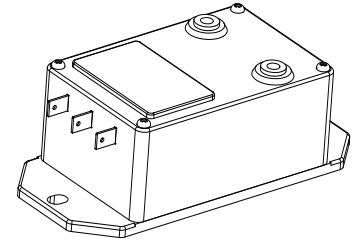


# Current Transducer LV 100/SP47

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



$$I_{PN} = 10 \text{ mA}$$



## Electrical data

$I_{PN}$	Primary nominal RMS current	10	mA
$I_{PM}$	Primary current, measuring range	0 ... $\pm 20$	mA
$R_M$	Measuring resistance with $\pm 12 \text{ V}$	@ $\pm 10 \text{ mA}_{\text{max}}$	$R_{M \text{ min}}$ 0 $R_{M \text{ max}}$ 140 $\Omega$
		@ $\pm 20 \text{ mA}_{\text{max}}$	0    40 $\Omega$
	with $\pm 18 \text{ V}$	@ $\pm 10 \text{ mA}_{\text{max}}$	80    250 $\Omega$
		@ $\pm 20 \text{ mA}_{\text{max}}$	80    90 $\Omega$
$I_{SN}$	Secondary nominal RMS current	50	mA
$N_p/N_s$	Turns ratio	10000 : 2000	
$S$	Sensitivity	5	mA/mA
$U_C$	Supply voltage ( $\pm 5 \%$ )	$\pm 12 \dots 18$	V
$I_C$	Current consumption	25 (@ $\pm 18 \text{ V}$ ) + $I_S$	mA

## Accuracy - Dynamic performance data

$\epsilon_{\text{tot}}$	Total error @ $I_{PN}, T_A = 25 \text{ }^\circ\text{C}$	$\pm 0.7$	%
$\epsilon_L$	Linearity error	< 0.1	%
$I_O$	Offset current @ $U_P = 0, T_A = 25 \text{ }^\circ\text{C}$	Typ	Max $\pm 0.3$ mA
$I_{OT}$	Temperature variation of $I_O$	-40 $^\circ\text{C}$ ... +85 $^\circ\text{C}$	$\pm 0.6$ $\pm 1.0$ mA
		-25 $^\circ\text{C}$ ... +70 $^\circ\text{C}$	$\pm 0.4$ $\pm 0.6$ mA
$t_{D90}$	Delay time to 90 % of the final output value for $U_{PN \text{ step}}^1$	20 ... 100	$\mu\text{s}$

## General data

$T_A$	Ambient operating temperature	-40 ... +85	$^\circ\text{C}$
$T_{A \text{ st}}$	Ambient storage temperature	-45 ... +90	$^\circ\text{C}$
$R_P$	Resistance of primary winding @ $T_A = 85 \text{ }^\circ\text{C}$	2000	$\Omega$
$R_S$	Resistance of secondary winding @ $T_A = 85 \text{ }^\circ\text{C}$	63	$\Omega$
$m$	Mass	460	g
	Standard <sup>2)</sup>	EN 50155: 2017	

**Notes:** <sup>1)</sup>  $R_1 = 100 \text{ k}\Omega$  ( $L/R$  constant, produced by the resistance and inductance of the primary circuit)

<sup>2)</sup> Additional information available on request.

## Features

- Closed loop (compensated) voltage transducer using the Hall effect
- Insulating plastic case recognized according to UL 94-V0.

## Principle of use

- For voltage measurements, a current proportional to the measured voltage must be collected through an external resistor  $R_1$  which is selected by the user and installed in series with the primary circuit of the transducer.

## Special features

- $U_C = \pm 12 \dots 18 (\pm 5 \%) \text{ V}$
- $U_d = 9 \text{ kV}$
- $T_A = -40 \text{ }^\circ\text{C} \dots +85 \text{ }^\circ\text{C}$ .

## Advantages

- Excellent accuracy
- Very good linearity
- Low temperature drift
- Low delay time
- Wide frequency bandwidth
- High immunity to external interference
- Low disturbance in common mode.

## Applications

- Single or three phase inverters
- Propulsion and braking choppers
- Propulsion converters
- Auxiliary converters
- Battery chargers.

## Application domain

- Railway (fixed installations and onboard).

**Current Transducer LV 100/SP47**

**Insulation coordination**

$U_d$	RMS voltage for AC insulation test, 50 Hz, 1 min	9	kV
		Min	
$d_{cp}$	Creepage distance	77	mm
$d_{cl}$	Clearance	74.1	mm
$CTI$	Comparative tracking index (group I)	600	

**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

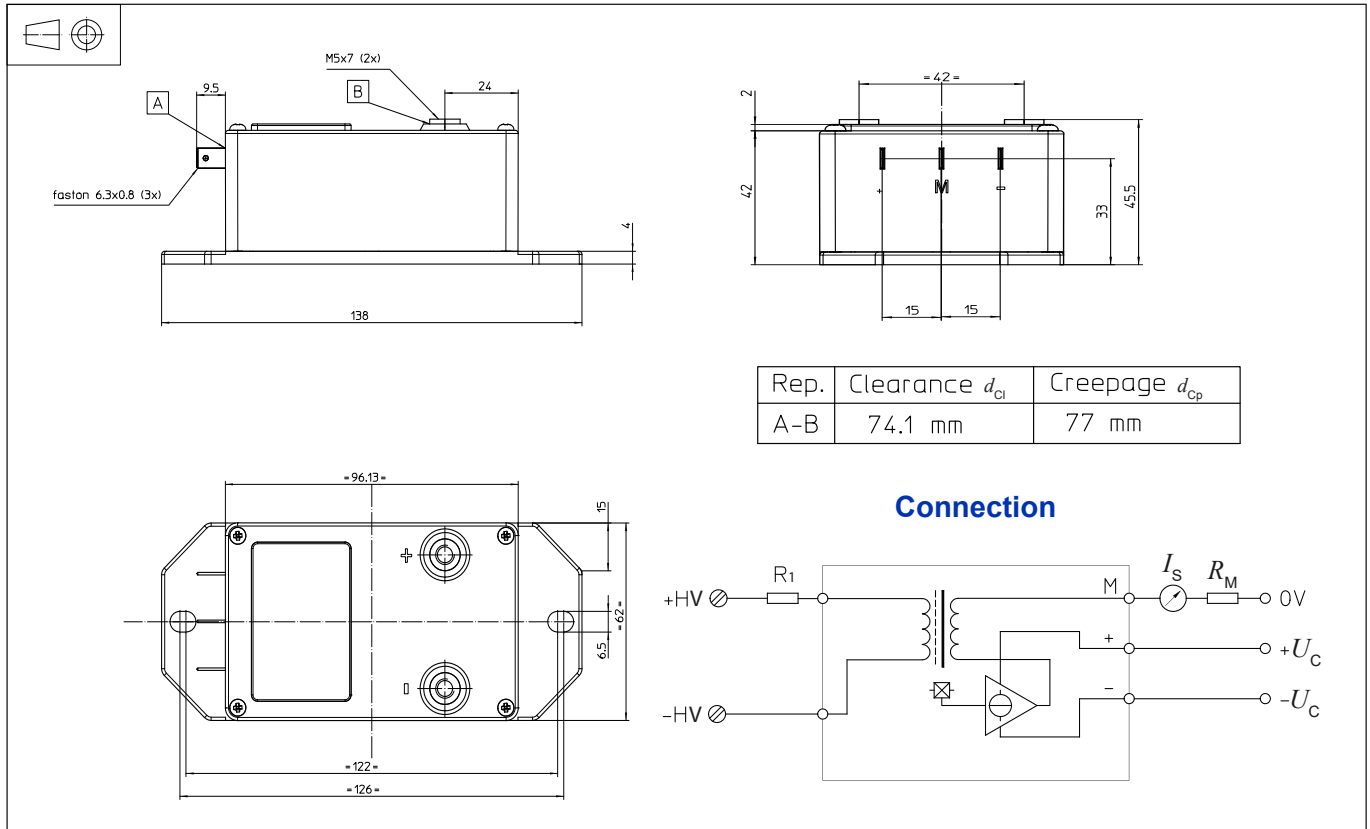
When operating the transducer, certain parts of the module can carry hazardous voltage (e.g. primary busbar, power supply). Ignoring this warning can lead to injury and/or cause serious damage.

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.

## Dimensions LV 100/SP47 (in mm)



### Mechanical characteristics

- General tolerance  $\pm 0.3$  mm
- Transducer fastening
  - 2 holes  $\varnothing 6.5$  mm
  - 2 M6 steel screws
- Recommended fastening torque 5 N·m
- Connection of primary
  - M5 screw terminals
  - Recommended fastening torque 2.2 N·m
- Connection of secondary Faston  $6.3 \times 0.8$  mm

### Remarks

- $I_S$  is positive when  $U_p$  is applied on terminal +HV.
- 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: <https://www.lem.com/en/file/3137/download/>.

### Instructions for use of the current transducer model LV 100/SP47

Primary resistor  $R_1$ : the transducer's optimum total error is obtained at the nominal primary current. As far as possible,  $R_1$  should be calculated so that the nominal voltage to be measured corresponds to a primary current of 10 mA.

Example: Voltage to be measured  $U_{PN} = 1000$  V

- a)  $R_1 = 100$  k $\Omega$  / 40 W,  $I_p = 10$  mA      Total error =  $\pm 0.7$  % of  $U_{PN}$  (@  $T_A = +25$  °C)  
 b)  $R_1 = 400$  k $\Omega$  / 5 W,  $I_p = 2.5$  mA      Total error =  $\pm 2.5$  % of  $U_{PN}$  (@  $T_A = +25$  °C)

Operating range (recommended): taking into account the resistance of the primary windings (which must remain low compared to  $R_1$  in order to keep thermal deviation as low as possible) and the insulation, this transducer is suitable for measuring nominal voltages from 100 to 2500 V.