

## Current Transducer HXS 10-NP/SP3

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

|           |                                            |                                           |              |   |
|-----------|--------------------------------------------|-------------------------------------------|--------------|---|
| $I_{PN}$  | Primary nominal current rms                | Serial                                    | Parallel     |   |
|           |                                            | $\pm 10$                                  | $\pm 20$     | A |
| $I_{PM}$  | Primary current, measuring range           | Serial                                    | Parallel     |   |
|           |                                            | $\pm 30$                                  | $\pm 60$     | A |
| $V_{OUT}$ | Analog Output voltage @ $I_P$              | $V_{OE} \pm (0.625 \cdot I_P / I_{PN})$ V |              |   |
| $G_{TH}$  | Theoretical sensitivity                    | 0.625                                     | $V / I_{PN}$ |   |
| $V_{REF}$ | Reference voltage <sup>1)</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                 | $< 5$                                     | $\Omega$     |   |
| $C_L$     | Capacitive loading ( $\pm 20\%$ )          | $= 4.7$                                   | nF           |   |
| $V_C$     | Supply voltage ( $\pm 5\%$ ) <sup>2)</sup> | 5                                         | V            |   |
| $I_C$     | Current consumption @ $V_C = 5\text{V}$    | 19                                        | mA           |   |

### Accuracy - Dynamic performance data

|                    |                                                                  |                   |                  |
|--------------------|------------------------------------------------------------------|-------------------|------------------|
| $X$                | Accuracy <sup>3)</sup> @ $I_{PN}$ , $T_A = 25^\circ\text{C}$     | $\leq \pm 1$      | %                |
| $\epsilon_L$       | Linearity error                                                  | $\leq \pm 0.5$    | %                |
|                    | 0 .. $I_{PN}$                                                    | $\leq \pm 1$      | %                |
|                    | 0 .. $3 \times I_{PN}$                                           | $\leq \pm 0.4$    | mV/K             |
| $TCV_{OE}$         | Temperature coefficient of $V_{OE}$ (+25.. 85°C)                 | $\leq \pm 0.525$  | mV/K             |
|                    | (-40.. +25°C)                                                    | $\leq \pm 0.01$   | %/K              |
| $TCV_{REF}$        | Temperature coefficient of $V_{REF}$ (+25.. 85°C)                | $\leq \pm 0.015$  | %/K              |
|                    | (-40.. +25°C)                                                    | $\leq \pm 0.15$   | mV/K             |
| $TCV_{OE/V_{REF}}$ | Temperature coefficient of $V_{OE}/V_{REF}$                      | $\leq \pm 0.05\%$ | % of reading/K   |
| $TCG$              | Temperature coefficient of $G$                                   | $\leq \pm 0.0125$ | V                |
| $V_{OE}$           | Electrical offset voltage @ $I_P = 0$ , $T_A = 25^\circ\text{C}$ | $\pm 0.7$         | %                |
| $V_{OM}$           | Magnetic offset voltage @ $I_P = 0$                              | $< 3$             | $\mu\text{s}$    |
| $t_{ra}$           | Reaction time to 10 % of $I_{PN}$ step                           | $< 5$             | $\mu\text{s}$    |
| $t_r$              | Response time to 90 % of $I_{PN}$ step                           | $> 50$            | A/ $\mu\text{s}$ |
| $di/dt$            | di/dt accurately followed                                        | $< 20$            | mVpp             |
| $V_{no}$           | Output voltage noise (DC .. 10 kHz)                              | $< 40$            | mVpp             |
|                    | (DC .. 1 MHz)                                                    | DC .. 50          | kHz              |
| $BW$               | Frequency bandwidth (-3 dB) <sup>4)</sup>                        |                   |                  |

### 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: 1997 |    |

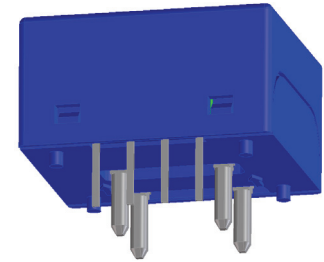
Notes: <sup>1)</sup> It is possible to overdrive  $V_{REF}$  with an external reference voltage between 1.5 - 2.8 V providing its ability to sink or source approximately 5 mA.

<sup>2)</sup> Maximum supply voltage (not operating)  $< 6.5\text{V}$

<sup>3)</sup> Excluding Offset and Magnetic offset voltage.

<sup>4)</sup> Small signal only to avoid excessive heatings of the magnetic core

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



### Features

- Hall effect measuring principle
- Multirange current transducer through PCB pattern lay-out
- Galvanic isolation between primary and secondary circuit
- Isolation test voltage 3500 V between Primary and Secondary
- Low power consumption
- Extremely low profile  $< 11\text{ mm}$
- Single power supply + 5 V
- Fixed offset & sensitivity
- Isolated plastic case recognized according to UL 94-V0.

### Special feature

- Two separate primary windings for dual phase measurement.

### 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 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.

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### Isolation characteristics

|                      |                                                 |       |    |  |
|----------------------|-------------------------------------------------|-------|----|--|
| <b>V<sub>d</sub></b> | Rms voltage for AC isolation test, 50 Hz, 1 min |       |    |  |
|                      | Primary to secondary                            | 3.5   | kV |  |
|                      | Primary 1 to primary 2                          | 2.5   | kV |  |
| <b>dCp</b>           | Creepage distance                               | > 5.5 | mm |  |
| <b>dCl</b>           | Clearance distance                              | > 5.5 | mm |  |
| <b>CTI</b>           | Comparative Tracking Index (group I)            | > 600 | V  |  |

### Applications examples

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

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

|                      | EN 50178 | IEC 61010-1 |
|----------------------|----------|-------------|
| Single isolation     | 600 V    | 600 V       |
| Reinforced isolation | 300 V    | 150 V       |

According to **UL508 standard** and following conditions: Max. Voltage 600V

- Over voltage category OV 3
- Pollution degree PD2

### 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).

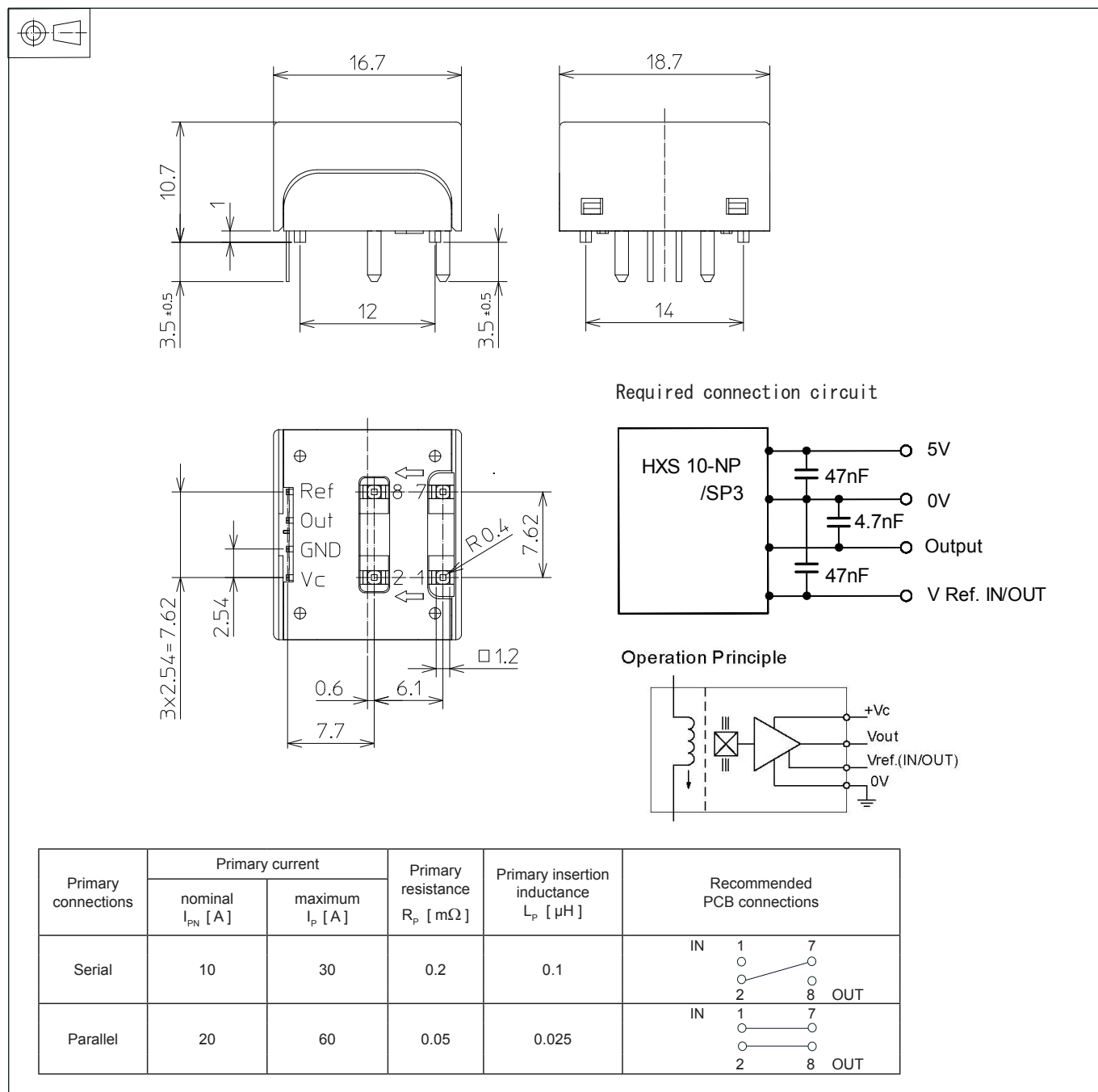
Ignoring this warning can lead to injury and/or cause serious damage.

This transducer is a 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 10-NP/SP3 (in mm)



### Mechanical characteristics

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

### Recommended PCB hole

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

### Remarks

- $V_{OUT}$  is positive when  $I_p$  flows from terminals 1, 7 (IN) to terminals 2, 8 (OUT).
- Temperature of the primary conductor should not exceed 100°C.