# Current Transducer RA 1005-S

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

## 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.

## Application Domain

- Traction.

## Electrical data

| | | | |
|---|---|---|---|
| $M$ | Mutual inductance | $3.98 \cdot 10^{-6}$ | H |
| $U_{out}$ | Output voltage (instantaneous)[1] | $U_{out} = M.\frac{di_P}{dt}$ | V |
| $U_{out}$ | Output voltage (sinusoidal wave)[1] | $U_{out} = 2 \cdot \pi \cdot M \cdot f \cdot I_{P\,AC}$ | V |
| | | with $2 \cdot \pi \cdot M = 25 \cdot 10^{-6}$ | H |
| | Example: @ 50 Hz, 20 A $U_{out} = 2 \cdot \pi \cdot 3.98 \cdot 10^{-6} \cdot 50 \cdot 20 = 25$ | | mV |
| $L_S$ | Inductance of secondary circuit (±3 %) | 5.9 | mH |
| $N_S$ | Number of secondary turns | 1480 | |

## Accuracy - Dynamic performance data

| | | | |
|---|---|---|---|
| $BW$ | Frequency bandwith | 20 ... 3000 | Hz |
| $X$ | Accuracy @ $I_{P\,AC}$ = 0.1 ... 20 A, $T_A$ = 25 °C<br>$BW$ = 20 ... 3000 Hz | < ±3 | % |
| $\varphi_{or}$ | Rated phase offset | −90° | |
| $\varphi U_{out}$ | Phase error of output voltage $U_{out}$[1], $I_P$ sinusoidal | | |
| | $BW$ = 20 ... 100 Hz | | −90° ±5° |
| $\frac{\Delta M_T}{M} \cdot 100$ | $BW$ = 100 ... 3000 Hz | | −90° ±2.5° |
| $\frac{\Delta L_T}{L} \cdot 100$ | Thermal drift of $M_T$ | $T_A$ = −40 ... + 85 °C | < ±0.3 % |
| | Thermal drift of $L_S$ and $L_T$ | $T_A$ = −40 ... + 85 °C | < ±0.3 % |

## Test circuit

| | | | |
|---|---|---|---|
| $L_T$ | Inductance of test circuit (±4 %) | 6 | mH |
| $N_T$ | Number of turns (test winding) | 1440 | |
| $R_T$ | Resistance of test winding | | |
| | @ $T_A$ = 85 °C (±5 %) | 307 | Ω |
| $I_T$ | Test current | < 40 | mA |

## General data

| | | | |
|---|---|---|---|
| $T_A$ | Ambient operating temperature | −40 ... 85 | °C |
| $T_S$ | Ambient storage temperature | −45 ... 90 | °C |
| $T_B$ | Primary conductor temperature | ≤ 100 | °C |
| $R_S$ | Resistance of secondary winding @ $T_A$ = 85 °C | | |
| | (±4 %) | 312 | Ω |
| $m$ | Mass | 760 | g |
| | Standard | EN 50155: 2007<br>EN 50121-3-2: 2015 | |

Note: [1] Without load resistance.



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### Insulation coordination

| | | | |
|---|---|---|---|
| $U_d$ | RMS voltage for AC insulation test, 50 Hz, 1 min | 12 [1)] | kV |
| | | 1.5 [2)] | kV |
| | | 0.5 [3)] | kV |
| $U_e$ | Partial discharge extinction RMS voltage @ 10 pC | > 2.8 [4)] | kV |
| $d_{Cp}$ | Creepage distance [5)] | 82.70 | mm |
| $d_{Cl}$ | Clearance [5)] | 69.60 | mm |
| $CTI$ | Comparative Tracking Index (group I) | 600 | |

Notes:
[1)] Between primary and secondary + test turns + shield
[2)] Between secondary + test turns and shield
[3)] Between secondary and test turns
[4)] Test carried out with a busbar ⌀ 40 mm centered in the aperture
[5)] See details figure 1.

## 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.







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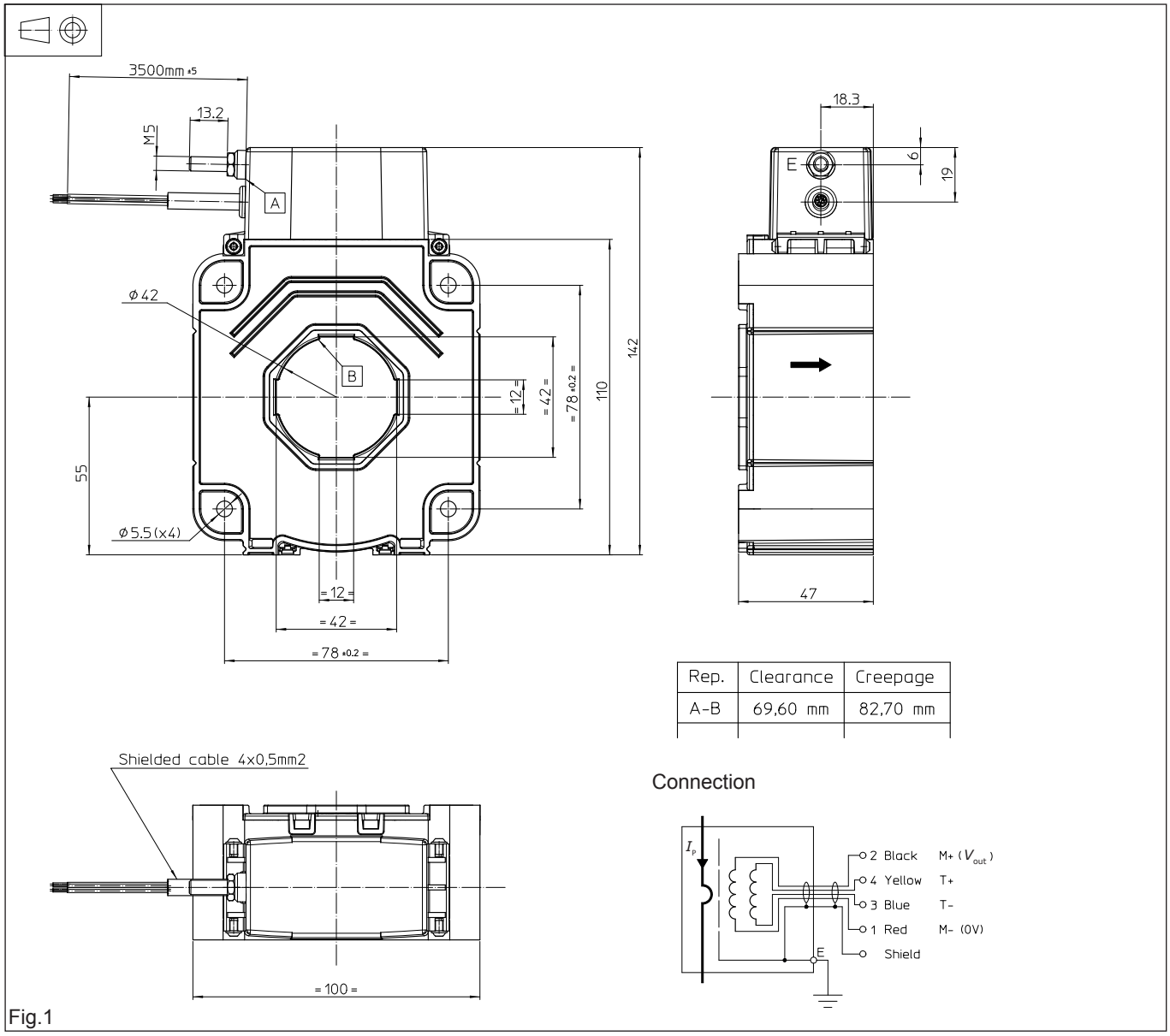
## Dimensions RA 1005-S (in mm)




| Rep. | Clearance | Creepage |
|---|---|---|
| A-B | 69,60 mm | 82,70 mm |

Fig.1

## Mechanical characteristics

- General tolerance ±1 mm
- Transducer fastening 4 holes ⌀ 5.5 mm
  4 steel screws M5
  Recommended fastening torque 4 N·m
  Primary through-hole ⌀ 42 mm
- Connection of secondary Shielded cable ⌀ 5.9 m
  4 x 0.5 mm²
- Connection of screen M5 threaded studs
  Recommended fastening torque 2.2 N·m

## Remarks

- $U_{out}$ is positive when $di_p/dt$ 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: **Products/Product Documentation.**
- This is a standard model. For different versions (supply voltages, turns ratios, unidirectional measurements...), please contact us.



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