CURRENT CLAMPS FOR AC/DC CURRENT

E series

The E series is designed for the measurement of alternating and direct currents using Hall-effect technology. Currents are measured from a few milliamperes to over 100 A.

The slim, elongated shape of these clamps allows them to take measurements in cable strands or confined spaces such as switchboard wiring, motor controls and automotive electrical circuits.

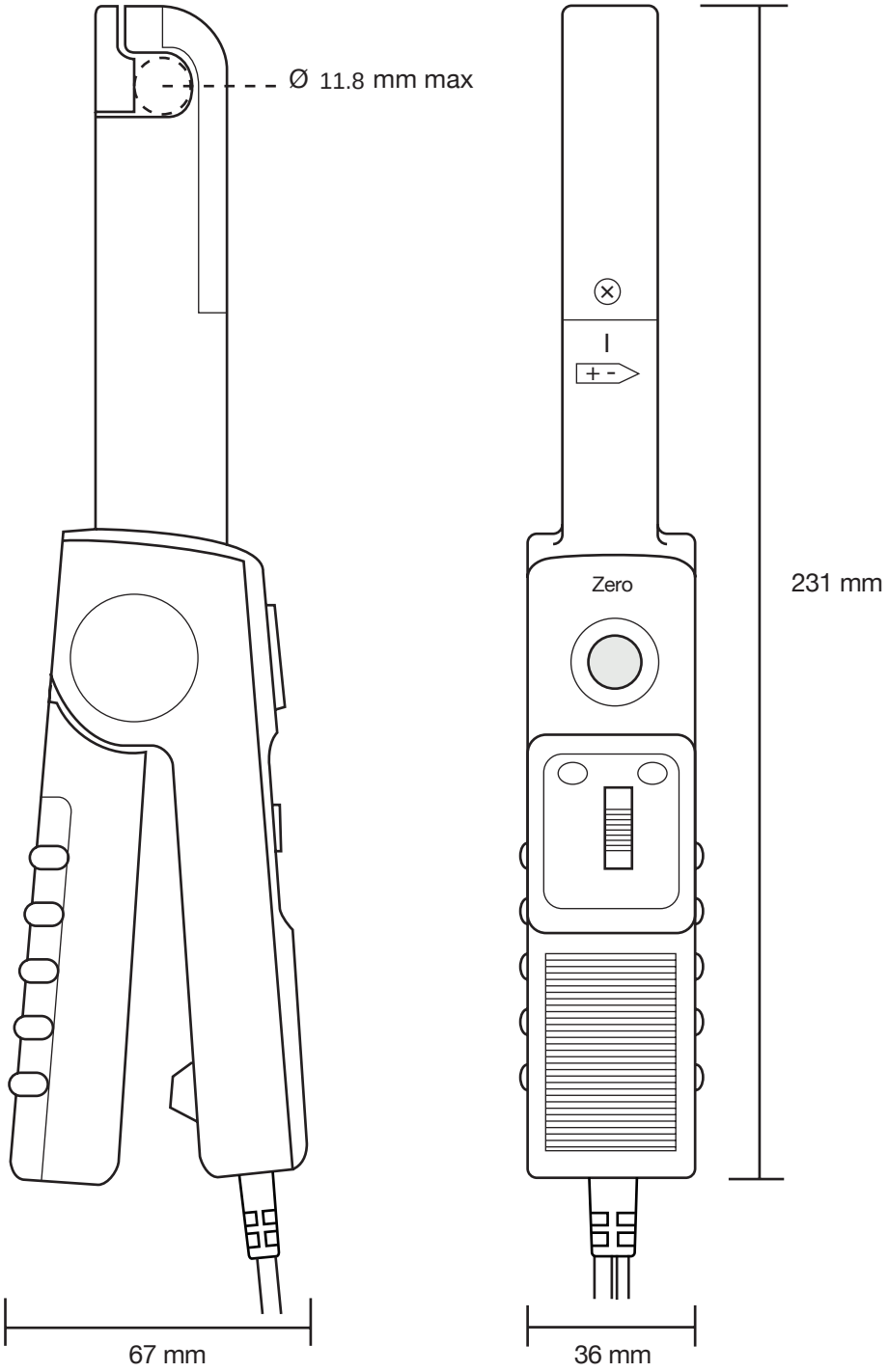
Their low phase shift ensures excellent performance for power measurement.

These clamps feature a voltage output (mV). Their ability to measure AC+DC signals is valued for True RMS measurements.

The E25 model offers the highest sensitivity for measurements of weak current. This clamp can be connected to multimeters, loggers, data acquisition systems, etc.

The E27 model can be connected directly to an oscilloscope.

CURRENT CLAMPS FOR AC/DC CURRENT



CURRENT CLAMP FOR AC/DC CURRENT

Model E25

Current	2 A DC - 1.5 A AC	80 A DC - 60 A AC
Output	1 mV/mA	10 mV/A

Description

The E25 clamp meter is designed to measure AC and DC currents using Hall-effect technology. Its slim, elongated shape allows it to take measurements in confined or hard-to-reach spaces. Via a lead terminated with two insulated Ø4 mm male banana leads, this clamp meter outputs an mV AC+DC signal that mirrors the shape and amplitude of the measured current.

The E25 clamp is equipped with an automatic DC zero system and a disengageable standby mode (Auto Power Off (APO)). It can be powered by a battery or a standard mains adapter via a Micro USB connector and offers two different sensitivity settings.

Electrical specifications

- **Current range:**
  5 mA .. 80 A DC / 60 A AC across 2 calibres
- **Accuracy and phase shift** [1]**:**

Calibre	1 mV/mA (1 V/A)	10 mV/A	
Primary current:	5 mA .. 2 A DC 5 mA .. 1.5 A AC	50 mA .. 50 A DC 50 mA .. 40 A AC	50 A .. 80 A DC 40 A .. 60 A AC
Accuracy in % of output signal	≤ 2 % + 5 mV	≤ 4% + 500 µV	≤ 12 %
Phase shift	≤ 1° (DC .. 65 Hz)	≤ 1° (DC .. 65 Hz)	≤ 1° (DC .. 65 Hz)
Noise [2]	DC: 8 mV DC AC: 4 mV AC_{RMS}	DC: 120 µV DC AC: 180 µV AC_{RMS}	DC: 120 µV DC AC: 180 µV AC_{RMS}

- **Output signal:**
  1 mV AC+DC / mA AC+DC (2 V at 2 A)
  10 mV AC+DC / A AC+DC (0.8 V at 80 A)
- **Bandwidth**:
  DC .. 20 kHz (-3 dB) (depending on current value)
- **DC zero adjustment:**
  Automatic adjustment of current sensitivity at the touch of a button
- **Typical output noise level (peak-to-peak) from DC to 100 kHz:**
  - 2 A calibre: 4 mV_{RMS} / 8 mV DC
  - 80 A calibre: 180 $µV_{RMS}$ / 120 µV DC
- **Power supply:**
  9 V alkaline (NEDA 1604A, IEC 6LR61)
  5 V DC via a µUSB connector
- **Battery life:**
  80 hours typical (alkaline battery)
- **"ON" LED indicator (3):**
  "On" = In operation & battery level OK
  "Flashing" = Battery life < 4 hours
  "Colour = green" = APO ON
  "Colour = yellow" = APO OFF
- **"OL" LED indicator:**
  Overload indication; current measured is too high for the calibre being used.
- **Influence of temperature:**
  ≤ 800 ppm/°C, 10 mA DC/°C
- **Influence of relative humidity:**
  ≤ 0.5% at 10% to 85% RH at ambient temperature
- **Influence of conductor position in jaws:**
  ≤ 0.5 %
- **Common-mode voltage (600 V max) during AC measurement (max):**
  at 50/60 Hz: ≤ 1 mA/100 V
- **Remanence:**
  at 80 A DC: 370 mA DC typical

Mechanical specifications

- **Clamping capacity:**
  Cable: Ø max 11.8 mm
- **Output:**
  1.5 m two-wire cable terminated with two insulated male Ø4 banana leads
- **Dimensions:**
  231 x 67 x 36 mm
- **Mass:**
  330 g with battery
- **Operating temperature:**
  -10° at +50°C
- **Storage temperature:**
  -30° at +80°C
- **Relative humidity for operation:**
  0 to 85 % RH with a linear decrease above 35 °C
- **Operating altitude:**
  0 to 2,000 m
- **Casing protection rating:**
  IP 20 (IEC 60529)
- **Drop test:**
  1 m (IEC 60068-2-31)
- **Colours:**
  Dark grey/Red

Safety specifications

- **Electrical safety:**
  Type A instrument, with double insulation or reinforced insulation between the primary, the secondary and the grippable part located under the guard as per IEC 61010-1 & IEC 61010-2-032
  - 600 V category III, pollution degree 2
  - 300 V category IV, pollution degree 2
- **Electromagnetic compatibility (EMC) :**
  Compliant with IEC 61326-1: 2013 (portable instrument)
  with field strengths of 10 V/m:
  - ≤ 4 A DC @[80MHz, 1GHz]

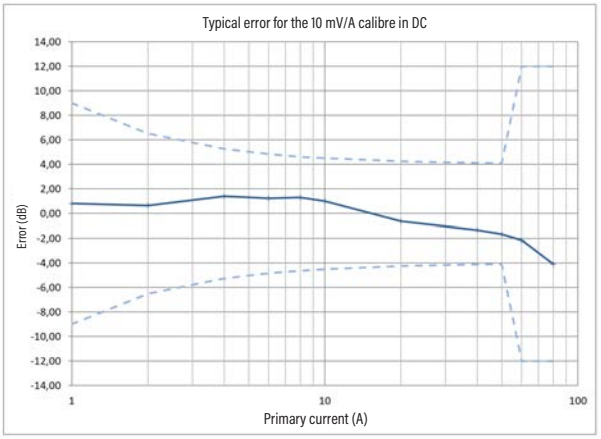
CURRENT CLAMP FOR AC/DC CURRENT

Model E25

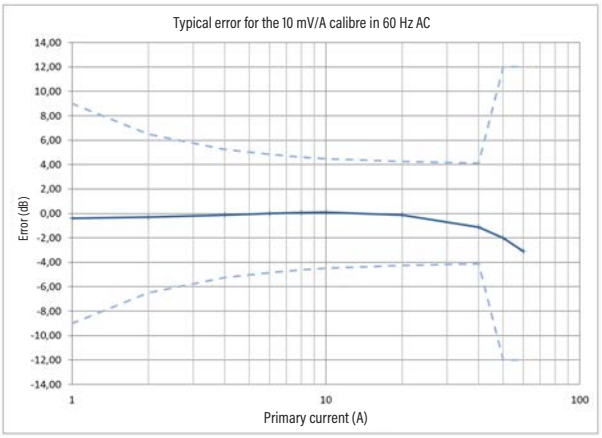
Curves

80 A calibre

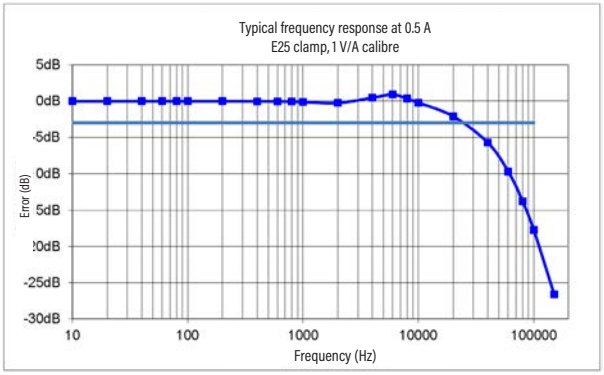
Linearity for DC



Linearity for AC

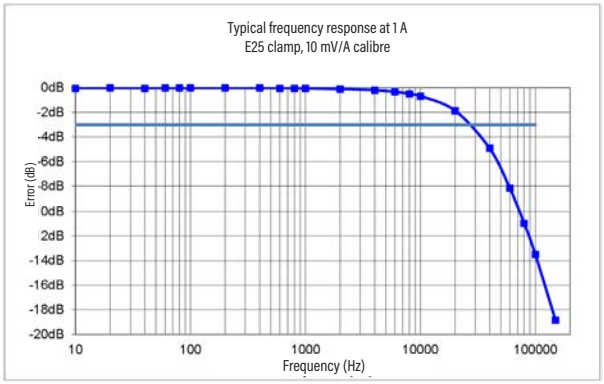


2 A calibre

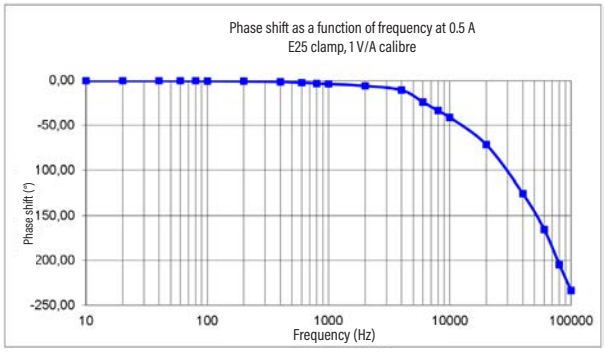


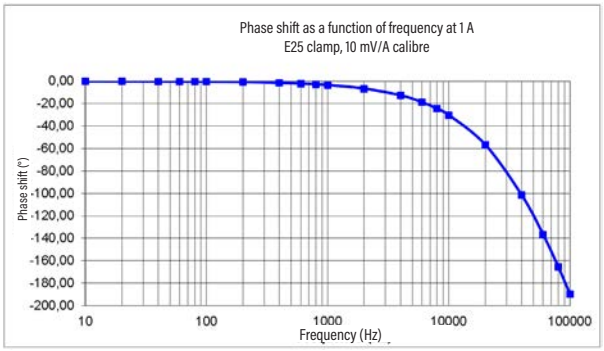
80 A calibre

Frequency response



Frequency phase shift





CURRENT CLAMP FOR AC/DC CURRENT

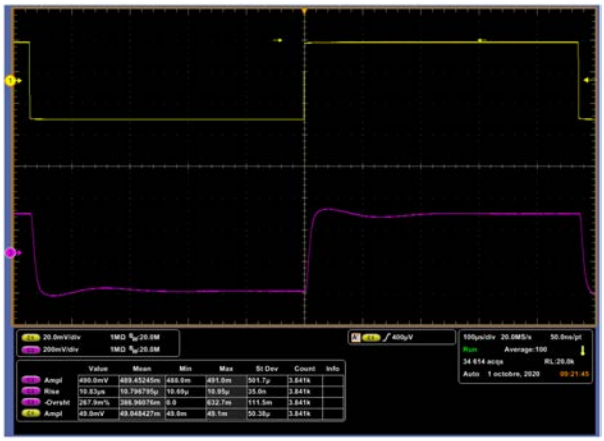
Model E25

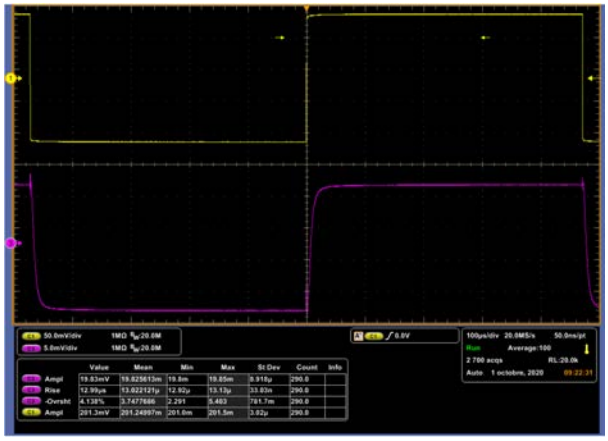
Curves

2 A calibre

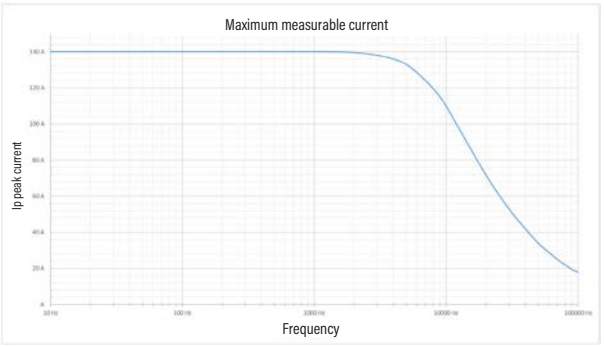
80 A calibre

Pulse response





Limitation of the measurable current as a function of frequency



(1) Conditions of reference: 23°C ± 5°K, 20–75% RH, power supply voltage 6.5 V DC to 9.0 V DC, sinusoidal signal with a frequency of DC to 1 kHz, external magnetic field < 40 A/m, no DC components, no external conductor with circulating current, conductor centred for measurement, load impedance ≥ 1 MΩ / ≤ 100 pF.

(2) Typical value(s)

(3) With an alkaline battery, without an external power supply

To order	Reference
AC/DC current probe, model **E25**, with battery and user manual	P01120025

CURRENT CLAMP FOR AC/DC CURRENT

Model E27 (insulated AC/DC current probe)

Current	10 A peak	100 A peak
Output	100 mV/A	10 mV/A

Description

The E27 clamp meter is designed to measure AC and DC currents using Hall-effect technology. Its narrow, elongated shape allows it to take measurements within cable strands or in confined spaces such as switchboard wiring, motor controls or power supplies, and automotive electrical circuits.

This clamp provides an output signal in mV that mirrors the shape and amplitude of the measured current, via a coaxial lead terminated with an insulated BNC lead.

The E27 clamp is equipped with an automatic DC zero system, a disengageable standby mode (Auto Power Off (APO)), and can be powered by a standard mains adapter via a micro-USB connector.

This clamp offers two different sensitivity settings and a wide bandwidth. It is valued for performing measurement and display of complex AC+DC signals on an oscilloscope.

Electrical specifications

- **Current range:**
  0.1 .. 10 A peak
  0.5 .. 100 A peak
- **Accuracy and phase shift** (1)**:**

Calibre	10 A	100 A	
Primary current:	100 mA .. 10 A peak	500 mA .. 40 A peak	40 A .. 100 A peak
Accuracy in % of output signal	< 3% + 5 mV	< 4% + 500 µV	< 15%
Phase shift	≤ 1.5°	≤ 1°	≤ 1°

- **Output signal:**
  100 mV AC+DC / A AC+DC (1 V at 10 A)
  10 mV AC+DC / A AC+DC (1 V at 100 A)
- **Bandwidth:**
  DC .. 100 kHz (-3 dB) (depending on current value)
- **Rise time (10% to 90%) and fall time (90% to 10%):**
  - 10 A calibre: 3 µs
  - 100 A calibre: 3 µs
- **10 % delay time:**
  - 10 A calibre: 1.8 µs
  - 100 A calibre: 1.8 µs

  Insertion impedance (at 10 kHz / 50 kHz)
  ≤ 2 mΩ / ≤ 10 mΩ
- **DC zero adjustment:**
  Automatic adjustment of current sensitivity at the touch of a button
- **Typical output noise level (peak-to-peak) from DC to 100 kHz:**
  - 10 A calibre: 5 $mV_{peak\text{-}peak}$
  - 100 A calibre: 600 $\mu V_{peak\text{-}peak}$
- **Power supply:**
  9 V alkaline (NEDA 1604A, IEC 6LR61)
  5 V DC via a µUSB connector
- **Battery life:**
  80 hours typical (alkaline battery)
- **"ON" LED indicator** (2)**:**
  "On" = In operation & battery level OK
  "Flashing" = Battery life < 4 hours
  "Colour = green" = APO ON
  "Colour = yellow" = APO OFF
- **"OL" LED indicator:**
  Overload indication; current measured is too high for the calibre being used.
- **Influence of temperature:**
  ≤ 800 ppm/°C, 10mA DC/°C
- **Influence of relative humidity:**
  ≤ 0.5% at 10% to 85% RH at ambient temperature
- **Influence of adjacent conductor:**
  ≤ 4 mA/A @60Hz
- **Influence of conductor position in jaws:**
  ≤ 0.5 % of output signal at 1 kHz
- **Common-mode voltage (600 V max) during AC measurement (max):**
  at 50/60 Hz: ≤ 1 mA/100 V
  at 400 Hz: ≤ 7 mA/100 V
- **Remanence:**
  at 100 A DC: 450 mA DC typical

Mechanical specifications

- **Clamping capacity:**
  Cable: Ø max 11.8 mm
- **Output:**
  Coaxial cable 2 m long, terminated by an insulated BNC connector
- **Dimensions:**
  231 x 67 x 36 mm
- **Mass:**
  330 g with battery
- **Operating temperature:**
  -10° at +50°C
- **Storage temperature:**
  -30° at +80°C
- **Relative humidity for operation:**
  0 to 85 % RH with a linear decrease above 35 °C
- **Operating altitude:**
  0 to 2,000 m
- **Casing protection rating:**
  IP 20 (IEC 60529)
- **Drop test:**
  1 m (IEC 60068-2-31)
- **Colours:**
  Dark grey/Red

Safety specifications

- **Electrical safety:**
  Type A instrument, with double insulation or reinforced insulation between the primary, the secondary and the grippable part located under the guard as per IEC 61010-1 & IEC 61010-2-032
  - 600 V category III, pollution degree 2
  - 300 V category IV, pollution degree 2
- **Electromagnetic compatibility (EMC) :**
  Compliant with IEC 61326-1: 2013 (portable instrument) with field strengths of 10 V/m on the 100 mV/A calibre:
  - ≤ 400 mA DC @[80MHz, 280MHz]
  - ≤ 2 A DC @[280MHz, 460MHz]
  - ≤ 400 mA DC @[460MHz, 1GHz]

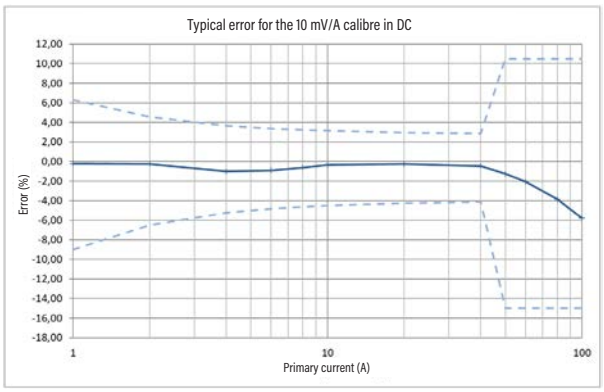
CURRENT CLAMP FOR AC/DC CURRENT

Model E27 (insulated AC/DC current probe)

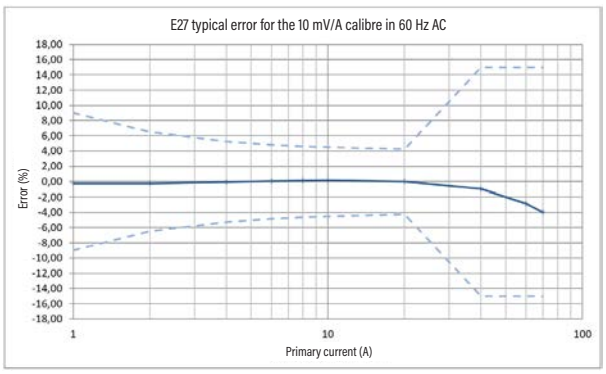
Curves

100 A calibre

Linearity for DC



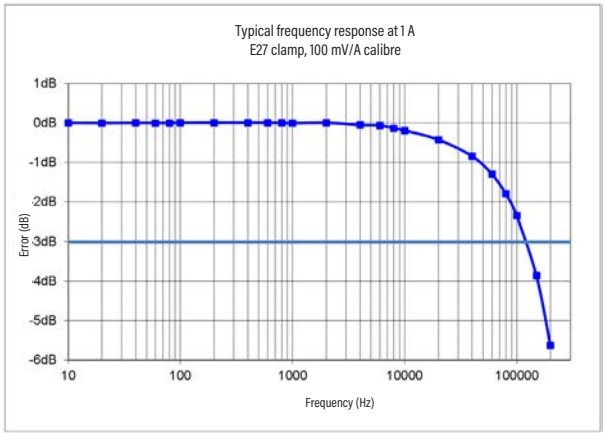
Linearity for AC

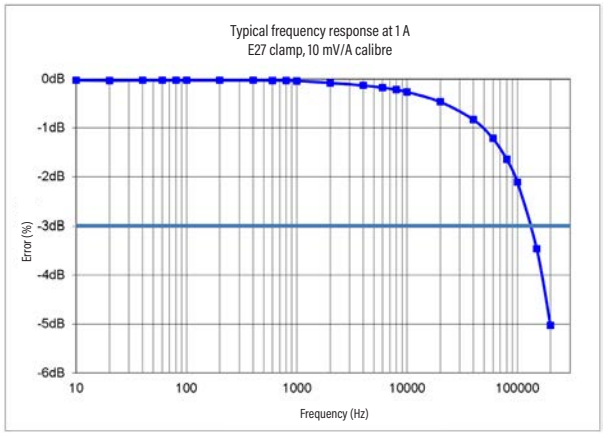


10 A calibre

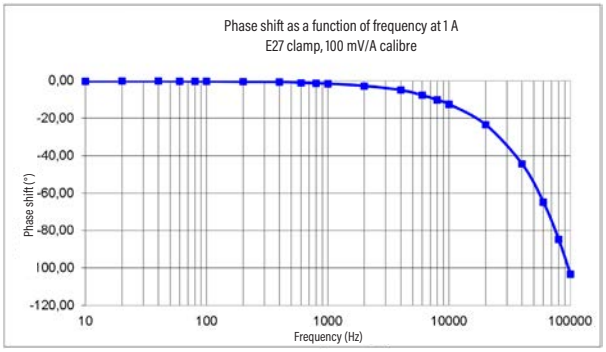
100 A calibre

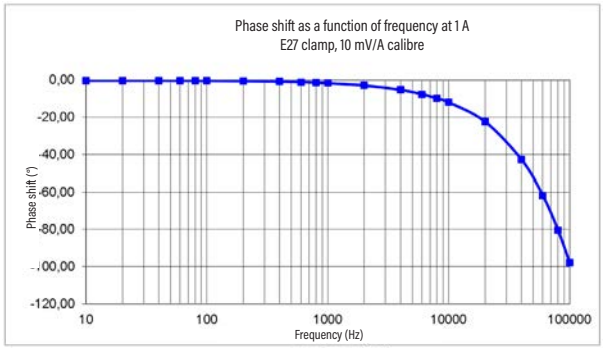
Frequency response





Frequency phase shift





CURRENT CLAMP FOR AC/DC CURRENT

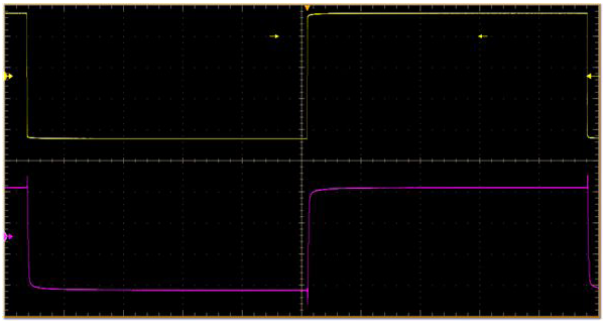
Model E27 (insulated AC/DC current probe)

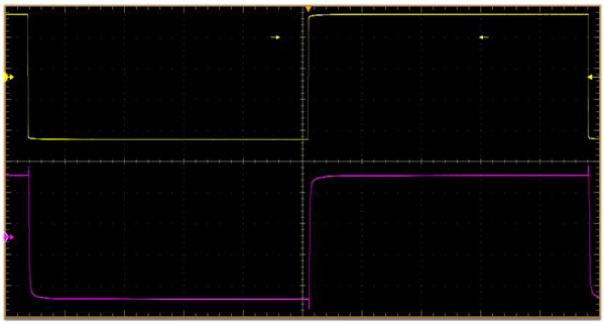
Curves

10 A calibre

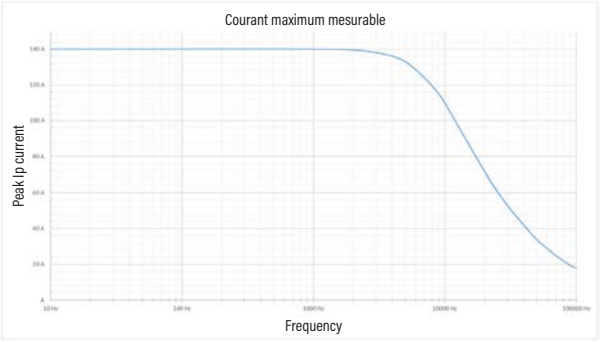
100 A calibre

Pulse response





Limitation of the measurable current as a function of frequency



(1) Conditions of reference: 23°C ± 5°K, 20–75% RH, power supply voltage 6.5 V DC to 9.0 V DC, sinusoidal signal with a frequency of DC to 1 kHz, external magnetic field < 40 A/m, no DC components, no external conductor with circulating current, conductor centred for measurement, load impedance ≥ 1 MΩ / ≤ 100 pF.

(2) With an alkaline battery, without an external power supply

To order	Reference
AC/DC current clamp, model **E27,** for oscilloscopes, with battery and operating user manual	P01120027