



## GEN series CTS200ID

200 A RMS / 300 A DC Current  
Transducer

### Special features

- 200 A RMS nominal current
- 300 A DC nominal current
- 500 kHz bandwidth (-3 dB)
- 27.6 mm aperture for cables and bus bars
- -40 °C to +85 °C operating range
- Best in class for accuracy and stability
- Isolated AC and DC current measurements
- 2 ppm maximum linearity error
- Industry standard D-SUB 9 connector
- Full aluminum body for superior EMI shielding
- Advanced sensor protection circuits

### GEN series CTS200ID applications

The HBM series of current transducers feature industry standard, fluxgate, closed-loop technology. The second harmonic zero flux detection ensures the highest accuracy and lowest drift while maintaining a high bandwidth. HBM current transducers are perfect for measuring currents between 10 and 1000 A RMS. With the high bandwidth support, they can be used with fast rise time signals, such as those found in electric drives or other inverter applications, such as those in renewable industries.

The CT series is available for 50 A RMS to 1200 A RMS, all sharing the same high-end technology. All connectors are compatible for fast exchange.

The optional 1 HE 19" rack mountable power supply can power any mix of up to six CTs. Current output cables to connect directly to the GN31XB power card, as well as to the GN61XB card, are available.

Optional burden resistors are available for the GEN series Data Acquisition Systems or power analyzers without an integrated burden resistor.

The advanced sensor protection circuit ASPC prevents sensor damage for incorrect use cases, such as currents applied to unpowered CTs or powered CTs without a burden resistor to close the current output loop.

| <b>Specification Highlights</b> |                |                    |                                   |
|---------------------------------|----------------|--------------------|-----------------------------------|
|                                 | <b>Symbol</b>  | <b>Value</b>       | <b>Comment</b>                    |
| Nominal primary AC current      | $I_{PN}$ AC    | 200 A RMS          |                                   |
| Nominal primary DC current      | $I_{PN}$ DC    | $\pm 300$ A        |                                   |
| Nominal secondary current       | $I_{SN}$       | $\pm 600$ mA       | At nominal primary DC current     |
| Primary / secondary ratio       | n1 : n2        | 1:500              |                                   |
| Measurement range               | $\hat{I}_{PM}$ | $\pm 370$ A        |                                   |
| Measurement resistance          | $R_M$          | 3 $\Omega$ maximum | See Figure 1.1 for details        |
| Bandwidth                       | f(-3dB)        | 500 kHz            | Small signal, refer to Figure 1.3 |

| <b>Electrical Specifications</b>                                   |                 |  |   |
|--|-----------------|--|---|
| At Ta = 23 °C, supply voltage = $\pm 15$ V unless otherwise stated |                 |  |   |
| <b>Parameter</b>   | <b>Symbol</b>   | <b>Value</b>   | <b>Comment</b>  |
| Overload capacity  | $\hat{I}_{OL}$  | $\pm 1500$ A for 100 ms                                    | Non-measured, 100 ms  |
| Linearity error  | $\epsilon_L$    | $\pm 2$ ppm  | Refers to nominal DC current                                      |
| Offset current (including earth field)                             | $I_{OE}$        | $\pm 20$ ppm   | Refers to nominal DC current                                      |
| DC -10 Hz overall accuracy @ 25 °C<br>(= $\epsilon_L + I_{OE}$ )   | acc $\epsilon$  | $\pm 22$ ppm   | Refers to nominal DC current                                      |
| Offset temperature coefficient                                     | TC $I_{OE}$     | $\pm 0.1$ ppm/K  | Refers to nominal DC current                                      |
| Amplitude error  | $\epsilon_G$    | 10 Hz - 5 kHz  | $\pm 0.01\%$  |
|  |                 | 5 kHz - 100 kHz  | $\pm 1.00\%$  |
|  |                 | 100 kHz - 1 MHz  | $\pm 20.00\%$   |
| Phase shift  | $\theta$        | 10 Hz - 5 kHz  | $\pm 0.1^\circ$   |
|  |                 | 5 kHz -100 kHz   | $\pm 0.5^\circ$   |
|  |                 | 100 kHz - 1 MHz  | $\pm 5.0^\circ$   |
| Response time to a step current IPN                                | tr @ 90%        | 1  | di/dt = 100A/ $\mu$ s   |
| Noise  | noise           | 0 - 100 Hz   | 0.02 ppm RMS  |
|  |                 | 0 - 1 kHz  | 0.04 ppm RMS  |
|  |                 | 0 - 10 kHz   | 0.40 ppm RMS  |
|  |                 | 0 - 100 kHz  | 1.50 ppm RMS  |
| Fluxgate excitation frequency                                      | $f_{Exc}$       | 32.5 kHz   |   |
| Induced RMS voltage on primary conductor                           |                 | 5 $\mu$ V RMS  |   |
| <b>Stability</b>   |                 |  |   |
| Offset stability over time   |                 | $\pm 0.2$ ppm/month  | Refers to nominal DC current                                      |
| Offset change with vertical external magnetic field                |                 | $\pm 2.4$ $\mu$ A /mT<br>( $\pm 0.6$ $\mu$ A /mT typical)  | (Perpendicular to bus bar)<br>$\mu$ A refers to secondary current |
| Offset change with horizontal external magnetic field              |                 | $\pm 6$ $\mu$ A /mT<br>( $\pm 2.4$ $\mu$ A /mT typical)    | (Perpendicular to bus bar)<br>$\mu$ A refers to secondary current |
| Offset change with power supply voltage changes                    |                 | $\pm 0.12$ $\mu$ A /V<br>( $\pm 0.012$ $\mu$ A /V typical) | $\mu$ A refers to secondary current                               |
| Offset change with absolute power supply voltages tracking         |                 | $\pm 0.12$ $\mu$ A /V<br>( $\pm 0.036$ $\mu$ A /V typical) | $\mu$ A refers to secondary current                               |
| <b>Power supply</b>  |                 |  |   |
| Power supply voltages  | Uc              | 15 V $\pm 0.75$ V DC                                       |   |
| Positive current consumption                                       | Ips             | 104 mA + Is  | Add Is (if Is is positive)  |
| Negative current consumption                                       | I <sub>ns</sub> | 96 mA + Is   | Add Is (if Is is negative)  |

### Burden Resistor RM and Ambient Temperature Derating

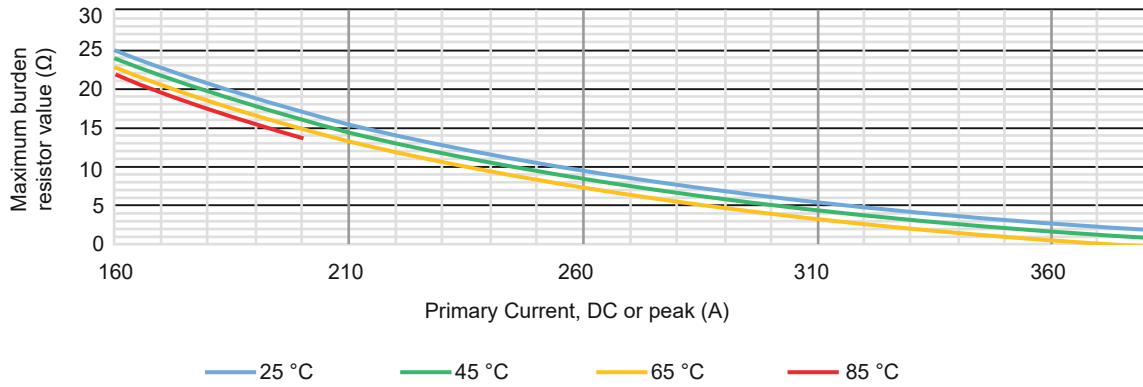


Figure 1.1: Burden resistor RM and ambient temperature derating

### Frequency and Ambient Temperature Derating

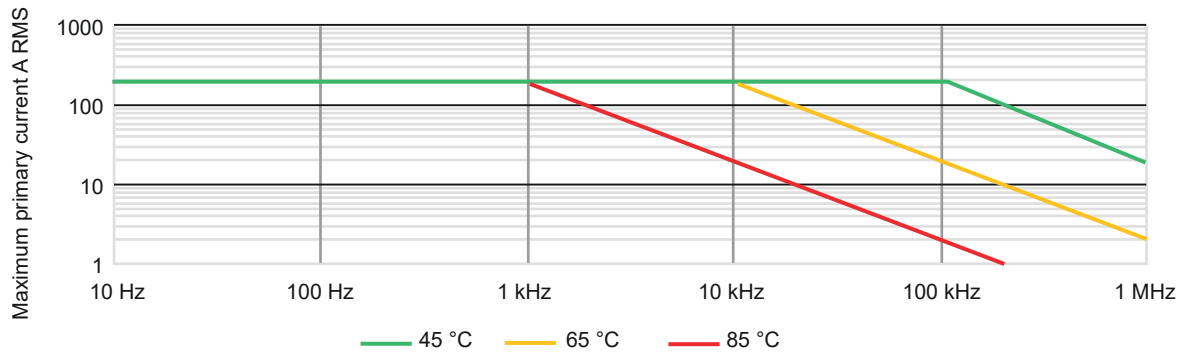


Figure 1.2: Frequency and ambient temperature derating

### Amplitude and Phase Frequency Characteristics

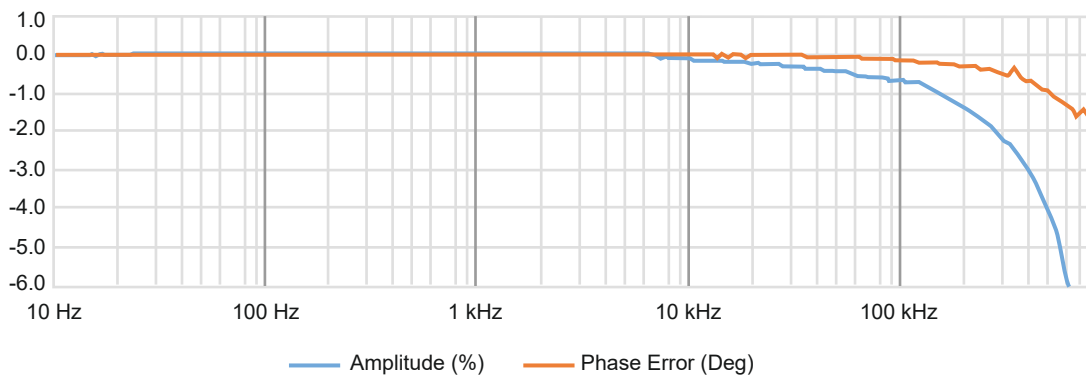


Figure 1.3: Frequency characteristics


| <b>Isolation Specifications</b>                    |                               |                             |
|--|-------------------------------|-----------------------------|
| Clearance  | 9 mm                          |                             |
| Creepage distance                                  | 10 mm                         |                             |
| Comparative tracking index (CTI)                   | > 600 V                       |                             |
| RMS voltage for AC isolation test, 50/60 Hz, 1 min |                               |                             |
| Between primary and (secondary and shield)         | 5.7 kV                        |                             |
| Between secondary and shield                       | 0.2 kV                        |                             |
| Impulse withstand voltage (1.2/50 $\mu$ s)         | 10.4 kV                       |                             |
| <b>Continuous working voltage</b>                  | <b>Using uninsulated wire</b> | <b>Using insulated wire</b> |
| Non mains signals                                  | 1000 V                        | 2000 V                      |
| CAT II signals                                     | 600 V RMS / 600 V DC          | 1000 V RMS / 1000 V DC      |
| CAT III signals                                    | 300 V RMS / 300 V DC          | 1000 V RMS / 1000 V DC      |
| <b>Transient voltage</b>                           | <b>Using uninsulated wire</b> | <b>Using insulated wire</b> |
| Non mains signals                                  | 4500 V                        | 6000 V                      |
| CAT II signals                                     | 6000 V                        | 6000 V                      |
| CAT III signals                                    | 6000 V                        | 8000 V                      |

**Note** Higher isolation voltages can be achieved using isolated bus bars. Contact custom systems at: [customsystems@hbm.com](mailto:customsystems@hbm.com).

| <b>Environmental and Safety Specifications</b> |  |
|--|--|
| Ambient operating temperature range            | -40 °C to +85 °C   |
| Storage temperature range                      | -40 °C to +85 °C   |
| Relative humidity                              | 20% to 80%, Non-condensing   |
| Maximum altitude                               | 2000 m (6562 ft)   |
| Harmonized standards for CE compliance         | EN 61326-1 EMC<br>EN 61010-1:2010 Safety<br>IEC61010-2-30  |
| External devices                               | External devices connected to current transducers must comply with the standards IEC61010-1, IEC60950 or IEC62368-1 and be energy-limited circuitry  |
| Cleaning                                       | The transducer should only be cleaned with a damp cloth. No detergent or chemicals should be used.   |
| Ambient Temperature                            | <b>Note:</b> When multiple primary turns are used or high primary currents are applied the temperature around the transducer will increase, please monitor to ensure that the maximum ratings are not exceeded.<br>It is recommended to have minimum 1mm <sup>2</sup> per ampere in the primary bus-bar. |

| <b>Advanced Sensor Protection Circuits (ASPC)</b>   |
|---|
| Developed to protect the current transducer from typical fault conditions   |
| <ul style="list-style-type: none"> <li>Unit is unpowered and secondary circuit is open or closed</li> <li>Unit is powered and secondary circuit is open or interrupted</li> </ul> |
| Both DC and AC primary current up to 100% of nominal value can be applied to the current transducers in the situations above without damage to the electronics                    |

**Note** The sensor core can be magnetized in all the cases above, resulting in a small change in output offset current (less than 10 ppm)

| <b>Korean Certification</b>   |   |
|---|---|
|  | 상호 : 스펙트리스코리아주식회사                                     |
|   | 기자재명칭(모델명) : 1-CTS200ID/Current transducer (CTS200ID) |
|   | 제조사 : Hottinger Brüel & Kjaer GmbH, Germany           |
|   | 제조국가 : 덴마크  |
|   | R-R-s3k- CTS200ID                                     |

## D-SUB 9 Pins Male Pin Layout

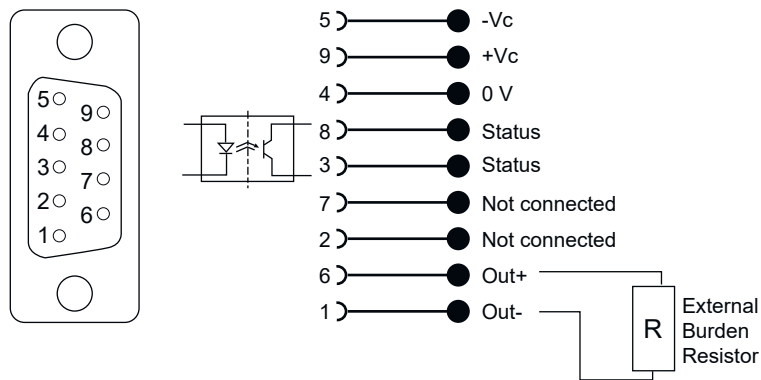


Figure 1.4: Standard D-SUB 9 current output

### Status pin properties

|                                    |   |
|------------------------------------|---|
| Forwarded direction                | Pin 8 to 3 (shorted, when the sensor is operating in normal conditions) |
| Maximum forward current            | 10 mA   |
| Maximum forward voltage            | 60 V  |
| Maximum reverse voltage            | 5 V   |
| Positive primary current direction | Identified by an arrow on the transducer body                           |

## Physical, Weight and Dimensions<sup>(1)</sup>

|                          |   |
|--------------------------|---|
| Weight                   | 0.6 kg  |
| Mounting instructions    |   |
| Base plate mounting      | 2 holes $\Phi$ 6.5 mm<br>2 x M5 steel screws / 6 N.m      |
| Back side panel mounting | 3 holes $\Phi$ 4.0 mm x 6 H<br>3 x M4 steel screw / 4 N.m |

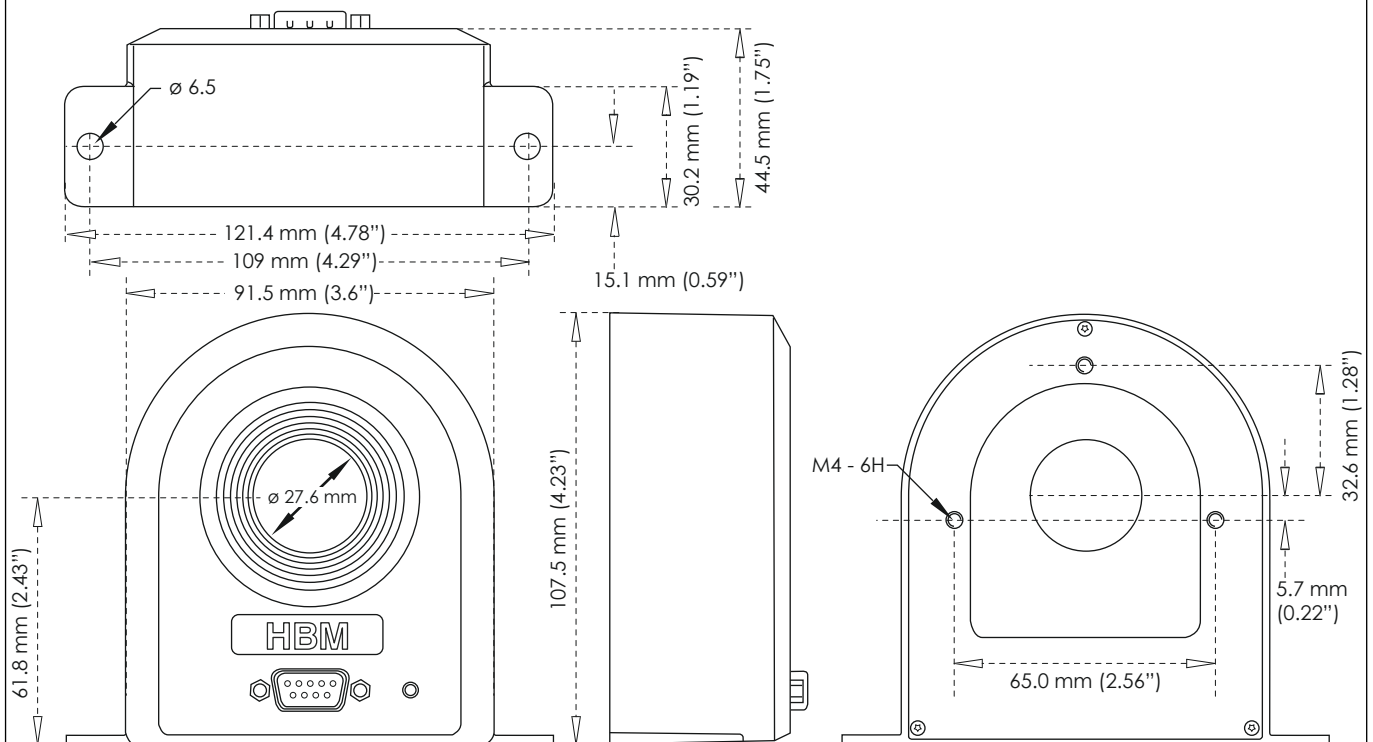


Figure 1.5: CTS50/200ID/400ID/600ID dimensions

(1) General tolerance of 0.3 mm unless otherwise stated

# 1-CTPSIU-6-1U Interface Unit for CT (Option, to be ordered separately)

Modular 19" rack with 1 to maximum 6 channel CT support.



**Figure 1.6:** Front side (left) and rear side (right)

|                                       |  |
|---------------------------------------|--|
| Maximum number of CTs                 | 6  |
| Input connectors                      | 9 pin SUBD                                     |
| Output connectors                     | XLR  |
| Signal LEDs                           | CT Power ON, CT Status                         |
| Power supply                          | 100 to 240 V AC, 47 to 63 Hz<br>120 - 370 V DC |
| Weight                                | Typical 6.5 kg (14.33 lb)                      |
| Operating temperature range           | 0 °C to +50 °C (32 °F to 122 °F)               |
| Dimensions                            |  |
| Height                                | 87.2 mm (3,43")                                |
| Width / Width including mounting ears | 442 mm (17,40") / 466 mm (18,34")              |
| Depth                                 | 415 mm (16,33")                                |

**Figure 1.7:** Dimensions

## Current Transducer Family Overview

| Type                            | Nominal current           | Bandwidth (-3 dB) | Ratio<br>Primary : Secondary | Aperture size |
|---------------------------------|---------------------------|-------------------|------------------------------|---------------|
| CTS50ID                         | 50 A RMS /<br>75 A DC     | 1000 kHz          | 1 : 500                      | 27.6 mm       |
| CTS200ID                        | 200 A RMS /<br>300 A DC   | 500 kHz           | 1 : 500                      | 27.6 mm       |
| CTS400ID                        | 400 A RMS /<br>600 A DC   | 300 kHz           | 1 : 2000                     | 27.6 mm       |
| CTS600ID                        | 600 A RMS /<br>900 A DC   | 500 kHz           | 1 : 1500                     | 27.6 mm       |
| CTM1200ID                       | 1200 A RMS /<br>1500 A DC | 400 kHz           | 1 : 1500                     | 45.0 mm       |
| CTM1200ID-CD3000 <sup>(1)</sup> | 1200 A RMS /<br>1500 A DC | 15 kHz            | 1 : 1500                     | 45.0 mm       |

Other values available on request<sup>(2)</sup>

- (1) Support for low current calibration.
- (2) Contact custom systems at: [customsystems@hbm.com](mailto:customsystems@hbm.com)  
Request quote/information for special products for GEN series.

# GN310B/GN311B HBM Current Transducer (CT) Wire Diagram

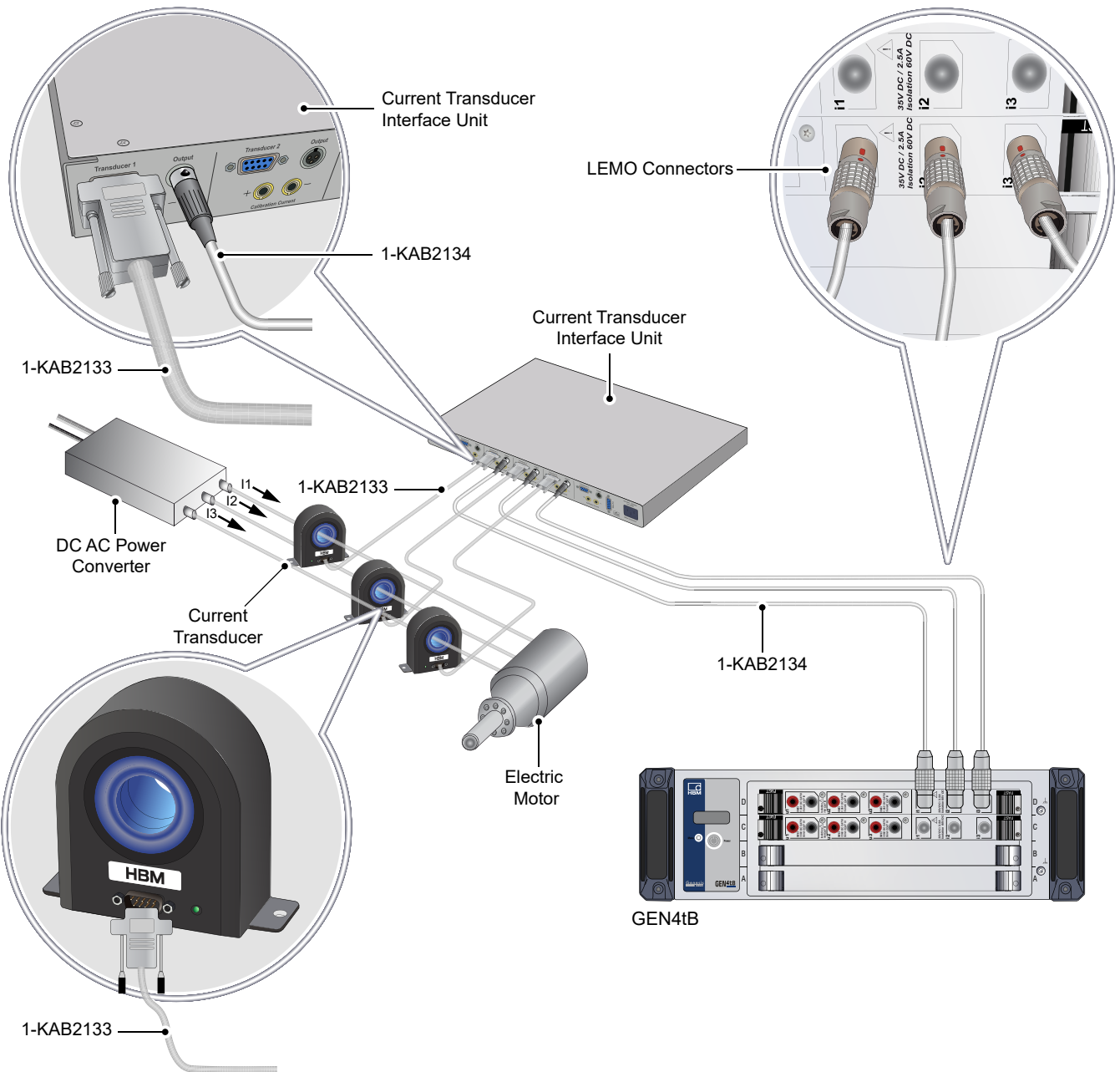
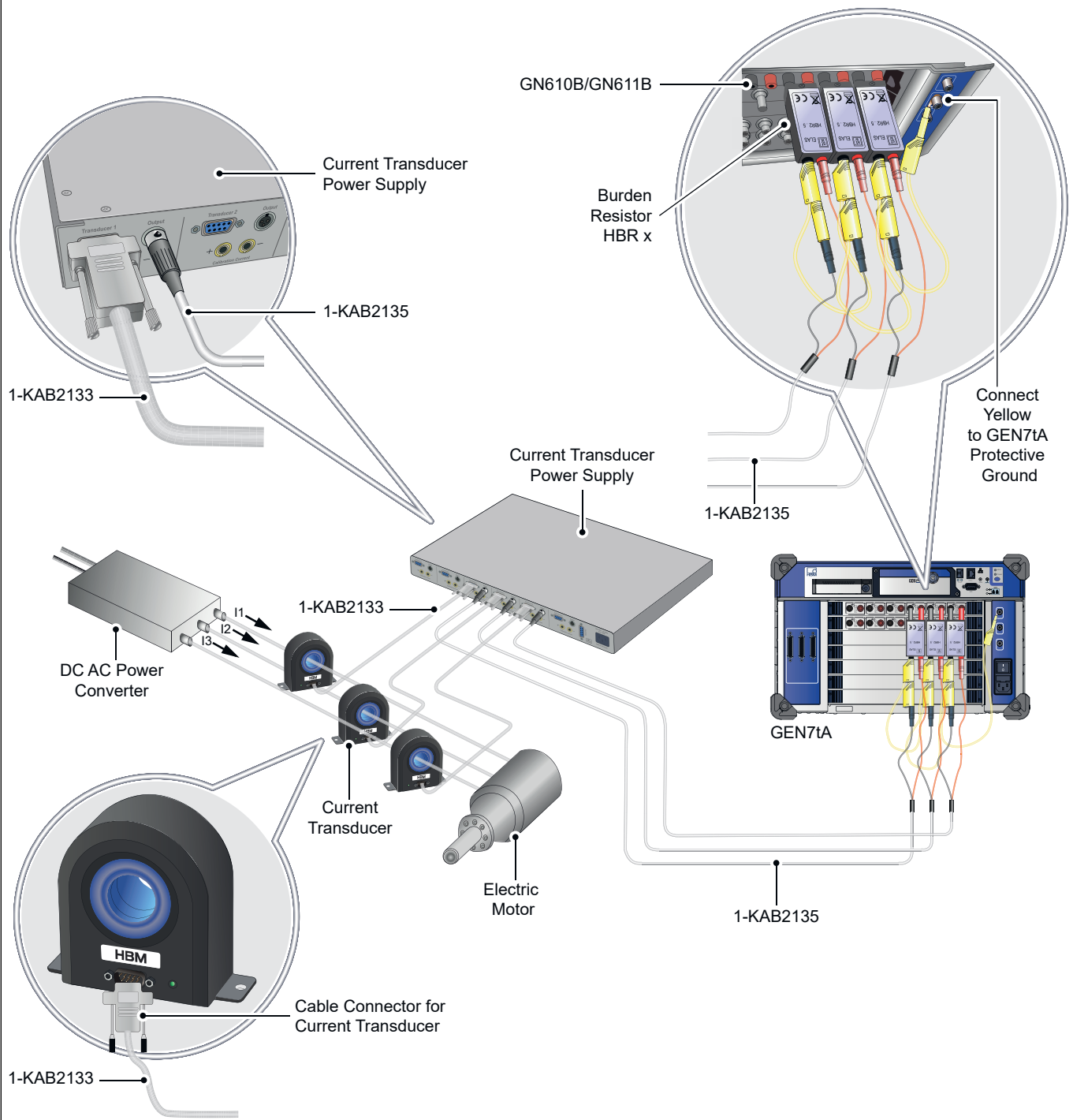


Figure 1.8: Current transducer connection diagram


# GN610B/GN611B Current Transducer (CT) Wire Diagram







**Figure 1.9:** Current transducer connection diagram



## Ordering Information

| Article  | Description   | Order No.  |
|--|---|------------|
| 300 A DC or<br>200 A RMS<br>current transducer  | Ultra-stable, high-precision fluxgate technology current transducer.<br>Non-intrusive isolated DC and AC current measurement up to 200 A RMS / 300 A DC.<br>Full aluminum body for superior EMI shielding.<br>Extended operating temperature range.<br>Large aperture $\varnothing$ 27.6 mm for cables and bus bars.<br>Industry standard D-Sub 9 pin connection. | 1-CTS200ID |

## Current Transducers Interface and Cables, to be ordered separately

| Article   | Description   | Order No.  |
|---|---|--|
| CT Interface unit                    | Interface unit for up to six current transducers.<br>Industry standard D-SUB 9 pin input connectors.<br>Multi-pin XLR output connectors.<br>Supports transducer calibration winding access through 4 mm banana plugs.<br>Front LEDs to indicate normal operation of each transducer.<br>100 - 240 V AC 50/60 Hz AC input voltage.<br>120 - 370 V DC input voltage.<br>1U height 19" rack mountable. | 1-CTPSIU-6-1U  |
| CT cables                           | Industry standard current transducer connection cable. Shielded, low ohmic 9 wire cable with D-SUB 9 connectors on both ends.<br>Supports power, status, current output and calibration current input.<br>Lengths: 2, 5, 10 and 20 meters (6, 16, 32 and 65 ft)   | 1-KAB2133-2<br>1-KAB2133-5<br>1-KAB2133-10<br>1-KAB2133-15<br>1-KAB2133-20 |
| XLR to LEMO<br>cable for GN31XB    | CT interface unit to GN31xB DAQ power card connection cable. Uses XLR and LEMO connectors for a direct current output connection to the GEN DAQ card.<br>Length 2 m (6 ft)  | 1-KAB2134-2  |
| XLR to Banana<br>cable for GN61XB  | CT interface unit to GN61xB DAQ 1kV card connection cable. Uses XLR and banana connectors for a current output connection to the GEN DAQ card. Requires an additional burden resistor in front of the GN61xB card to convert current to voltage.<br>Length 2 m (6 ft)   | 1-KAB2135-2  |






## GN610B/GN611B Burden Resistors, to be ordered separately

### Burden selection for GN610B/GN611B

**Note:** When using the CTS/CTM series together with GN610B/GN611B cards a burden resistor is required to convert the CT output current to a voltage. When selecting the burden several specifications need to be taken into account: maximum power of the burden, maximum voltage the CT can drive with constant current, the wire impedance of the cables used etc. See the CT operating manual for more details.

| Model            | Recommended burden | mV/A sensitivity | A/V scaling |
|------------------|--------------------|------------------|-------------|
| CTS50ID          | HBR 2.5 $\Omega$   | 5.0              | 200         |
| CTS200ID         | HBR 1.0 $\Omega$   | 2.0              | 500         |
| CTS400ID         | HBR 1.0 $\Omega$   | 0.5              | 2000        |
| CTS600ID         | HBR 1.0 $\Omega$   | 0.6667           | 1500        |
| CTS1200ID        | HBR 1.0 $\Omega$   | 0.6667           | 1500        |
| CTS1200ID-CD3000 | HBR 1.0 $\Omega$   | 0.6667           | 1500        |

| Article   | Description  | Order No.                                  |
|---|--|--|
| HBR 0.25 $\Omega$ , 1 W precision burden resistor<br>  | 0.25 $\Omega$ 1 W, 0.02% high precision, low thermal drift burden resistor. Internally uses 4 wire connection to reduce inaccuracy caused by the currents running to the burden resistor. Using banana input connectors and banana output pins. Directly compatible with GN610B/GN611B acquisition cards.  | Ordered from custom systems <sup>(1)</sup> |
| HBR 0.5 $\Omega$ , 1 W precision burden resistor<br>   | 0.5 $\Omega$ 1 W, 0.02% high precision, low thermal drift burden resistor. Internally uses 4 wire connection to reduce inaccuracy caused by the currents running to the burden resistor. Using banana input connectors and banana output pins. Directly compatible with GN610B/GN611B acquisition cards.   | Ordered from custom systems <sup>(1)</sup> |
| HBR 1 $\Omega$ , 1 W precision burden resistor<br>    | 1 $\Omega$ , 1 W, 0.02% high precision, low thermal drift burden resistor. Internally uses 4 wire connection to reduce inaccuracy caused by the currents running to the burden resistor. Using banana input connectors and banana output pins. Directly compatible with GN610B/GN611B acquisition cards.   | Ordered from custom systems <sup>(1)</sup> |
| HBR 2.5 $\Omega$ , 1 W precision burden resistor<br> | 2.5 $\Omega$ , 1 W, 0.02% high precision, low thermal drift burden resistor. Internally uses 4 wire connection to reduce inaccuracy caused by the currents running to the burden resistor. Using banana input connectors and banana output pins. Directly compatible with GN610B/GN611B acquisition cards. | Ordered from custom systems <sup>(1)</sup> |
| HBR 10 $\Omega$ , 1 W precision burden resistor<br>  | 10 $\Omega$ , 1 W, 0.02% high precision, low thermal drift burden resistor. Internally uses 4 wire connection to reduce inaccuracy caused by the currents running to the burden resistor. Using banana input connectors and banana output pins. Directly compatible with GN610B/GN611B acquisition cards.  | Ordered from custom systems <sup>(1)</sup> |

(1) Contact custom systems at: [customsystems@hbm.com](mailto:customsystems@hbm.com)  
Request quote/information for special products for GEN series.

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**Hottinger Brüel & Kjaer GmbH**

Im Tiefen See 45 · 64293 Darmstadt · Germany  
Tel. +49 6151 803-0 · Fax: +49 6151 803-9100  
E-mail: [info@hbm.com](mailto:info@hbm.com) · [www.hbm.com](http://www.hbm.com)

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