

# Current Transducer HAIS 50 ... 400-P HAIS 50 ... 150-TP

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

$$I_{PN} = 50 \dots 150 \text{ A}$$

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



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



## Electrical data

	Primary nominal RMS current $I_{PN}$ (A)	Primary current measuring range $I_{PM}$ (A)	Type	
	50	$\pm 150$	HAIS 50-P/50-TP <sup>1)</sup>	
	100	$\pm 300$	HAIS 100-P/100-TP <sup>1)</sup>	
	150	$\pm 450$	HAIS 150-P/150-TP <sup>1)</sup>	
	200	$\pm 600$	HAIS 200-P	
	400	$\pm 600$	HAIS 400-P	
$S_N$	Nominal sensitivity @ $I_{PN}$		0.625	V / $I_{PN}$
$U_{out}$	Output voltage (Analog) @ $I_p$		$U_{OE} + (0.625 \cdot I_p / I_{PN}) \text{ V}$	
$U_{ref}$	Reference voltage <sup>2)</sup>		2.5 $\pm$ 0.025	V
	Output voltage		typ. 200	$\Omega$
	Output impedance		$\geq 200$	k $\Omega$
$R_L$	Load resistance		$\geq 2$	k $\Omega$
$R_{out}$	Output internal resistance		< 5	$\Omega$
$C_L$	Load capacitance ( $\pm 20 \%$ )		4.7	nF
$U_C$	Supply voltage ( $\pm 5 \%$ ) <sup>3)</sup>		5	V
$I_C$	Current consumption @ $U_C = 5 \text{ V}$		< 19	mA

## Accuracy - Dynamic performance data

$\epsilon$	Error <sup>4)</sup> @ $I_{PN}$ , $T_A = 25 \text{ }^\circ\text{C}$	$\leq \pm 1$	% of $I_{PN}$
$\epsilon_L$	Linearity error 0 ... $I_{PM}$	$\leq \pm 0.5$	% of $I_{PN}$
$TCU_{OE}$	Temperature coefficient of $U_{OE}$	$\leq \pm 0.3$	mV/K
$TCU_{ref}$	Temperature coefficient of $U_{ref}$	+25 ... +85 $^\circ\text{C}$	$\leq \pm 0.01$ %/K
		-40 ... +25 $^\circ\text{C}$	$\leq \pm 0.015$ %/K
$TCU_{OE}/U_{ref}$	Temperature coefficient of $U_{OE}/U_{ref}$	$\leq \pm 0.2$	mV/K
$TCS$	Temperature coefficient of $S$	$\leq \pm 0.05$ % of reading	K
$U_{OE}$	Electrical offset voltage @ $I_p = 0$ , $T_A = 25 \text{ }^\circ\text{C}$	$U_{ref} \pm 0.025$	V
$U_{OM}$	Magnetic offset voltage @ $I_p = 0$		
	after an overload of $I_{PM}$	HAIS 50-P/TP	< $\pm 0.5$ % of $I_{PN}$
		HAIS 100-P/TP ... 400-P	< $\pm 0.4$ % of $I_{PN}$
$t_{D10}$	Delay time to 10 % of the final output value for $I_{PN}$ step	< 3	$\mu\text{s}$
$t_{D90}$	Delay time to 90 % of the final output value for $I_{PN}$ step <sup>5)</sup>	< 5	$\mu\text{s}$
$U_{no}$	RMS noise voltage (DC ... 10 kHz)	< 15	mVpp
		< 40	mVpp
$BW$	Frequency bandwidth (-3 dB) <sup>6)</sup>	DC ... 50	kHz

### Notes:

- <sup>1)</sup> -TP version is equipped with a primary bus bar; Temperature of primary bus bar should not exceed 100  $^\circ\text{C}$
- <sup>2)</sup> It is possible to overdrive  $U_{ref}$  with an external reference voltage between 1.5 V - 2.8 V providing its ability to sink or source approximately 5 mA
- <sup>3)</sup> Maximum supply voltage (not operating) < 6.5 V
- <sup>4)</sup> Excluding offset and magnetic offset voltage
- <sup>5)</sup> Tested with 0 ... 125 A step with slope 100 A/ $\mu\text{s}$
- <sup>6)</sup> Small signal only to avoid excessive heatings of the magnetic core.

## Features

- Hall effect measuring principle
- Galvanic separation between primary and secondary circuit
- Insulation test voltage 2500 V
- Low power consumption
- Single power supply +5 V
- Fixed offset & sensitivity
- Insulating plastic case recognized according to UL 94-V0.

## Advantages

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

## Applications

- AC variable speed drives and servo motor 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 HAIS 50 ... 400-P and HAIS 50 ... 150-TP

### General data

$T_A$	Ambient operating temperature	-40 ... +85	°C
$T_{A\text{st}}$	Ambient storage temperature	-40 ... +85	°C
$m$	Mass (in brackets: TP version)	20 (30)	g
	Standards	EN 50178: 1997	

### Insulation coordination

$U_d$	RMS voltage for AC insulation test, 50 Hz, 1 min	2.5	kV
$U_t$	Partial discharge RMS test voltage ( $q_m < 10$ pC)		
	HAIS 50 ... 400-P	> 1	kV
	HAIS 50 ... 150-TP	> 1.4	kV
$U_{Ni}$	Impulse withstand voltage 1.2/50 $\mu$ s	8	kV
		Min	
$d_{Cp}$	Creepage distance	> 8	mm
$d_{Cl}$	Clearance distance	> 8	mm
$CTI$	Comparative Tracking Index (group I)	> 600	

### Applications examples

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

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

	EN 50178	IEC 61010-1
$d_{Cp}, d_{Cl}, U_{Ni}$	Rated insulation voltage	Nominal voltage
Basic insulation	1000 V	1000 V
Reinforced insulation	600 V	300 V

### 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.



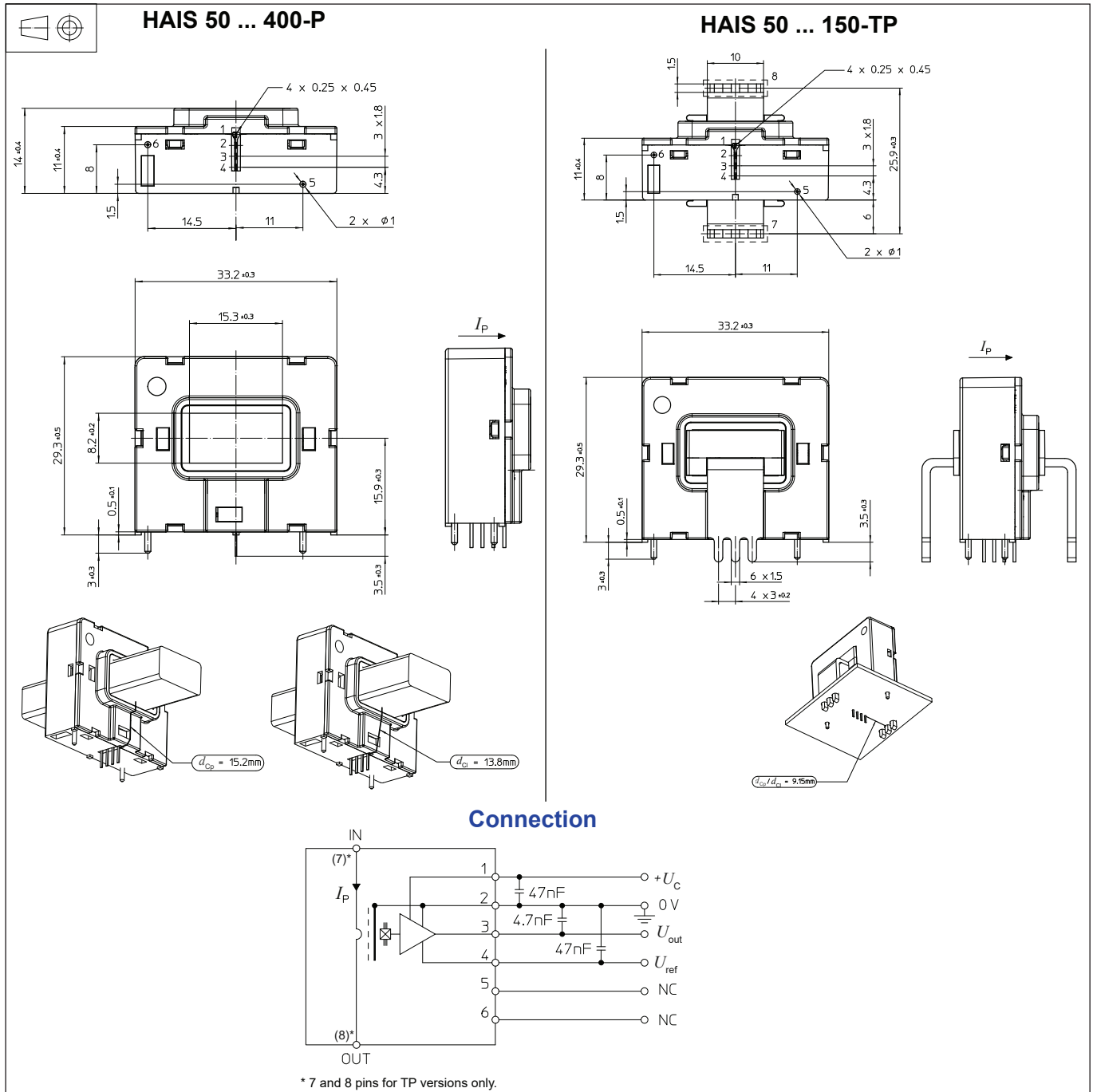
Caution, risk of electrical shock

When operating the transducer, certain parts of the module can carry hazardous voltage (e.g. 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.

## Dimensions HAIS 50 ... 400-P and HAIS 50 ... 150-TP (in mm)



### Mechanical characteristics

- General tolerance  $\pm 0.2$  mm
- Primary through-hole 15.3 mm x 8.2 mm.

### Recommended PCB hole sizes

- Primary bus bar pins 7 and 8 PCB hole  $2.3 \pm 0.1$  mm (for TP versions only)
- Secondary pins 1-4 PCB hole  $0.7 \pm 0.1$  mm
- Support pins 5 and 6 PCB hole  $1.5 \pm 0.1$  mm.

### Remarks

- Magnetic core connected internally to 0 V for better  $dv/dt$  immunity
- $U_{out}$  is positive when  $I_p$  flows in the direction of the arrow
- Temperature of the primary conductor should not exceed 100 °C.

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