

## Current Transducer HXS 20-NP

For the electronic measurement of currents: 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

$I_{PN}$	Primary nominal RMS current	$\pm 20$	A
$I_{PM}$	Primary current, measuring range	$\pm 60$	A
$S_N$	Nominal sensitivity	0.625	V / $I_{PN}$
$U_{out}$	Output voltage (Analog) @ $I_P$	$U_{OE} \pm (0.625 \cdot I_P / I_{PN})$	V
$U_{ref}$	Reference voltage <sup>1)</sup>	2.5 $\pm 0.025$	V
	Output impedance	typ. 200	$\Omega$
	Load impedance	200	k $\Omega$
$R_L$	Load resistance	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>2)</sup>	5	V
$I_C$	Current consumption @ $U_C = 5 \text{ V}$	19	mA

### Accuracy - Dynamic performance data

$\varepsilon$	Error <sup>3)</sup> @ $I_{PN}$ , $T_A = 25^\circ \text{C}$	$\pm 1$	%
$\varepsilon_L$	Linearity error	0 ... $I_{PN}$	$\pm 0.5$ %
	0 ... $3 \times I_{PN}$	$\pm 1$	%
$TCU_{OE}$	Temperature of coefficient of $U_{OE}$ (+25 ... 105 $^\circ \text{C}$ )	$\pm 0.4$	mV/K
	(-40 ... +25 $^\circ \text{C}$ )	$\pm 0.525$	mV/K
$TCU_{ref}$	Temperature of coefficient of $U_{ref}$ (+25 ... 105 $^\circ \text{C}$ )	$\pm 0.01$	%/K
	(-40 ... +25 $^\circ \text{C}$ )	$\pm 0.015$	%/K
$TCU_{OE}/U_{ref}$	Temperature coefficient of $U_{OE}/U_{ref}$	$\pm 0.15$	mV/K
$TCS$	Temperature of coefficient of $S$	$\pm 0.05\%$ of reading/K	
$U_{OE}$	Electrical offset voltage @ $I_P = 0$ , $T_A = 25^\circ \text{C}$	$U_{ref} \pm 0.0125$	V
$U_{OM}$	Magnetic offset voltage @ $I_P = 0$		
	after an overload of $3 \times I_{PN}$	$\pm 0.7$	%
$t_{D10}$	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>4)</sup>	< 5	$\mu \text{s}$
$U_{no}$	Output voltage noise (DC ... 10 kHz)	< 20	mVpp
	(DC ... 1 MHz)	< 40	mVpp
$BW$	Frequency bandwidth (-3 dB) <sup>5)</sup>	DC ... 50	kHz

**Notes:** <sup>1)</sup> It is possible to overdrive  $U_{ref}$  with an external reference voltage between 1.5 - 2.8 V providing its ability to sink or source approx. 5 mA

<sup>2)</sup> Maximum supply voltage (not operating) < 6.5 V

<sup>3)</sup> Excluding offset and magnetic offset voltage

<sup>4)</sup> For a  $di/dt = 50 \text{ A}/\mu \text{s}$

<sup>5)</sup> Small signal only to avoid excessive heatings of the magnetic core.

$I_{PN} = 5, 10, 20 \text{ A}$   
**DUAL PHASE**



### Features

- Hall effect measuring principle
- Multirange current transducer through PCB pattern lay-out
- Galvanic separation between primary and secondary circuit
- Insulation test voltage 3500 V
- Extremely low profile < 11 mm
- Fixed offset & sensitivity
- Low power consumption
- Single power supply +5 V
- 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.

### Application

- 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 HXS 20-NP

### General data

$T_A$	Ambient operating temperature <sup>1)</sup>	-40 ... +105	°C
$T_{A\text{st}}$	Ambient storage temperature	-40 ... +105	°C
$m$	Mass	10	g
	Standards	EN 50178:1997	

**Note:** <sup>1)</sup> UL recognized with surrounding temperature until +85 °C.

### Insulation coordination

$U_d$	RMS voltage for AC insulation test, 50 Hz, 1 min	3.5	kV
		Min	
$d_{Cp}$	Creepage distance	7.48	mm
$d_{Ci}$	Clearance	6.6	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

**According to UL 508 standards** and following conditions: Maximum voltage 600 V

- Over voltage category OV 3
- Pollution degree PD2

	EN 50178	IEC 61010-1
$d_{Cp}, d_{Ci}$	Rated insulation voltage	Nominal voltage
Basic insulation	600 V	600 V
Reinforced insulation	300 V	150 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.



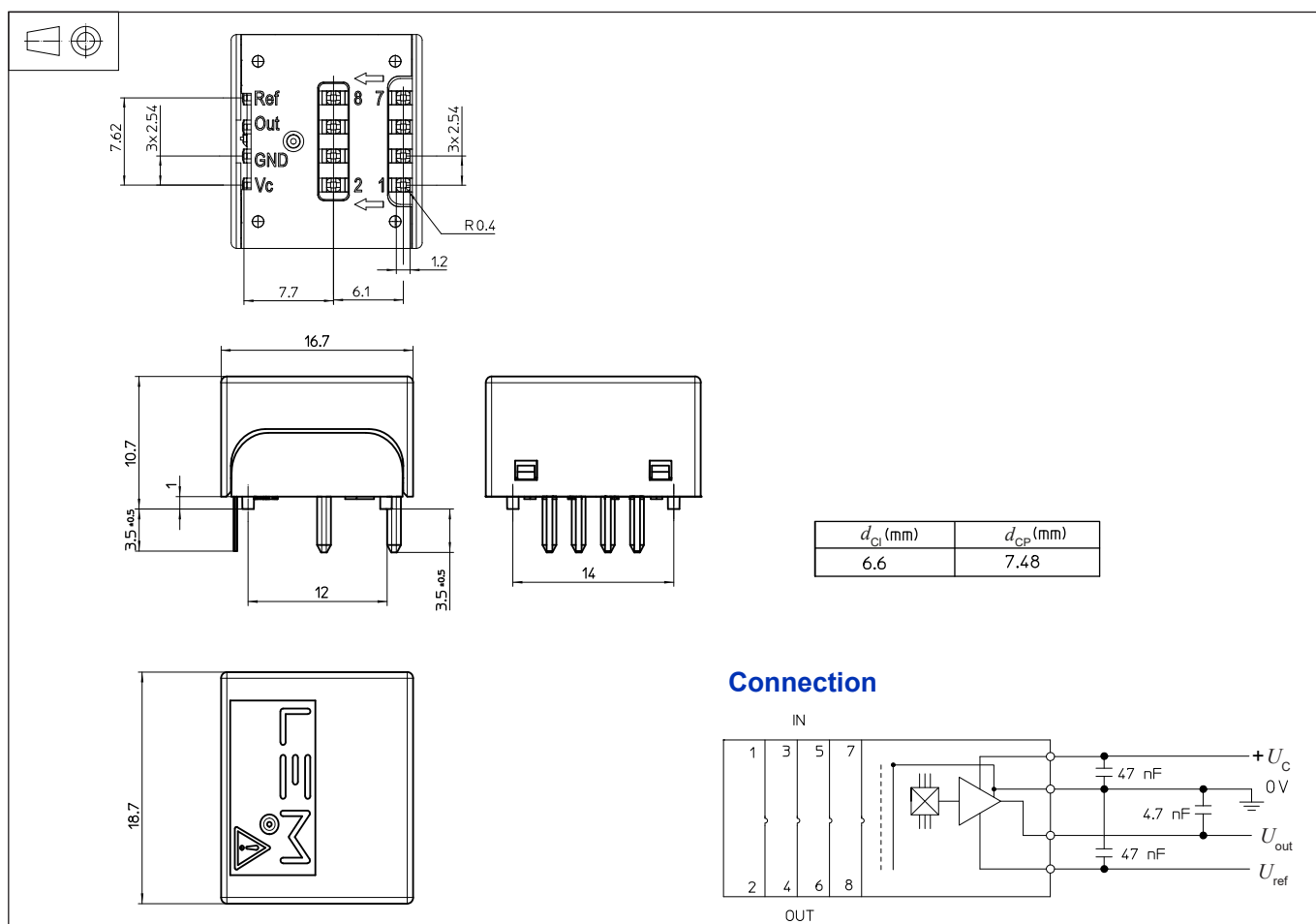
Caution, risk of electrical shock

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

## Dimensions HXS 20-NP (in mm)



Primary connections	Primary RMS current		Primary resistance $R_p$ [mΩ]	Primary insertion inductance $L_p$ [μH]	Recommended PCB connections
	nominal $I_{PN}$ [A]	maximum $I_p$ [A]			
1	20	60	0.05	0.025	IN 1 3 5 7 OUT 2 4 6 8
2	10	30	0.2	0.1	IN 1 3 5 7 OUT 2 4 6 8
4	5	15	1	0.4	IN 1 3 5 7 OUT 2 4 6 8

### Mechanical characteristics

- General tolerance  $\pm 0.2$  mm
- Transducer fastening & connection of primary jumper 8 pins  $1.2 \times 1.2$  mm (corner R 0.4 mm)
- Transducer fastening & connection of secondary pin 4 pins  $0.5 \times 0.25$  mm

### Recommended PCB hole

- Primary PCB hole  $\varnothing 1.5$  mm
- Secondary PCB hole  $\varnothing 0.7$  mm

### Remarks

- $U_{out}$  is positive when  $I_p$  flows from terminals 1, 3, 5, 7 (IN) to terminals 2, 4, 6, 8 (OUT).
- Temperature of the primary conductor should not exceed 120 °C.
- Installation of the transducer must be done, unless otherwise specified on the datasheet, according to LEM Transducer Generic Mounting Rules. Please refer to LEM document N°ANE120504 available on our Web site: <https://www.lem.com/en/file/3137/download>