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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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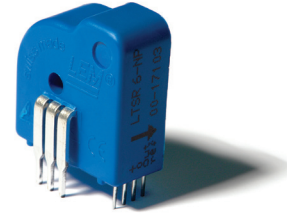


# Current Transducer LTSR 6-NP

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



$$I_{PN} = 6 \text{ At}$$



## Electrical data

$I_{PN}$	Primary nominal RMS current	6	At
$I_{PM}$	Primary current, measuring range	0 ... $\pm 19.2$ <sup>1)</sup>	At
$\hat{I}_P$	Overload capability	250	At
$V_{out}$	Output voltage (analog) @ $I_P$	$2.5 \pm (0.625 \times I_P / I_{PN})$	V
	@ $I_P = 0$	$2.5$ <sup>2)</sup>	V
$V_{ref}$	Reference voltage (internal reference), Ref <sub>OUT</sub> mode	$2.5$ <sup>3)</sup>	V
	Reference voltage (external reference), Ref <sub>IN</sub> mode	1.9 ... $2.7$ <sup>4)</sup>	V
$G$	Sensitivity	104.16	mV/A
$N_S$	Number of secondary turns ( $\pm 0.1$ %)	2000	
$R_L$	Load resistance	$\geq 2$	k $\Omega$
$C_{Lmax}$	Maximum capacitive loading	500	pF
$R_{IM}$	Internal measuring resistance ( $\pm 0.5$ %)	208.33	$\Omega$
$TCR_{IM}$	Temperature coefficient of $R_{IM}$	$< 50$	ppm/K
$U_C$	Supply voltage ( $\pm 5$ %)	5	V
$I_C$	Current consumption @ $U_C = 5$ V	Typical $28 + I_S$ <sup>5)</sup> ( $V_{out}/R_L$ )	mA

## Accuracy - Dynamic performance data

$X$	Accuracy @ $I_{PN}$ , $T_A = 25$ °C	$\pm 0.2$	%
	Accuracy with $R_{IM}$ , @ $I_{PN}$ , $T_A = 25$ °C	$\pm 0.7$	%
$\epsilon_L$	Linearity error	$< 0.1$	%
		Max	
$TCV_{out}$	Temperature coefficient of $V_{out} / V_{ref}$ @ $I_P = 0$	-40 ... +85 °C 150	ppm/K
$TCG$	Temperature coefficient of $G$	-40 ... +85 °C 50 <sup>6)</sup>	ppm/K
$V_{OM}$	Magnetic offset voltage @ $I_P = 0$ ,		
	after an overload of $3 \times I_{PN}$	$\pm 7$	mV
	after an overload of $5 \times I_{PN}$	$\pm 8$	mV
	after an overload of $10 \times I_{PN}$	$\pm 10$	mV
$TCV_{ref}$	Temperature coefficient of $V_{ref}$		
	@ $I_P = 0$ -10 ... +85 °C	50	ppm/K
	-40 ... -10 °C	100	ppm/K
$t_{ra}$	Reaction time @ 10 % of $I_{PN}$	$< 100$	ns
$t_r$	Step response time to 90 % of $I_{PN}$ <sup>7)</sup>	$< 400$	ns
$BW$	Frequency bandwidth (0 ... -0.5 dB)	DC ... 100	kHz
	(-0.5 ... 1 dB)	DC ... 200	kHz

**Notes:** <sup>1)</sup> Only in Ref<sub>OUT</sub> mode or with external Ref less than 2.525 V and greater than 2.475 V. For external Ref<sub>OUT</sub> of these limits see leaflet. <sup>2)</sup>  $V_{out}$  is linked to  $V_{ref}$ , by conception the difference between these two nodes for  $I_P = 0$  is maximum  $\pm 25$  mV,  $2.475 \text{ V} < V_{out} < 2.525 \text{ V}$ . <sup>3)</sup> In Ref<sub>OUT</sub> mode at  $T_A = 25$  °C,  $2.475 \text{ V} < V_{ref} < 2.525 \text{ V}$ . The minimal impedance loading the ref pin should be  $> 220$  k $\Omega$ . Internal impedance = 600  $\Omega$ . For most applications you need to buffer this output to feed it into an A DC for example. <sup>4)</sup> To overdrive the Ref (1.9 V ... 2.7 V) max  $\pm 1$  mA is needed. <sup>5)</sup>  $I_S = I_P / N_S$ . <sup>6)</sup> Only due to  $TCR_{IM}$  <sup>7)</sup> For a  $di/dt > 15 \text{ A}/\mu\text{s}$ .

## Features

- Closed loop (compensated) current transducer using the Hall effect
- Unipolar supply voltage
- Insulating plastic case recognized according to UL 94-V0
- Compact design for PCB mounting
- Incorporated measuring resistance
- Extended measuring resistance
- Access to the internal voltage reference
- Possibility to feed the transducer reference from external supply.

## Advantages

- Excellent accuracy
- Very good linearity
- Low temperature drift
- Optimized response time
- Wide frequency bandwidth
- No insertion losses
- High immunity to external interference
- Current overload capability.

## 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.

### General data

$T_A$	Ambient operating temperature	-40 ... +85	°C
$T_S$	Ambient storage temperature	-40 ... +100	°C
$m$	Mass	10	g
	Standards (see Note <sup>1</sup> in page 1)	EN 50178: 1997 IEC 60950-1: 2001	

### Insulation coordination

$U_d$	RMS voltage for AC insulation test, 50 Hz, 1 min	3	kV
$\hat{U}_W$	Impulse withstand voltage 1.2/50 $\mu$ s	> 8	kV
$U_e$	Partial discharge extinction RMS voltage @ 10 pC	> 1.5 Min	kV
$d_{Cp}$	Creepage distance <sup>1)</sup>	15.35	mm
$d_{Cl}$	Clearance <sup>2)</sup>	6.2	mm
$CTI$	Comparative tracking index (group IIIa)	175	

**Notes:** <sup>1)</sup> Specification according to IEC 1000-4-8 not adhered to in DC, error according to two axes 1.5 % instead of 1 %

<sup>2)</sup> On housing

<sup>3)</sup> On PCB with soldering pattern UTEC93-703.

### 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
$d_{Cp}, d_{Cl}, \hat{U}_W$	Rated insulation voltage	Nominal voltage
Basic insulation	600 V	600 V
Reinforced insulation	300 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.

## UL 508: Ratings and assumptions of certification

File # E189713 Volume: 2 Section: 1

### Standards

- CSA C22.2 NO. 14-10 INDUSTRIAL CONTROL EQUIPMENT - Edition 11
- UL 508 STANDARD FOR INDUSTRIAL CONTROL EQUIPMENT - Edition 17

### Ratings

Parameter	Symbol	Unit	Value
Primary involved potential		V AC/DC	600
Max surrounding air temperature	$T_A$	°C	85
Primary current	$I_P$	A	According to series primary currents
Output voltage	$V_{out}$	V	0 to 5

### Conditions of acceptability

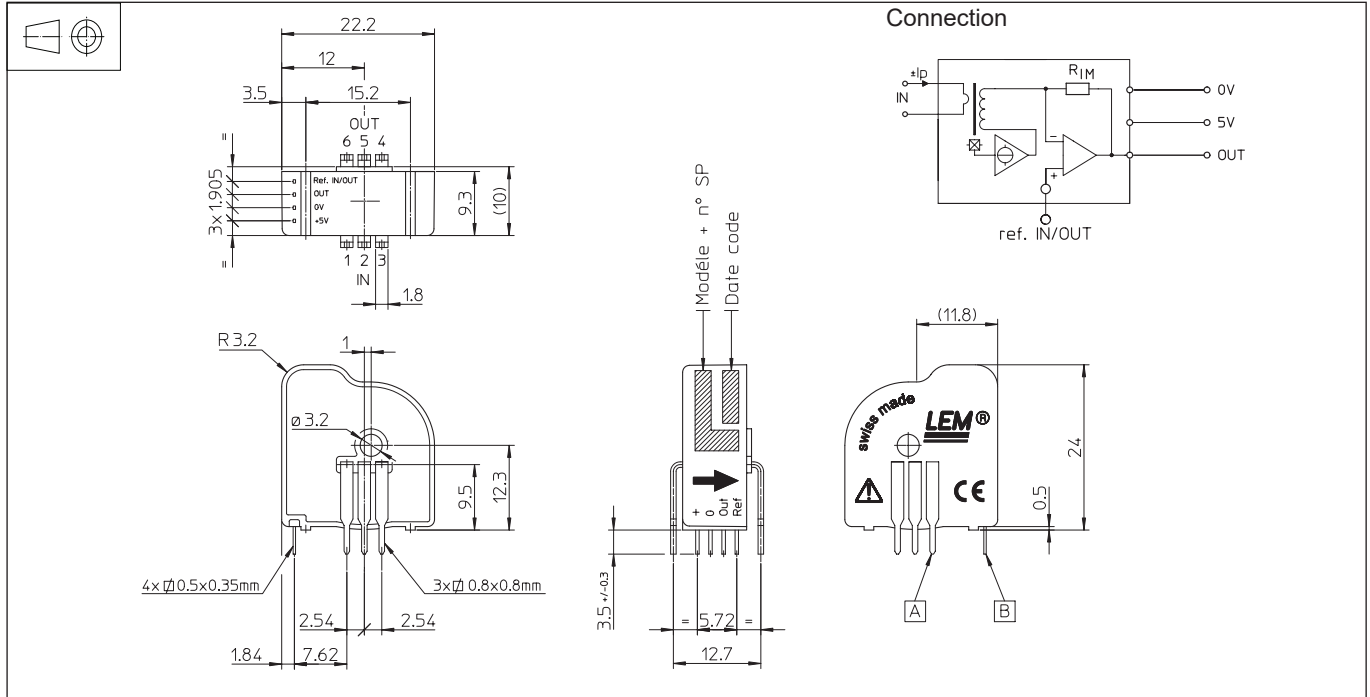
When installed in the end-use equipment, consideration shall be given to the following:

- 1 - *These devices must be mounted in a suitable end-use enclosure.*
- 2 - *The terminals have not been evaluated for field wiring.*
- 3 - *The LTS, LTSR, LTSP Series are intended to be mounted on the printed wiring board of the end-use equipment (with a minimum CTI of 100).*
- 4 - *The LTS, LTSR, LTSP Series shall be used in a pollution degree 2 environment.*
- 5 - *Low voltage circuits are intended to be powered by a circuit derived from an isolating source (such as a transformer, optical isolator, limiting impedance or electro-mechanical relay) and having no direct connection back to the primary circuit (other than through the grounding means).*
- 6 - *The LTS, LTSR, LTSP Series: based on results of temperature tests, in the end-use application, a maximum of 100°C cannot be exceeded at soldering point between primary coil pin and soldering point or on primary bus bar (corrected to the appropriate evaluated max, surrounding air).*
- 7 - *For LTS, LTSR, LTSP Series, the secondary sensing circuit was evaluated as the circuit intended to be supplied from a Limited Voltage/Current circuit defined in UL 508 standard.*

### Marking

Only those products bearing the UL or UR Mark should be considered to be Listed or Recognized and covered under UL's Follow-Up Service. Always look for the Mark on the product.

## Dimensions LTSR 6-NP (in mm)



Number of primary turns	Primary nominal RMS current	Nominal output voltage $V_{out}$ <sup>1)</sup>	Primary resistance $R_P$ [mΩ]	Primary insertion inductance $L_P$ [μH]	Recommended connections
1	±6	2.5 ±0.625	0.18	0.013	
2	±3	2.5 ±0.625	0.81	0.05	
3	±2	2.5 ±0.625	1.62	0.12	

### Mechanical characteristics

- General tolerance: ±0.2 mm
- Transducer fastening of primary: 6 pins 0.8 × 0.8 mm  
Recommended PCB hole: 1.3 mm
- Transducer fastening of secondary: 4 pins 0.5 × 0.35 mm  
Recommended PCB hole: 0.8 mm
- Primary through-hole: Ø 3.2 mm

- This is a standard model. For different versions (supply voltages, turns ratios, unidirectional measurements...), please contact us.

**Note:** <sup>1)</sup> Output voltage when LTSR 6-NP is used with internal reference.

### Remarks

- $V_{out}$  swings above 2.5 V when  $I_p$  flows from terminals 1, 2, 3 to terminals 4, 5, 6 (with the arrow).
- Temperature of the primary conductor should not exceed 100 °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: [Products/Product Documentation](#).

### Output voltage - Primary current

