mA or less (Scaled value, after input of 2000 A DC) |
| Common-mode voltage rejection ratio (CMRR) | 140 dB or greater (50 Hz/60 Hz), 120 dB or greater (100 kHz) (Effect on output voltage/common-mode voltage) |
| Effect of conductor position (With a wire diameter of 10 mm) | DC,50 Hz/60 Hz: ±0.01% rdg.or less (100 A input)<br>1 kHz: ±0.05% rdg.or less (10 A input)<br>10 kHz: ±0.2% rdg.or less (10 A input)<br>100 kHz: ±0.8% rdg.or less (10 A input) |
| Effect of external magnetic field | 80 mA or less<br>(Scaled value, in a DC and 60 Hz magnetic field of 400 A/m) |
| Maximum input current | Within the derating range<br>Maximum input of up to ±3200 Apeak (design value) allowed at 40°C or less for 20 ms or less |
| Maximum rated voltage to ground | 1000 V CAT III Expected transient overvoltage: 8000 V |
| Output voltage | 1 mV/A |
| Offset voltage | ±10ppm Typical (23°C, no input) |
| Linearity | ±10ppm Typical (23°C) |
| Output impedance | 50 Ω ±10 Ω |
| Operating temperature and humidity range | -40°C to 85°C, 80% RH or less (no condensation) |
| Storage temperature and humidity range | -40°C to 85°C, 80% RH or less (no condensation) |
| Power supply | Power supplied from PW6001, PW3390, CT9555, CT9556, CT9557, or external DC power supply |
| Dimensions | Approx. 229 mm (9.02 in) W × 232 mm (9.13 in) H × 112 mm (4.41 in) D |
| Mass | Approx. CT6877: 5 kg (176.4 oz), CT6875-01: 5.3 kg (186.9 oz) |

**Frequency derating**




| Model No. (Order Code) | Rated current | Output cable length |
|---|---|---|
| CT6877 | 2000 A | 3 m (9.84 ft) |
| CT6877-01 | 2000 A | 10 m (32.81 ft) |

# CT6876, CT6876-01

## AC/DC 1000 A

**Frequency band:**
**DC to 1.5 MHz** (±3 dB Typical)*
*CT6876-01: DC to 1.2 MHz
(±3 dB Typical)

Diameter of measurable conductors:
ϕ 36 mm (1.42 in) or less
Output connector: ME15W

### Specifications

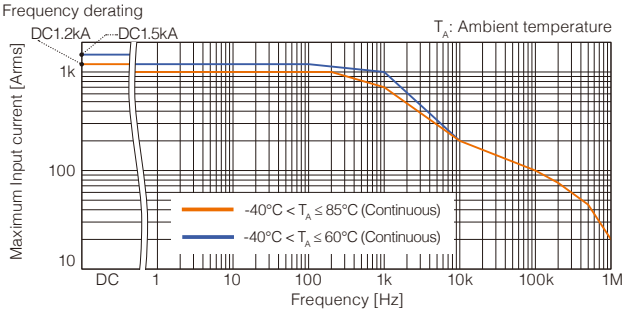
Accuracy (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

| Frequency | Amplitude | Phase |
|---|---|---|
| DC | ±0.04% rdg. ±0.008% f.s. | - |
| DC < f < 16 Hz | ±0.1% rdg. ±0.02% f.s. | ±0.1° |
| 16 Hz ≤ f < 45 Hz | ±0.05% rdg. ±0.01% f.s. | ±0.1° |
| 45 Hz ≤ f ≤ 66 Hz | ±0.04% rdg. ±0.008% f.s. | ±0.1° |
| 66 Hz < f ≤ 100 Hz | ±0.05% rdg. ±0.01% f.s. | ±0.1° |
| 100 Hz < f ≤ 500 Hz | ±0.1% rdg. ±0.02% f.s. | ±0.2° |
| 500 Hz < f ≤ 1 kHz | ±0.2% rdg. ±0.02% f.s. | ±0.4° |
| 1 kHz < f ≤ 5 kHz | ±0.5% rdg. ±0.02% f.s. | ±0.5° |
| 5 kHz < f ≤ 10 kHz | ±0.5% rdg. ±0.02% f.s. | ±(0.1 × f kHz)° |
| 10 kHz < f ≤ 50 kHz | ±2% rdg. ±0.05% f.s. | ±(0.1 × f kHz)° |
| 50 kHz < f ≤ 100 kHz | ±3% rdg. ±0.05% f.s. | ±(0.1 × f kHz)° |
| 100 kHz < f ≤ 1 MHz | ±(0.03 × f kHz)% rdg. ±0.05% f.s. | ±(0.1 × f kHz)° |
| Frequency band | 1.5 MHz (±3 dB Typical) | – |

- With sine wave input and centrally positioned conductor; does not reflect various effects.
- When connected to instrument with an input resistance of at least 1 MΩ.
- Amplitude accuracy and phase accuracy are defined for input of 110% f.s. or less that falls within the derating range.
- Values provided for frequencies of DC < f < 10 Hz are design values.
- Add ±0.01% rdg. to the amplitude accuracy for input from 100% f.s. to 110% f.s.
- For the CT6876-01, add the following for frequencies of 1 kHz < f ≤ 1 MHz:
- Amplitude accuracy: ±(0.005 × f kHz)% rdg. Phase accuracy: ±(0.015 × f kHz)°

| | |
|---|---|
| Temperature and humidity range for guaranteed accuracy | 0°C to 40°C (32°F to 104°F), 80% RH or less |
| Effect of temperature | In ranges from -40°C to 0°C (-40°F to 32°F) and 40°C to 85°C (104°F to 185°F)<br>Amplitude sensitivity: ±20 ppm of rdg./ °C<br>Offset voltage: ±5 ppm of f.s./ °C |
| Magnetic susceptibility | 20 mA or less (Scaled value, after input of 1000 A DC) |
| Common-mode voltage rejection ratio (CMRR) | 140 dB or greater (50 Hz/60 Hz), 120 dB or greater (100 kHz)<br>(Effect on output voltage/common-mode voltage) |
| Effect of conductor position | DC,50 Hz/60 Hz: ±0.01% rdg.or less (100 A input)<br>10 kHz: ±0.5% rdg.or less (10 A input)<br>100 kHz: ±3% rdg.or less (10 A input)<br>With a wire diameter of 10 mm |
| Effect of external magnetic field | 40 mA or less<br>(Scaled value, in a DC and 60 Hz magnetic field of 400 A/m) |
| Maximum input current | Within the derating range<br>Maximum input of up to ±1800 Apeak (design value) allowed at 40°C or less for 20 ms or less |
| Maximum rated voltage to ground | 1000 V CAT III Expected transient overvoltage: 8000 V |
| Output voltage | 2 mV/A |
| Output impedance | 50 Ω ±10 Ω |
| Offset voltage | ±15ppm Typical (23°C, no input) |
| Linearity | ±5ppm Typical (23°C) |
| Operating temperature and humidity range | -40°C to 85°C, 80% RH or less (no condensation) |
| Storage temperature and humidity range | -40°C to 85°C, 80% RH or less (no condensation) |
| Power supply | Power supplied from PW6001, PW3390, CT9555, CT9556, CT9557, or external DC power supply |
| Dimensions | Approx. 160 mm (6.30 in) W × 112 mm (4.41 in) H × 50 mm (1.97 in) D |
| Mass | Approx. CT6876: 0.95 kg (33.5 oz), CT6876-01: 1.25 kg (44.1 oz) |

Frequency derating




| Model No. (Order Code) | Rated current | Output cable length |
|---|---|---|
| CT6876 | 1000 A | 3 m (9.84 ft) |
| CT6876-01 | 1000 A | 10 m (32.81 ft) |

# CT6875, CT6875-01

## AC/DC 500 A

**Frequency band:**
**DC to 2 MHz** (±3 dB Typical)*
*CT6875-01: DC to 1.5 MHz
(±3 dB Typical)

Diameter of measurable conductors:
ϕ 36 mm (1.42 in) or less
Output connector: ME15W

### Specifications

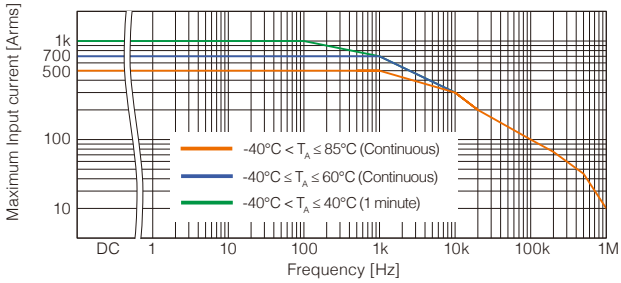
Accuracy (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

| Frequency | Amplitude | Phase |
|---|---|---|
| DC | ±0.04% rdg. ±0.008% f.s. | - |
| DC < f < 16 Hz | ±0.1% rdg. ±0.02% f.s. | ±0.1° |
| 16 Hz ≤ f < 45 Hz | ±0.05% rdg. ±0.01% f.s. | ±0.1° |
| 45 Hz ≤ f ≤ 66 Hz | ±0.04% rdg. ±0.008% f.s. | ±0.1° |
| 66 Hz < f ≤ 100 Hz | ±0.05% rdg. ±0.01% f.s. | ±0.1° |
| 100 Hz < f ≤ 500 Hz | ±0.1% rdg. ±0.02% f.s. | ±0.2° |
| 500 Hz < f ≤ 1 kHz | ±0.2% rdg. ±0.02% f.s. | ±0.4° |
| 1 kHz < f ≤ 5 kHz | ±0.4% rdg. ±0.02% f.s. | ±0.5° |
| 5 kHz < f ≤ 10 kHz | ±0.4% rdg. ±0.02% f.s. | ±(0.1 × f kHz)° |
| 10 kHz < f ≤ 50 kHz | ±1.5% rdg. ±0.05% f.s. | ±(0.1 × f kHz)° |
| 50 kHz < f ≤ 100 kHz | ±2.5% rdg. ±0.05% f.s. | ±(0.1 × f kHz)° |
| 100 kHz < f ≤ 1 MHz | ±(0.025 × f kHz)% rdg. ±0.05% f.s. | ±(0.1 × f kHz)° |
| Frequency band | 2 MHz (±3 dB Typical) | – |

- With sine wave input and centrally positioned conductor; does not reflect various effects.
- When connected to instrument with an input resistance of at least 1 MΩ.
- Amplitude accuracy and phase accuracy are defined for input of 110% f.s. or less that falls within the derating range.
- Values provided for frequencies of DC < f < 10 Hz are design values.
- Add ±0.01% rdg. to the amplitude accuracy for input from 100% f.s. to 110% f.s.
- For the CT6875-01, add the following for frequencies of 1 kHz < f ≤ 1 MHz:
- Amplitude accuracy: ±(0.005 × f kHz)% rdg. Phase accuracy: ±(0.015 × f kHz)°

| | |
|---|---|
| Temperature and humidity range for guaranteed accuracy | 0°C to 40°C (32°F to 104°F), 80% RH or less |
| Effect of temperature | In ranges from -40°C to 0°C (-40°F to 32°F) and 40°C to 85°C (104°F to 185°F)<br>Amplitude sensitivity: ±20 ppm of rdg./ °C<br>Offset voltage: ±5 ppm of f.s./ °C |
| Magnetic susceptibility | 10 mA or less (Scaled value, after input of 500 A DC) |
| Common-mode voltage rejection ratio (CMRR) | 140 dB or greater (50 Hz/60 Hz), 120 dB or greater (100 kHz)<br>(Effect on output voltage/common-mode voltage) |
| Effect of conductor position | DC,50 Hz/60 Hz: ±0.01% rdg.or less (100 A input)<br>10 kHz: ±0.4% rdg.or less (10 A input)<br>100 kHz: ±2.5% rdg.or less (10 A input)<br>With a wire diameter of 10 mm |
| Effect of external magnetic field | 20 mA or less<br>(Scaled value, in a DC and 60 Hz magnetic field of 400 A/m) |
| Maximum input current | Within the derating range<br>Maximum input of up to ±1500 Apeak (design value) allowed at 40°C or less for 20 ms or less |
| Maximum rated voltage to ground | 1000 V CAT III Expected transient overvoltage: 8000 V |
| Output voltage | 4 mV/A |
| Offset voltage | ±15ppm Typical (23°C, no input) |
| Linearity | ±5ppm Typical (23°C) |
| Output impedance | 50 Ω ±10 Ω |
| Operating temperature and humidity range | -40°C to 85°C, 80% RH or less (no condensation) |
| Storage temperature and humidity range | -40°C to 85°C, 80% RH or less (no condensation) |
| Power supply | Power supplied from PW6001, PW3390, CT9555, CT9556, CT9557, or external DC power supply |
| Dimensions | Approx. 160 mm (6.30 in) W × 112 mm (4.41 in) H × 50 mm (1.97 in) D |
| Mass | Approx. CT6875: 0.8 kg (28.2 oz), CT6875-01: 1.10 kg (38.8 oz) |

Frequency derating




| Model No. (Order Code) | Rated current | Output cable length |
|---|---|---|
| CT6875 | 500 A | 3 m (9.84 ft) |
| CT6875-01 | 500 A | 10 m (32.81 ft) |

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