# General



### Can a transducer be de-magnetized?

The elimination of magnetic offset requires demagnetization. A degauss cycle requires driving the core through the entire B-H loop with a low frequency AC source, then gradually decreasing the excitation returning the B-H operating point to the origin. As a minimum, provide 5 cycles at full amplitude and then decrease the excitation smoothly no faster than 4 % per cycle, requiring 30 cycles or 500 ms at 60 Hz.

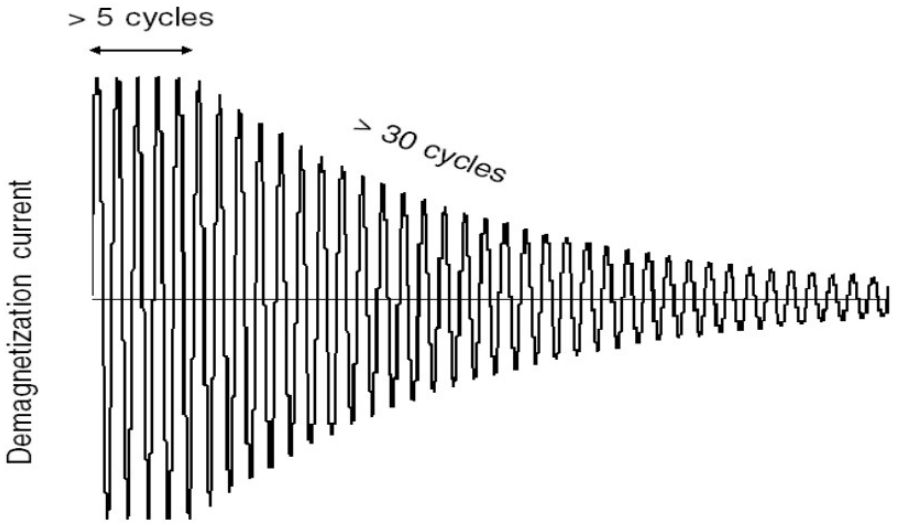



*Figure 5: Degauss cycle current*

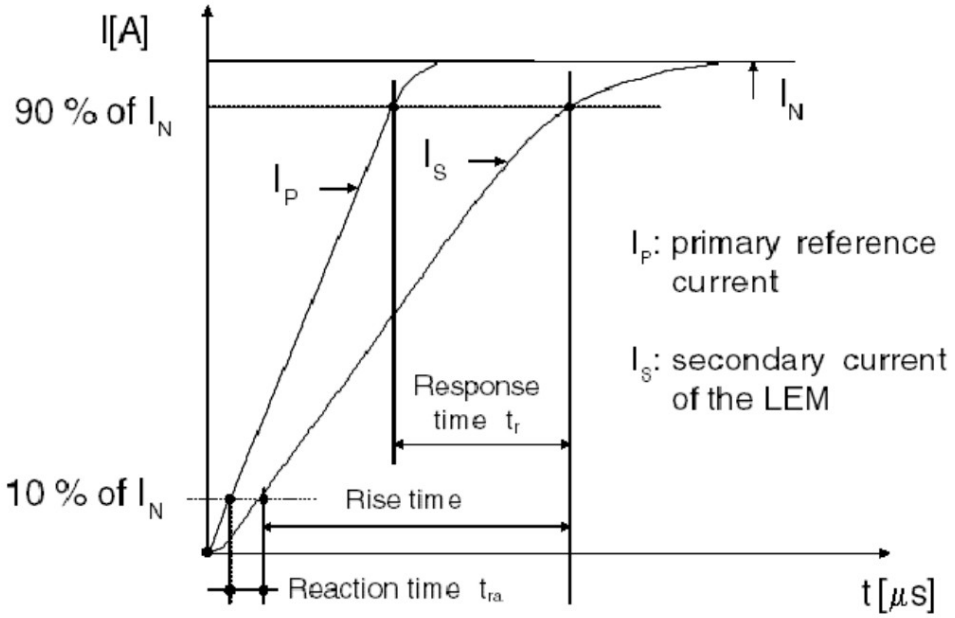
For closed-loop devices, additional care must be taken to ensure the compensation coil does not negate the demagnetization effect. Alternatively, a partial demagnetization of the core is possible by providing an appropriate signal in the opposite polarity of the magnetization. The difficulty is determining the exact amplitude and duration to obtain a satisfactory result. With a well-defined application it may be feasible to determine the required value empirically and apply this correction as necessary.

### Why does the burden resistor (Rm) have a limitation?

Voltage and current transducers giving a current output need to have a burden resistor (Rm - also called measurement resistor) connected to their output. This resistor has to be within a defined range to allow a safe and optimum operation of the transducer. The minimum resistor value is set for thermal protection of the output power stage of the transducer. This will be 0 ohm for some transducer types. The maximum resistor value is set to allow a defined current / voltage measurement range for the transducer. Connecting a higher resistor than the one specified will reduce the measurement range of the transducer. In case you need a high or lower value than specified on the datasheet of the transducer, please contact your technical support. Different values can be computed depending on your exact application data.

### How is reaction time measured (Tra)?

LEM defines the reaction time (tra) as the delay between the rise time of the output signal and the rise time of the applied signal taken at 10% of the total variation of IN (Nominal Current)




### How is response time measured (tr)?

LEM defines the response time (tr) as the delay between the rise time of the output signal and the rise variation of the applied signal taken at 90% of the total variation of IN (Nominal Current).

### What are the advantages of transducers using an ASIC?

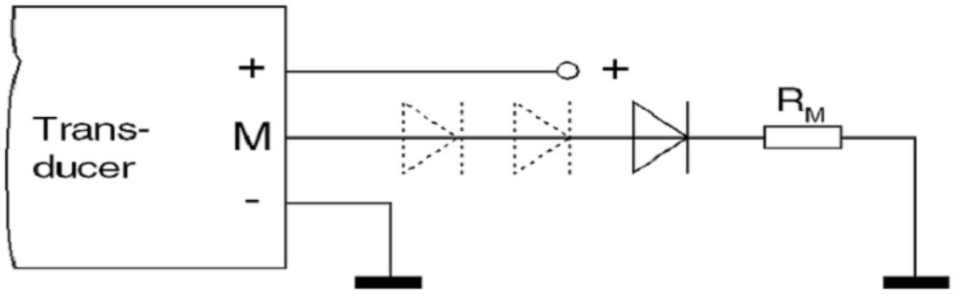
The ASIC (Application Specific Integrated Circuit) is, as the name indicates, an integrated circuit designed to provide several specific functions in one package. The advantages are that it offers:

- A low power supply (single +5V for example)
- Better accuracy and drift
- Improved behaviour in disturbed environments
- Smaller size

## How do transducers with a unipolar power supply work?

The vast majority of LEM closed loop transducers are specified for use with bipolar supply voltages (e.g. ±15 V). However, most transducers can also be operated from a unipolar supply for the measurement of unidirectional currents. In these cases the following must be taken into account:

- For AV 100 series only, refer to the paragraph 6.2.4 of the document CH 24101 and pay careful attention to apply:
  - $V_C$> +20V for positive unipolar power supply
  - $V_C$< -20V for negative unipolar power supply
- The supply voltage should be equal to the sum of the positive and negative voltages indicated in the datasheet (e.g. a ±15 V product should be powered with +30 V).
- Selection of the measurement resistance and the maximum current must not imply excessive power dissipation in the transducer output stage (do not hesitate to contact LEM to get the correct measuring resistance assessment).
- The output stage is designed for use with a bipolar power supply and diodes must be inserted in series with the output (see the drawing below) to allow a minimum output bias voltage without creating a measurement offset.




Addition of series diode(s) when operating with a unipolar power supply

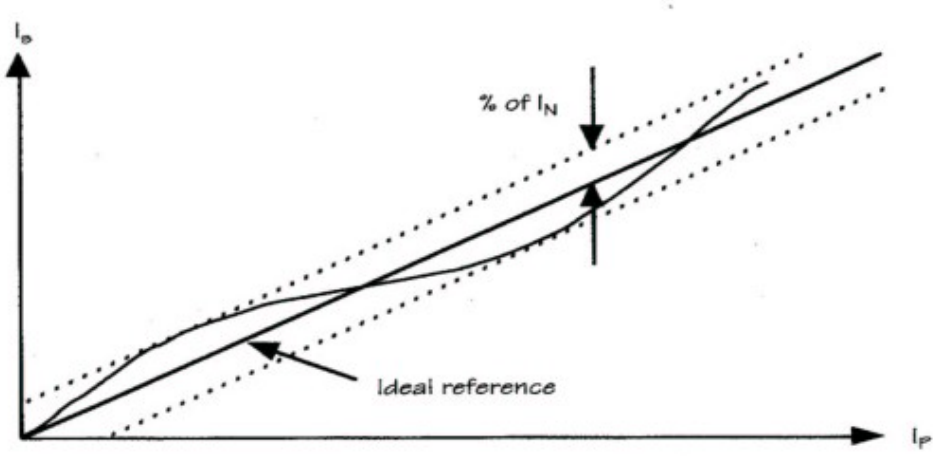
## What is the function of the burden resistor (Rm)?

Burden resistors are often specified for closed loop based transducers.

Closed loop transducers have an integrated current generator that gives the out put signal. The burden resistor is set to define best current/voltage ratio for your application. Current signals are also much less sensitive to external perturbation, which is important when you have some distance between the location of the transducers and the control electronics processing its signal.

## How is linearity measured?

Linearity is a percentage of the error relative to the rated current for the whole current range (see diagram, below)




## Which parameters must be considered when choosing a transducer?

All aspects of an application must be taken into account for the selection of the transducer and system design, with particular attention to the following:

- Electrical requirements, including power supply requirements, peak measurement, response time, di/dt and dv/dt.
- Mechanical requirements, including aperture size, overall dimensions, mass, materials, mounting and vibration.
- Thermal conditions, including current profile versus time, maximum RMS measurement, thermal resistances and cooling.
- Environmental conditions, including vibration, operating temperature range and proximity of other conductors or magnetic fields.

## How can magnetisation of the current transducer be avoided?

Magnetisation of the current transducer will create an inaccuracy of the measurement by adding an offset to the output signal. Magnetisation may occur in the following cases:

- Transducer overload
- Lack of power supply

The offset created by the magnetisation will disappear:

- Naturally, over a certain period of time depending on the magnetic material that will slowly recover (this is a very slow process).
- By performing a demagnetisation of the transducer by applying a decreasing sinus current signal to the transducer (please contact our technical support to define the optimum settings).

## How should the power supply for a transducer be calculated?

Only transducers using the closed loop technology require special care when defining the power supply. For all other technologies, the current consumption is mentioned on the datasheet.

Due to the working principle of closed loop current and voltage transducers, the current consumption can be spit in two versions, a fixed version plus one function of the current/voltage to be measured. The fixed version, due to the control electronics is mentioned on the datasheet. The version depending on the current or voltage to be measured, due to the closed loop principle, can be calculated as follows:

- For a current transducer: I = peak primary current x turn ratio
- For a voltage transducer: I = (peak primary voltage/primary resistor) x turn ratio