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Current Transducer HXS 50-NP

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).

I_{PN} = 12.5 - 25 - 50 A

LEM TRANSDUCERS 5 YEARS WARRANTY CE RoHS COMPLIANT 2002/95/EC

All Data are given with a R_L = 10 kΩ

Electrical data

I_{PN}	Primary nominal r.m.s. current		± 50	A
I_P	Primary current measuring range		± 150	A
V_{OUT}	Analog output voltage @ I_P		$V_{REF} \pm (0.625 \cdot I_P / I_{PN})$	V
		$I_P = 0$	$V_{REF} \pm 0.0125$	V
V_{REF}	Internal Reference [1] - Output voltage		2.5 ± 0.025	V
	V_{REF} Output impedance	typ.	200	Ω
	V_{REF} Load impedance		≥ 200	kΩ
R_L	Output load resistance		≥ 2	kΩ
R_{OUT}	Output impedance		< 10	Ω
C_L	Max. output capacitive load		< 1	µF
V_C	Supply voltage (± 5 %)		5	V
I_C	Current consumption @ V_C = 5 V		22	mA

Accuracy - Dynamic performance data

X	Accuracy [2] @ I_{PN} , T_A = 25°C	≤ ± 1	% of I_{PN}
e_L	Linearity error 0 .. I_{PN}	≤ ± 0.5	% of I_{PN}
	.. 3 x I_{PN}	≤ ± 1	% of I_{PN}
TCV_{OUT}	Thermal drift of V_{OUT} @ $I_P = 0$	≤ ± 0.4	mV/K
TCV_{REF}	Thermal drift of V_{REF}	≤ ± 0.01	%/K
TCV_{OUT}/V_{REF}	Thermal drift of V_{OUT}/V_{REF} @ $I_P = 0$	≤ ± 0.2	mV/K
TCe_G	Thermal drift of the gain	≤ ± 0.05% of reading/K	
V_{OM}	Residual voltage @ $I_P = 0$, after an overload of 3 x $I_{PN\,DC}$	< ± 1	% of I_{PN}
t_{ra}	Reaction time @ 10 % of I_{PN}	< 3	µs
t_r	Response time @ 90 % of I_{PN}	< 5	µs
di/dt	di/dt accurately followed	> 50	A/µs
V_{no}	Output noise (DC .. 10 kHz)	< 20	mVpp
	(DC .. 1 MHz)	< 40	mVpp
f	Frequency bandwidth (-3 dB) [3]	DC .. 50	kHz

General data

T_A	Ambient operating temperature	- 40 .. + 85	°C
T_S	Ambient storage temperature	- 40 .. + 85	°C
m	Mass	10	g
	Standards	EN 50178 (97-10-01)	

Features

- Hall effect measuring principle
- Multirange current transducer through PCB pattern lay-out
- Galvanic isolation between primary and secondary circuit
- Isolation test voltage 3500V
- Low power consumption
- Extremely low profile, < 11mm
- Single power supply +5V
- Fixed offset & gain
- Insulated 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.
- Internal & external reference

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] 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.
[2] Excluding offset and hysteresis.
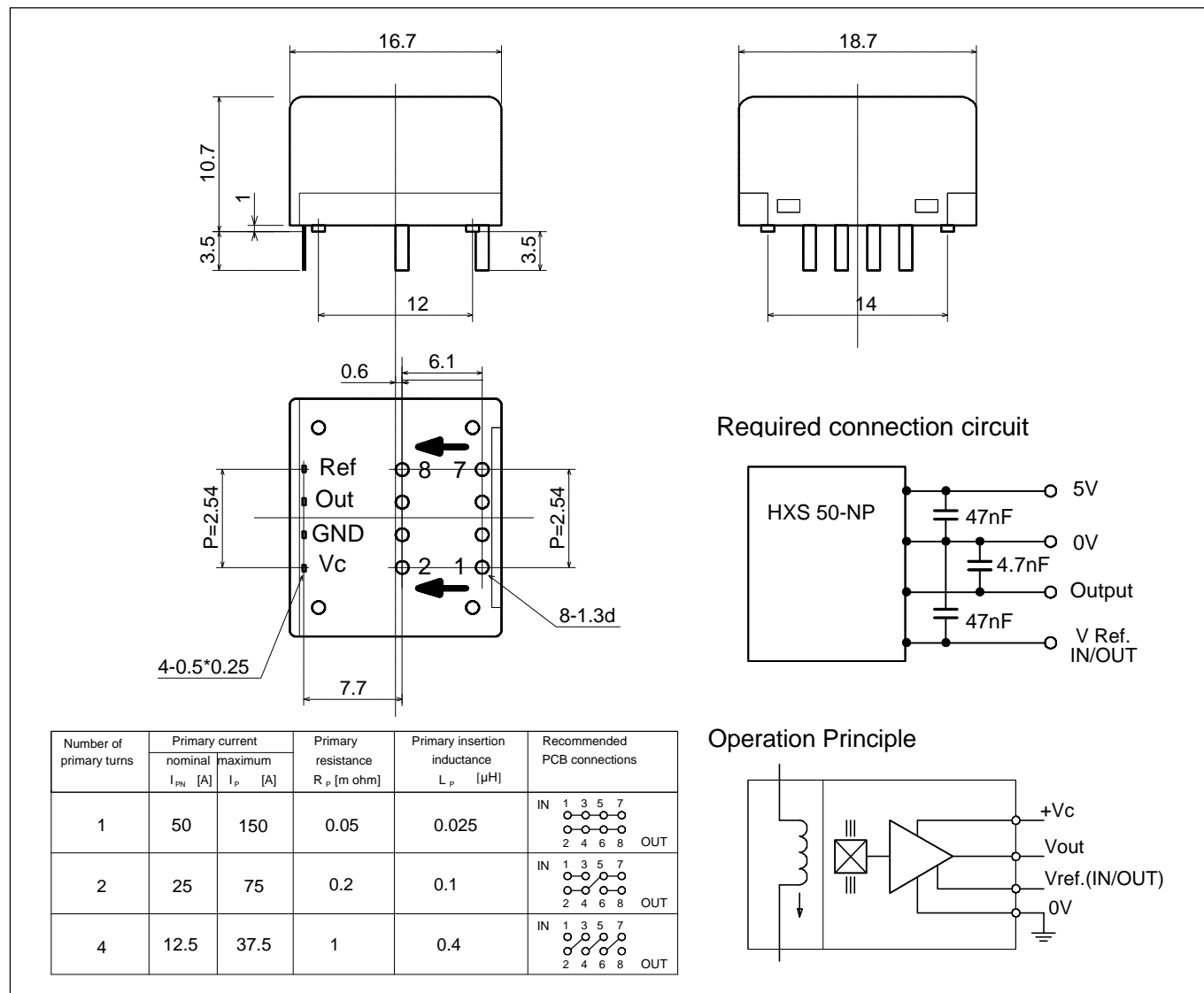[3] Small signal only to avoid excessive heatings of the magnetic core.

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Isolation characteristics

V_b	Nominal Voltage	150	V r.m.s.
	with IEC 61010-1 standards and following conditions		
	- Single insulation		
	- Over voltage category III		
	- Pollution degree 2		
	- Heterogeneous field		
V_b	Nominal Voltage	300	V r.m.s.
	with EN 50178 standards and following conditions		
	- Reinforced insulation		
	- Over voltage category III		
	- Pollution degree 2		
	- Heterogeneous field		
V_d	R.m.s. voltage for AC isolation test, 50/60 Hz, 1 mn	3.5	kV
dCp	Creepage distance	> 5.5	mm
dCl	Clearance distance	> 5.5	mm
CTI	Comparative tracking index (Group I)	> 600	V

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Dimensions HXS 50-NP (in mm. 1 mm = 0.0394 inch)

16.7

10.7

1

3.5 3.5

12

18.7

14

0.6 6.1

P=2.54

Ref
Out
GND
Vc

8 7

2 1

P=2.54

8-1.3d

4-0.5*0.25

7.7

Required connection circuit

HXS 50-NP

47nF
4.7nF
47nF

5V
0V
Output
V Ref. IN/OUT

Operation Principle

+Vc
Vout
Vref.(IN/OUT)
0V

Number of primary turns	Primary current		Primary resistance	Primary insertion inductance	Recommended PCB connections
	nominal I_{PN} [A]	maximum I_P [A]	R_P [m ohm]	L_P [µH]	
1	50	150	0.05	0.025	IN 1 3 5 7 / 2 4 6 8 OUT
2	25	75	0.2	0.1	IN 1 3 5 7 / 2 4 6 8 OUT
4	12.5	37.5	1	0.4	IN 1 3 5 7 / 2 4 6 8 OUT

Mechanical characteristics

- General tolerance — ± 0.2 mm
- Fastening & connection of primary jumper — 8 pins Ø 1.3 mm
  Recommended PCB hole — Ø 1.5 mm
- Fastening & connection of secondary — 4 pins 0.5 x 0.25
  Recommended PCB hole — Ø 0.7 mm

Remarks

- V_{OUT} is positive when I_P flows from terminals 1, 3, 5, 7 (IN) to terminals 2, 4, 6, 8 (OUT).
- Temperature of the primary conductors should not exceed 100°C.

Safety

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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.

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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.