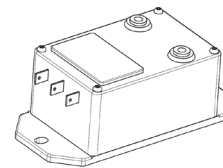# LEM

Current Transducer LV 100/SP41

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

I_{PN} = 10 mA

5 YEAR WARRANTY by LEM CE UKCA RoHS

Features

- Closed loop (compensated) current 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 = ±15 … 24 (±5 %) V
- I_T = 0.1 A
- N_T = 100 turns
- Completely potted
- Faston on primary winding
- CCQ or CECC components and high-reliability components for transistors, zener diodes and operational amplifiers.

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).

Electrical data

I_{PN}	Primary nominal RMS current			10	mA
I_{PM}	Primary current, measuring range			0 … ±20	mA
R_M	Measuring resistance		$R_{M\,min}$	$R_{M\,max}$	
	with ±15 V	@ ±10 mA $_{max}$	0	200	Ω
		@ ±20 mA $_{max}$	0	70	Ω
	with ±24 V	@ ±10 mA $_{max}$	60	360	Ω
		@ ±20 mA $_{max}$	60	150	Ω
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 (±5 %)			±15 … 24	V
I_C	Current consumption			25 (@ ±24 V) + I_S	mA

Accuracy - Dynamic performance data

			Typ	Max	
ε_{tot}	Total error @ I_{PN}, T_A = 25 °C	±0.7			%
ε_L	Linearity error	< 0.1			%
I_O	Offset current @ U_P = 0, T_A = 25 °C			±0.3	mA
I_{OT}	Temperature variation of I_O −25 °C … +70 °C		±0.4	±0.6	mA
$t_{D\,90}$	Delay time to 90 % of the final output value for U_{PN} step[1]	< 100			µs

Test circuit

N_T	Number of turns	100	
R_T	Resistance of test winding @ T_A = 70 °C	4	Ω
I_T	Test current [2]	0.1	A

General data

T_A	Ambient operating temperature	−25 … +70	°C
$T_{A\,st}$	Ambient storage temperature	−40 … +85	°C
R_P	Resistance of primary winding @ T_A = 70 °C	1900	Ω
R_S	Resistance of secondary winding @ T_A = 70 °C	60	Ω
m	Mass	450	g
	Standard [3]	EN 50155: 2017	

Notes: [1] R_1 = 100 kΩ (L/R constant, produced by the resistance and inductance of the primary circuit)
 [2] Test current 0.5 A RMS can be applied for maximum 10 s within 2 hours @ T_A = 25 °C
 [3] Additional information available on request.

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Insulation coordination		
U_d	RMS voltage for AC insulation test, 50 Hz, 1 min	6 [4] kV
CTI	Comparative tracking index (group IIIa)	< 249

Note: [4] Between primary and secondary + test winding.

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).
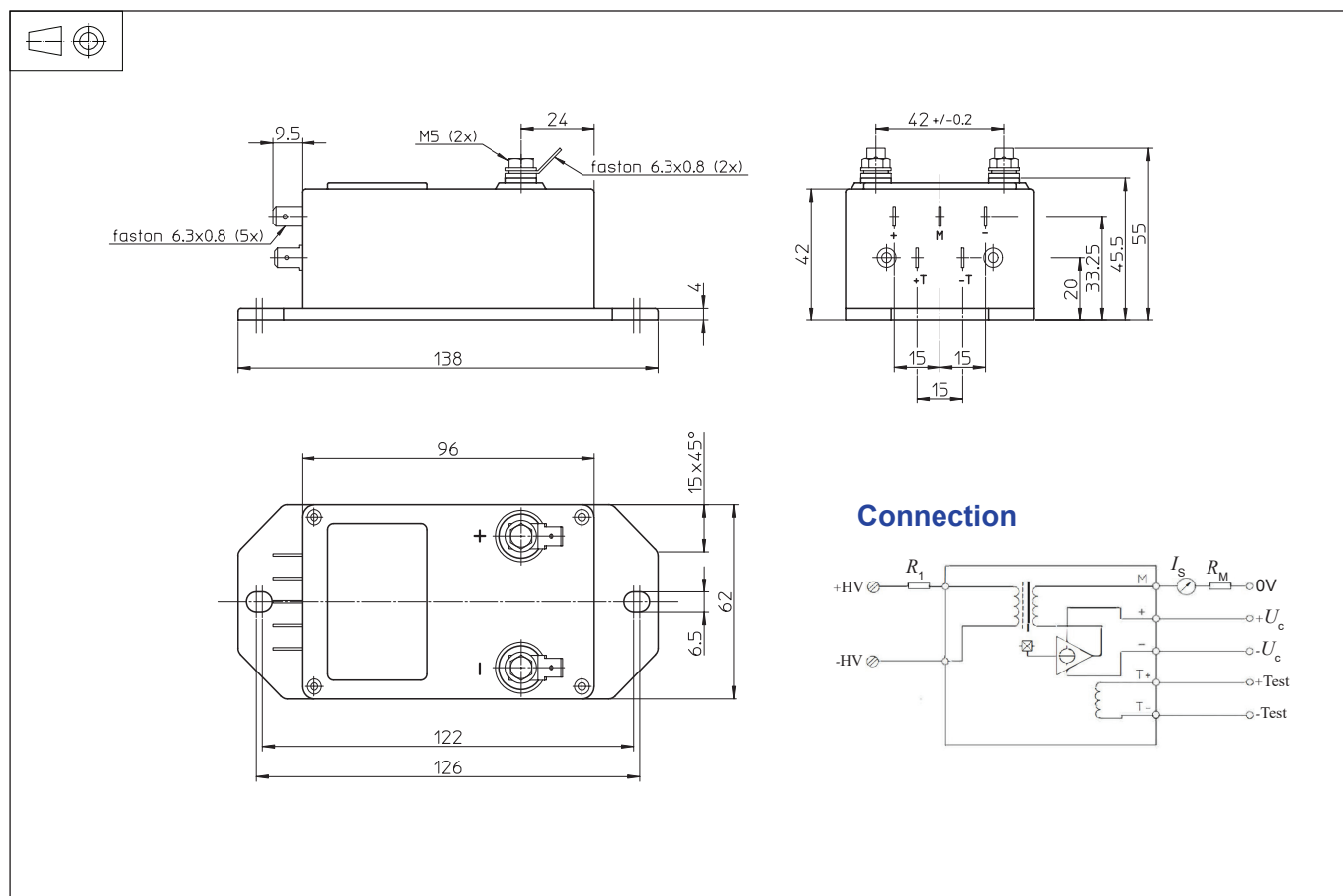Ignoring this warning can lead to injury and/or cause serious damage.
This transducer is a build-in device, whose conducting parts must be inaccessible after installation.
A protective housing or additional shield could be used.
Main supply must be able to be disconnected.

Dimensions LV 100/SP41 (in mm)

Connection

Mechanical characteristics

- General tolerance   ±0.3 mm
- Transducer fastening   2 holes ⌀ 6.5 mm
                M6 steel screws
  Recommended fastening torque 5 N·m
- Connection of primary   Faston 6.3 × 0.8 mm
- Connection of secondary Faston 6.3 × 0.8 mm

Remarks

- I_S is positive when U_P is applied on terminal +HV.
- The primary circuit of the transducer must be linked to the connections where the voltage has to be measured.
- 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/SP41

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 kΩ / 40 W, I_P = 10 mA   Total error = ±0.7 % of U_{PN} (@ T_A = +25 °C)
b) R_1 = 400 kΩ/   5 W, I_P = 2.5 mA   Total error = ±3 % 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 4000 V.