

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

NEW

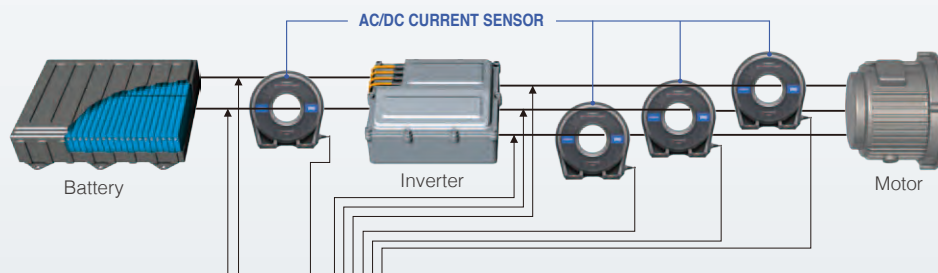
CT6877



Raising the Bar for High-Accuracy Measurement

Example of the CT6877 being used with the Power Analyzer PW6001

Evaluate inverter power conversion efficiency



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.

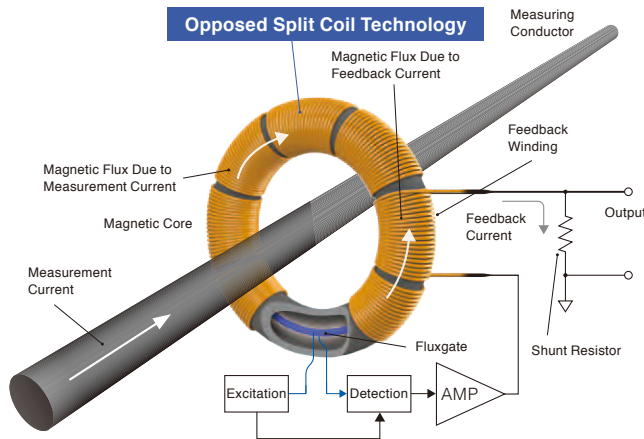


HIOKI POWER ANALYZER PW6001

Unparalleled technology driving the evolution of current measurement

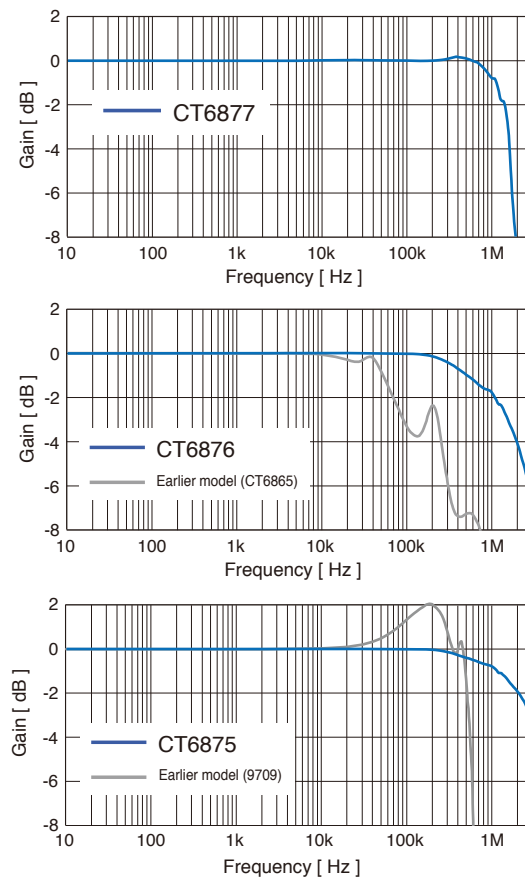
Broadband Flux Gate Zero-Flux Method Sensor with New Opposed Split Coil*

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.



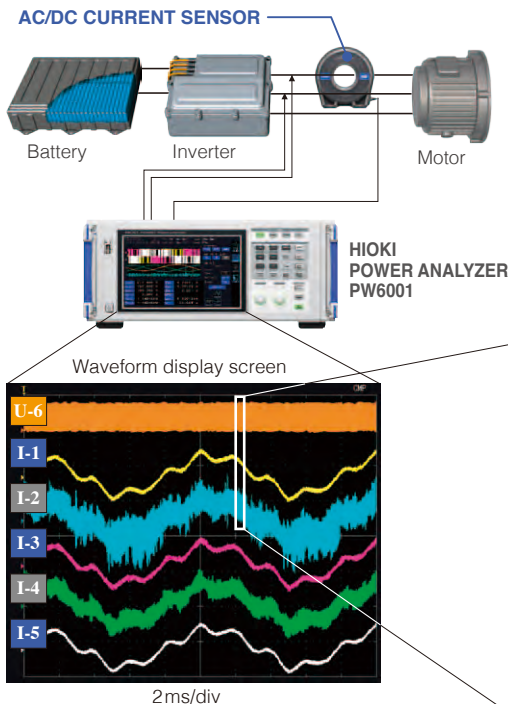
*Opposed Split Coil: Coil in which divided windings are arranged opposite each other on a magnetic core to broaden the range of current detection

Frequency Characteristics (Typical)



Excellent noise resistance

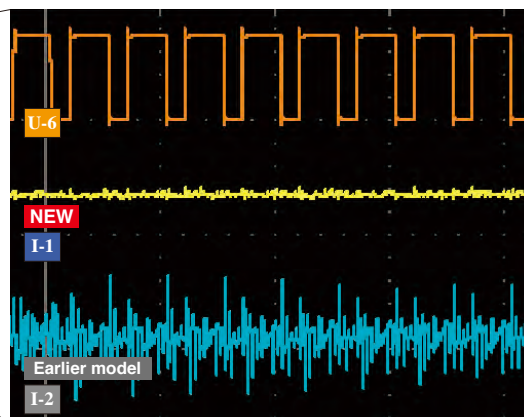
Featuring a significantly improved common-mode rejection ratio compared to earlier models and improved noise performance across a wide frequency band



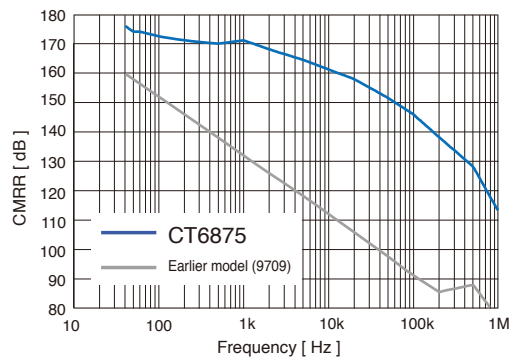
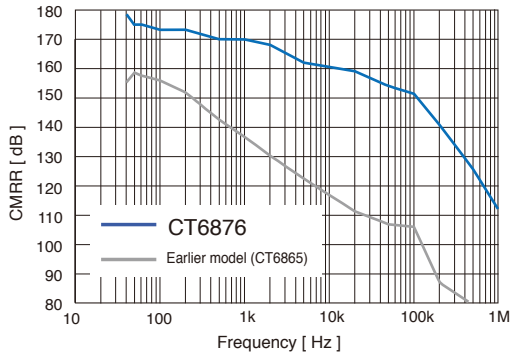
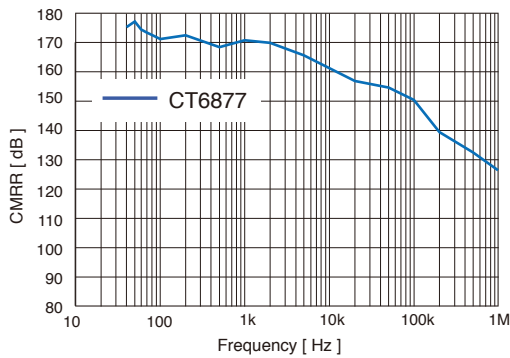
Comparison of 3-phase motor U-phase voltage waveforms from an SiC inverter

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).

**POWER ANALYZER PW6001: Combined Accuracy**

Frequency	Current	Power	Phase
DC	$\pm 0.06\%$ rdg. $\pm 0.038\%$ f.s. (f.s.=PW6001 Range)	$\pm 0.06\%$ rdg. $\pm 0.058\%$ f.s. (f.s.=PW6001 Range)	PW6001 accuracy + sensor accuracy
$45 \text{ Hz} \leq f \leq 66 \text{ Hz}$	$\pm 0.06\%$ rdg. $\pm 0.028\%$ f.s. (f.s.=PW6001 Range)	$\pm 0.06\%$ rdg. $\pm 0.038\%$ f.s. (f.s.=PW6001 Range)	
Bandwidths other than $45 \text{ Hz} \leq f \leq 66 \text{ Hz}$ 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	$\pm 0.09\%$ rdg. $\pm 0.078\%$ f.s. (f.s.=PW3390 Range)	$\pm 0.09\%$ rdg. $\pm 0.078\%$ f.s. (f.s.=PW3390 Range)	PW3390 accuracy + sensor accuracy
$45 \text{ Hz} \leq f \leq 66 \text{ Hz}$	$\pm 0.08\%$ rdg. $\pm 0.058\%$ f.s. (f.s.=PW3390 Range)	$\pm 0.08\%$ rdg. $\pm 0.058\%$ f.s. (f.s.=PW3390 Range)	
Bandwidths other than $45 \text{ Hz} \leq f \leq 66 \text{ Hz}$ 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 AAC/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	$\pm 0.04\%$ rdg. $\pm 0.008\%$ f.s.	-
$DC < f < 16 \text{ Hz}$	$\pm 0.1\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.1^\circ$
$16 \text{ Hz} \leq f < 45 \text{ Hz}$	$\pm 0.05\%$ rdg. $\pm 0.01\%$ f.s.	$\pm 0.1^\circ$
$45 \text{ Hz} \leq f \leq 66 \text{ Hz}$	$\pm 0.04\%$ rdg. $\pm 0.008\%$ f.s.	$\pm 0.1^\circ$
$66 \text{ Hz} < f \leq 100 \text{ Hz}$	$\pm 0.05\%$ rdg. $\pm 0.01\%$ f.s.	$\pm 0.1^\circ$
$100 \text{ Hz} < f \leq 500 \text{ Hz}$	$\pm 0.1\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.2^\circ$
$500 \text{ Hz} < f \leq 1 \text{ kHz}$	$\pm 0.2\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.4^\circ$
$1 \text{ kHz} < f \leq 5 \text{ kHz}$	$\pm 0.5\%$ rdg. $\pm 0.02\%$ f.s.	$\pm (0.3 + 0.1 \times f \text{ kHz})^\circ$
$5 \text{ kHz} < f \leq 10 \text{ kHz}$	$\pm 0.5\%$ rdg. $\pm 0.02\%$ f.s.	$\pm (0.3 + 0.1 \times f \text{ kHz})^\circ$
$10 \text{ kHz} < f \leq 50 \text{ kHz}$	$\pm 1.5\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.3 + 0.1 \times f \text{ kHz})^\circ$
$50 \text{ kHz} < f \leq 100 \text{ kHz}$	$\pm 2.5\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.3 + 0.1 \times f \text{ kHz})^\circ$
$100 \text{ kHz} < f \leq 700 \text{ kHz}$	$\pm (0.025 \times f \text{ kHz})\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.3 + 0.1 \times f \text{ kHz})^\circ$
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 M Ω .
- 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 $\pm 0.01\%$ 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 \leq 700 kHz:
- Amplitude accuracy: $\pm (0.005 \times f \text{ kHz})\%$ rdg. Phase accuracy: $\pm (0.015 \times f \text{ kHz})^\circ$

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)

Amplitude sensitivity: ± 15 ppm of rdg./°C

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 140 dB or greater (50 Hz/60 Hz), 120 dB or greater (100 kHz)

rejection ratio (CMRR) (Effect on output voltage/common-mode voltage)

Effect of conductor position (With a wire diameter of 10 mm) DC, 50 Hz/60 Hz: $\pm 0.01\%$ rdg. or less (100 A input)

1 kHz: $\pm 0.05\%$ rdg. or less (10 A input)

10 kHz: $\pm 0.2\%$ rdg. or less (10 A input)

100 kHz: $\pm 0.8\%$ rdg. or less (10 A input)

Effect of external magnetic field 80 mA or less (Scaled value, in a DC and 60 Hz magnetic field of 400 A/m)

Maximum input current Within the derating range

Maximum input of up to ± 3200 A peak (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 ± 10 ppm Typical (23°C, no input)

Linearity ± 10 ppm Typical (23°C)

Output impedance 50 Ω $\pm 10 \Omega$

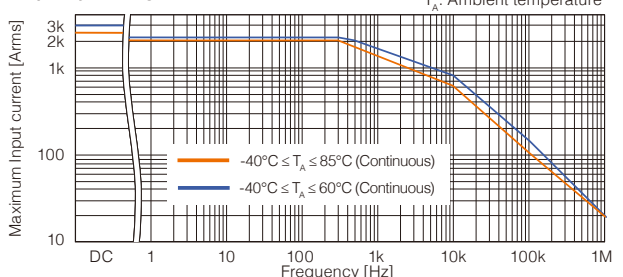
Operating temperature and humidity range -40°C to 85°C, 80% RH or less (no condensation)

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 \times 232 mm (9.13 in) H \times 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

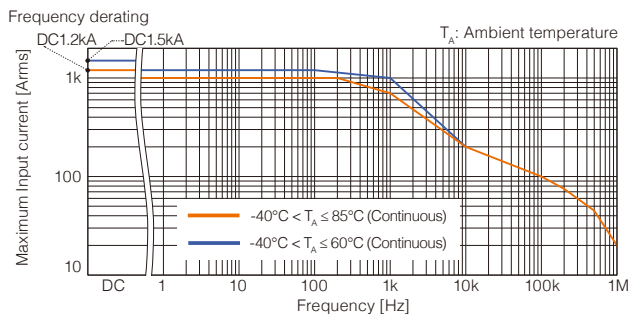
Specifications

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

Frequency	Amplitude	Phase
DC	$\pm 0.04\%$ rdg. $\pm 0.008\%$ f.s.	-
DC < f < 16 Hz	$\pm 0.1\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.1^\circ$
16 Hz \leq f < 45 Hz	$\pm 0.05\%$ rdg. $\pm 0.01\%$ f.s.	$\pm 0.1^\circ$
45 Hz \leq f \leq 66 Hz	$\pm 0.04\%$ rdg. $\pm 0.008\%$ f.s.	$\pm 0.1^\circ$
66 Hz < f \leq 100 Hz	$\pm 0.05\%$ rdg. $\pm 0.01\%$ f.s.	$\pm 0.1^\circ$
100 Hz < f \leq 500 Hz	$\pm 0.1\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.2^\circ$
500 Hz < f \leq 1 kHz	$\pm 0.2\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.4^\circ$
1 kHz < f \leq 5 kHz	$\pm 0.5\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.5^\circ$
5 kHz < f \leq 10 kHz	$\pm 0.5\%$ rdg. $\pm 0.02\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
10 kHz < f \leq 50 kHz	$\pm 2\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
50 kHz < f \leq 100 kHz	$\pm 3\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
100 kHz < f \leq 1 MHz	$\pm (0.03 \times f \text{ kHz})\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
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 M Ω .
- 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 $\pm 0.01\%$ 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 \leq 1 MHz:
- Amplitude accuracy: $\pm (0.005 \times f \text{ kHz})\%$ rdg. Phase accuracy: $\pm (0.015 \times f \text{ kHz})^\circ$

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) Amplitude sensitivity: ± 20 ppm of rdg./°C 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) (Effect on output voltage/common-mode voltage)
Effect of conductor position	DC, 50 Hz/60 Hz: $\pm 0.01\%$ rdg. or less (100 A input) 10 kHz: $\pm 0.5\%$ rdg. or less (10 A input) 100 kHz: $\pm 3\%$ rdg. or less (10 A input) With a wire diameter of 10 mm
Effect of external magnetic field	40 mA or less (Scaled value, in a DC and 60 Hz magnetic field of 400 A/m)
Maximum input current	Within the derating range Maximum input of up to ± 1800 A peak (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 $\pm 10\%$
Offset voltage	± 15 ppm Typical (23°C, no input)
Linearity	± 5 ppm 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 \times 112 mm (4.41 in) H \times 50 mm (1.97 in) D
Mass	Approx. CT6876: 0.95 kg (33.5 oz), CT6876-01: 1.25 kg (44.1 oz)



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

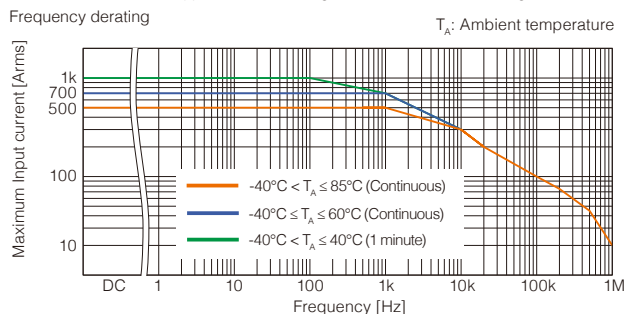
Specifications

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

Frequency	Amplitude	Phase
DC	$\pm 0.04\%$ rdg. $\pm 0.008\%$ f.s.	-
DC < f < 16 Hz	$\pm 0.1\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.1^\circ$
16 Hz \leq f < 45 Hz	$\pm 0.05\%$ rdg. $\pm 0.01\%$ f.s.	$\pm 0.1^\circ$
45 Hz \leq f \leq 66 Hz	$\pm 0.04\%$ rdg. $\pm 0.008\%$ f.s.	$\pm 0.1^\circ$
66 Hz < f \leq 100 Hz	$\pm 0.05\%$ rdg. $\pm 0.01\%$ f.s.	$\pm 0.1^\circ$
100 Hz < f \leq 500 Hz	$\pm 0.1\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.2^\circ$
500 Hz < f \leq 1 kHz	$\pm 0.2\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.4^\circ$
1 kHz < f \leq 5 kHz	$\pm 0.4\%$ rdg. $\pm 0.02\%$ f.s.	$\pm 0.5^\circ$
5 kHz < f \leq 10 kHz	$\pm 0.4\%$ rdg. $\pm 0.02\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
10 kHz < f \leq 50 kHz	$\pm 1.5\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
50 kHz < f \leq 100 kHz	$\pm 2.5\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
100 kHz < f \leq 1 MHz	$\pm (0.025 \times f \text{ kHz})\%$ rdg. $\pm 0.05\%$ f.s.	$\pm (0.1 \times f \text{ kHz})^\circ$
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 M Ω .
- 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 $\pm 0.01\%$ 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 \leq 1 MHz:
- Amplitude accuracy: $\pm (0.005 \times f \text{ kHz})\%$ rdg. Phase accuracy: $\pm (0.015 \times f \text{ kHz})^\circ$

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) Amplitude sensitivity: ± 20 ppm of rdg./°C 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) (Effect on output voltage/common-mode voltage)
Effect of conductor position	DC, 50 Hz/60 Hz: $\pm 0.01\%$ rdg. or less (100 A input) 10 kHz: $\pm 0.4\%$ rdg. or less (10 A input) 100 kHz: $\pm 2.5\%$ rdg. or less (10 A input) With a wire diameter of 10 mm
Effect of external magnetic field	20 mA or less (Scaled value, in a DC and 60 Hz magnetic field of 400 A/m)
Maximum input current	Within the derating range Maximum input of up to ± 1500 A peak (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
Output impedance	± 15 ppm Typical (23°C, no input)
Offset voltage	± 5 ppm Typical (23°C)
Linearity	50 Ω $\pm 10\%$
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 \times 112 mm (4.41 in) H \times 50 mm (1.97 in) D
Mass	Approx. CT6875: 0.8 kg (28.2 oz), CT6875-01: 1.10 kg (38.8 oz)



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)

HIOKI

HIOKI E. E. CORPORATION