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

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.
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

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:

<table>
<thead>
<tr>
<th>NEW</th>
<th>Earlier model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT6875</td>
<td>9709</td>
</tr>
<tr>
<td>CT6876</td>
<td>CT6865</td>
</tr>
<tr>
<td>CT6877</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Current</th>
<th>Power</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±0.06% rdg. ±0.03% f.s. (f.s.=PW3390 Range)</td>
<td>±0.06% rdg. ±0.03% f.s. (f.s.=PW3390 Range)</td>
<td></td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 66 Hz</td>
<td>±0.06% rdg. ±0.02% f.s. (f.s.=PW6001 Range)</td>
<td>±0.06% rdg. ±0.02% f.s. (f.s.=PW6001 Range)</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Current</th>
<th>Power</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±0.05% rdg. ±0.05% f.s. (f.s.=PW3390 Range)</td>
<td>±0.05% rdg. ±0.05% f.s. (f.s.=PW3390 Range)</td>
<td></td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 66 Hz</td>
<td>±0.05% rdg. ±0.06% f.s. (f.s.=PW3390 Range)</td>
<td>±0.05% rdg. ±0.06% f.s. (f.s.=PW3390 Range)</td>
<td></td>
</tr>
</tbody>
</table>

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) combines for maximum additional length of 10 m (32.81 ft)

Specifications

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

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Amplitude</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±0.04% rdg. ±0.006% f.s.</td>
<td>-</td>
</tr>
<tr>
<td>16 Hz ≤ f ≤ 45 Hz</td>
<td>±0.05% rdg. ±0.007% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>45 Hz ≤ f ≤ 66 Hz</td>
<td>±0.04% rdg. ±0.006% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>66 Hz ≤ f ≤ 100 Hz</td>
<td>±0.05% rdg. ±0.01% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>100 Hz ≤ f ≤ 500 Hz</td>
<td>±0.1% rdg. ±0.02% f.s.</td>
<td>±0.2°</td>
</tr>
<tr>
<td>500 Hz ≤ f ≤ 1 kHz</td>
<td>±0.2% rdg. ±0.03% f.s.</td>
<td>±0.3°</td>
</tr>
<tr>
<td>1 kHz ≤ f ≤ 5 kHz</td>
<td>±0.5% rdg. ±0.005% f.s.</td>
<td>±(0.3+0.1×f kHz)°</td>
</tr>
<tr>
<td>5 kHz ≤ f ≤ 10 kHz</td>
<td>±0.5% rdg. ±0.005% f.s.</td>
<td>±(0.3+0.1×f kHz)°</td>
</tr>
<tr>
<td>10 kHz ≤ f ≤ 100 kHz</td>
<td>±0.5% rdg. ±0.005% f.s.</td>
<td>±(0.3+0.1×f kHz)°</td>
</tr>
<tr>
<td>50 kHz ≤ f ≤ 100 kHz</td>
<td>±0.5% rdg. ±0.005% f.s.</td>
<td>±(0.3+0.1×f kHz)°</td>
</tr>
</tbody>
</table>

- 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 MOhm.
- 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 to 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 ≤ 1 kHz: 0.05% rdg. (f.s.=PW6001 Range)
- Amplitude accuracy: ±(0.05 + 1 kHz)° rdg. Phase accuracy: ±0.01% 1 kHz)

Temperature and humidity range for guaranteed accuracy

Effect of temperature: in ranges from 0°C to 40°C (32°F to 104°F) 80% RH or less and DC, 50 Hz/60 Hz: ±0.01% rdg. or less (100 A input)
Effect of humidity: ±0.1% rdg. or less (20% RH or less (20°C) or 50% RH or less (20°C))
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:

- Maximum input of up to ±3200 Apeak (design value) allowed at 40°C or less for 20 ms or less
- 1 mA/A
- 100 ppm Typcal (23°C, no input)
- 100 ppm Typcal (23°C)

Amplitude sensitivity: ±15 ppm of rdg./℃ (30°C to 185°F)

Magnetic susceptibility: 0% or less (Scaled value, after input of 2000 A DC)

Output voltage:

- 10 MΩ or less (Scaled value, after input of 2000 A DC)
- 125 MΩ or greater (50 Hz/60 Hz), 125 MΩ or greater (100 Hz)

Effect on output voltage (common-mode voltage):

- Effect of conductor position (With a wire diameter of 10 mm)
- ±0.05% rdg. ±0.01% f.s. ±0.1°
- ±0.5% rdg. ±0.02% f.s. ±(0.3+0.1×f kHz)°
- ±2.5% rdg. ±0.05% f.s. ±(0.3+0.1×f kHz)°
- ±0.05% rdg. ±0.01% f.s. ±0.1°
- ±0.5% rdg. ±0.02% f.s. ±(0.3+0.1×f kHz)°
- ±(0.025 × f kHz)% rdg. ±0.05% f.s. ±(0.3+0.1×f kHz)°
- ±0.5% rdg. ±0.02% f.s. ±(0.3+0.1×f kHz)°

Common-mode voltage rejection ratio (CMRR):

- DC: ±0.05% rdg. or less (100 A input)
- 1 kHz: ±0.05% rdg. or less (10 A input)
- 10 kHz: ±0.2% rdg. or less (10 A input)
- 100 kHz: ±0.8% rdg or less (10 A input)

Effect of external magnetic field:

- 50 Hz/60 Hz: ±0.01% rdg. or less (100 A input)
- 1 kHz: ±0.01% rdg. or less (1 kA input)

Magnetic susceptibility: 140 dB or greater (50 Hz/60 Hz), 120 dB or greater (100 Hz)

Effect of conductor position (With a wire diameter of 10 mm)

- ±0.05% rdg. ±0.01% f.s. ±0.1°
- ±0.5% rdg. ±0.02% f.s. ±(0.3+0.1×f kHz)°
- ±2.5% rdg. ±0.05% f.s. ±(0.3+0.1×f kHz)°
- ±0.05% rdg. ±0.01% f.s. ±0.1°
- ±0.5% rdg. ±0.02% f.s. ±(0.3+0.1×f kHz)°
- ±(0.025 × f kHz)% rdg. ±0.05% f.s. ±(0.3+0.1×f kHz)°
- ±0.5% rdg. ±0.02% f.s. ±(0.3+0.1×f kHz)°

Output linearity:

- ±0.05% rdg. or less (100 A input)
- 100 kHz: ±0.01% rdg. or less (10 A input)

Output impedance:

- 50 ±1 Ω

Operating temperature:

- -40°C to 85°C (Continuous)
- 40°C or less for 20 ms or less

Power supply:

- Power supplied from PW6001, PW3390, CT9555, CT9556, CT9557, or external DC power supply

Dimensions:

- Approx. 229 mm (8.94 in) x 322 mm (12.67 in) x 112 mm (4.41 in)

Frequency derating:

- -40°C ≤ TA < 88°C (Continuous)
- -40°C ≤ TA < 86°C (Continuous)

Maximum input current (amps)
Specifications

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

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Amplitude</th>
<th>Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td>±0.04% rdg. ±0.002% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>DC &lt; f &lt; 14 Hz</td>
<td>±0.01% rdg. ±0.002% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>14 Hz ≤ f &lt; 45 Hz</td>
<td>±0.005% rdg. ±0.01% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>45 Hz ≤ f &lt; 66 Hz</td>
<td>±0.04% rdg. ±0.008% f.s.</td>
<td>±0.1°</td>
</tr>
<tr>
<td>66 Hz ≤ f &lt; 100 Hz</td>
<td>±0.005% rdg. ±0.01% f.s.</td>
<td>±0.2°</td>
</tr>
<tr>
<td>100 Hz ≤ f &lt; 500 Hz</td>
<td>±0.01% rdg. ±0.02% f.s.</td>
<td>±0.4°</td>
</tr>
<tr>
<td>500 Hz ≤ f &lt; 1 kHz</td>
<td>±0.02% rdg. ±0.02% f.s.</td>
<td>±0.4°</td>
</tr>
<tr>
<td>1 kHz ≤ f &lt; 5 kHz</td>
<td>±0.5% rdg. ±0.02% f.s.</td>
<td>±0.5°</td>
</tr>
<tr>
<td>5 kHz ≤ f &lt; 10 kHz</td>
<td>±0.5% rdg. ±0.02% f.s.</td>
<td>±0.1kHz</td>
</tr>
<tr>
<td>10 kHz ≤ f &lt; 100 kHz</td>
<td>±0.1% rdg. ±0.02% f.s.</td>
<td>±0.1kHz</td>
</tr>
<tr>
<td>100 kHz ≤ f &lt; 1 MHz</td>
<td>±0.03% rdg. ±0.02% f.s.</td>
<td>±0.1kHz</td>
</tr>
</tbody>
</table>

Effect of temperature

In ranges from -40°C to 0°C (-40°F to 32°F) and 40°C to 85°C

- Amplitude accuracy and phase accuracy are defined for input of 100% 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 f ≤ 1 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 output current

Maximum current of up to 1800 Apeak (design value) allowed at 40°C or less for 20 ms or less

Output voltage

2 mV/A

Output impedance

50 Ω ±10%

Offset voltage

±15 ppm of f.s. (±3 dB Typical)

Linearity

±15 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 (6.3 in)  W  × 112 mm (4.41 in)  H  × 50 mm (1.97 in)  D

Mass

Approx. CT6876: 0.95 kg (2.1 lbs)  CT6876-01: 1.25 kg (2.77 lbs)

Frequency derating

DC ≤ 2 kHz

DC ≤ 3 kHz

TA: Ambient temperature

Model No. (Order Code)  Rated current  Output cable length

| CT6876  | 1000 A  | 3 m (9.84 ft) |
| CT6876-01 | 1000 A  | 10 m (32.1 ft) |

Model No. (Order Code)  Rated current  Output cable length

| CT6875  | 500 A  | 3 m (9.84 ft) |
| CT6875-01 | 500 A  | 10 m (32.1 ft) |

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