

Current Transducer HAIS 50..400-P and HAIS 50..100-TP

$$I_{PN} = 50 \dots 400 \text{ A}$$

For the electronic measurement of currents : DC, AC, pulsed, mixed, with a galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).



All Data are given with a $R_L = 10 \text{ k}\Omega$



Electrical data

| Primary nominal current rms I_{PN} (A) | Primary current, measuring range I_{PM} (A) | Type | RoHS since date code |
|---|--|---------------------------------------|----------------------|
| 50 | ± 150 | HAIS 50-P, HAIS 50-TP ¹⁾ | 45231, 46272 |
| 100 | ± 300 | HAIS 100-P, HAIS 100-TP ¹⁾ | 45231, 46012 |
| 150 | ± 450 | HAIS 150-P | 46172 |
| 200 | ± 600 | HAIS 200-P | 45231 |
| 400 | ± 600 | HAIS 400-P | planned |

| | | |
|-----------|--|---|
| V_{OUT} | Output voltage (Analog) @ I_p $I_p = 0$ | $V_{REF} \pm (0.625 \cdot I_p / I_{PN})$ V $V_{REF} \pm 0.025$ V |
| V_{REF} | Reference voltage ²⁾ - Output voltage | 2.5 ± 0.025 V |
| | V_{REF} Output impedance | typ. 200 Ω |
| | V_{REF} Load impedance | ≥ 200 k Ω |
| R_L | Load resistance | ≥ 2 k Ω |
| R_{OUT} | Output internal resistance | < 10 Ω |
| C_L | Capacitive loading | < 1 μ F |
| V_C | Supply voltage (± 5 %) | 5 V |
| I_C | Current consumption @ $V_C = 5$ V | 22 mA |

Accuracy - Dynamic performance data

| | | | |
|---------------------|--|-------------------|---------------|
| X | Accuracy ³⁾ @ I_{PN} , $T_A = 25^\circ\text{C}$ | $\leq \pm 1$ | % of I_{PN} |
| e_L | Linearity error $0 \dots 3 \times I_{PN}$ | $\leq \pm 0.5$ | % of I_{PN} |
| TCV_{OE} | Temperature coefficient of V_{OE} @ $I_p = 0$ | $\leq \pm 0.3$ | mV/K |
| TCV_{REF} | Temperature coefficient of V_{REF} | $\leq \pm 0.01$ | %/K |
| TCV_{OUT}/V_{REF} | Temperature coefficient of V_{OUT}/V_{REF} @ $I_p = 0$ | $\leq \pm 0.2$ | mV/K |
| TCV_{OUT} | Temperature coefficient of V_{OUT} | $\leq \pm 0.05\%$ | of reading/K |
| V_{OM} | Magnetic offset voltage @ $I_p = 0$, after an overload of $3 \times I_{PN DC}$ | $< \pm 0.4$ | % of I_{PN} |
| t_{ra} | Reaction time @ 10 % of I_{PN} | < 3 | μ s |
| t_r | Response time to 90 % of I_{PN} step | < 5 | μ s |
| di/dt | di/dt accurately followed | > 100 | A/ μ s |
| V_{no} | Output voltage noise (DC .. 10 kHz) | < 15 | mVpp |
| | (DC .. 1 MHz) | < 40 | mVpp |
| BW | Frequency bandwidth (-3 dB) ⁴⁾ | DC .. 50 | kHz |

Features

- Hall effect measuring principle
- Galvanic isolation between primary and secondary circuit
- Isolation test voltage 2500V
- Low power consumption
- Single power supply +5V
- Fixed offset & gain
- Bus bar version available for 50A and 100A ratings.
- Isolated plastic case recognized according to UL94-V0.

Advantages

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

Applications

- 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

Notes : ¹⁾ -TP version is equipped with a primary bus bar.

²⁾ It is possible to overdrive V_{REF} with an external reference voltage between 2 - 2.8 V providing its ability to sink or source approximately 2.5 mA.

³⁾ Excluding offset and hysteresis.

⁴⁾ Small signal only to avoid excessive heatings of the magnetic core.

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General data

| | | |
|-------|--|-----------------------------|
| T_A | Ambient operating temperature | - 40 .. + 85 °C |
| T_S | Ambient storage temperature | - 40 .. + 85 °C |
| m | Mass (in brackets : TP version) Standards | 20 (30) g EN 50178: 1997 |

Isolation characteristics

| | | | |
|-------------|--|-------|-------|
| V_b | Rated isolation voltage rms with IEC 61010-1 standards and following conditions - Single insulation - Over voltage category III - Pollution degree 2 - Heterogeneous field | 300 | V rms |
| V_b | Rated isolation voltage rms with EN 50178 standards and following conditions - Reinforced insulation - Over voltage category III - Pollution degree 2 - Heterogeneous field | 600 | V rms |
| V_d | Rms voltage for AC isolation test, 50 Hz, 1 min | 2.5 | kV |
| V_e | Partial discharge extinction voltage rms @ 10pC | | |
| | HAIS 50..400-P | > 1 | kV |
| | HAIS 50..100-TP | > 1.4 | kV |
| \hat{V}_w | Impulse withstand voltage 1.2/50 μ s | 8 | kV |
| dCp | Creepage distance | > 8 | mm |
| dCl | Clearance distance | > 8 | mm |
| CTI | Comparative tracking index (Group I) | > 600 | |

If insulated cable is used for the primary circuit, the voltage category could be improved with the following table :

| Cable insulation (primary) | Category |
|----------------------------|--------------|
| HAR 03 | 450V CAT III |
| HAR 05 | 550V CAT III |
| HAR 07 | 650V CAT III |

Safety



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



Caution! Risk of electrical shock

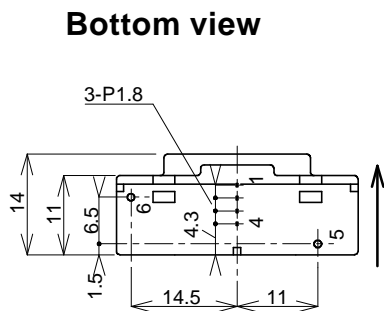
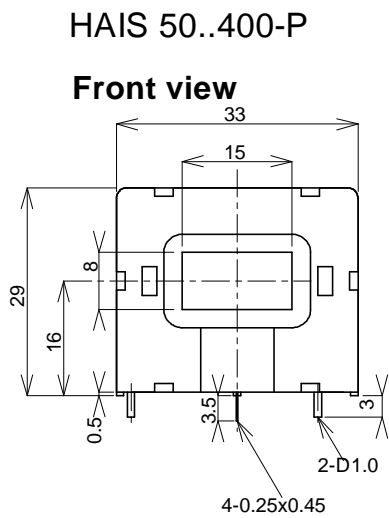
When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply).

Ignoring this warning can lead to injury and/or cause serious damage.

This transducer is a built-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.

Dimensions HAIS 50..400-P and HAIS 50..100-TP (in mm. 1 mm = 0.0394 inch)

Terminal Pin Identification

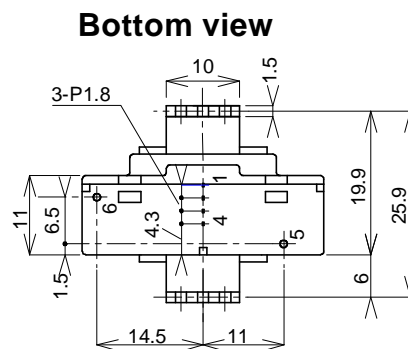
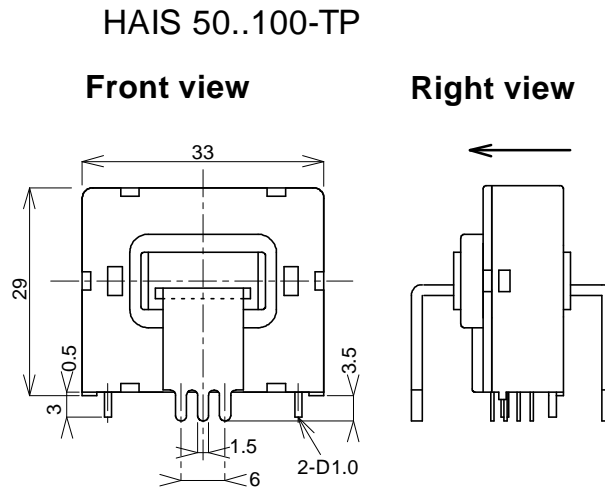
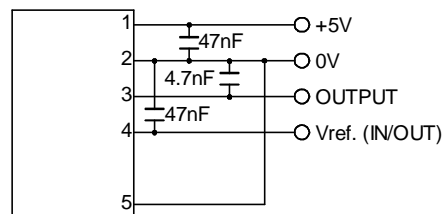
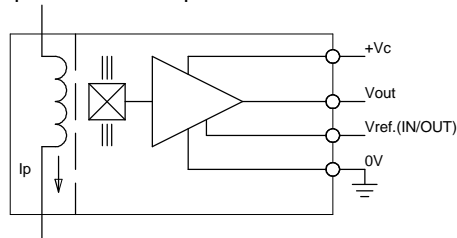
- 1...+5V
- 2...0V
- 3...OUTPUT
- 4...Vref. (IN/OUT)
- 5...Core Earth (*)
- 6...NC.

Recommended PCB hole

- Pin 1-4 : $0.7 \pm 0.1\text{mm}$
- Pin 5-6 : $1.5 \pm 0.1\text{mm}$
- Primary bus bar : $2.3 \pm 0.1\text{mm}$

General tolerance : $\pm 0.2\text{mm}$

Unit : mm


Required Connection Circuit

Operation Principle


(*) should be connected to 0V of Power Supply for better dv/dt immunity.
 Arrow indicates positive current direction.