Electrical data

At T_A = 25°C, V_C = + 5 V, output voltage referred to V_{REF} unless otherwise noted.

Parameter	Symbol	Unit	Min	Typ	Max	Comment
Primary nominal residual current rms	I_{PRN}	A		1		
Primary residual current, measuring range	I_{PRM}	A	-1.7		1.7	
Supply voltage	V_C	V	4.75	5	5.25	
Current consumption	I_C	mA	16	17.5	21.6	+ I_P (mA)/N_S With N_S = 1000 turns - 40°C .. 105°C
Reference voltage @ I_P = 0	V_{REF}	V	2.495	2.5	2.505	Internal reference
External reference voltage	V_{REF}	V	2.3		4	Internal resistance of V_{REF} input = 499 Ω Note 1
Electrical offset current referred to primary (Note 2)	I_{OE}	mA	-24	+7	24	
Temperature coefficient of V_{REF}	TCV_{REF}	ppm/K			±50	
Temperature coefficient of V_{OE} @ I_P = 0	TCV_{OE}	ppm/K		±50	±500	ppm/K of 2.5 V - 40°C .. 105°C
Theoretical sensitivity	Gth	V/A		1.2		
Sensitivity error (Note 2)	ε_G	%	-1.6	0.5	1.6	R_L > 500 kΩ
Temperature coefficient of G	TCG	ppm/K			±200	- 40°C .. 105°C
Linearity error	ε_L	% of I_{PRM}		0.5	1	
Reaction time @ 10 % of I_{PRN}	t_{ra}	µs		7		R_L > 500 kΩ, di/dt > 5 A/µs
Response time @ 90 % of I_{PRN}	t_r	µs		50		R_L > 500 kΩ, di/dt > 5 A/µs
Frequency bandwidth (- 1 dB)	BW	kHz		9.5		R_L > 500 kΩ
Output voltage noise (1 Hz .. 10 kHz)	V_{no}	mV rms		6		R_L > 500 kΩ
Magnetic offset current referred to primary (1000 x I_{PRN})	I_{OM}	mA		57		
Accuracy (Note 3)	X	%			1.9	= $(\varepsilon_G^2 + \varepsilon_L^2)^{1/2}$
Output voltage referred to GND (during Degauss cycle)		V		0.3	0.5	Note 1
Output voltage referred to V_{REF} (Test current)		V	V_{OE} + 0.2	V_{OE} + 0.35	V_{OE} + 0.5	Note 1

Notes: [1] See “Application information” section.

[2] Only with a primary nominal residual current, see paragraph “Primary nominal residual current and primary nominal curent”.

[3] Accuracy @ T_A and I_P : $X_{TA} = (X^2 + (TCG \cdot 100 \cdot (T_A - 25))^2 + (TCV_{OE} \cdot 2.5 \cdot (T_A - 25)/Gth \cdot 100/ I_P)^2)^{1/2}$

LEM reserves the right to carry out modifications on its transducers, in order to improve them, without prior notice.

Application information

Filtering, decoupling CTSR transducer

Supply voltage Vc (5 V):

The CTSR transducers have internal decoupling capacitors, but in the case of a power supply track on the application PCB having a high impedance, it is advised to provide local decoupling, 100 nF or more, located close to the transducer.

Reference Vref:

Ripple present on the **V**ref pin can be filtered with a low value of capacitance because of the internal 499 ohm series resistance. The CTSR transducers have an internal capacitor of 22 nF between **V**ref pin and Gnd pin and the maximum filter capacitance value which could be added is 1 µF. Adding a larger decoupling capacitor will increase the activation delay of degauss.

Output Vout:

The CTSR transducers have an internal low pass filter 470 ohm/22 nF; if a decoupling capacitor is added on **V**out pin, the bandwidth and the response time will be affected. In case of short circuit, the transducer CTSR can source or sink up to a maximum of 10 mA on its output **V**out.

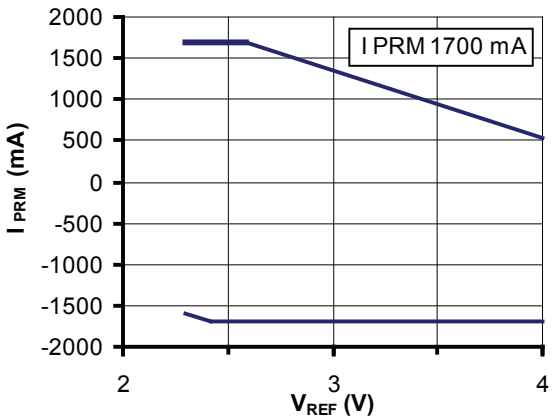
Using an external reference voltage

If the **V**ref pin of the transducer is not used it could be either left unconnected or filtered according to the previous paragraph "Reference **V**ref".

The **V**ref pin has two modes Ref Out and Ref In:

- In the Ref Out mode the 2.5 V internal precision reference is used by the transducer as the reference point for bipolar measurements; this internal reference is connected to the **V**ref pin of the transducer through a 499 ohms resistor. It tolerates sink or source currents up to ±5 mA, but the 499 ohms resistor prevents this current to exceed these limits.
- In the Ref In mode, an external reference voltage is connected to the **V**ref pin; this voltage is specified in the range 2.3 to 4 V and is directly used by the transducer as the reference point for measurements. The external reference voltage **V**ref must be able:
  - o either to source a typical current of $\frac{Vref - 2.5}{499}$, the maximum value will be 3 mA when **V**ref = 4 V.
  - o or to sink a typical current of $\frac{2.5 - Vref}{499}$, the maximum value will be 0.4 mA when **V**ref = 2.3 V.

The following graphs show how the measuring range of the transducer depends on the external reference voltage value **V**ref (**V**c = 5 V).



Upper limit: I_P=1700 mA (**V**ref = 2.3..2.625 V)
Upper limit: I_P=-833.3***V**ref+3854.2 (**V**ref = 2.625..4 V)
Lower limit: I_P=-833.3***V**ref+312.5 (**V**ref = 2.3..2.375 V)
Lower limit: I_P=-1700 mA (**V**ref = 2.375..4 V)

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