# CURRENT CLAMP FOR AC/DC CURRENT




## MH series

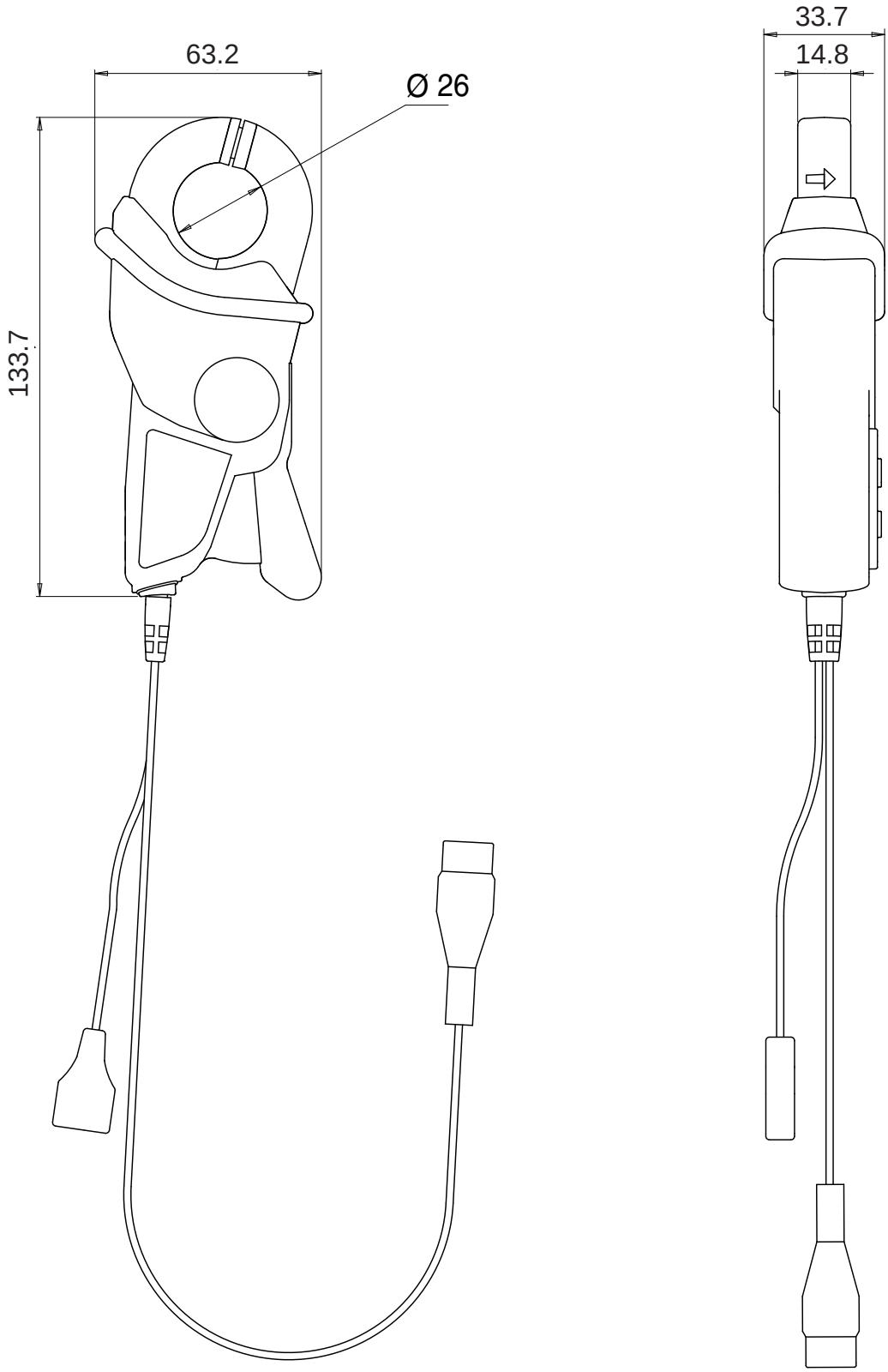
The MH60 clamp is designed to measure DC and AC currents up to 1 MHz using dual Hall effect/Transformer technology.

It includes an internal NiMh rechargeable battery and can be recharged or powered using a 5 V DC 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 "DC zero" 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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## 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 1MHz 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)**:**

| Primary current: | 0 to 60 $A_{peak}$ (0 to 42 ARMS or DC) | 60 to 90 $A_{peak}$ (42 to 64 ARMS or DC) | 90 to 110 $A_{peak}$ (64 to 80 ARMS or DC) | 110 to 140 $A_{peak}$ (80 to 100 ARMS or DC) |
|---|---|---|---|---|
| Accuracy in % of output signal | ≤ (1.5 % ± 0.1 mV) | ≤ 2.5 % | 4 % | 6 % |
| Phase shift @ 50 Hz | ≤ 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 30 kHz filter 11.7 µs
  With 3 kHz filter: 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 push-button
- **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)
- **Power supply:**
  Internal NiMh rechargeable battery + 5 V DC 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 ppm /°C
  +45 °C .. +50 °C: ≤ 2200 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:**
  Coaxial cable 2 m long, terminated by an insulated BNC connector
- **Dimensions:**
  138 x 49 x 28 mm
- **Mass:**
  Approximately 200 g
- **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-period (CEI 68-2-27)
- **Vibration resistance:**
  10/55/10 Hz, 0.15 mm (CEI 68-2-6)
- **Self-extinguishing capability:**
  UL94 V2
- **Colours:**
  Dark grey case with red jaws

## Safety specifications

Type A clamp with double insulation or reinforced insulation between the primary, the secondary and the grippable part located under the guard as per CEI 61010-1 & CEI 61010-2-032

- 600 V category III, pollution degree 2
- 300 V category IV, pollution degree 2

- **Electromagnetic compatibility (EMC) :**
  Emission according to EN 50081-1: class B
  Immunity according to 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.

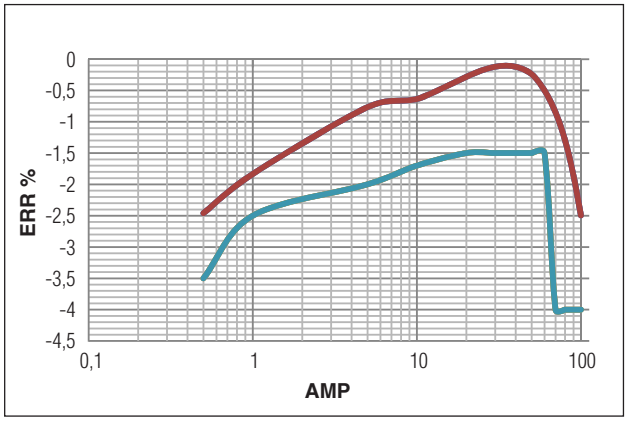
| To order | Reference |
|---|---|
| AC/DC clamp model **MH60** with a 100 V-240 V 50/60 Hz mains adapter, 1.5 A USB-A, type-A male USB ⇔ type-B male µUSB cable 1.80 m long, verification certificate and 5-language user manual | P01120612 |

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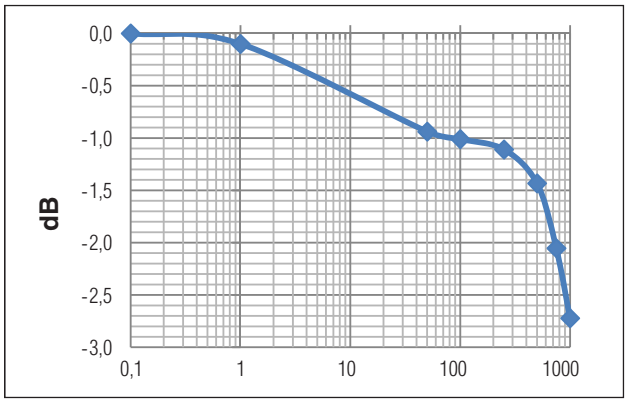
## Model MH60 (insulated AC/DC current probe)

### Curves

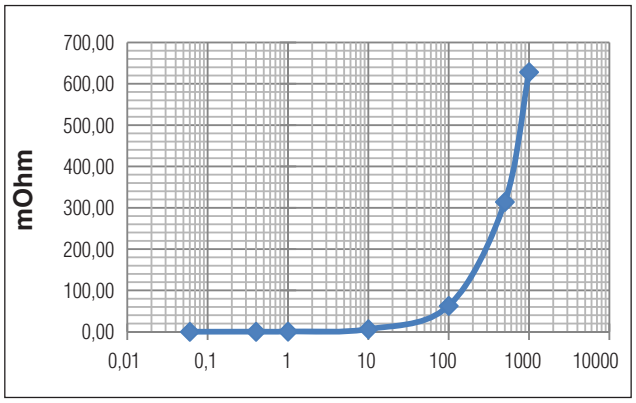
Linearity in DC 100 A calibre



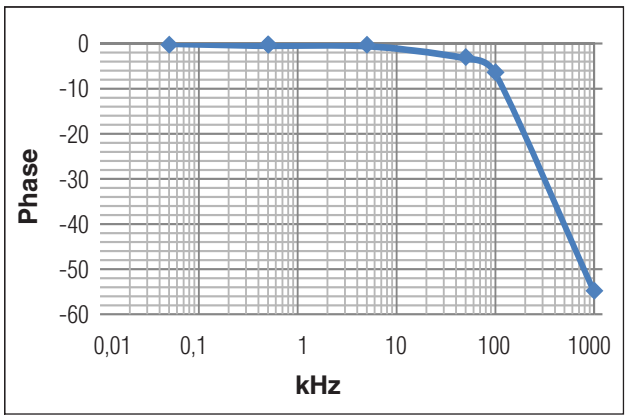

Frequency response at 0.5 A



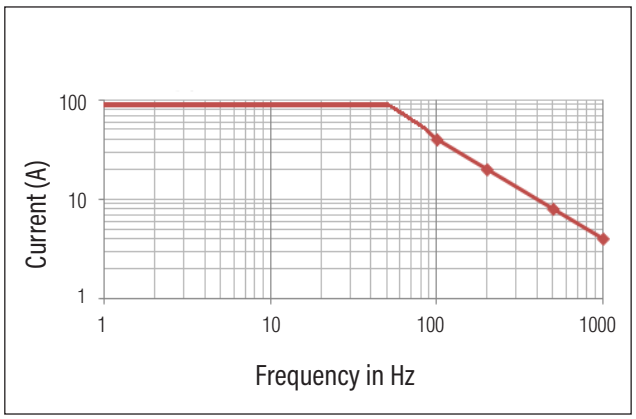

Insertion impedance




Phase shift at 3 A




Limitation of measurable current according to the frequency

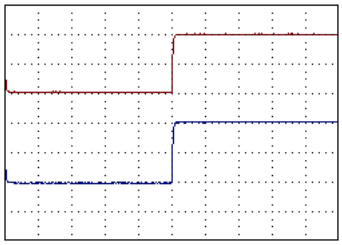


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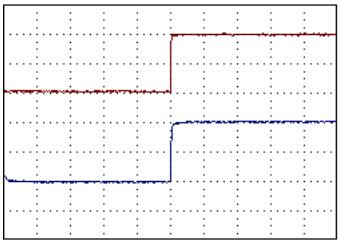
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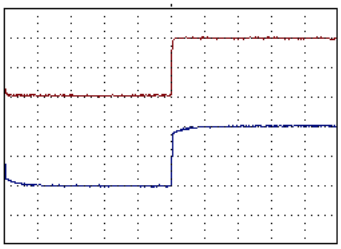
#### 1 A peak



Input signal:
X: 1 ms/div
Y: 1 A/div
MH60 output signal
X: 1 ms/div
Y: 1 A/div

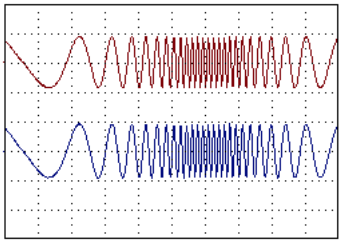


Input signal:
X: 0.1 ms/div
Y: 1 A/div
MH60 output signal
X: 0.1 ms/div
Y: 1 A/div

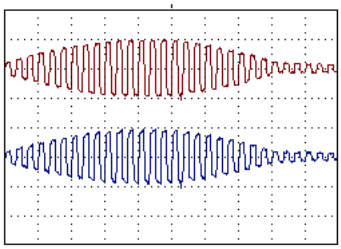


Input signal:
X: 20 µs/div
Y: 1 A/div
MH60 output signal
X: 20 µs/div
Y: 1 A/div

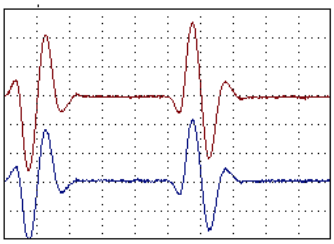
#### 2 A peak



Input signal:
X: 5 ms/div
Y: 2 A/div
MH60 output signal
X: 5 ms/div
Y: 2 A/div

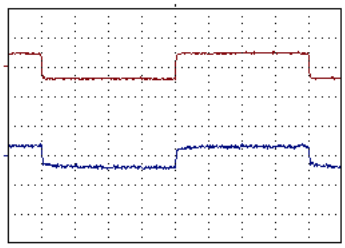


Input signal:
X: 50 µs/div
Y: 1 A/div
MH60 output signal
X: 1 µs/div
Y: 1 A/div



Input signal:
X: 200 µs/div
Y: 0.5 A/div
MH60 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/div
MH60 output signal
X: 20 µs/div
Y: 0.25 A/div

# NOTES