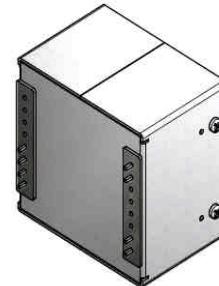


# High Performance Current Transducer

## ITN 12-P/SP2 ULTRASTAB

$I_{PM} = 0 \dots 25 A$

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



### Electrical data

$I_{PND}$	Primary continuous direct current (nominal)	12.5	A
$I_{PN}$	Primary nominal RMS current	8.8	A
$I_{PM}$	Primary current, measuring range (peak limit)	0 ... $\pm 25$	A
$\dot{I}_{P\max}$	Maximum overload capability 100 ms <sup>1)</sup>	$\pm 62.5$	A
$R_M$	Measuring resistance	$R_{M\min} \quad R_{M\max}$	
	Over operating current, temperature and supply voltage range	0 <sup>2)</sup>	$\Omega$
$I_{SNDC}$	Secondary continuous direct current (nominal)	0 ... $\pm 50$	mA
$I_{SN}$	Secondary nominal RMS current	35	mA
$K_N$	Conversion ratio	1 : 250	
$U_C$	Supply voltage ( $\pm 5\%$ )	$\pm 15$	V
$I_C$	Current consumption $\pm 15$ V	$\leq 60 + I_S$	mA

### Accuracy - Dynamic performance data

$\varepsilon_L$	Linearity error <sup>3)</sup>	$\leq 4$	ppm
$I_{OE}$	Electrical offset current + self magnetization + effect of earth magnetic field @ $T_A = 25^\circ C$ <sup>3)</sup>	$< 100$	ppm
$\Delta I_{OE}$	Offset stability (no load) <sup>3)</sup>	$< 5$	ppm/month
$TCI_{OE}$	Temperature coefficient of $I_{OE}$ ( $10^\circ C \dots 45^\circ C$ ) <sup>3)</sup>	$< 2$	ppm/K
	Offset vs. power supply stability @ $T_A = 25^\circ C$ <sup>3)</sup> @ $U_C = \pm 15 V \pm 5\%$	$< 1$	ppm/% of $U_C = \pm 15 V$

### General data

$RH$	Relative humidity (non condensing)	20 ... 80	%
$T_A$	Ambient operating temperature	+10 ... +45	$^\circ C$
$T_S$	Ambient storage temperature	-20 ... +85	$^\circ C$
$R_S$	Resistance of secondary winding @ $T_A = 25^\circ C$	90	$\Omega$
$m$	Mass	0.35	kg

Notes: <sup>1)</sup> Single pulse only, not AC.

Overload conditions of use as described on page 3.

<sup>2)</sup> Max value of  $R_M$  is given in figures on page 4.

<sup>3)</sup> All ppm figures refer to secondary measuring range 50 mA.

### Features

- Closed loop (compensated) current transducer using an extremely accurate zero flux detector
- Mountable onto a PCB
- Metal housing for high immunity against external interference.

### Special feature

- Lower offset.

### Advantages

- Excellent accuracy
- Very good linearity
- Low temperature drift
- Wide frequency bandwidth
- High immunity to external electrostatic and magnetic fields interference
- High resolution
- Low noise on output signal
- Low noise feedback to main conductor.

### Applications

- Feed back element in precision current regulated devices (power supplies...)
- Calibration unit
- Precise and high-stability inverters
- Energy measurement
- Medical equipment.

### Application domain

- Industrial and Medical.

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### Insulation coordination

Between primary and secondary

$U_b$	Rated insulation RMS voltage, reinforced insulation Rated insulation RMS voltage, single insulation with IEC 61010-1 standards and following conditions - Over voltage category III - Pollution degree 2	150 300	V V
$U_d$	RMS voltage for AC insulation test, 50/60 Hz, 1 min	2.4 <sup>1)</sup>	kV
$\hat{U}_w$	Impulse withstand voltage 1.2/50 $\mu$ s	4.3	kV
$U_b$	Rated insulation RMS voltage, reinforced insulation Rated insulation RMS voltage, single insulation with EN 50178 standards and following conditions - Over voltage category III - Pollution degree 2	150 300	V V
$d_{cp}$	Creepage distance	4.7	mm
$d_{cl}$	Clearance	3.3	mm
CTI	Comparative tracking index (group IIIb)	175	Min

Note: <sup>1)</sup> Between primary and secondary + shield.

### 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.

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### Output noise figures: @ 25 °C

Random RMS noise ppm:

0 – 10 Hz	0 – 100 Hz	0 – 1 kHz	0 – 10 kHz	0 – 100 kHz
< 0.4	< 0.5	< 0.7	< 5	< 10

Re-injected RMS noise measured on primary cable < 5  $\mu$ V  
 (DC – 50 kHz)

### Dynamic performance data

$BW$	Frequency bandwidth for small signal 0.5 %, of $I_{P_N \text{ DC}}$ $(\pm 1 \text{ dB})$ $(\pm 3 \text{ dB})$	DC ... 100	kHz
$t_r$	Response time <sup>1)</sup> to 90 % of $I_{P_N}$	< 1	$\mu$ s

Note: <sup>1)</sup> For a  $di/dt > 20 \text{ A}/\mu\text{s}$ .

### Over current protection - Electrical specification - Status

As soon as electrical saturation appears, the transducer switches from normal operation to over current mode.

This electrical saturation appears in any case beyond twice the measuring range.

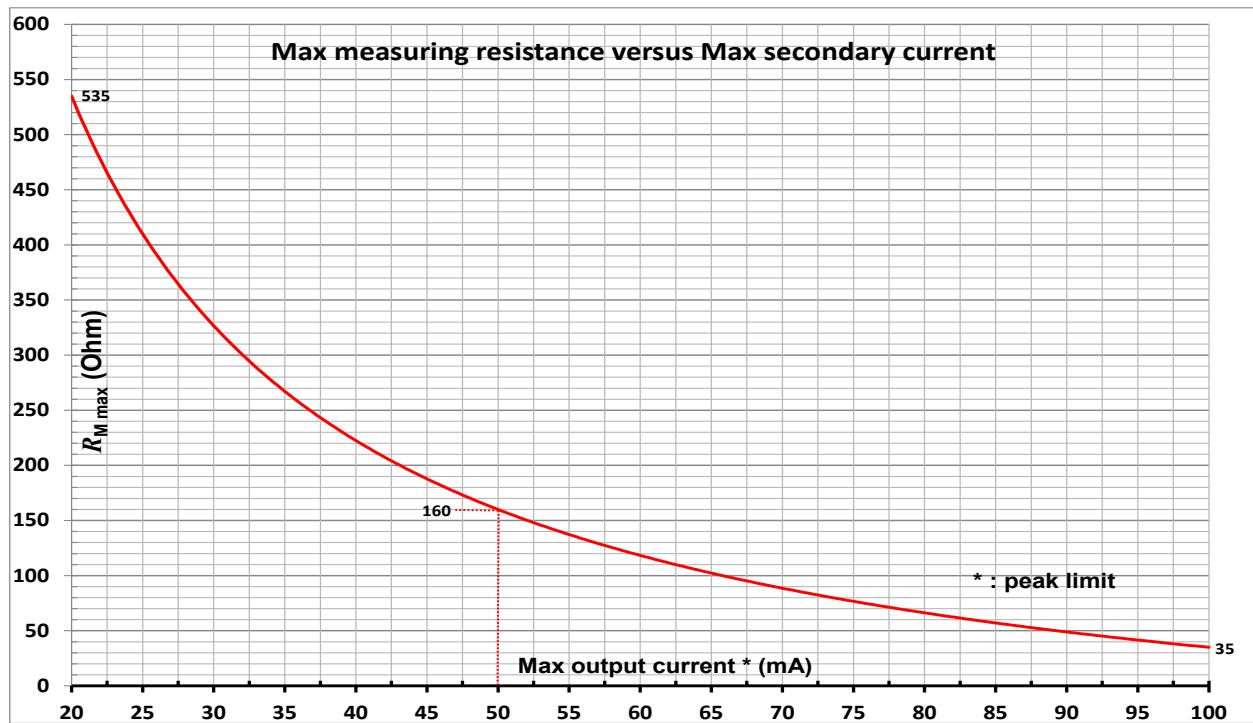
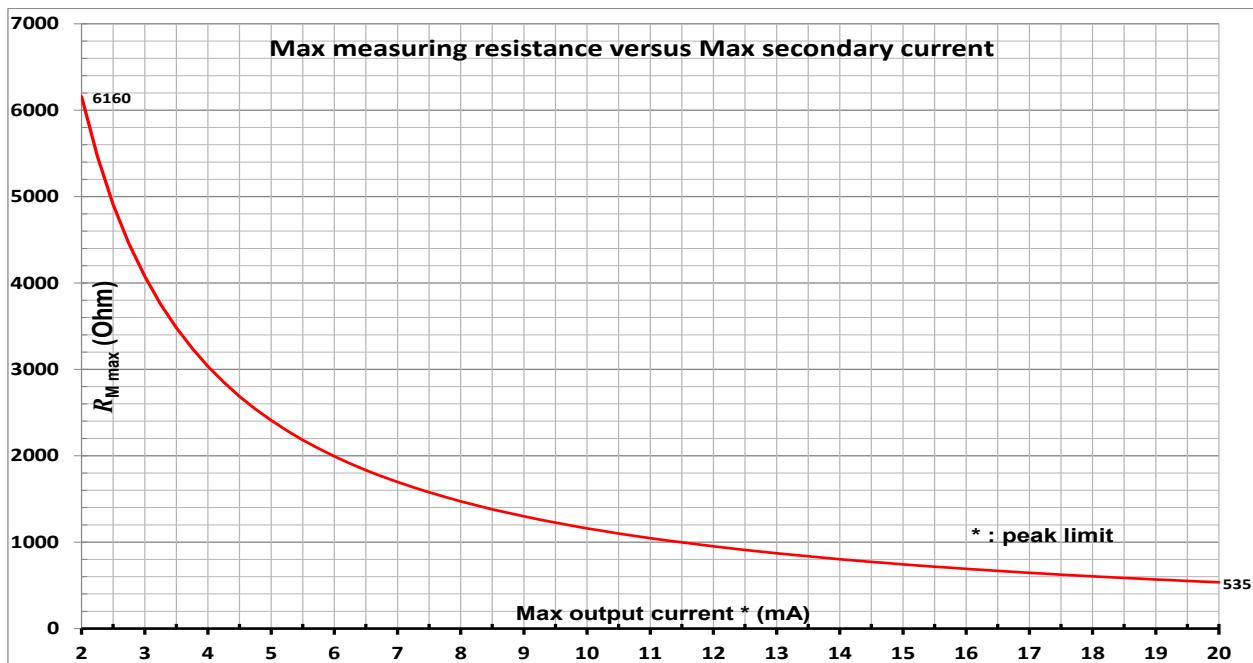
The primary current corresponding to this trip level is related to the temperature inside the transducer.

Under these conditions:

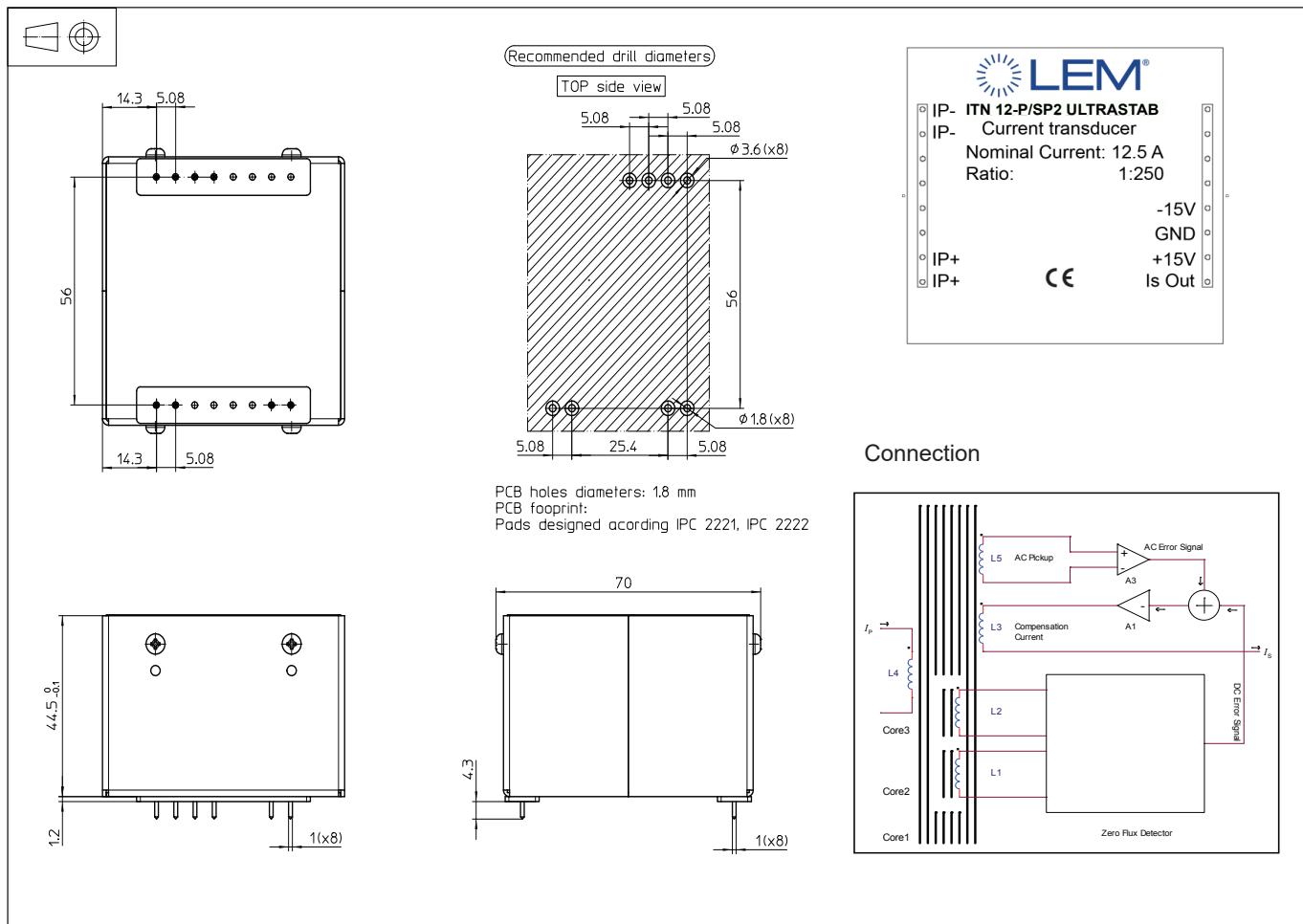
- Fault level  $I_p > 200 \text{ % of } I_{P_N \text{ DC}}$
- Primary current must not exceed 25 A
- If the primary current has exceeded the maximum  $I_p = 25 \text{ A}$  or the device has been powered up with primary current flowing, it will enter the overload state. In this situation the output current will remain higher than  $\pm 100 \text{ mA}$  (maximum  $\pm 120 \text{ mA}$  with 20 ohm burden resistor), independent of the primary current.
- Action in case of overload:
  1. Make sure the primary current is switched off.
  2. Power down the device for one second.
  3. Power up the device.
  4. Reestablish the primary current.

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### Max measuring resistance versus Max secondary current



## Dimensions ITN 12-P/SP2 ULTRASTAB (in mm)



## Mechanical characteristics

- General tolerance
- Fastening and connection of primary
- Fastening and connection of secondary
- Recommended PCB hole

$\pm 0.5$  mm  
 4 pins  $1 \times 1$  mm  
 4 pins  $1 \times 1$  mm  
 1.8 mm

## Remarks

- $I_s$  is positive when  $I_p$  flows from terminals  $I_p+$  to terminals  $I_p-$ .
- Temperature of the primary conductor should not exceed 65 °C.
- Do not apply primary current to unpowered device.
- 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>

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