Current Transducer HTFS 200 .. 800-P

For the electronic measurement of currents: DC, AC, pulsed..., with galvanic separation between the primary circuit and the secondary circuit.

\[ I_{PN} = 200 .. 800 \text{A} \]

All data are given with \( R_L = 10 \text{k}\Omega \)

### Electrical data

<table>
<thead>
<tr>
<th>Primary nominal rms current ( I_{PN} ) (A)</th>
<th>Primary current measuring range ( I_\pm ) (A)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>±300</td>
<td>HTFS 200-P</td>
</tr>
<tr>
<td>400</td>
<td>±600</td>
<td>HTFS 400-P</td>
</tr>
<tr>
<td>600</td>
<td>±900</td>
<td>HTFS 600-P</td>
</tr>
<tr>
<td>800</td>
<td>±1200</td>
<td>HTFS 800-P</td>
</tr>
</tbody>
</table>

#### Electrical data

- \( V_{out} \): Output voltage (Analog) \( @ I_p \)
  - \( V_{ref} = \left( 1.25 \cdot I_p / I_{PN} \right) V \)
  - \( V_{ref} = \pm 0.025 V \)

- \( V_{ref} \): Reference voltage
  - \( 1/2 \cdot U_C \pm 0.025 V \)
  - \( V_{ref} = \text{Typ. } 200 \Omega \)
  - \( V_{ref} = \text{Load impedance} \geq 200 \text{ k}\Omega \)

- \( R_L \): Load resistance
  - \( \geq 2 \text{ k}\Omega \)

- \( R_{out} \): Output internal resistance
  - \( < 5 \text{ } \Omega \)

- \( C_L \): Capacitive loading
  - \( 4.7 \text{ nF} \)

- \( U_C \): Supply voltage (±5 %)
  - \( 5 \text{ V} \)

- \( I_C \): Current consumption \( @ U_C = 5 \text{ V} \)
  - \( 19 \text{ (typ) mA} \)
  - \( 25 \text{ (max) mA} \)

### Accuracy - Dynamic performance data

- \( X \): Accuracy \( @ I_{PN}, T_p = 25 \text{ °C} \)
  - \( \pm 1 \% \)

- \( \varepsilon_L \): Linearity error \( 0 \ldots 1.5 \times I_{PN} \)
  - \( \pm 0.5 \% \)

- \( TCV_{DE} \): Temperature of coefficient of \( V_{DE} @ I_p = 0, \)
  - \( \leq 0.1 \text{ mV/K} \)

- \( TCV_{ref} \): Temperature of coefficient of \( V_{ref} \)
  - \( \leq 190 \text{ ppm/K} \)

- \( TCG \): Temperature of coefficient of \( V_{out} \)
  - \( \leq 420 \text{ ppm/K} \)

- \( V_{OM} \): Magnetic offset voltage \( @ I_p = 0 \) and specified \( R_{L,*} \)
  - \( < 0.5 \text{ %} \)
  - \( < 0.5 \text{ after an overload of } 3 \times I_{PN,DC} \)

- \( V_{no} \): Output voltage noise \( (DC \ldots 20 \text{ MHz}) \)
  - \( < 40 \text{ mVpp} \)

- \( t_w \): Reaction time to 10 % of \( I_{PN} \)
  - \( < 2 \text{ } \mu s \)

- \( t_s \): Step response time to 90 % of \( I_{PN} \)
  - \( < 3.5 \text{ } \mu s \)

- \( \text{d}i/\text{d}t \): \( \text{d}i/\text{d}t \) accurately followed
  - \( > 100 \text{ A}/\mu s \)

- \( BW \): Frequency bandwidth \( (-3 \text{ dB}) \)
  - \( \text{DC} \ldots 240 \text{ kHz} \)

### Notes

1. It is possible to overdrive \( V_{ref} \) with an external reference voltage between 0.5 - 2.65 V
2. Excluding offset and magnetic offset voltage
3. Small signal only to avoid excessive heatings of the magnetic core.

### Features

- Hall effect measuring principle
- Galvanic separation between primary and secondary circuit
- Low power consumption
- Single power supply +5 V
- Ratiometric offset
- Insulating plastic case recognized according to UL 94-V0
- Fixation by M3 nuts and screws
- \( T_A = -40 \text{ °C} \ldots +105 \text{ °C} \)

### Advantages

- Small size and space saving
- Only one design for wide current ratings range
- High immunity to external interference
- \( V_{ref} \) IN/OUT.

### Applications

- Forklift drives
- AC variable speed drives
- Static converters for DC motor drives
- Battery supplied applications
- Uninterruptible Power Supplies (UPS)
- Switched Mode Power Supplies (SMPS)
- Power supplies for welding applications.

### Application domain

- Industrial.
Current Transducer HTFS 200 .. 800-P

**General data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient operating temperature</td>
<td>-40 .. +105 °C</td>
</tr>
<tr>
<td>Ambient storage temperature</td>
<td>-40 .. +105 °C</td>
</tr>
<tr>
<td>Mass</td>
<td>60 g</td>
</tr>
</tbody>
</table>

**Isolation characteristics**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rms voltage for AC insulation test, 50 Hz, 1 min</td>
<td>2.5 kV</td>
</tr>
<tr>
<td>Impulse withstand voltage 1.2/50 µs</td>
<td>4 kV</td>
</tr>
<tr>
<td>Partial discharge extinction rms voltage @ 10 pC</td>
<td>&gt;1 kV</td>
</tr>
<tr>
<td>Creepage distance</td>
<td>&gt;4 mm</td>
</tr>
<tr>
<td>Clearance</td>
<td>&gt;4 mm</td>
</tr>
<tr>
<td>Comparative Tracking Index (group IIIa)</td>
<td>&gt;220 V</td>
</tr>
</tbody>
</table>

**Applications examples**

<table>
<thead>
<tr>
<th>EN 50178</th>
<th>IEC 61010-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated insulation voltage</td>
<td>Nominal voltage</td>
</tr>
<tr>
<td>Basic insulation</td>
<td>300 V</td>
</tr>
<tr>
<td>Reinforced insulation</td>
<td>150 V</td>
</tr>
</tbody>
</table>

According to **EN 50178 and IEC 61010-1 standards** and following conditions:

- Over voltage category OV 3
- Pollution degree PD2
- Non-uniform field

**Safety**

This transducer must be used in limited-energy secondary circuits according to IEC 61010-1.

This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer’s operating instructions.

Caution, risk of electrical shock

When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply). Ignoring this warning can lead to injury and/or cause serious damage.

This transducer is a build-in device, whose conducting parts must be inaccessible after installation. A protective housing or additional shield could be used. Main supply must be able to be disconnected.
HTFS measuring range with external $V_{ref}$

Upper limit: $I_p = -160 \times V_{ref} + 720$ ($V_{ref} = 0.5 \ldots 2.65$ V)

Lower limit: $I_p = -160 \times V_{ref} + 80$ ($V_{ref} = 0.5 \ldots 2.65$ V)

Upper limit: $I_p = 864$ ($V_{ref} = 0.5 \ldots 1.8$ V)

Upper limit: $I_p = -320 \times V_{ref} + 1440$ ($V_{ref} = 1.8 \ldots 2.65$ V)

Lower limit: $I_p = -320 \times V_{ref} + 160$ ($V_{ref} = 0.5 \ldots 2.65$ V)

Upper limit: $I_p = 1200$ ($V_{ref} = 0.5 \ldots 2.0$ V)

Upper limit: $I_p = -480 \times V_{ref} + 2160$ ($V_{ref} = 2 \ldots 2.65$ V)

Lower limit: $I_p = -480 \times V_{ref} + 240$ ($V_{ref} = 0.5 \ldots 2.65$ V)

Upper limit: $I_p = 1200$ ($V_{ref} = 0.5 \ldots 2.625$ V)

Upper limit: $I_p = -640 \times V_{ref} + 2880$ ($V_{ref} = 2.625 \ldots 2.65$ V)

Lower limit: $I_p = -640 \times V_{ref} + 320$ ($V_{ref} = 0.5 \ldots 2.4$ V)

Lower limit: $I_p = -1200$ ($V_{ref} = 2.4 \ldots 2.65$ V)
Dimensions HTFS 200 .. 800-P (in mm)

Connection

Mechanical characteristics

- General tolerance: ±0.2 mm
- Fixation to PCB: 4 × M3 (not supplied)
  Recommended PCB hole: <2.5 N·m
- Connection to secondary: 4 pins 0.5 × 0.25 mm
  Recommended PCB hole: Φ 0.7 mm

Remarks

- $V_{out}$ is positive when $I_p$ flows in the direction of the arrow.
- Temperature of the primary conductor should not exceed 120 °C.