

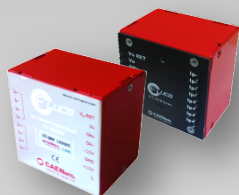
Precision Current
Measurements

ELUCS

Product Catalogue

CT-BOX ²

Digital Current Transducer Box for the Highest Accuracy Current Measurements



4 CT-PCB Series

13 A, 26 A and 52 A Full-Scale Precision Current Transducers for PCB Mounting

CT-100 / CT-150 ⁶

100 A and 150 A Full-Scale Precision Current Transducers for Rack/Panel and PCB Mounting



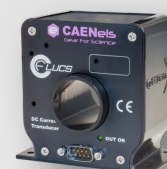
8 FLUCS - Selection Guide



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CT-200 / CT-300 / CT-400 ⁹

200 A, 300 A and 400 A Full-Scale Precision Current Transducers for Rack/Panel Mounting



11 CT-600 / CT-1000

600 A and 1000 A Full-Scale Precision Current Transducers for Rack/Panel Mounting

PS1215 ¹³

Low-Noise Bipolar Power Supply for Current Transducers



15 Frequency Response
Maximum Current Ratings



CT-BOX

Digital Current Transducer Box
for the Highest Accuracy Current Measurements



CT-BOX

- Precise and accurate current measuring system includes current transducer and measuring unit in order to obtain best-in-class performances.
- Internal calibration and thermal stabilization to obtain excellent stability of current measurements.
- Data-logger and oscilloscope modes of operation

FEATURES

- Digital Interface
 - Ethernet
 - USB
 - RS-232
- < 1 ppm/K Temperature Coefficient
- < 0.005 % Full-Scale Accuracy (with High-Accuracy Calibration Option)
- Configurable Recorder on microSD-Flash
- Trigger Input / Output and Alarm Output
- External Temperature Sensors
- Analog Monitor
- Local Display for Current Readings
- Desktop or Rack Mounting in 1U
- Integrated Fan-less AC/DC Power Supply
- Dedicated Software Application

APPLICATIONS

- Test & Measurement Setups
- Sensing Element in Calibration Systems
- Power Supplies
- Biomedical Devices

The CT-BOX is a stand-alone system designed to measure with the highest accuracy and precision DC and AC currents, providing the readings in different digital formats.

The CT-BOX system is developed to be used with the 0-FLUCS current output DCCTs allowing measurements of currents up to kA.

The system integrates a burden resistor and a conditioning network feeding a 24-bit temperature stabilized ADC in order to have < 1 ppm/K temperature dependence. The digital section interfaced to the ADC performs a calibrated measurement in order to eliminate the non-ideal behavior thus providing a 0.005% Full-scale current value accuracy (optional). The ADC sampling frequency can be configured up to 100 kHz allowing to acquire high frequency components and fast current transients.

Current readings can be triggered in different modes:

- by an external LVTTTL or TTL signal;
- by a remote command sent to the digital interface;
- internally, setting the sampling period and the acquisition window.

The time-stamp, the current readings and the external temperature values are stored in a microSD Flash memory allowing long-term acquisitions.

The microSD memory can be either read via Ethernet, USB or RS-232 interfaces or removed from the system and transferred to other devices in order to download its content.





A temperature probe can be plugged on the back of the system if needed in order to also read and store external temperature values.

A local display showing current readings as well as other settings – e.g. IP address, mode of operation – is present.

A configurable alarm output can be used to signal to an external device if a pre-set current threshold has been exceeded.

About Us

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-  Power Supply Systems
-  Precision Current Measurements
-  Beamline Electronic Instrumentation
-  FMC & MTCA.4 – MicroTCA for Physics

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An integrated function allows to compensate for measurement setup offset currents.

The unit integrates a low-noise mixed AC/DC power supply to connect the

CT-BOX directly to the AC mains.

The extremely compact design (1U–9”) allows using the instrument as benchmark or to install the systems in a 1U-19” rack.

Technical Specifications

| | CT-BOX |
|-----------------------------------|---|
| AC Line Input | 90-260 V(AC), 46-440 Hz |
| Maximum Power Consumption | 25W |
| Current Accuracy | < 0.01 % (standard) < 0.005 % (High-Accuracy option) |
| Current Resolution | 24-bit |
| Sampling Frequency | 0.1 Hz – 100 kHz |
| Thermal Coefficient (typ.) | < 1 ppm/K |
| Current Ranges Available [A] | 100, 150, 200, 300, 400, 600, 1000 |
| Current Readings | 7 ½ digits |
| Linearity | < 25 ppm/FS |
| Long Term Stability | < 10 ppm/FS |
| Noise | < 1 ppm (up to 10 Hz readout) < 5 ppm (up to 10 kHz readout) |
| Offset | < 1 ppm/FS (with Zero Offset function) |
| Number of Memory Readings | depending on microSD card capacity |
| LED Indicators | Power OK, DCCT connected, Status, SD reading/writing, Acquisition running |
| Temperature Probe Resolution | 0.1 °C |
| Temperature Probe Accuracy | ± 0.5 °C |
| Temperature Accuracy | 0.05% |
| Digital Interfaces | Ethernet 10/100 Mbps TCP-IP USB 2.0 RS-232 |
| Analog Monitor | ±10 V (LEMO connector) |
| Trigger Inputs | Digital Interface (soft-trigger) TTL 5V – LVTTTL compatible |
| Alarm Output | TTL 5V Solid State Relay |
| Mechanical Dimensions (L x W x H) | 180 x 220 x 41 mm |
| Operating Temperature | 0 ... 40 °C |



CT-BOX
also for 1U – 19” installation

Ordering Options

| | | |
|---------------|-------------|--|
| WCTBOX100XAA | CT-BOX-100 | 100A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOX150XAA | CT-BOX-150 | 200A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOX200XAA | CT-BOX-200 | 200A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOX300XAA | CT-BOX-300 | 300A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOX400XAA | CT-BOX-400 | 400A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOX600XAA | CT-BOX-600 | 600A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOX1000XAA | CT-BOX-1000 | 1000A Current Transducer Digital Box with Local Display and Ethernet, USB, RS-232 Communication Interfaces |
| WCTBOXMBXAAA | CT-BOX-MB | CT-BOX mounting brackets for 1U – 19” cabinet installation |
| WCTBOX1YXAAA | CT-BOX-YC | CT-BOX In-House Yearly Calibration Service (< 0.01% accuracy) |
| WCTBOXSICLXA | CT-BOX-HAC | CT-BOX High-Accuracy Calibration Service (<0.005% accuracy) |



CT-13
CT-26
CT-52
Current or
Voltage
Output



CT-PCB Series

- Closed-loop current transformer technology allows accurate monitoring of DC and AC bipolar currents up to $\pm 52A$ with a small PCB-mount device.
- Galvanic isolation between primary and secondary conductor for simple current sensing at different potential.
- Standard current output and voltage output ("V"-version) available.

FEATURES

- Monitoring of DC and AC currents
- Excellent Linearity
- Closed-loop detection
- Galvanically isolated from primary
- Low Temperature Drift
- Current-output or Voltage-output versions
- Wide Bandwidth
- High Accuracy
- UL 94 V-0 flammability grade
- LED indicates correct operation
- PCB-mount versions

APPLICATIONS

- Power Supplies
- Sensing Element in Calibration Systems
- Biomedical Devices
- Test & Measurement Setups

The 0-FLUCS (0-FLUX Current Sensor) family is based on a closed loop technology that allows accurate and precise monitoring of DC and AC currents with high bandwidth. The metal casing guarantees higher noise immunity and reduces undesired noise pick-up from external sources.

The transducers CT-13, CT-26 and CT-52 are PCB-mount devices rated at maximum currents of 13A, 26A and 52A with primary to secondary ratio of 1:250, 1:500 and 1:1000 respectively.

Galvanic isolation between the primary and the secondary circuits allows to measure currents at a different potential and simplifies interfacing when using the 0-FLUCS as the feedback element of current regulated power supplies.

Output from the CT-PCB sensors can be chosen between two different versions: standard secondary current output or buffered voltage output (low temperature coefficient shunt resistor

and low-noise amplifier are embedded in the CT-13V, CT-26V and CT-52V).

Main characteristics of the 0-FLUCS current transformers are negligible temperature coefficient on the secondary output current, excellent linearity and extremely low noise.





DC current transformers represent the ideal replacement for systems where Hall-effect sensors are used as current sensing elements and better performances are needed.

The compact mechanical dimensions of this transducer series and its limited weight allow for easy mounting on printed circuit boards with a Through Hole (TH) topology. A plastic cover is placed on the bottom side of the device to allow for easier mounting on the PCB.

Main applications for these current transducers are precise and stable regulated power supplies and power inverters.

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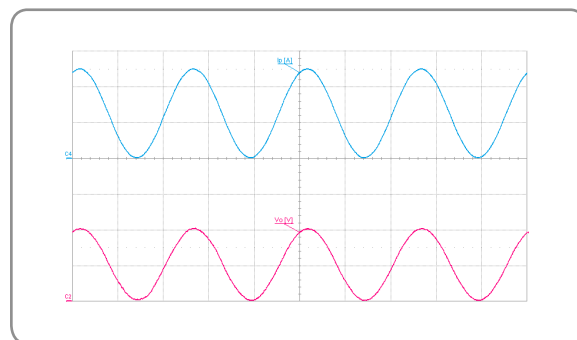
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Due to the excellent characteristics, the CT PCB transducers can be used in a variety of calibration, acceptance testing and quality control applications in industrial, power generation and automotive fields.

Commercially available versions of the CT-13, CT-26 and CT-52 with their respective “V” voltage-output versions CT-13V, CT-26V and CT-52V.

| Technical Specifications | CT-13 | CT-26 | CT-52 |
|--|---|---------|---------|
| Current Transform Ratio - N | 1:250 | 1:500 | 1:1000 |
| Maximum DC Primary Current - $I_{P(DC)}$ | ±13 A | ±26 A | ±52 A |
| Maximum RMS Primary Current - $I_{P(RMS)}$ | 9.2 A | 18.4 A | 36.8 A |
| Current Polarity | Bipolar | | |
| Maximum DC Secondary Current - $I_{S(DC)}$ | ±52 mA | | |
| Maximum RMS Secondary Current - $I_{S(RMS)}$ | 37 mA | | |
| Small Signal Bandwidth – typ. | 500 kHz | | |
| Small Signal Bandwidth – “V”-version – typ. | > 200 kHz | | |
| Noise (RMS) – typ. | < 1 ppm (@200 Hz) < 10 ppm (@50 kHz) | | |
| Output Voltage (“V”-version) - V_{OUT} | ±10 V | | |
| Output Voltage Ratio (“V” version) – $V_{OUT}/I_{P(DC)}$ | 0.8 V/A | 0.4 V/A | 0.2 V/A |
| Maximum Output Current – “V”-version | ±15 mA | | |
| External Shunt Resistor (current output only) – R_S | 0...40 Ω | | |
| Temperature Coefficient – TC (typ.) | < 0.5 ppm/K < 2 ppm/K (“V”-version) | | |
| Protection Signal | Yes – OK Status | | |
| Supply Voltage (± 6%) | ±15 V | | |
| Connections | 16-pin through-hole PCB mounting | | |
| Mechanical (Outer) Dimensions | 66 × 68 × 48 mm | | |
| Primary Conductor | Internal | | |
| Maximum Weight | 300 g | | |



CT-PCB Voltage Output – “V” Version 
DC + 20-kHz sine-wave primary current – i.e. I_p [A] – and output voltage of a CT-13V version – i.e. V_o [V]



0-FLUCS Closed-Loop Technology

The CT-PCB current transducer series is based on the CAEN ELS 0-FLUCS Closed-Loop Technology.

Ordering Options

| | | |
|-------------|--------|---|
| WCT13XAAAAA | CT-13 | 13A Primary Current O-FLUCS, PCB-Mounting |
| WCT26XAAAAA | CT-26 | 26A Primary Current O-FLUCS, PCB-Mounting |
| WCT52XAAAAA | CT-52 | 52A Primary Current O-FLUCS, PCB-Mounting, |
| WCT13VAAAAA | CT-13V | 13A Primary Current O-FLUCS, PCB-Mounting, Voltage-Output |
| WCT26VAAAAA | CT-26V | 26A Primary Current O-FLUCS, PCB-Mounting, Voltage-Output |
| WCT52VAAAAA | CT-52V | 52A Primary Current O-FLUCS, PCB-Mounting, Voltage-Output |



CT-100
CT-150

Current or
Voltage
Output



CT-100 / CT-150

- Closed-loop current transformer technology allows accurate monitoring of DC and AC bipolar currents up to $\pm 100A$ (CT-100) or up to $\pm 150A$ (CT-150).
- Galvanic isolation between primary and secondary conductor for simple current sensing at different potential.
- Standard current output and voltage output ("V"-version) available.

FEATURES

- Monitoring of DC and AC currents
- Excellent Linearity
- Closed-loop detection
- Galvanically isolated from primary
- Low Temperature Drift
- Current-output or Voltage-output versions
- Wide Bandwidth
- High Accuracy
- UL 94 V-0 flammability grade
- LED indicates correct operation
- DB-9 Connector or PCB-mount versions

APPLICATIONS

- Power Supplies
- Sensing Element in Calibration Systems
- Biomedical Devices
- Nuclear Magnetic Resonance (NMR)
- Test & Measurement Setups

The 0-FLUCS (0-FLUX Current Sensor) family is based on a closed loop technology that allows accurate and precise monitoring of DC and AC currents with high bandwidth.

The CT-100/CT-150 transducers are rated at a maximum bipolar primary current of 100A/150A with a transformation ratio of 1:1000/1:1500.

Galvanic isolation between the primary and the secondary circuits allows to measure currents at a different potential and simplifies interfacing when using the 0-FLUCS as the feedback element of current regulated power supplies.

Output from the 0-FLUCS transducers can be chosen between two different versions: secondary current output or buffered voltage output (low temperature coefficient shunt resistor and low-noise amplifier are embedded in the device).

Also connection type can be chosen

between the "C" option – a male DB-9 Connector – and the "P" option – 7-pin through-hole for PCB mounting.

Main characteristics of the 0-FLUCS current transformers are negligible temperature coefficient on the secondary output current, excellent linearity and extremely low noise.





DC current transformers represents the ideal replacement for systems where Hall-effect sensors are used as current sensing elements and better performances are needed.

All CT-100/CT-150 devices also have different mounting holes in order to be easily installed in different configurations. Both self-threading screws and normal Ones can be used.

Main application fields for these current transducers are precise and extremely stable regulated power supplies and power inverters.

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Due to the excellent characteristics, the 0-FLUCS transducers can be used in a variety of calibration, acceptance testing and quality control applications in industrial, power generation and automotive fields.

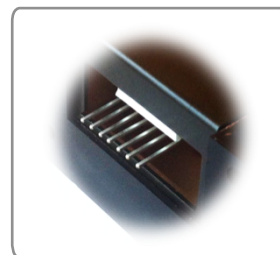
Commercially available versions of the CT-100/CT-150 current sensors are DB-9 connector “C” and 7-pin strip type “P” with their respective voltage-output versions “V”.


| Technical Specifications | CT-100 | CT-150 |
|--|--|--|
| Current Transform Ratio – N | 1:1000 | 1:1500 |
| Maximum DC Primary Current - $I_{P(DC)}$ | ±100 A | ±150 A |
| Maximum RMS Primary Current - $I_{P(RMS)}$ | 71 A | 106 A |
| Current Polarity | Bipolar | |
| Maximum DC Secondary Current - $I_{S(DC)}$ | ±100 mA | |
| Maximum RMS Secondary Current - $I_{S(RMS)}$ | 71 mA | |
| Small Signal Bandwidth (±3 dB) - BW | > 500 kHz > 200 kHz (“V”-version) | |
| Noise (RMS) – typ. | < 0.5 ppm (@200 Hz) < 5 ppm (@50 kHz) | < 1.5 ppm (@200 Hz) < 8 ppm (@50 kHz) |
| External Shunt Resistor (current output only) - R_S | 0...40 Ω | |
| Output Voltage (“V”-version) - V_{OUT} | ±10 V | |
| Output Voltage Ratio (“V” version) – $V_{OUT}/I_{P(DC)}$ | 0.1 V/A | (1/15) V/A |
| Maximum Output Current – “V”-version | ±15 mA | |
| Temperature Coefficient – TC (typ.) | < 0.5 ppm/K < 2 ppm/K (“V”-version) | |
| Linearity | < 3 ppm < 15 ppm (“V”-version) | |
| Induction into Primary (typ.) | 35 μV (RMS) | |
| Protection Signal | Yes - Primary Over-Current | |
| Supply Voltage (± 6%) | ±15 V | |
| Connections | DB-9 Connector (“C”) or 7-pin type (“P”) | |
| Mechanical (Outer) Dimensions | 45 × 57 × 75 mm | |
| Primary Conductor Hole Diameter – \varnothing | 16 mm | |
| Operating Temperature Range | 0...+50 °C | |
| Maximum Weight | 250 g | |



0-FLUCS Closed-Loop Technology

The CT-100 and CT-150 current transducer series is based on the CAEN ELS 0-FLUCS Closed-Loop Technology.




CT-100/CT-150
7-pin strip connector for PCB

PS1215I – PS1215V
Low-Noise Power Supplies
for current transducers



Ordering Options

| | | |
|--------------|-----------|--|
| WCT100CXAAA | CT-100-C | 100 A Primary Current 0-FLUCS , DB-9 connector |
| WCT100PXAAA | CT-100-P | 100 A Primary Current 0-FLUCS , 7-pin type connections |
| WCT100VCXAAA | CT-100V-C | 100 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |
| WCT100VPXAAA | CT-100V-P | 100 A Primary Current 0-FLUCS , 7-pin type connections, Voltage-Output |
| WCT150CXAAA | CT-150-C | 150 A Primary Current 0-FLUCS , DB-9 connector |
| WCT150PXAAA | CT-150-P | 150 A Primary Current 0-FLUCS , 7-pin type connections |
| WCT150VCXAAA | CT-150V-C | 150 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |
| WCT150VPXAAA | CT-150V-P | 150 A Primary Current 0-FLUCS , 7-pin type connections, Voltage-Output |

FLUCS - Selection Table



The following table summarizes data and characteristics of the FLUCS current transducer standard models:

| Model | Maximum DC Primary Current | Current Transformer Ratio - N | Bandwidth (3 dB) - BW | Equivalent Input Noise | Temperature Coefficient - TC | Output Type | | Max DC secondary current / Max voltage output | Max external Shunt Resistor | Supply Voltage | Mounting | | Primary Conductor Hole Diameter | Mechanical Dimensions | Temperature Range | | | | |
|----------|----------------------------|-------------------------------|-----------------------|------------------------|------------------------------|-------------|---------|---|-----------------------------|----------------|----------|------------------|---------------------------------|-----------------------|-------------------|----------|-----------------|----------|-----------------|
| | | | | | | Current | Voltage | | | | PCB | Panel | | | | | | | |
| CT-13 | ±13 A | 1:250 | >500 kHz | <1 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±52 mA | 40 Ω | ±15 V | ✓ | ✗ | Internal | 66 x 64 x 48 mm | 0°C - 50°C | | | | |
| CT-13V | | | >200 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10.4 V | n/a | | ✓ | ✗ | | | | | | | |
| CT-26 | ±26 A | 1:500 | >500 kHz | <1 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±52 mA | 40 Ω | | ✓ | ✗ | | | | Internal | 66 x 64 x 48 mm | | |
| CT-26V | | | >200 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10.4 V | n/a | | ✓ | ✗ | | | | | | | |
| CT-52 | ±52 A | 1:1000 | >500 kHz | <1 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±52 mA | 40 Ω | | ✓ | ✗ | | | | | | Internal | 66 x 64 x 48 mm |
| CT-52V | | | >200 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10.4 V | n/a | | ✓ | ✗ | | | | | | | |
| CT-100 | ±100 A | 1:1000 | >500 kHz | <1 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±100 mA | 40 Ω | | ✓ | ✓ | 16 mm | 45 x 57 x 75 mm | | | | | |
| CT-100V | | | >200 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | | ✓ | ✓ | | | | | | | |
| CT-150 | ±150 A | 1:1500 | >300 kHz | <1 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±100 mA | 40 Ω | | ✓ | ✓ | | | | 16 mm | 45 x 57 x 75 mm | | |
| CT-150V | | | >200 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | | ✓ | ✓ | | | | | | | |
| CT-200 | ±200 A | 1:1000 | >100 kHz | <1.5 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±200 mA | 40 Ω | | ✗ | ✓ | | | | | | 30.7 mm | 94 x 91 x 50 mm |
| CT-200V | | | >100 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | | ✗ | ✓ | | | | | | | |
| CT-300 | ±300 A | 1:1500 | >100 kHz | <1.5 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±200 mA | 30 Ω | | ✗ | ✓ | 30.7 mm | 94 x 91 x 50 mm | | | | | |
| CT-300V | | | >100 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | | ✗ | ✓ | | | | | | | |
| CT-400 | ±400 A | 1:2000 | >100 kHz | <1.5 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±200 mA | 20 Ω | | ✗ | ✓ | | | | 30.7 mm | 94 x 91 x 50 mm | | |
| CT-400V | | | >100 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | | ✗ | ✓ | | | | | | | |
| CT-600 | ±600 A | 1:1500 | >150 kHz | <1.5 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±400 mA | 5 Ω | ✗ | ✓ | 107 x 91 x 50 mm | | | 107 x 91 x 50 mm | | | | |
| CT-600V | | | >150 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | ✗ | ✓ | | | | | | | | |
| CT-1000 | ±1000 A | 1:2000 | >150 kHz | <1.5 ppm @ BW = 200 Hz | < 0.5 ppm/K | ✓ | ✗ | ±500 mA | 2 Ω | ✗ | ✓ | | 107 x 91 x 50 mm | 107 x 91 x 50 mm | | | | | |
| CT-1000V | | | >150 kHz | <10 ppm @ BW = 50 kHz | typ. < 2 ppm/K | ✗ | ✓ | ±10V | n/a | ✗ | ✓ | | | | | | | | |



CT-200
CT-300
CT-400

Current or
Voltage
Output



CT-200 / CT-300 / CT-400

- Closed-loop current transformer technology allows accurate monitoring of DC and AC bipolar currents up to $\pm 200A$ (CT-200), $\pm 300A$ (CT-300) or $\pm 400A$ (CT-400).
- Galvanic isolation between primary and secondary conductor for simple current sensing at different potential.
- Standard current output and voltage output ("V"-version) available.

FEATURES

- Monitoring of DC and AC currents
- Excellent Linearity
- Closed-loop detection
- Galvanically isolated from primary
- Low Temperature Drift
- Current-output or Voltage-output versions
- Wide Bandwidth
- High Accuracy
- UL 94 V-0 flammability grade
- LED indicates correct operation
- DB-9 Connector for rack/panel mounting

APPLICATIONS

- Power Supplies
- Sensing Element in Calibration Systems
- Biomedical Devices
- Nuclear Magnetic Resonance (NMR)
- Test & Measurement Setups

The 0-FLUCS (0-FLUX Current Sensor) family is based on a closed loop technology that allows accurate and precise monitoring of DC and AC currents with high bandwidth.

The CT-200/CT-300/CT-400 transducers are rated at a maximum bipolar primary current of 200A/300A/400A with a transform ratio of respectively 1:1000, 1:1500 and 1:2000.

Galvanic isolation between the primary and the secondary circuits allows to measure currents at a different potential and simplifies interfacing when using the 0-FLUCS as the feedback element of current regulated power supplies.

Output from the 0-FLUCS transducers can be chosen between two different versions: secondary current output or buffered voltage output (low TC shunt resistor and low-noise amplifier are embedded in the device).

A standard DB-9 connector is used for

the transducer connections.

Main characteristics of the 0-FLUCS current transformers are negligible temperature coefficient on the secondary output current, excellent linearity and extremely low noise.

DC current transformers represents the ideal replacement for systems where Hall-effect sensors are used as current sensing elements and better performances are needed.





All CT-200/CT-300/CT-400 devices also have different mounting holes in order to be easily installed in different configurations. Both self-threading screws and normal ones can be used.

Main application fields for these current transducers are precise and extremely stable regulated power supplies and power inverters.

Due to the excellent characteristics, the 0-FLUCS transducers can be used in a variety of calibration, acceptance

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testing and quality control applications in industrial, power generation and automotive fields.

Commercially available versions of the CT-200/CT-300/CT-400 current

transformers are the standard current-output and the voltage-output “V” version.

Different output voltage ratings – e.g. ± 2.5 V or ± 5 V – are available upon request for a minimum quantity

| Technical Specifications | CT-200 | CT-300 | CT-400 |
|--|--|--|--|
| Current Transform Ratio - N | 1:1000 | 1:1500 | 1:2000 |
| Maximum DC Primary Current - $I_{P(DC)}$ | ± 200 A | ± 300 A | ± 400 A |
| Maximum RMS Primary Current - $I_{P(RMS)}$ | 141 A | 212 A | 283 A |
| Current Polarity | Bipolar | | |
| Maximum DC Secondary Current - $I_{S(DC)}$ | ± 200 mA | | |
| Maximum RMS Secondary Current - $I_{S(RMS)}$ | 141 mA | | |
| External Shunt Resistor Value - R_S | 0...40 Ω | 0...30 Ω | 0...20 Ω |
| Small Signal Bandwidth – typ. BW | > 200 kHz | > 200 kHz | > 200 kHz |
| Small Signal Bandwidth – “V” version – typ. BW | 100 kHz | 150 kHz | 150 kHz |
| Noise (RMS) – typ. | < 1.5 ppm (@200 Hz) < 6 ppm (@50 kHz) | < 1.8 ppm (@200 Hz) < 7 ppm (@50 kHz) | < 2 ppm (@200 Hz) < 8 ppm (@50 kHz) |
| Output Voltage (“V”-version) - V_{OUT} | ± 10 V | | |
| Output Voltage Ratio (“V” version) - $V_{OUT}/I_{P(DC)}$ | 0.05 V/A | (1/30) V/A | 0.025 V/A |
| Maximum Output Current – “V”-version | ± 15 mA | | |
| Temperature Coefficient – TC (typ.) | < 0.5 ppm/K < 2 ppm/K (“V”-version) | | |
| Linearity | < 3 ppm < 15 ppm (“V”-version) | | |
| Induction into Primary (typ.) | 5 μ V (RMS) | | |
| Offset (with factory trimming) | < 10 ppm/FS | | |
| Protection Signal | Yes - Primary Over-Current | | |
| Supply Voltage ($\pm 6\%$) | ± 15 V | | |
| Maximum Current Consumption | 50 mA + I_S | | |
| Connections | DB-9 Connector | | |
| Mechanical (Outer) Dimensions | 94 × 91 × 50 mm | | |
| Primary Conductor Hole Diameter - ϕ | 30 mm | | |
| Maximum Weight | 380 g | | |



0-FLUCS Closed-Loop Technology

The CT-200, CT-300 and CT-400 models are based on the CAEN ELS 0-FLUCS Closed-Loop Technology.



Status LED and signal

PS1215I – PS1215V
Low-Noise Power Supplies
for current transducers



Ordering Options

| | | |
|--------------|---------|--|
| WCT200XAAAA | CT-200 | 200 A Primary Current 0-FLUCS , DB-9 connector |
| WCT200VXAAAA | CT-200V | 200 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |
| WCT300XAAAA | CT-300 | 300 A Primary Current 0-FLUCS , DB-9 connector |
| WCT300VXAAAA | CT-300V | 300 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |
| WCT400XAAAA | CT-400 | 400 A Primary Current 0-FLUCS , DB-9 connector |
| WCT400VXAAAA | CT-400V | 400 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |



CT-600
CT-1000

Current or
Voltage
Output



CT-600 / CT-1000

- Closed-loop current transformer technology allows accurate monitoring of DC and AC bipolar currents up to $\pm 600\text{A}$ (CT-600) and to $\pm 1000\text{A}$ (CT-1000).
- Galvanic isolation between primary and secondary conductor for simple current sensing at different potential.
- Standard current output and voltage output ("V"-version) available.

FEATURES

- Monitoring of DC and AC currents
- Excellent Linearity
- Closed-loop detection
- Galvanically isolated from primary
- Low Temperature Drift
- Current-output or Voltage-output versions
- Wide Bandwidth
- High Accuracy
- UL 94 V-0 flammability grade
- LED indicates correct operation
- DB-9 Connector for rack/panel mounting

APPLICATIONS

- Power Supplies
- Sensing Element in Calibration Systems
- Biomedical Devices
- Nuclear Magnetic Resonance (NMR)
- Test & Measurement Setups

The 0-FLUCS (O-FLUX Current Sensor) family is based on a closed loop technology that allows accurate and precise monitoring of DC and AC currents with high bandwidth.

The CT-600 and CT-1000 transducers are rated at a maximum bipolar primary current of 600A and 1000A with a transform ratio of 1:1500 and 1:2000.

Galvanic isolation between the primary and the secondary circuits allows to measure currents at a different potential and simplifies interfacing when using the 0-FLUCS as the feedback element of current regulated power supplies.

Output from the transducers can be chosen between two different versions: secondary current output or buffered voltage output (low TC shunt resistor and low-noise amplifier are embedded in the device).

A standard DB-9 connector is used for the transducer connections.

Main characteristics of the 0-FLUCS current transformers are negligible temperature coefficient on the secondary output current, excellent linearity and extremely low noise.

DC current transformers represents the ideal replacement for systems where Hall-effect sensors are used as current sensing elements and better performances are needed.





All CT-600 and CT-1000 devices also have different mounting holes in order to be easily installed in different configurations. Both self-threading screws and normal ones can be used.

Main application fields for these current transducers are precise and extremely stable regulated power supplies and power inverters.

Due to the excellent characteristics, the CT-600 and CT-1000 transducers can be used in a variety of calibration,

About Us

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-  Power Supply Systems
-  Precision Current Measurements
-  Beamline Electronic Instrumentation
-  FMC & MTCA.4 – MicroTCA for Physics

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acceptance testing and quality control applications in industrial, power generation and automotive fields.

Commercially available versions of the CT-600 and CT-1000 current sensors are

the standard current-output CT-600 and CT-1000 and the voltage-output version CT-600V and CT-1000V. Different output voltage ratings – e.g. ± 2.5 V or ± 5 V – are available upon request for a minimum quantity.

| Technical Specifications | CT-600 | CT-1000 |
|--|--|---|
| Current Transform Ratio - N | 1:1500 | 1:2000 |
| Maximum DC Primary Current - $I_{P(DC)}$ | ± 600 A | ± 1000 A |
| Maximum RMS Primary Current - $I_{P(RMS)}$ | 424 A | 707 A |
| Current Polarity | Bipolar | |
| Maximum DC Secondary Current - $I_{S(DC)}$ | ± 400 mA | ± 500 mA |
| Maximum RMS Secondary Current - $I_{S(RMS)}$ | 283 mA | 354 mA |
| External Shunt Resistor Value - R_S | 0...5 Ω | 0...2 Ω |
| Small Signal Bandwidth (-1 dB) - typ. BW | > 150 kHz | |
| Noise (RMS) - typ. | < 1.5 ppm (@200 Hz) < 7 ppm (@50 kHz) | < 1.5 ppm (@200 Hz) < 10 ppm (@50 kHz) |
| Output Voltage ("V"-version) - V_{OUT} | ± 10 V | |
| Output Voltage Ratio ("V" version) - $V_{OUT}/I_{P(DC)}$ | (1/60) V/A | 0.01 V/A |
| Maximum Output Current - "V"-version | ± 15 mA | |
| Temperature Coefficient - TC (typ.) | < 0.5 ppm/K < 2 ppm/K ("V"-version) | |
| Induction into Primary (typ.) | 5 μ V (RMS) | 10 μ V (RMS) |
| Linearity | < 3 ppm < 15 ppm ("V"-version) | |
| Offset (with factory trimming) | < 10 ppm/FS | |
| Protection Signal | Yes - Primary Over-Current | |
| Supply Voltage ($\pm 6\%$) | ± 15 V | |
| Maximum Current Consumption | 50 mA + I_S | |
| Connections | DB-9 Connector | |
| Mechanical (Outer) Dimensions | 107 x 91 x 50 mm | |
| Primary Conductor Hole Diameter - \emptyset | 30 mm | |
| Maximum Weight | 450 g | 600 g |



0-FLUCS Closed-Loop Technology

The CT-200, CT-300 and CT-400 models are based on the CAEN ELS 0-FLUCS Closed-Loop Technology.



 Status LED and signal

PS1215I – PS1215V
Low-Noise Power Supplies
for current transducers



Ordering Options

| | | |
|--------------|----------|---|
| WCT600XAAAA | CT-600 | 600 A Primary Current 0-FLUCS , DB-9 connector |
| WCT600VAAAA | CT-600V | 600 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |
| WCT1000XAAAA | CT-1000 | 1000 A Primary Current 0-FLUCS , DB-9 connector |
| WCT1000VAAAA | CT-1000V | 1000 A Primary Current 0-FLUCS , DB-9 connector, Voltage-Output |




PS1215I PS1215V

Low-Noise
Power Supply for
Current Transducers




PS1215

- Low Noise Mixed Bipolar AC/DC Power Supply for optimal operation of the  Current Transducers.
- Extended Input Range for Voltage and Frequency.
- “I” and “V” versions include cables for Current and Voltage Output Transducers respectively.

FEATURES


- Mixed Switching/Linear Topology
- 27W Bipolar Output - ± 15 V
- Low Noise
- Extended AC Input Range
- Current-output or Voltage-output versions with cables
- LEDs indicate correct operation
- Three-pole screw locking connector

APPLICATIONS

- Power Supply for  Transducers
- Bipolar Supply for Precise Instrumentation
- Test & Measurement Setups

The PS1215 is a single-output, dual-voltage mixed switching-linear power supply that is designed in order to obtain low-noise operation and high efficiency and it is especially suited for optimal performances of current measurement systems where switching power supplies could corrupt the measure with noise, less accuracy and less precision.

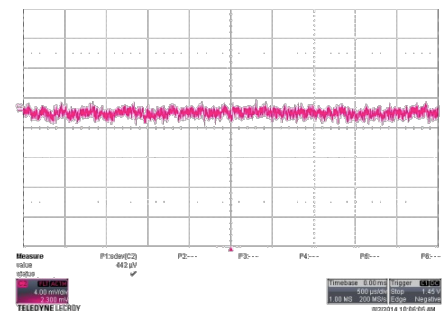
The power supply is housed in a robust and compact stainless steel box that can be placed close to the supplied device in order to reduce cable lengths and minimize consequent possible noise pick-up.

These power supplies are particularly designed for operation with CAEN ELS DC Current Transducers (DCCT) of the  series.

The PS1215 power supply has an output voltage accuracy of $\pm 3\%$ on both its positive and negative outputs.

Maximum peak-to-peak voltage noise

measured at the device output terminals is rated at 4 mV (measured at full load).







Output DC voltages are made available through a 3-pole connector with a screw locking that allows securing the connection.

The PS1215 power supply can be ordered in three different versions, differing by the output cabling.

The PS1215I version also includes the DB-9 connector and two “banana”-type plugs for the current output of standard transducers, the PS1215V version includes the same cabling with BNC coaxial connector for voltage-output ones.

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Technical Specifications

PS1215

| | |
|---------------------------------------|---|
| Output Positive Voltage ($\pm 3\%$) | +15 V |
| Output Negative Voltage ($\pm 3\%$) | -15 V |
| Maximum Output Power | 27 W |
| Maximum Output Current | +15V @ 900 mA -15V @ 900 mA |
| Output Ripple + Noise | 0.003 % _{RMS} @ DC-1MHz 0.025 % _{PEAK-PEAK} @ DC-1 MHz |
| AC Line Voltage Input | 90 – 260 V _{AC} |
| AC Line Frequency | 47 - 63 Hz |
| Input to Output Isolation | 3 kV |
| Output to Earth-Case Isolation | 500 V |
| Hold-up time | 16 ms (typ.) at 115 V _{AC} |
| Cooling | Natural convection |
| Dimensions | 136.4 × 41 × 90.7 mm |
| Weight | 600 g |
| Y-Cable length (CT-I and CT-V) | 3m |
| Indicators | 2 LEDs |
| Protections | Output short-circuit Output over-voltage |
| Operating Temperature Range | 0°C – 50°C |

PS1215V

AC-DC Power Supply and cables for
 Voltage-Output Current Transducers



0-FLUCS Closed-Loop Technology

The PS1215 models are designed for optimal operation for the CAEN ELS 0-FLUCS current transducers.



PS1215I

AC-DC Power Supply and cables for
 Current-Output Current Transducers

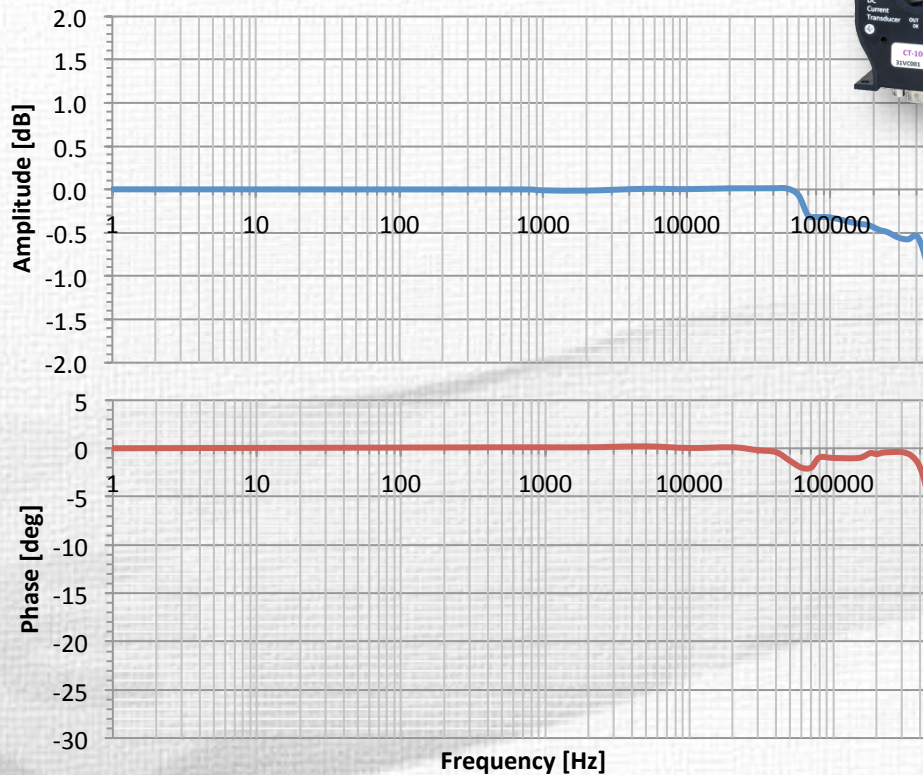
Ordering Options

| | | |
|--------------|---------|--|
| WPS1215XAAAA | PS1215 | PS1215 - AC/DC Single Output - Dual Voltage ± 15 V Low Noise Power Supply - 27W max - 3m cable |
| WPS1215IXAAA | PS1215I | PS1215 - AC/DC Single Output - Dual Voltage ± 15 V Low Noise Power Supply - 27W max + Y-Cable CT-I: 3m cable with DB-9 and "banana" plugs (current output) |
| WPS1215VXAAA | PS1215V | PS1215 - AC/DC Single Output - Dual Voltage ± 15 V Low Noise Power Supply - 27W max + Y-Cable CT-V: 3m cable with DB-9 and BNC (voltage output) |



AC Performance

CT-150 Amplitude and Phase Response



Amplitude Response

| Frequency | Amplitude |
|-----------------|-----------|
| DC ... 50 kHz | < 0.02 dB |
| 50 ... 200 kHz | < 0.5 dB |
| 200 ... 400 kHz | < 1 dB |

Phase Response

| Frequency | Phase Shift |
|-----------------|-------------|
| DC ... 2 kHz | < 0.1° |
| 2 Hz ... 40 kHz | < 0.5° |
| 40 ... 400 kHz | < 2° |



Maximum Current Ratings

Absolute Ratings

Absolute Maximum Ratings for Single-Pulse Primary Current Overload

| Model | Continuous* | for 10 s | for 1 s | For 0.1 s |
|----------|-------------|----------|----------|-----------|
| CT-13 | ± 14 A | ± 16 A | ± 26 A | ± 78 A |
| CT-13V | ± 13.5 A | ± 16 A | ± 26 A | ± 65 A |
| CT-26 | ± 28 A | ± 32 A | ± 52 A | ± 156 A |
| CT-26V | ± 27 A | ± 32 A | ± 52 A | ± 130 A |
| CT-52 | ± 52 A | ± 62 A | ± 104 A | ± 208 A |
| CT-52V | ± 52 A | ± 62 A | ± 104 A | ± 208 A |
| CT-100 | ± 105 A | ± 125 A | ± 200 A | ± 600 A |
| CT-100V | ± 105 A | ± 125 A | ± 200 A | ± 500 A |
| CT-150 | ± 157 A | ± 180 A | ± 300 A | ± 900 A |
| CT-150V | ± 155 A | ± 180 A | ± 300 A | ± 750 A |
| CT-200 | ± 210 A | ± 250 A | ± 400 A | ± 1200 A |
| CT-200V | ± 205 A | ± 250 A | ± 400 A | ± 1000 A |
| CT-300 | ± 315 A | ± 360 A | ± 600 A | ± 1800 A |
| CT-300V | ± 310 A | ± 360 A | ± 600 A | ± 1500 A |
| CT-400 | ± 420 A | ± 480 A | ± 800 A | ± 2400 A |
| CT-400V | ± 410 A | ± 480 A | ± 800 A | ± 2000 A |
| CT-600 | ± 630 A | ± 720 A | ± 1200 A | ± 3600 A |
| CT-600V | ± 620 A | ± 720 A | ± 1200 A | ± 3000 A |
| CT-1000 | ± 1020 A | ± 1200 A | ± 2000 A | ± 5000 A |
| CT-1000V | ± 1010 A | ± 1200 A | ± 2000 A | ± 5000 A |

* Specifications over the rated currents are not guaranteed

Precision Current Measurements



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