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ILEA SMZ 805

Operating instructions
and technical data*



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Current probe

ILEA SMZ 805



Application

- Potential-free current measurement in power electronic circuits such as inverters or switching power supplies
- Potential-free current measurement of current pulses
- Potential-free current measurement of current signals containing both AC and DC components

Measurement range

- Measurement range (I) ± 800 A
- Maximum detectable current slew rate: $\frac{di}{dt} = 1500$ A/ μ s
- Measurement error $< 0,4$ % (related to the nominal value 800 A)

Safety instructions

Warning! The current probe ILEA SMZ 805 should only be used by technical personnel. To prevent any injuries and damages please follow the necessary precautions and the operating information:

- Use only the power cable which is delivered with the current probe. Make sure that the cable is not damaged. Plug the power cable only in a properly installed grounded socket. The power cord should be accessible for full length.
- Make sure that the current probe is not used in humid or wet environments. Do not place the current probe on a humid or a wet ground.
- Do not expose the current probe to direct sunlight.
- Use the current probe only at usual room temperature.
- Avoid mechanical shocks or vibrations.
- The current probe is suitable only for operation in closed rooms.
- The current probe must not be operated in an environment with explosion hazards.
- Before starting with the measuring operation, make sure that the current probe is stabilized at ambient temperature (Important when transporting from cold to warm rooms and vice versa).
- Only currents through contact safe insulated conductors may be measured.
- Before attaching the current sensor to the conductor, where the current is to be measured, the conductor must be disconnected from voltage (de-energized).
- The 4-mm connector on the front side of the amplifier is connected to the signal ground of the current probe.

This connector is not connected to the potential of the protective earth (PE)!

- Place the amplifier of the current probe in such a way that a sufficient cooling is possible. For this purpose, a surrounding free space of 50 cm is recommended.
- Before each operation of the current probe, check whether the current probe (sensor, amplifier and cable) is damaged. If so it must not be used.
- Use the current probe only as it is specified in this manual.
- All the applicable regulations of the operation site, norms, regulations and terms should be adhered to.
- Do not make any changes to the current probe. In particular, the device should not be opened.

*Subject to technical modifications without prior notice

Guide

The current clamp ILEA SMZ 805 is suitable for the potential-free measurement of arbitrary alternating currents, mixed currents and direct currents. It is therefore ideal for the development of power electronic circuits. For example, figure 1 shows an inverter in which currents are measured at various points.

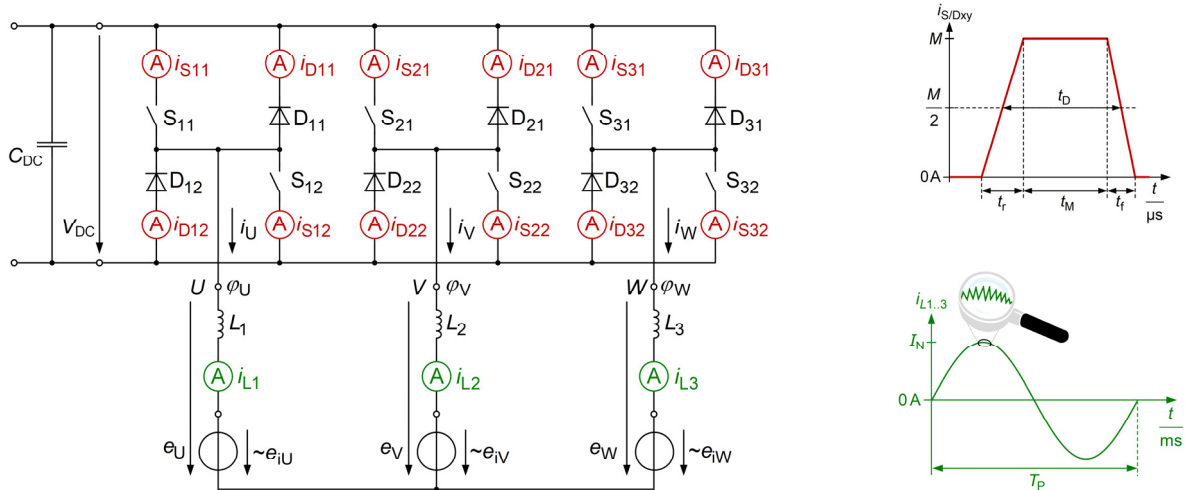


Figure 1 Current measurement in an inverter

Instruction guide

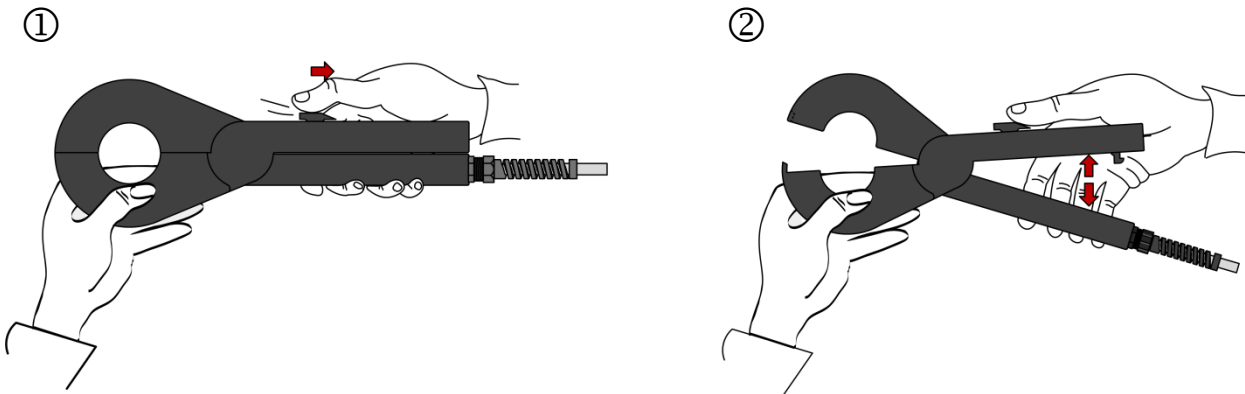


Figure 2 Handling of the opening mechanism of the current sensor

The current sensor of the probe is opened in two steps as shown in figure 2.

The measurement setup of the current probe together with an oscilloscope is shown in figure 3 below.

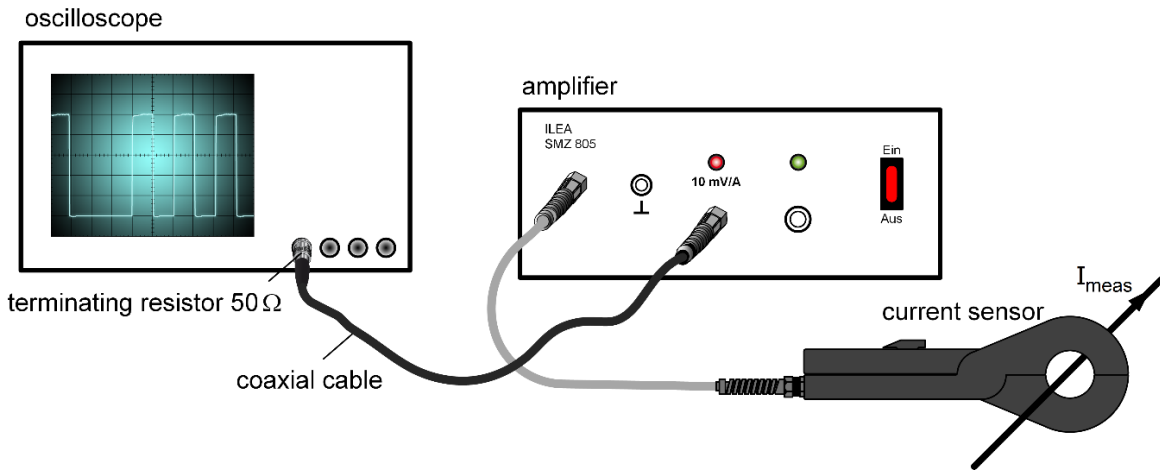


Figure 3 Measurement setup

The measurement signal is output over the connected coaxial cable as voltage and refers to 10 mV per 1 A measuring current when a terminating resistor of 50 Ω (2 W) is used.

Illustrative current flow

For DC measurement, the maximum value of 800 A should not be exceeded. During transition between two DC current values a maximum current slew rate of $1500 \frac{A}{\mu s}$ can be detected.

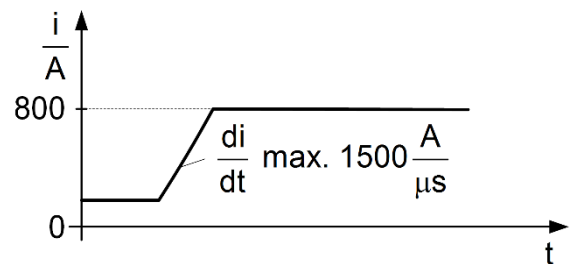


Figure 4 Transition between two DC currents

For pulse current measurement, the peak value should be less than 1500 A. For periodic current pulses with a peak value of 1500 A, the pulse duration $T_{Puls} = 120 \mu s$ should not be exceeded and the pulse period T_{Period} should be greater than 10 ms.

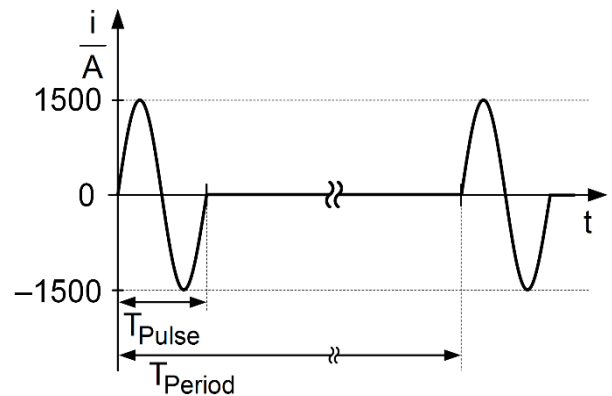


Figure 5 Sinusoidal current pulses

In case of a current jump with overshoot, a peak value of 1500 A should not be exceeded.

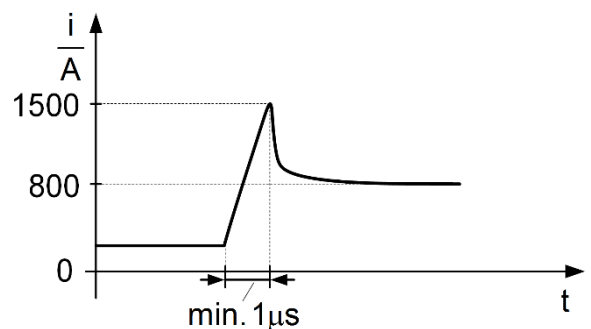


Figure 6 Current jump with overshoot

When the device is switched on, an offset correction of the output signal is done automatically. The duration of this process is about two seconds and is indicated by a green LED light on the front panel of the amplifier. During this process the current sensor should be kept closed; furthermore, the conductor located in the opening window of the current sensor should not carry any current during this process.

The mentioned offset adjustment process can be triggered by pressing the corresponding button on the front panel even when the device is switched on. This may be necessary if the current probe was overloaded or if the thermal conditions in the device have changed significantly.

The potential of the outer conductor of the connected coaxial cable should not deviate more than a maximum of $\pm 30\text{ V}$ in the application from the potential of the protective earth of the mains.

The 4 mm plug socket on the front of the amplifier is connected to the ground of the signal of the current probe.



The plug socket is not connected to the protective earth potential!

Attention! The current probe ILEA SMZ 805 is a sensitive measuring device, which requires a careful mechanical handling!

Throwing, dropping, leverage etc. are prohibited.

To counteract changes in the electronic due to aging, a calibration of one year is proposed.

The current sensor of the probe must be kept open when the device is not in use.

Technical Data of ILEA SMZ 805

Electrical features

Measuring current I

Measurement range	$-800\text{ A} \leq I \leq +800\text{ A}$
Nominal value I_N	800 A

Maximum current value

Maximum DC current $ I_{\max} $	800 A
Pulse current $ I_{\max} $ (Half sinusoidal wave with max. impulse duration of 60 μs , pulse period of minimum 10 ms)	1500 A
Maximum detectable current slew rate $\frac{di}{dt}$	1500 A/ μs

Measurement error

Offset error (in terms of I_N); in the range	< 0.2 %
Other error (in terms of I_N); in the range	< 0.2 %

Dynamic measuring range

Response delay	< 15 ns
Insertion inductance	< 10 nH

Measurement output

Takes place over the connected coaxial cable (BNC) with a terminating resistor of 50 Ω - (2 W): Ratio	10 mV/A
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Constructive features

Safety class	IP 40
Application environment	in a closed room

Main connection/Power supply

Supply voltage	230 V $\pm 10\%$ with 50 Hz
Max. power input	100 VA
Mains fuse	500 mA

Amplifier

Dimensions	(w \times d \times h) 275 mm \times 220 mm \times 115 mm
Mass	3.86 kg
Output plug socket	BNC-socket (should be connected with 50 Ω)

Measuring current sensor

Diameter of the current sensor (= maximum diameter of the measuring conductor)	40 mm
Width of the current sensor	26.5 mm
Mass	0.56 kg
Case material of the current sensor	Acrylnitril-Butadien-Styrol (ABS)
Cable length of the current sensor	130 cm

Mechanical features

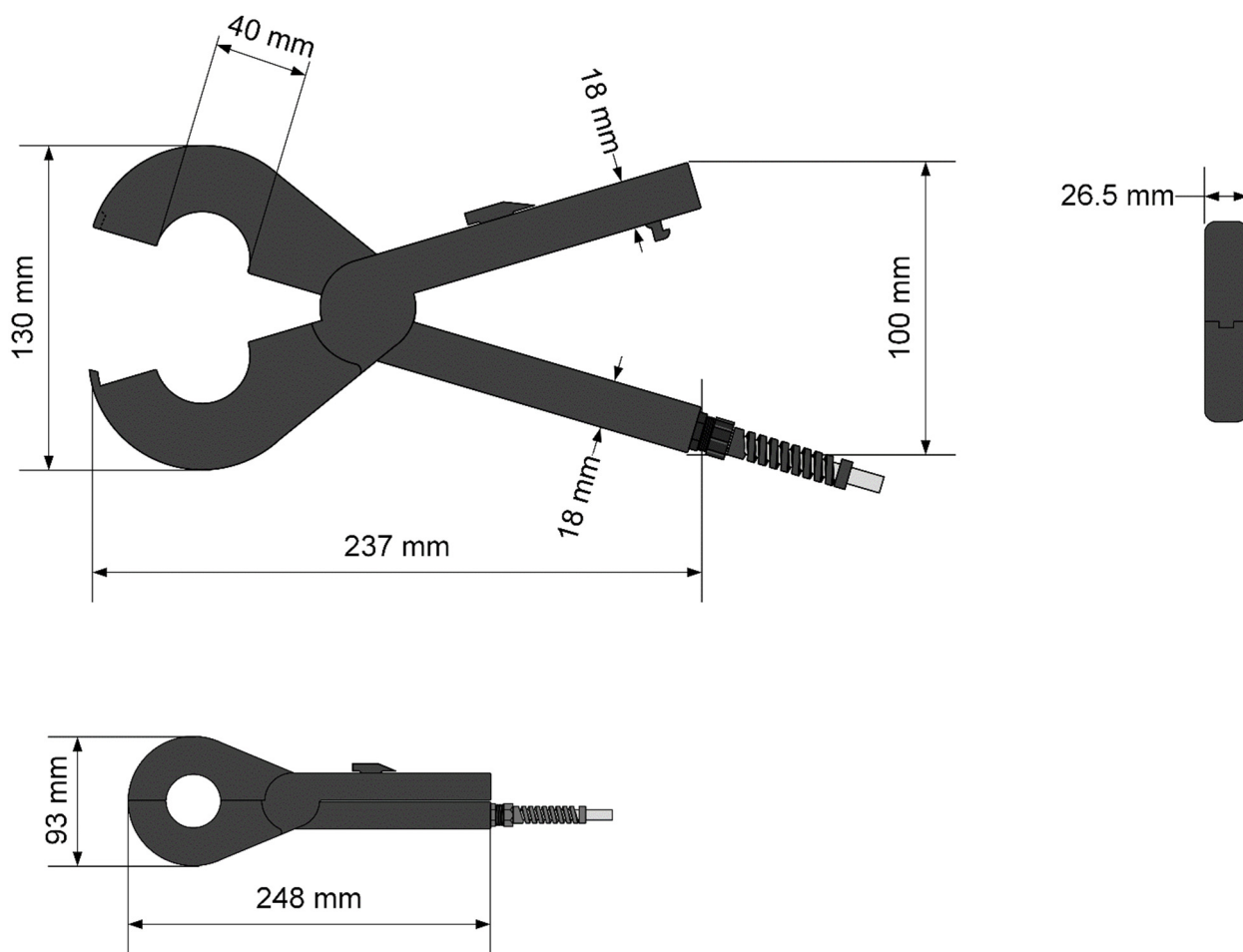


Figure 7 Dimensions of the current sensor