Current clamp for AC/DC current

MH serie



MH SERIES

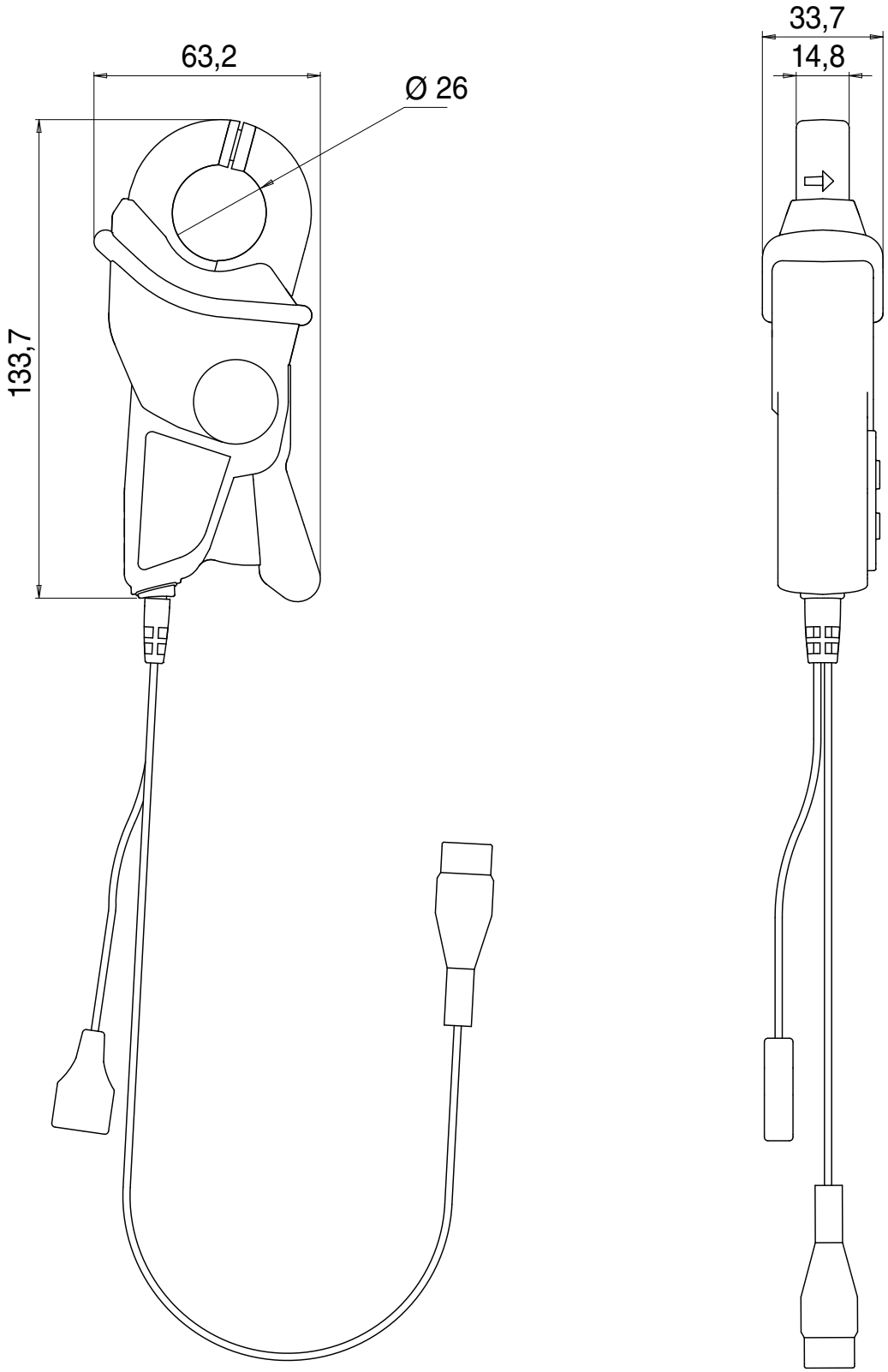
The MH60 clamp is designed to measure DC and AC currents up to 1 MHz using dual Hall effect/Transformer technology.

It includes an internal NiMh rechargeable battery and can be recharged or powered using a 5 VDC power supply via the female type-B µUSB connector with which it is equipped.

It has an automatic standby system (which can be deactivated), an automatic “DCzero” system for compensation of magnetic and electronic drift, a switchable selective filter (3 kHz, 30 kHz) and a system for compensating the effects of the earth field and other constant DC fields.

Its ability to measure AC+DC signals is useful for True RMS measurements.

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Current probe for AC/DC current
Model MH60 (insulated AC/DC current probe)

Current	140 A peak
Output	10 mV / A



DESCRIPTION

The MH60 clamp is designed to measure DC and AC currents up to 1 MHz using dual Hall effect/ Transformer technology.

ELECTRICAL SPECIFICATIONS

- **Current range:**
  0.5 .. 100 A DC (140 A peak)
- **Output signal:**
  10 mV AC+DC / A AC+DC (1 V at 100 A)
- **Accuracy and phase shift (1):**

Calibre	100 A			
Primary current	15 mA .. 0.7 A peak (10 mA .. 0.5 Arms or DC)	0.7 A .. 90 A peak (0.5 A .. 64 Arms or DC)	90 A .. 125 A peak (64 A .. 90 Arms or DC)	125 A .. 140 A peak (90 A .. 100 Arms or DC)
% Accuracy of output signal	NS	≤ 1.5 % + 100 µV	≤ 4 %	≤ 5 %
Phase shift @ 50 Hz (2)	NS	≤ 1°	≤ 1°	≤ 1°

- **Bandwidth:**
  DC .. 1 MHz (-3 dB) (depending on current value)
- **Rise time and fall time:**
  From 10 % to 90 %
  Without filter: 350 ns
  With filter 30 kHz: 11.7 µs
  With filter 3 kHz: 117 µs
- **dI/dt @ 2 A peak-peak:**
  5 A / µs
- **Delay time @ 2 A peak-peak:**
  0.35 µs typical
- **Insertion impedance:**
  ~ 0.25 mΩ @ 400 Hz
  ~ 0.628 mΩ @ 1 MHz
- **DC zero adjustment:**
  ±3 A by pushbutton
- **Noise RMS:**
  Without filter: 15 mA typical (< 88 mA peak-peak)
  30 kHz filter: 5 mA typical (< 36.6 mA peak-peak)
  3 kHz filter: 4 mA typical (< 35.8 m A peak-peak)
- **Battery:**
  Internal NiMh rechargeable battery + 5 VDC external via female µUSB type B connection
- **Battery life:**
  8 hours typical with fully-charged battery
- **Typical consumption:**
  < 150 mA (battery charging)
- **Low battery signal:**
  Flashing green LED x 2 hours
- **Overload indication:**
  RED "OL" LED to indicate excessive measurement current
- **Influence of temperature:**
  -10 °C .. +45 °C: ≤ 1,200 /°C
  +45 °C .. +50 °C: ≤ 2,200 ppm /°C
- **Influence of conductor position in jaws:**
  ≤ 1.5 % of output signal
- **Common mode voltage (600 V max) for AC measurements (typical/max):**
  at 50 Hz: 3.5 mA/5 mA @ 100 V
  at 400 Hz: 25.9 mA/50 mA @ 100 V

MECHANICAL SPECIFICATIONS

- **Clamping capacity:**
  Cable: Ø max 26 mm
- **Max. jaw insertion capacity:**
  ≤ 90 °C
- **Output:**
  Built-in cable 2 m long with moulded isolated male BNC plug
- **Dimensions:**
  138 x 49 x 28 mm
- **Weight:**
  200 g approx.
- **Operating temperature:**
  -10 °C to +50 °C
- **Storage temperature:**
  -20 °C to +50 °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 40 (EN 60529)
- **Drop test:**
  1 m (EN 60068-2-32)
- **Shock resistance:**
  100 g / 6 ms / half-periode (IEC 68-2-27)
- **Vibration resistance:**
  10/55/10 Hz, 0.15 mm (IEC 68-2-6)
- **Self-extinguishing capability:**
  UL94 V2
- **Colours:**
  Casing: dark grey
  Jaws: red

SAFETY SPECIFICATIONS

- **Electrical safety:**
  Instrument with double insulation or reinforced insulation between the primary the secondary and the grippable part located under the guard as per IEC 1010-1 & IEC 1010-2-032
  - 600 V category II, pollution degree 2
  - 300 V category III, pollution degree 2
- **Electromagnetic compatibility (EMC):**
  EN 50081-1: class B
  EN 50082-2:
  - Electrostatic discharge (IEC 1000-4-2):
    4 kV level 2 performance criterion B
    8 kV in the air level 3 performance criterion B
  - Radiated field (IEC 1000-4-3):
    10 V/m performance criterion A
  - Fast transients (IEC 1000-4-4):
    1 kV level 2 performance criterion B
    2 kV level 3 performance criterion B
  - Magnetic field at the network frequency (IEC 1000-4-8):
    field of 400 A/m at 50 Hz: < 1 A

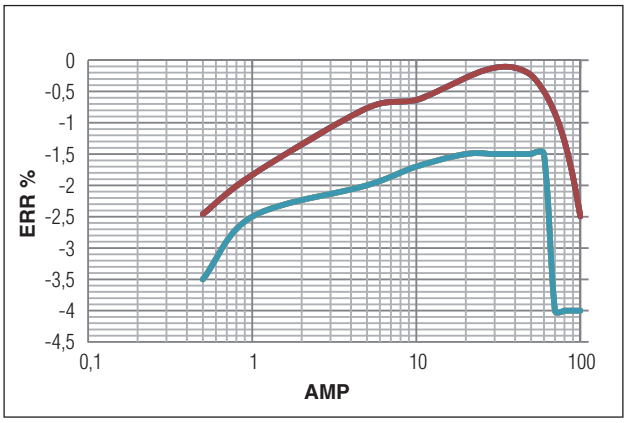
(1) Conditions of reference: 23 °C ± 5 °K, 20 at 75 % RH, power supply voltage 5 V ± 5 % V DC sinusoidal signal with frequency of DC at 400 Hz, external magnetic field < 40 A/m, no DC components, no external conductor with circulating current, conductor centred for measurement, load impedance > 1 MΩ / < 100 pF.

(2) without filter.

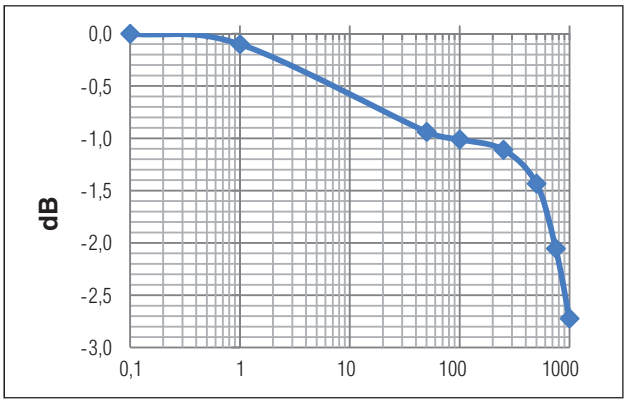
To order	Reference
AC/DC clamp model **MH60** with a 100 V-240 V 50/60 Hz mains adapter, 1.5 A USB-A, type-A male USB ↔ type-B male µUSB cable 1.80 m long, verification certificate and 5-language user manual	P01120612

CURVES

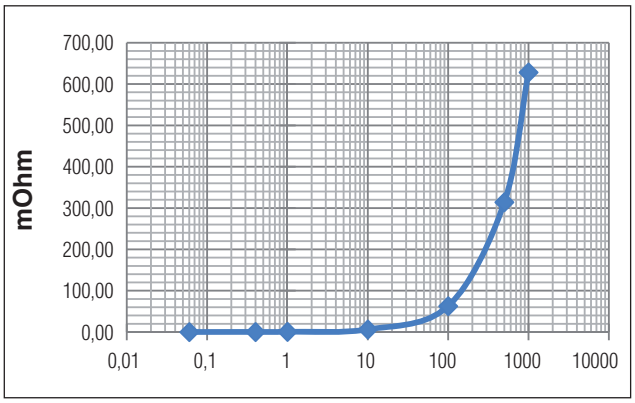
Linearity in DC 100 A calibre



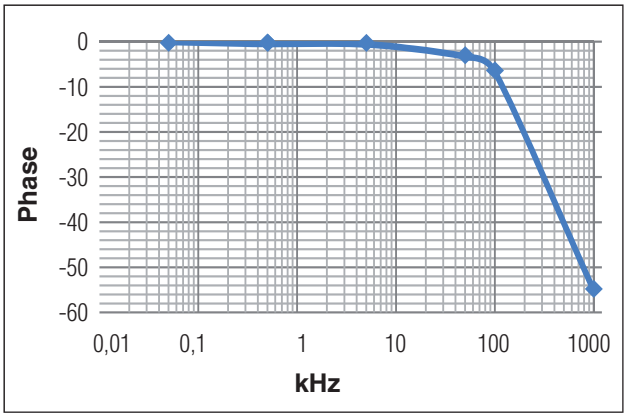
Frequency response to 0.5 A



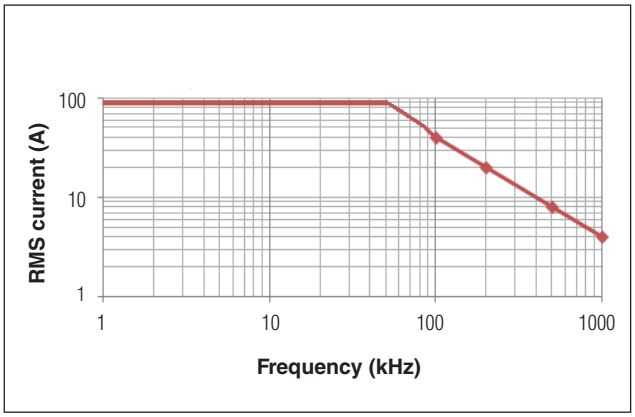
Insertion impedance



Phase shift at 3 A



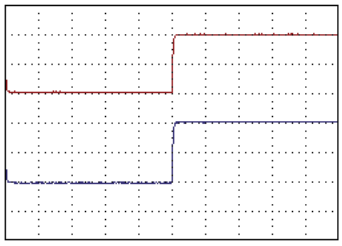
Limitation of measurable current according to the frequency



Current clamp for AC/DC current
Model MH60 (insulated AC/DC current probe)

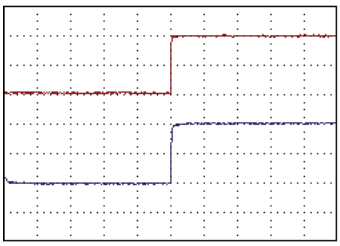
CURVES

1 A peak



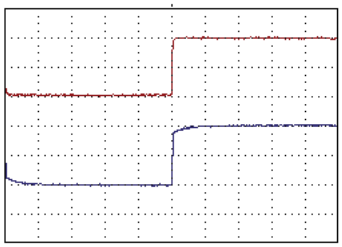
Input signal:
X: 1 ms/div
Y: 1 A V/div

Clamp output signal
X: 1 ms/div
Y: 1 A/div



Input signal:
X: 0.1 ms/div
Y: 1 A V/div

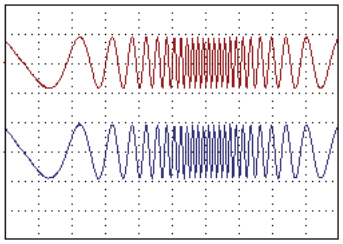
Clamp output signal
X: 0.1 ms/div
Y: 1 A/div



Input signal:
X: 20 µs/div
Y: 1 A V/div

Clamp output signal
X: 20 µs/div
Y: 1 A/div

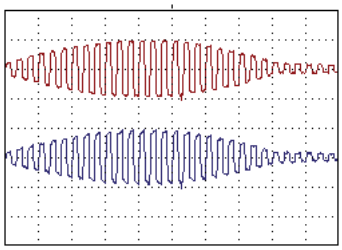
2 A peak



Input signal:
X: 5 ms/div
Y: 2 A/div

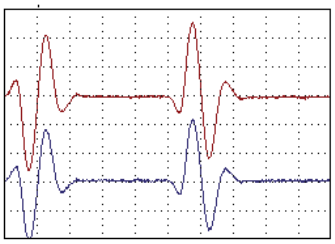
Clamp output signal
X: 5 ms/div
Y: 2 A/div

1 A peak



Input signal:
X: 50 µs/div
Y: 1 A/div

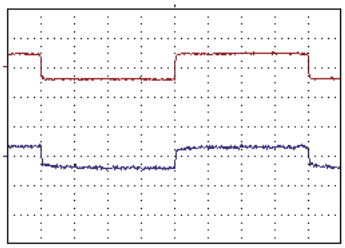
Clamp output signal
X: 1 µs/div
Y: 1 A/div



Input signal:
X: 200 µs/div
Y: 0.5 A/div

Clamp output signal
X: 200 µs/div
Y: 0.5 A/div

0.1 A peak



Input signal:
X: 20 µs/div
Y: 0.25 A V/div

Clamp output signal
X: 20 µs/div
Y: 0.25 A/div