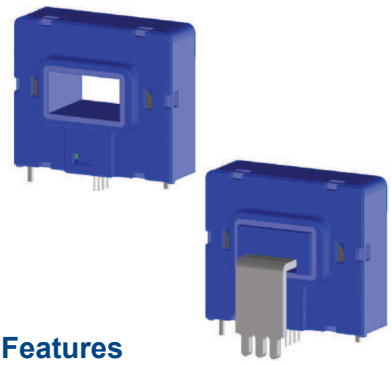
Current Transducer HAIS 50..400-P and HAIS 50..100-TP

I_{PN} = 50 .. 400 A

For the electronic measurement of currents: DC, AC, pulsed..., 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 kΩ

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**	47096

V_{OUT}	Output voltage (Analog) @ I_P		V_{OE} ± (0.625· I_P/I_{PN})	V
G_{TH}	Theoretical sensitivity		0.625	V/I_{PN}
V_{REF}	Reference voltage [2] - Output voltage		2.5 ± 0.025	V
	V_{REF} Output impedance	typ.	200	Ω
	V_{REF} Load impedance		≥ 200	kΩ
R_L	Load resistance		≥ 2	kΩ
R_{OUT}	Output internal resistance		< 5	Ω
C_L	Capacitive loading (± 20 %)		=4.7	nF
V_C	Supply voltage (± 5 %)[3]		5	V
I_C	Current consumption @ V_C = 5 V		19	mA

Accuracy - Dynamic performance data

X	Accuracy [4] @ I_{PN} , T_A = 25°C		≤ ± 1	% of I_{PN}
ε_L	Linearity error 0 .. I_{PM}		≤ ± 0.5	% of I_{PN}
TCV_{OE}	Temperature coefficient of V_{OE}		≤ ± 0.3	mV/K
TCV_{REF}	Temperature coefficient of V_{REF},	+25°C...+85°C	≤ ± 0.01	%/K
		-40°C...+25°C	≤ ± 0.015	%/K
TCV_{OE}/V_{REF}	Temperature coefficient of V_{OE} / V_{REF}		≤ ± 0.2	mV/K
TCG	Temperature coefficient of G		≤ ± 0.05% of reading/K	
V_{OE}	Electrical offset voltage @ I_P = 0, T_A = 25°C		V_{REF} ± 0.025	V
V_{OM}	Magnetic offset voltage @ I_P = 0, after an overload of I_{PM}	HAIS 50-(T)P	< ± 0.5	% of I_{PN}
		HAIS 100-(T)P..400-P	< ± 0.4	% of I_{PN}
t_{ra}	Reaction time @ 10 % of I_{PN}		< 3	µs
t_r	Response time to 90 % of I_{PN} step		< 5	µs
di/dt	di/dt accurately followed		> 100	A/µs
V_{no}	Output voltage noise	(DC ..10 kHz)	< 15	mVpp
		(DC .. 1 MHz)	< 40	mVpp
BW	Frequency bandwidth (- 3 dB) [5]		DC .. 50	kHz

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 1.5 - 2.8 V providing its ability to sink or source approximately 5 mA.
[3] Maximum supply voltage (not operating) < 6.5 V
[4] Excluding Offset and Magnetic offset voltage.
[5] Small signal only to avoid excessive heatings of the magnetic core.

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

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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)	20 (30)	g
	Standards	EN 50178: 1997	

Isolation characteristics

V_b Rated isolation voltage rms with EN50178, IEC61010-1 standards at following conditions

- Over voltage category III
- Pollution degree 2
- Heterogeneous field

	EN50178	IEC61010-1
Single insulation	1000V	1000V
Reinforced insulation	600V	300V

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 µs	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

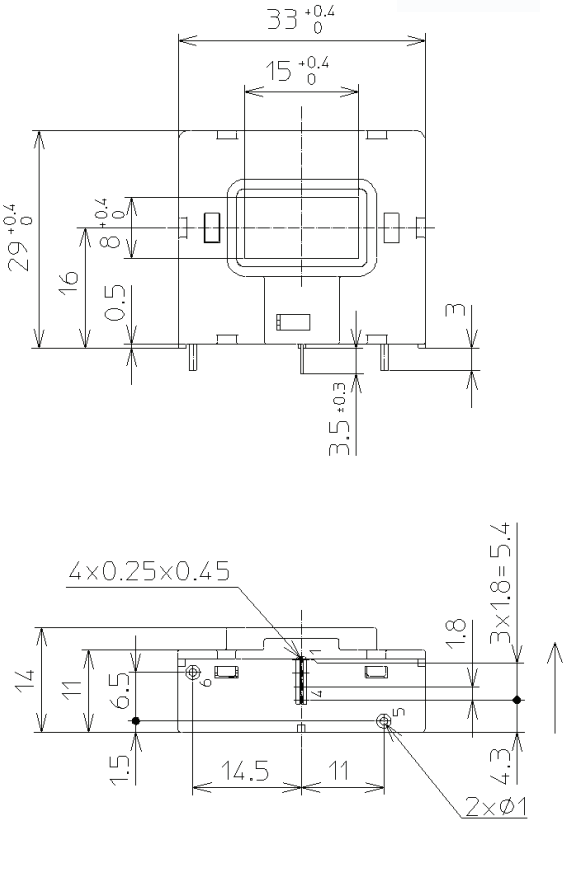
This transducer must be used in electric/electronic equipment with respect to applicable standards and safety requirements in accordance with the manufacturer's operating instructions.

Caution, risk of electrical shock

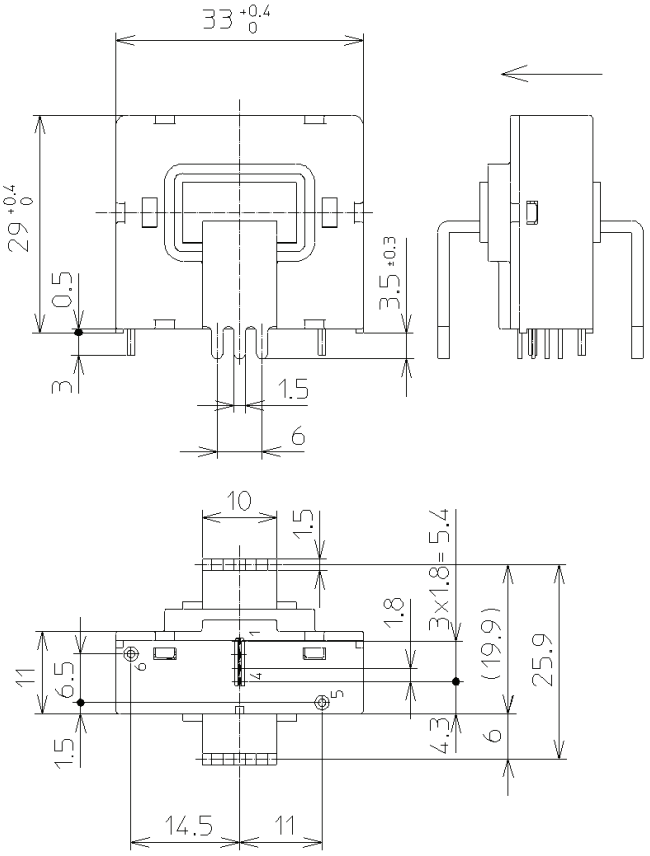
When operating the transducer, certain parts of the module can carry hazardous voltage (eg. primary busbar, power supply).
Ignoring this warning can lead to injury and/or cause serious damage.
This transducer is a built-in device, whose conducting parts must be inaccessible after installation.
A protective 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)

HAIS 50..400-P



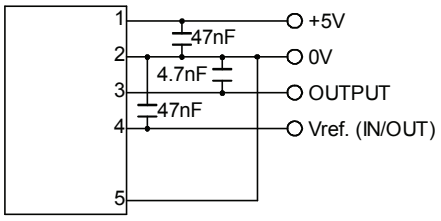
HAIS 50..100-TP



Terminal Pin Identification

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

Required Connection Circuit

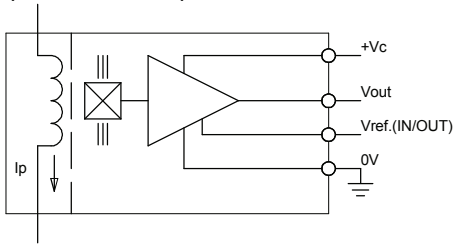


Recommended PCB hole

Pin 1-4 : 0.7 ±0.1mm
Pin 5-6 : 1.5 ±0.1mm
Primary bus bar : 2.3 ±0.1mm

General tolerance : ±0.2mm

Operation Principle



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