

# High Performance Current Transducer ITN 12-P ULTRASTAB

For the electronic measurement of currents: DC, AC, pulsed..., with galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).



$I_{PM} = 0 \dots 12.5 \text{ A}$



## Electrical data

$I_{PN}$	Primary nominal current DC	12.5	A
$I_{PN}$	Primary nominal current rms	8.8	A
$I_{PM}$	Primary current, measuring range	0 .. $\pm 12.5$	A
$\hat{I}_p$	Max overload capability 100 ms <sup>1)</sup>	$\pm 62.5$	A
$R_M$	Measuring resistance	$R_{M \min}$ $R_{M \max}$	
	Over operating current, temperature and supply voltage range	0 31	$\Omega$
$I_S$	Secondary current	0 .. $\pm 50$	mA
$I_{SN}$	Secondary nominal current rms	35	mA
$K_N$	Conversion ratio	1 : 250	
$V_C$	Supply voltage ( $\pm 5 \%$ )	$\pm 15$	V
$I_C$	Current consumption $\pm 15 \text{ V}$	$\leq 60 + I_S$	mA

## Accuracy - Dynamic performance data

$\epsilon_L$	Linearity error <sup>2)</sup>	$\leq 4$	ppm
$I_{OE}$	Electrical offset current + self magnetization + effect of earth magnetic field @ $T_A = 25^\circ\text{C}$ <sup>2)</sup>	$< 500$	ppm
$\Delta I_{OE}$	Offset stability (no load) <sup>2)</sup>	$< 5$	ppm/month
$TCI_{OE}$	Temperature coefficient of $I_{OE}$ ( $10^\circ\text{C} \dots 45^\circ\text{C}$ ) <sup>2)</sup>	$< 2$	ppm/K
	Offset vs. power supply stability @ $T_A = 25^\circ\text{C}$ <sup>2)</sup> @ $V_C = \pm 15 \text{ V} \pm 5 \%$	$< 1$	ppm/% of $V_C = \pm 15 \text{ V}$

## General data

$T_A$	Ambient operating temperature	10 .. + 45	$^\circ\text{C}$
	Humidity (non condensing)	20 - 80 %	RH
$T_S$	Ambient storage temperature	- 20 .. + 85	$^\circ\text{C}$
	Humidity (non condensing)	20 - 80 %	RH
$R_S$	Secondary coil resistance @ $T_A = 25^\circ\text{C}$	90	$\Omega$
$m$	Mass	0.35	kg

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

Overload conditions of use as described page 4.

<sup>2)</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 on to a PCB
- Metal housing for high immunity against external interference.

## Advantages

- Very high accuracy
- Excellent linearity
- Extremely 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.

## Current Transducer ITN 12-P ULTRASTAB

### Isolation characteristics

Between primary and secondary

$V_b$	Rated isolation voltage rms, reinforced isolation	150	V
	Rated isolation voltage rms, single isolation	300	V
with IEC 61010-1 standards and following conditions			
- Over voltage category III			
- Pollution degree 2			
$V_d$	Rms voltage for AC isolation test, 50/60 Hz, 1 min	2.4 <sup>1)</sup>	kV
$\hat{V}_w$	Impulse withstand voltage 1.2/50 $\mu$ s	4.3	kV
$V_b$	Rated isolation voltage rms, reinforced isolation	150	V
	Rated isolation voltage rms, single isolation	300	V
with EN 50178 standards and following conditions			
- Over voltage category III			
- Pollution degree 2			
dCp	Creepage distance	4.7	mm
dCI	Clearance distance	3.3	mm
CTI	Comparative Tracking Index (Group IIIb)	175	V

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

### 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.

## Current Transducer ITN 12-P ULTRASTAB

### Output noise figures: @ 25°C

Random Noise ppm (rms):

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 noise measured on primary cable (DC - 50 kHz) < 5  $\mu V_{RMS}$

### Dynamic performance data

**BW** Frequency bandwidth for small signal 0.5 %, of  $I_{PN}$  (DC)  
 ( $\pm 1$  dB) DC .. 100 kHz  
 ( $\pm 3$  dB) DC .. > 500 kHz  
**di/dt** di/dt accurately followed > 20 A/ $\mu$ s  
**t<sub>r</sub>** Response time <sup>1)</sup> to 90 % of  $I_{PN}$  step < 1  $\mu$ s

Note: <sup>1)</sup> ITN 12-P is measured with input having di/dt of 20 A/ $\mu$ s.

## Current Transducer ITN 12-NP ULTRASTAB

### Over current protection - Electrical specification - Status

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

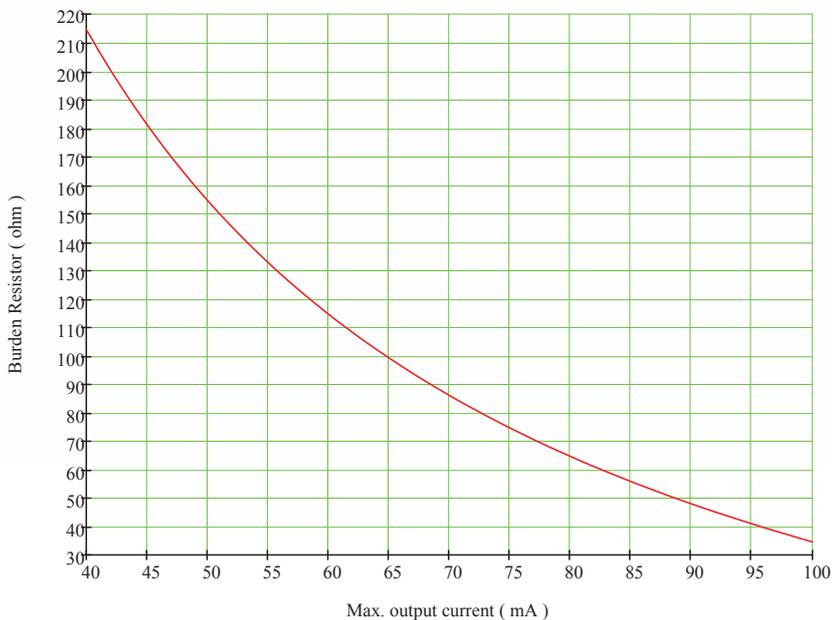
This electrical saturation appears in any case beyond twice the measuring range. The primary current corresponding to this trip level is related to the temperature inside the transducer.

Under this condition:

- Fault level  $I_p > 200\% \text{ of } I_{PN DC}$
- Primary current must not exceed 25 A
- If the primary current has exceeded the max.  $I_p = 25 \text{ A}$  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  $\pm 100 \text{ mA}$  (max  $\pm 150 \text{ mA}$  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.

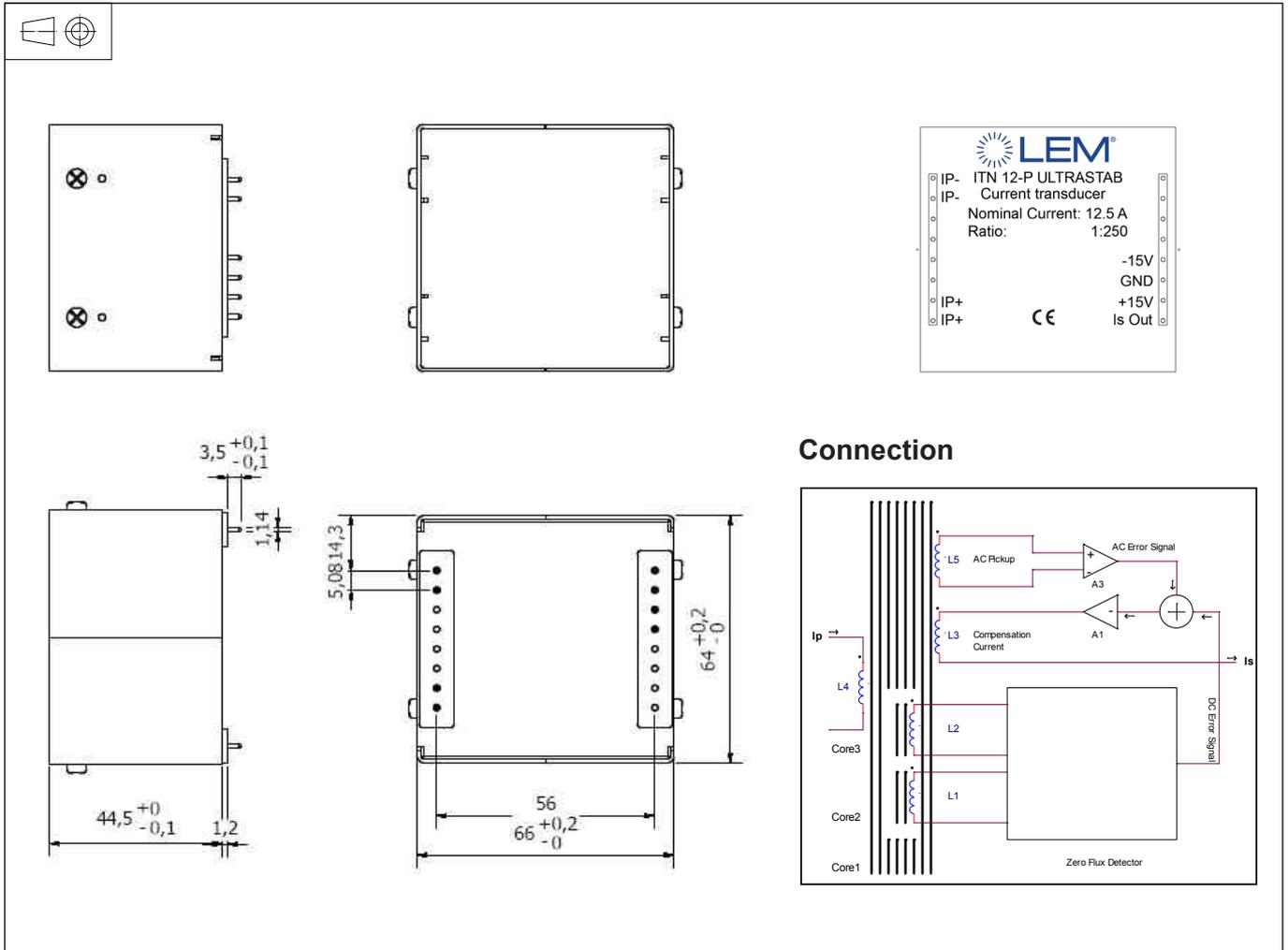
### Max secondary current versus measuring resistor

The graph shows the maximum allowable burden resistor versus output current



- Notes:
- a) Continuous output current must not exceed 50mA
  - b) Specifications has been verified with burden resistors equal to or less than 31 ohm

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



### Mechanical characteristics

- General tolerance  $\pm 0.3$  mm
- Fastening and connection of primary 4 pins 1 x 1 mm
- Fastening and connection of secondary 4 pins 1 x 1 mm
- Recommended PCB hole 1.6 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.