

# **Current Transducer RA 1005-S**

For the measurement of alternating components in a determined bandwidth, contained in a continuous primary current.



# Electrical data

M	Mutual inductance	3.98 · 10-6	Н
$U_{\mathrm{out}}$	Output voltage (instantaneous) <sup>1)</sup>	$U_{\text{out}} = M. \frac{di_{\text{P}}}{dt}$	V
$U_{\mathrm{out}}$	Output voltage (sinusoidal wave) <sup>1)</sup>	$U_{\text{out}} = M. \frac{\text{d}i_{\text{P}}}{\text{d}t}$ $U_{\text{out}} = 2 \cdot \pi \cdot M \cdot f \cdot I_{\text{PAC}}$	V
	with $2 \cdot \pi \cdot M =$		Н
	Example: @ 50 Hz, 20 A $U_{\rm out}$ = $2 \cdot \pi \cdot 3.98 \cdot 10^{-6} \cdot 50 \cdot 20$ =	25	mV
$L_{\mathrm{S}}$	Inductance of secondary windings (±3 %)	5.9	mΗ
$N_{\mathtt{S}}$	Number of secondary turns	1480	

## **Accuracy - Dynamic performance data**

BW	Frequency bandwith		20 3000	Hz
$\varepsilon$	Error @ $I_{PAC}$ = 0.1 20 A, $T_{A}$ =	: 25 °C	< ±3	%
	$BW = 20 \dots 3000$	Hz		
$arphi_{ m or}$	Rated phase offset		-90°	
$\varphi U_{\mathrm{out}}$	Phase error of output voltage U	$I_{\rm out}$ 1), $I_{\rm P}$ sinusoidal		
		<i>BW</i> = 20 100 Hz	−90° ±5°	
		BW = 100 3000 Hz	z −90° ±2.5°	
$\frac{\Delta M_T}{M}$ . 100	Thermal drift of $M_{ m T}$	$T_{\rm A}$ = -40 + 85 °C	< ±0.3	%
$\frac{\Delta L_T}{L}$ . 100	Thermal drift of $L_{\rm S}$ and $L_{\rm T}$	T <sub>A</sub> = −40 + 85 °C	< ±0.3	%

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$L_{T}$	Inductance of secondary winding (±4 %)	6	mH
$N_{T}$	Number of turns (test winding)	1440	
$R_{T}$	Resistance of test winding		
	@ $T_A = 85  ^{\circ}\text{C}  (\pm 5  \%)$	307	Ω
$I_{T}$	Test current	< 40	mA

### General data

$T_{\rm A} \\ T_{\rm Ast}$	Ambient operating temperature Ambient storage temperature	-40 85 -45 90	°C
$T_{B}$	Primary conductor temperature	≤ 100	°C
$R_{\rm S}$	Resistance of secondary winding @ $T_A$ = 85 °C		
_	(±4 %)	312	Ω
m	Mass	760	g
	Standards	EN 50155: 20	07
		EN 50121-3-2	2: 2015

Note: 1) Without load resistance.



#### **Feature**

 Insulated plastic case recognized according to UL 94-V0.

## **Advantages**

- No insertion losses
- · Current overload capability.

## **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 RA 1005-S**

Insulation coordination			
$U_{\rm d}$	RMS voltage for AC insulation test, 50 Hz, 1 min	12 <sup>1)</sup> 1.5 <sup>2)</sup>	kV kV
		0.5 3)	kV
$U_{t}$	Partial discharge RMS test voltage ( $q_{\scriptscriptstyle m}$ < 10 pC)	> 2.8 4)	kV
$d_{\rm Cp}$	Creepage distance 5)	82.70	mm
$d_{CI}$	Clearance 5)	69.60	mm
CTI	Comparative Tracking Index (group I)	600	

Notes:

- 1) Between primary and secondary + test turns + shield
- <sup>2)</sup> Between secondary + test turns and shield
- 3) Between secondary and test turns
- $^{\text{\tiny 4)}}\textsc{Test}$  carried out with a busbar Ø 40 mm centered in the aperture
- <sup>5)</sup> See details figure 1.

## 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).

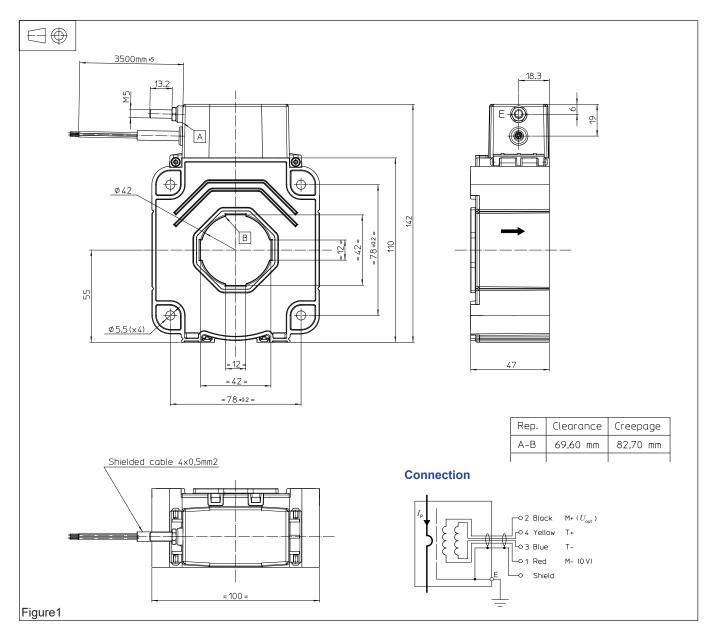
Ignoring this warning can lead to injury and/or cause serious damage.

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 RA 1005-S (in mm)



#### **Mechanical characteristics**

General tolerance

Transducer fastening

Recommended fastening torque Primary through-hole

· Connection of secondary

Connection of screen
 Recommended fastening torque

±1 mm

4 holes Ø 5.5 mm

4 steel screws M5

4 N·m

Ø 42 mm

Shielded cable Ø 5.9 m

4 x 0.5 mm<sup>2</sup>

M5 threaded studs

2.2 N·m

#### **Remarks**

- $U_{\rm out}$  is positive when  ${\rm d}i_{\rm p}/{\rm d}t$  flows in the direction of the arrow
- 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: <a href="https://www.lem.com/en/file/3137/download/">https://www.lem.com/en/file/3137/download/</a>.
- This is a standard model. For different versions (supply voltages, turns ratios, unidirectional measurements...), please contact us.