

## Current Transducer LTR 6-NP

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

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).



### Electrical data

$I_{PN}$	Primary nominal r.m.s. current	6	At
$I_P$	Primary current, measuring range	$0 \dots \pm 19.2^{1)}$	At
$\hat{I}_{PDC}$	Overload capability	250	At
$V_{OUT}$	Analog output voltage @ $I_P$ $I_P = 0$	$2.5 \pm (0.625 \cdot I_P / I_{PN})$	V
$V_{REF}$	Voltage reference (internal reference), refout mode	$2.5^{2)}$	V
	Voltage reference (external reference), refin mode	$2.5^{3)}$	V
$N_S$	Number of secondary turns ( $\pm 0.1 \%$ )	$1.9 \dots 2.7^{4)}$	V
$R_L$	Load resistance	2000	$k\Omega$
$C_L$	Max. capacitive loading	$\geq 2$	pF
$R_{IM}$	Internal measuring resistance ( $\pm 0.5 \%$ )	500	$\Omega$
$TCR_{IM}$	Thermal drift of $R_{IM}$	208.33	ppm/K
$V_C$	Supply voltage ( $\pm 5 \%$ )	$< 50$	V
$I_C$	Current consumption @ $V_C = 5 \text{ V}$	5	mA
	Typ	$28 + I_S^{5)} + (V_{OUT} / R_L)$	mA

### Accuracy - Dynamic performance data

$X$	Accuracy @ $I_{PN}$ , $T_A = 25^\circ\text{C}$	$\pm 0.2$	%
	Accuracy with $R_{IM}$ @ $I_{PN}$ , $T_A = 25^\circ\text{C}$	$\pm 0.7$	%
$\epsilon_L$	Linearity error	$< 0.1$	%
		Max	
$TCV_{OUT}$	Thermal drift of $V_{OUT} / V_{REF}$ @ $I_P = 0$		
	- $40^\circ\text{C} \dots + 85^\circ\text{C}$	150	ppm/K
$TCE_G$	Thermal drift of the gain	50 <sup>6)</sup>	ppm/K
$V_{OM}$	Residual voltage @ $I_P = 0$ , after an overload of $3 \times I_{PN}$	$\pm 0.5$	mV
	$5 \times I_{PN}$	$\pm 2.0$	mV
	$10 \times I_{PN}$	$\pm 2.0$	mV
$TCV_{REF}$	Thermal drift of internal $V_{REF}$ @ $I_P = 0$		
	- $10^\circ\text{C} \dots + 85^\circ\text{C}$	50	ppm/K
	- $40^\circ\text{C} \dots - 10^\circ\text{C}$	100	ppm/K
$t_{ra}$	Reaction time @ 10 % of $I_{PN}$	$< 100$	ns
$t_r$	Response time @ 90 % of $I_{PN}$	$< 400$	ns
$di/dt$	di/dt accurately followed	$> 15$	A/ $\mu\text{s}$
$f$	Frequency bandwidth (0 .. - 0.5 dB)	DC .. 100	kHz
	(- 0.5 .. 1 dB)	DC .. 200	kHz

### General data

$T_A$	Ambient operating temperature	- 40 .. + 85	$^\circ\text{C}$
$T_S$	Ambient storage temperature	- 40 .. + 100	$^\circ\text{C}$
	Insulating material group	III a	
$m$	Mass	10	g
	Standards <sup>7)</sup>	EN 50178 : 1997	
		IEC 60950-1 : 2001	

Notes : see overleaf.

### Features

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

### Advantages

- Excellent accuracy
- Very good linearity
- Very 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.

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## Current Transducer LTSR 6-NP

### Isolation characteristics

$V_d$	R.m.s. voltage for AC isolation test, 50/60 Hz, 1 mn	3	kV
$\hat{V}_w$	Impulse withstand voltage 1.2/50 $\mu$ s	> 8	kV
		Min	
$V_e$	R.m.s. voltage for partial discharge extinction @ 10pC	> 1.5	kV
		Min	
dCp	Creepage distance <sup>8)</sup>	15.35	mm
dCl	Clearance distance <sup>9)</sup>	6.2	mm
CTI	Comparative Tracking Index (Group III a)	175	

### Application 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
dCp, dCl, $\hat{V}_w$	Rated isolation voltage	Nominal voltage
Single isolation	600 V	600 V
Reinforced isolation	300 V	300 V

- Notes :
- <sup>1)</sup> Only in refout mode or with external REF less than 2.525 V and greater than 2.475 V. For external REF out 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 Refout mode at  $T_A = 25^\circ\text{C}$ ,  $2.475 \text{ V} < V_{REF} < 2.525 \text{ V}$ .  
The minimal impedance loading the ref pin should be  $> 220 \text{ kW}$ .  
Internal impedance = 600 W.  
For most applications you need to buffer this output to feed it into an ADC for example.
  - <sup>4)</sup> To overdrive the REF (1.9 V .. 2.7 V) max.  $\pm 1$  mA is needed.
  - <sup>5)</sup> Please see the operation principle on the other side. <sup>6)</sup> Only due to  $TCR_{IM}$ .
  - <sup>7)</sup> Specification according to IEC 1000-4-8 not adhered to in DC, error according to two axes 1.5% instead of 1%. <sup>8)</sup> On housing.
  - <sup>9)</sup> On PCB with soldering pattern UTEC93-703.

### 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.

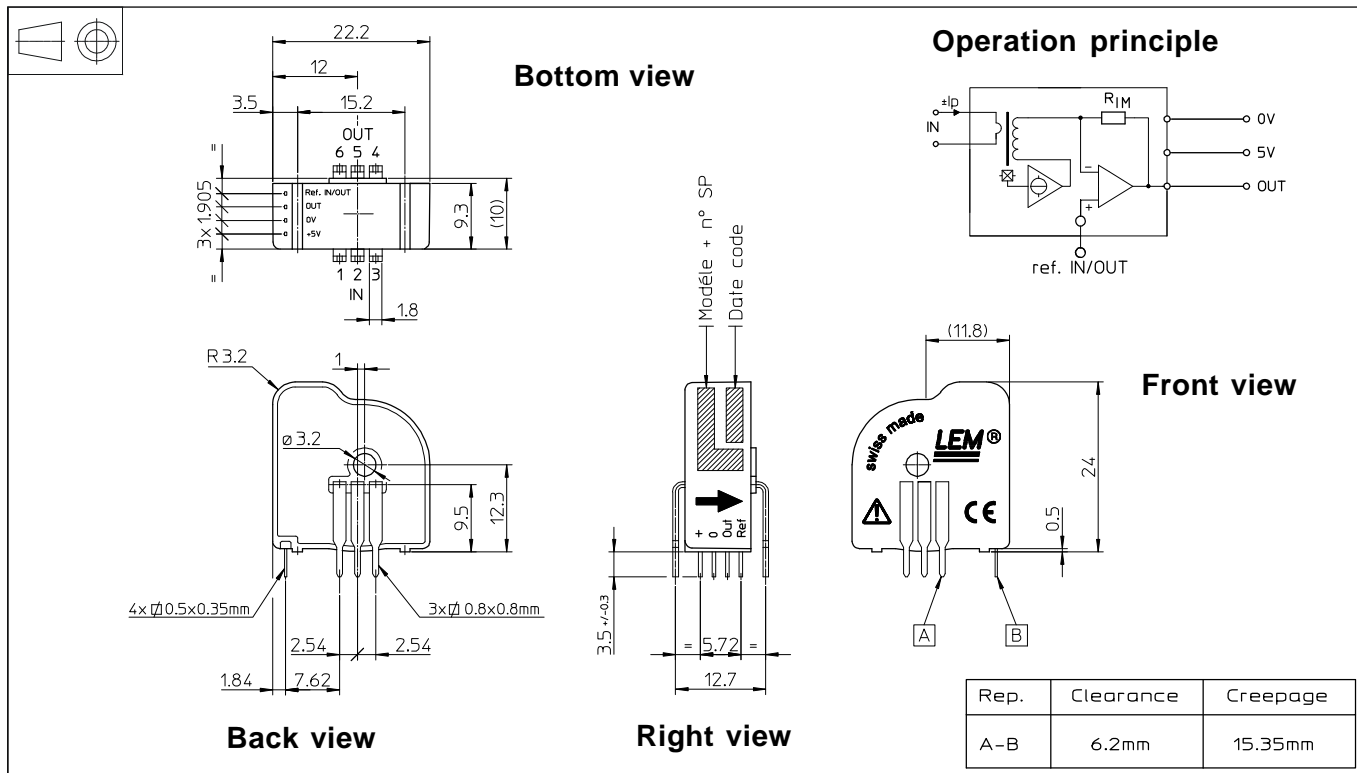
Main supply must be able to be disconnected.

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LEM reserves the right to carry out modifications on its transducers, in order to improve them, without previous notice.

## Dimensions LTSR 6-NP (in mm. 1 mm = 0.0394 inch)



Number of primary turns	Primary nominal r.m.s. current $I_{PN}$ [A]	Nominal <sup>10)</sup> output voltage $V_{OUT}$ [V]	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 ±0.2mm
- Fastening & connection of primary 6 pins 0.8x0.8mm  
Recommended PCB hole 1.3mm
- Fastening & connection of secondary 4 pins 0.5x0.35mm  
Recommended PCB hole 0.8mm
- Additional primary through-hole Ø3.2mm

### Remarks

- $V_{OUT}$  is positive when  $I_P$  flows from terminals 1, 2, 3 to terminals 6, 5, 4
- For the EMC, the acceptance criteria are available on request
- Temperature of the primary jumper should not exceed 100 [°C].

**Note :** <sup>10)</sup> Output voltage when LTSR 6-NP is used with internal reference.

### Output Voltage - Primary Current

