Current clamps for AC/DC current

PAC series

The PAC series is a range of professional AC/DC current clamps.

There are two different jaw designs available for clamping cables and small busbars.

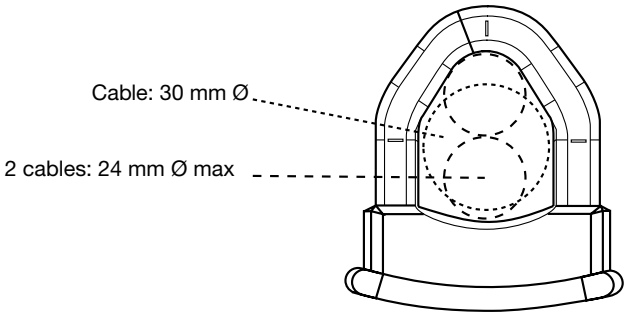
The PAC series clamps operate on the Hall effect principle, allow current measurement up to 1500 A DC and 1000 A AC. The electronics and the batteries are all located in the clamp handles. There are two sensitivity levels available: 1 mV/A and 10 mV/A.

A push button operates the automatic DC zeroing on models PAC 11, 12, 21 and 22.

Models PAC 10 and PAC 20 have potentiometer-operated zero adjustment.

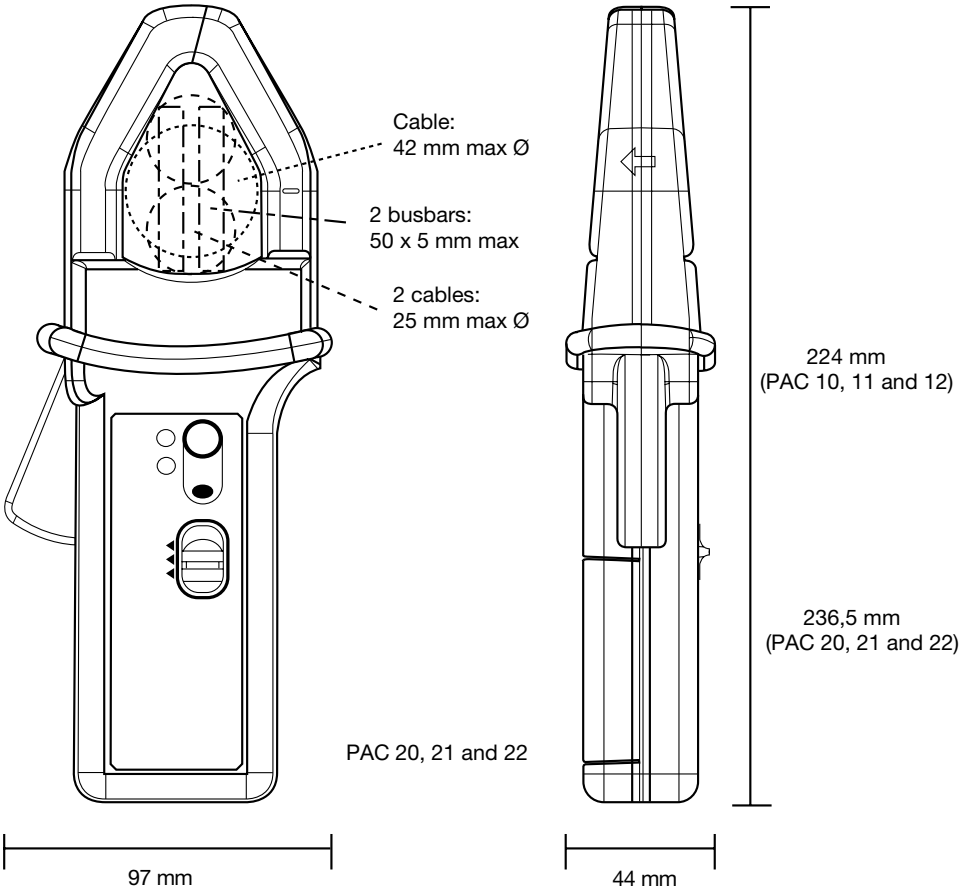
TRMS measurement with the DC component is possible using a multimeter or power meter with suitable capabilities.

Models PAC 12 and PAC 22 are designed for use with oscilloscopes and other BNC-input instruments.



Jaws

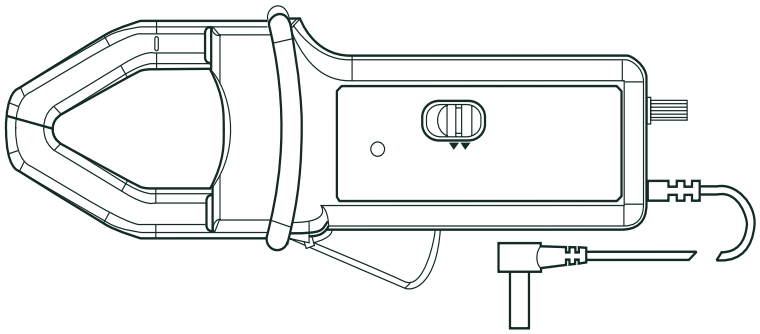
PAC10, 11 and 12



PAC 20, 21 and 22

Current clamp for AC/DC current
Model PAC10

Current	400 A AC 600 A DC
Output	1 mV/A



Description

Model PAC10 operates using the Hall effect, for precise measurement of AC or DC currents.

It has a mV output so that a direct reading may be made on a multimeter or logging equipment, etc.

Electrical specifications

Current calibres:
0.5 A AC to 400 A AC (600 A peak)
0.5 A AC to 600 A DC

Output signal: 1 mV/A

Accuracy (1):

Current range	1 A ...100 A	100 A ...400 A
Accuracy in % of output signal	1.5 % ± 1 mV	2 % 400 A ... 600 A DC: 2.5 %

Phase shift (1):

Current range	10 A ... 200 A	200 A ... 400 A
Phase shift 45 Hz…65 Hz	< 2.5°	< 2°

Overload:
2000 A DC and 1000 A AC up to 1 kHz

Bandwidth:
DC…5 kHz

Noise:
DC at 1 kHz: < 1 mV
DC at 5 kHz: < 1.5 mV
0.1 Hz at 5 kHz: < 500 µV

Load impedance:
1 MΩ and ≤ 100 pF

Insertion impedance:
0.39 mΩ at 50 Hz, 58 mΩ at 1000 Hz

Rise time and fall time:
< 100 µs from 10 % to 90 % of the voltage value

Operating voltage:
600 V rms

Common mode voltage:
600 V rms

Influence of adjacent conductor:
< 10 mA/A at 50 Hz

Influence of conductor position in jaws:
0.5 % of the reading

Battery:
9 V alkaline (NEDA 1604 A, IEC 6LR61)

Low battery signal:
Green LED when the battery voltage > 6.5 V

Battery life:
120 hours with Alkaline battery

Mechanical specifications

Operating temperature:
-10 °C to +55 °C

Storage temperature:
-40 °C to +80 °C

Relative humidity for operation:
+10 °C to +35 °C: 90 ± 5 % RH (without condensation)
+40 °C to +55 °C: 70 ± 5 % RH (without condensation)

Influence of temperature:
< 300 ppm/°K or 0.3 %/10 °K
< 0.3 A/°K

Influence of humidity:
10 % to 90 % RH at reference temperature: < 0.1 %

Operating altitude:
0 to 2,000 m

DC zero adjustment:
±12 A (10-turn potentiometer)

Max. jaw insertion capacity:
1 cable Ø 30 mm or 2 cables Ø 24 mm

Casing protection rating:
IP30 in accordance with IEC 529

Drop test:
1 m on a 38 mm container of oak on concrete, test in accordance with IEC 1010

Shock resistance:
100 g, in accordance with IEC 68-2-27

Vibration resistance:
Test in accordance with IEC 68-2-6

Frequency range:
5 Hz to 15 Hz: amplitude: 1.5 mm
15 Hz to 25 Hz: amplitude: 1 mm
25 Hz to 55 Hz: amplitude: 0.25 mm

Self-extinguishing capability:
Casing and jaws: UL94 V0

Dimensions:
224 x 97 x 44 mm

Weight:
440 g

Colours:
Dark grey and red jaws

Output:
via 1.5 m double insulated cable with 4 mm male safety plug

Safety specifications

Electrical safety:
double or reinforced insulation between the primary, the secondary and outer casing in accordance with IEC 1010-1-2 (indoor use).
600 V category III, pollution 2
300 V category IV, pollution 2

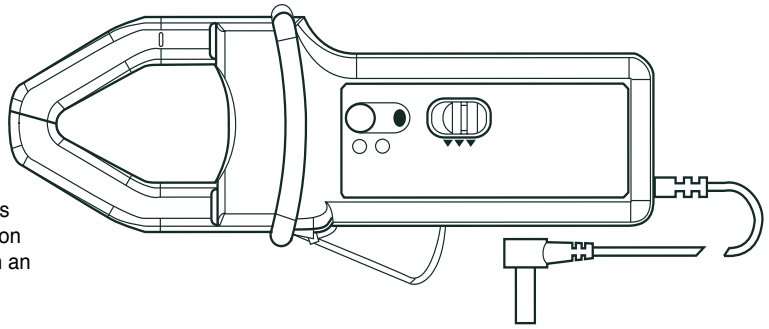
Electromagnetic compatibility (EMC):
EN 50081-1: class B
EN 50082-2:
- Electrical discharge IEC 1000-4-2
- Radial field IEC 1000-4-3
- Fast transients IEC 1000-4-4
- Magnetic field at 50/60 Hz IEC 1000-4-8

(1) Conditions of reference: 18 °C at 28 °C, 20 % to 75 % RH, 48 to 65 Hz, external magnetic field < 40 A/m, no DC component, no current-carrying conductor nearby, centred test sample, charge ≥ 1 MΩ and ≤ 100 pF, reset to zero before measurement (only DC) DC to 65 Hz, batteries 9 V ±0.1 V

To order	Reference
AC/DC current clamp model **PAC10** with battery and user's manual	P01120070
AC/DC current clamp model **PAC10** in carrying case with battery and user's manual	P01120070D

Current clamp for AC/DC current
Model PAC11

Current	40 A AC 60 A DC	400 A AC 600 A DC
Output	10 mV/A	1 mV/A



Description

The PAC11 model accurately measures AC or DC currents using the Hall-effect principle. This clamp with mV output on BNC (direct reading on multimeters, etc.) is equipped with an automatic DC zero system.

Electrical specifications

Calibre	60 A	600 A
Current range	0.2 A ... 40 A (60 A peak) 0.4 A ... 60 A DC	0.5 A ... 400 A (600 A peak) 0.5 A ... 600 A DC
Output signal	10 mV/A	1 mV/A
% Accuracy of output signal (1)	0.5 A...40 A: 1.5 % ±5 mV 40 A...60 A DC: 1.5 %	0.5 A...100 A: 1.5 % ±1 mV 100 A...400 A DC: 2 % 400 A...600 A DC: 2.5 %
Phase shift (45...65 Hz) (1)	10 A...20 A: < 3° 20 A...40 A: < 2°	10 A...100 A: < 2° 100 A...400 A: < 1.5°
Noise	DC...1 kHz: < 8 mV DC…5 kHz: < 12 mV 0.1 Hz…5 kHz: < 2 mV	DC...1 kHz: < 1 mV DC…5 kHz: < 1.5 mV 0.1 Hz…5 kHz: < 500 µV
Rise/fall time	≤ 100 µs from 10 % to 90 % of the voltage value	≤ 70 µs from 10 % to 90 % of the voltage value

Overload:
2000 A DC and 1000 A AC up to 1 kHz

Bandwidth:
DC...10 kHz at -3 dB

Load impedance:
≥ 1 MΩ and ≤ 100 pF

Insertion impedance:
0.39 mΩ at 50 Hz, 58 mΩ at 1000 Hz

Operating voltage:
600 V rms

Common mode voltage: 600 V rms

Influence of adjacent conductor:
< 10 mA/A at 50 Hz

Influence of conductor position in jaws:
0.5 % of the reading

Battery:
9 V alkaline (NEDA 1604 A, IEC 6LR61)

Low battery signal:
Green LED when the battery voltage > 6.5 V

Battery life:
50 hours with Alkaline battery.

Overload indicator:
Red LED
Auto switch-off: 0 minute

Mechanical specifications

Operating temperature:
-10 °C to +55 °C

Storage temperature:
-40 °C to +80°C

Relative humidity for operation:
+10 °C to +35 °C:
90 ± 5 % RH (without condensation)
+40 °C to +55 °C:
70 ± 5 % RH (without condensation)

Influence of temperature:
< 300 ppm/°K or 0.3 %/10 °K
< 0.3 A/°K

Influence of humidity:
10 % to 90 % RH at reference temperature:
< 0.1 %

Operating altitude:
0 to 2,000 m

DC zero adjustment:
Automatically operated by button (± 10 A)

Max. jaw insertion capacity:
1 cable Ø 30 mm or 2 cables Ø 24 mm or
2 busbars 31.5 x 10 mm

Casing protection rating:
IP30 in accordance with IEC 529

Drop test:
1 m on a 38 mm container of oak on concrete, test in accordance with IEC 1010

Shock resistance:
100 g, in accordance with IEC 68-2-27

Vibration resistance:
Test in accordance with IEC 68-2-6

Frequency range:
5 Hz to 15 Hz: amplitude: 1.5 mm
15 Hz to 25 Hz: amplitude: 1 mm
25 Hz to 55 Hz: amplitude: 0.25 mm

Self-extinguishing capability:
Casing and jaws: UL94 V0

Dimensions:
224 x 97 x 44 mm

Weight:
440 g

Colours:
Dark grey and red jaws

Output:
Via 1.5 m double insulated cable with 4 mm male safety plug

Safety specifications

Electrical safety:
double or reinforced insulation between the primary, the secondary and outer casing in accordance with IEC 1010-1-2 (indoor use).
600 V category III, pollution 2
300 V category IV, pollution 2

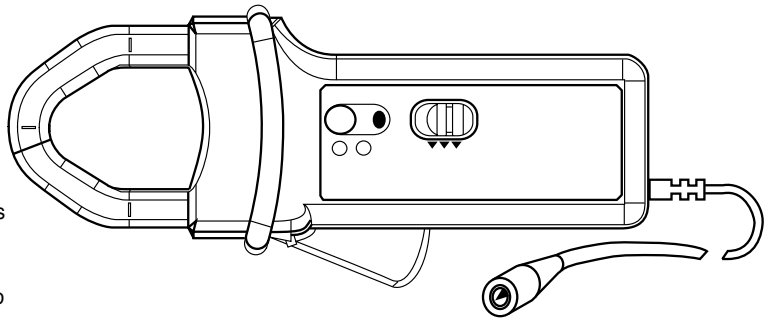
Electromagnetic compatibility (EMC):
EN 50081-1: class B
EN 50082-2:
- Electrical discharge IEC 1000-4-2
- Radial field IEC 1000-4-3
- Fast transients IEC 1000-4-4
- Magnetic field at 50/60 Hz IEC 1000-4-8

(1) Conditions of reference: 18° at 28°C, 20 to 75 % RH, 48 to 65 Hz, external magnetic field < 40 A/m, no DC component, no current-carrying conductor nearby, centred test sample, charge ≥ 1 MΩ and ≤ 100 pF, reset to zero before measurement (only DC) DC to 65 Hz, batteries 9 V ±0.1 V

To order	Reference
AC/DC current clamp model **PAC11** with battery and user's manual	P01120068
AC/DC current clamp model **PAC11** in carrying case with battery and user's manual	P01120068D

Oscilloscope clamp for AC/DC current
Model PAC12

Current	40 A AC 60 A DC	400 A AC 600 A DC
Output	10 mV/A	1 mV/A



■ Description

The PAC12 model accurately measures AC or DC currents by using the Hall-effect principle.

This clamp with mV output on BNC (direct reading on oscilloscopes, etc.) is equipped with an automatic DC Zero system.

■ Electrical specifications

Current calibres:
0.2 A AC...40 A AC (60 A peak) / 0.4 A DC...60 A DC
0.5 A AC...400 A AC (600 A peak) / 0.5 A DC...600 A DC

Output signal:
10 mV AC+DC / A AC+DC (0.6 V for 60 A)
1 mV AC+DC / A AC+DC (0.6 V for 600 A)

Accuracy and phase shift [1]:

■ 60 A calibre

Primary current	0.5 A…10 A	10 A…20 A	20 A…40 A	40 A…60 A (only DC)
Accuracy in % of output signal	≤ 1.5 % + 5 mV	≤ 1.5 % + 5 mV	≤ 1.5 % + 5 mV	≤ 1.5 %
Phase shift	Not specified	≤ 3°	≤ 2.2°	–

■ 600 A calibre

Primary current	0.5 A…10 A	10 A…100 A	100 A…300 A	300 A…400 A	400 A…600 A (only DC)
% Accuracy of output signal	≤ 1.5 % + 1 mV	≤ 1.5 % + 1 mV	≤ 2 %	≤ 2 %	≤ 2.5 %
Phase shift	Not specified	≤ 2.2°	≤ 2.2°	≤ 1.5°	-

Bandwidth:
DC...10 kHz (-3 dB) (depending on current value)

Rise/fall time from 10 % to 90 %:
29 μs

10 % delay time:
15 μs

Insertion impedance (at 400 Hz / 10 kHz):
< 2.7 mΩ / < 72 mΩ

Maximum currents:
3000 A DC or 1000 A AC continuous for a frequency ≤ 1 kHz (limitation proportional to the inverse of one third of the frequency above that)

DC zero adjustment:
Automatic
■ 60 A calibre:
± 10 A in 25 to 40 mA increments
■ 600 A calibre:
± 10 A in 25 to 40 mA increments

Typical output noise level (peak-peak) from DC to 100 kHz:
■ 60 A calibre:
DC to 1 kHz: ≤ 8 mV or 0.8 A DC
DC to 5 kHz: ≤12 mV or 1.2 A DC
0.1 Hz to 5 kHz: ≤ 2.0 mV rms or 0.2 A rms
■ 600 A calibre:
DC to 1 kHz: ≤ 1 mV or 1 A DC
DC to 5 kHz: ≤ 1.5 mV or 1.5 A DC
1 Hz to 5 kHz: ≤ 500 μV rms or 0.5 A rms

Battery:
9 V alkaline (NEDA 1604A, IEC 6LR61)

Battery life:
50 hours typical

Typical consumption:
10 mA typical / 14 mA max.

Battery level indicator:
Green LED

Overload indicator:
Red LED indicates if measured current is too high for the selected range
Influence of power supply voltage:
≤ 0.1 % of the reading

Influence of temperature:
Measurement: ≤ 300 ppm/K or 0.3 % of output signal per 10 °K
DC zero: 40 mA/10 °K

Influence of relative humidity:
< 0.5 % of output signal

Influence of adjacent conductor at 23 mm:
≤ 10 mA/A at 50 Hz

Influence of external field:
≤ 1.3 A pour 400 A/m

Influence of Ø 20 mm conductor position in jaws:
DC at 440 Hz: ≤ 0.5 % of the reading
DC at 1 kHz: ≤ 1 % of the reading
DC at 2 kHz: ≤ 3 % of the reading
DC at 5 kHz: ≤ 10 % of the reading

Influence of frequency [2]:
< 1 % of output signal from 65 Hz...440 Hz
< 3.5 % of output signal from 440 Hz...2 kHz
3 dB % of output signal from 2 kHz...10 kHz

Common mode rejection:
> 65 dB A/V at 50 Hz

Remanence:
0 to 50 A DC: 0.8 A typical
0 to 100 A DC: 1.3 A typical
0 to 200 A A DC: 2.1 A typical
0 to 400 A A DC: 3.3 A typical
0 to 600 A A DC: 4.0 A typical

Oscilloscope clamp for AC/DC current
Model PAC12

Mechanical specifications

Max. jaw opening:
31 mm

Clamping capacity:
Cables: Ø 30 mm
Ø 24 mm x 2
Bars: 1 busbar 50 x 10 mm
2 busbars 31.5 x 10 mm
3 busbars 25 x 8 mm
4 busbars 25 x 5 mm

Output:
Coaxial cable 2 m long, terminated by an insulated BNC connector

Dimensions:
224 x 97 x 44 mm

Weight:
440 g with battery

Operating temperature:
-10 °C to +55 °C

Storage temperature:
-40 °C to +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:
IP40 (IEC 529)

Drop test:
1 m (IEC 68-2-32)

Shock resistance:
100 g / 6 ms / half-period (IEC 68-2-27)

Protection against impacts:
IK04 0.5 J (EN 50102)

Vibration resistance:
5-15 Hz: 1.5 mm peak
15-25 Hz: 1 mm peak
25-55 Hz: 0.25 mm peak
(IEC 68-2-6)

Self-extinguishing capability:
UL94 V2

Colours:
Dark grey casing with red jaws

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

Electromagnetic compatibility (EMC):
EN 50081-1: class B
EN 50082-2:
- Electrostatic discharge IEC 1000-4-2:
  4 kV in contact, performance criterion B
  8 kV in the air, performance criterion B
- Radiated field IEC 1000-4-3:
  3 V/m level 2: influence < 5 % of measurement range
- Fast transients IEC 1000-4-4:
  1 kV performance criterion B
- Magnetic field at the network frequency IEC 1000-4-8:
  field of 30 A/m at 50 Hz level 4
  performance criterion A
- Conducted disturbances (IEC 1000-4-6):
  3 V performance criterion A

(1) Conditions of reference: 23 °C ± 5 °K, 20 % at 75 % RH, power supply voltage 9 V ± 0.1 V DC sinusoidal signal with frequency of DC to 65 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) Out of reference domain.

To order	Reference
AC/DC current clamp model **PAC12** for oscilloscope with battery and user's manual	P01120072

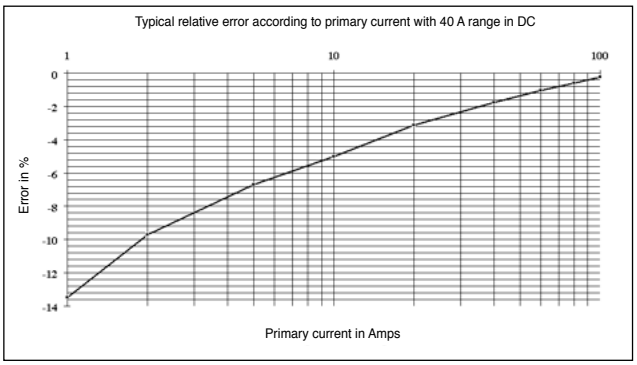
Oscilloscope clamp for AC/DC current
Model PAC12

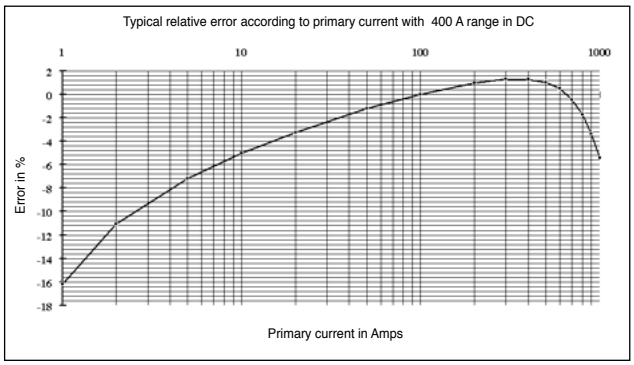
Curves

60 A calibre

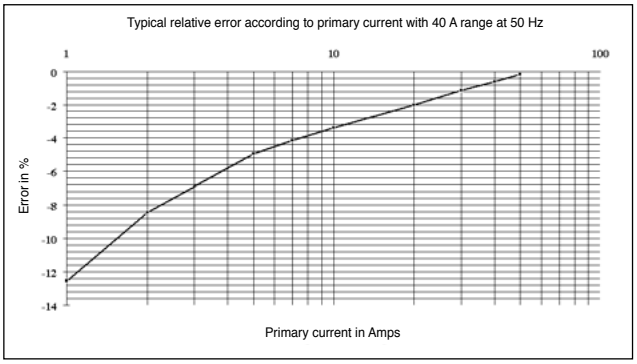
600 A calibre

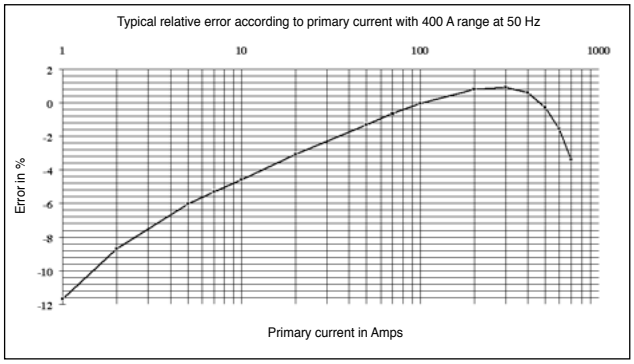
Linearity with DC



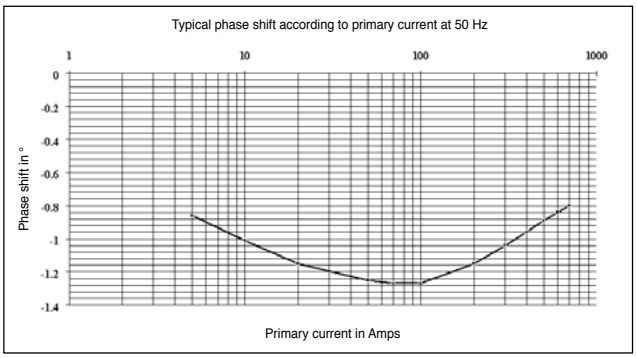


Linearity for AC

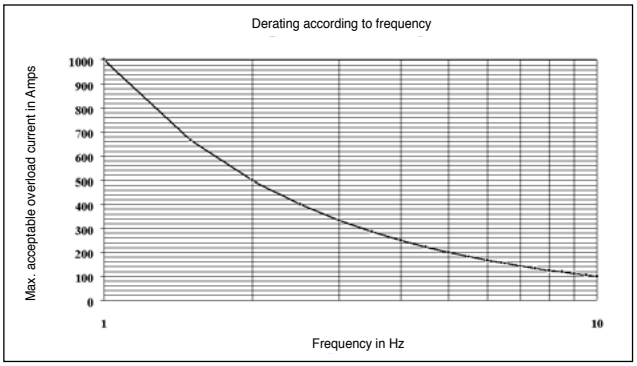




Phase shift



Limitation of measurable current according to the frequency

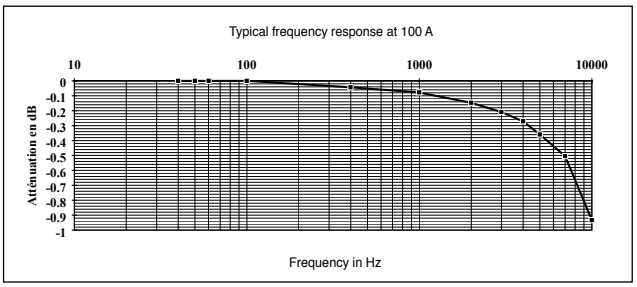


Oscilloscope clamp for AC/DC current
Model PAC12

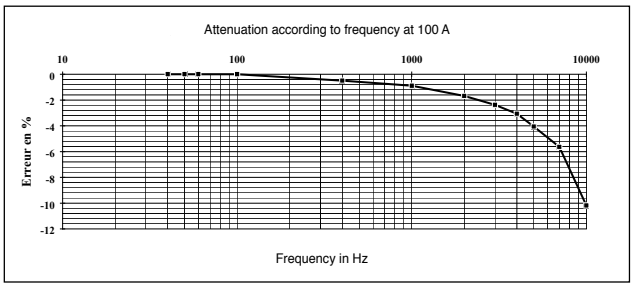
Curves

600 A calibre

Frequency response



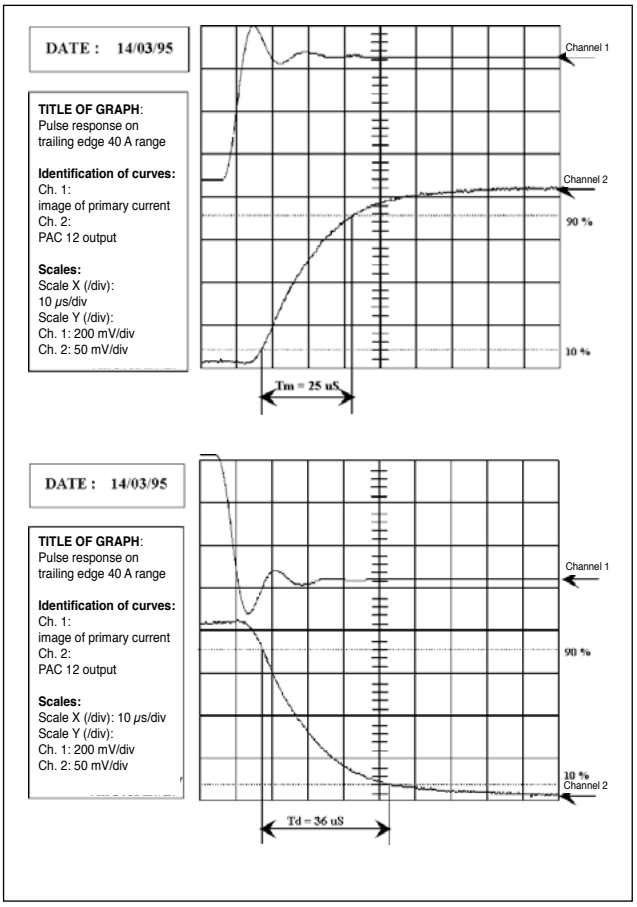
Attenuation according to the frequency

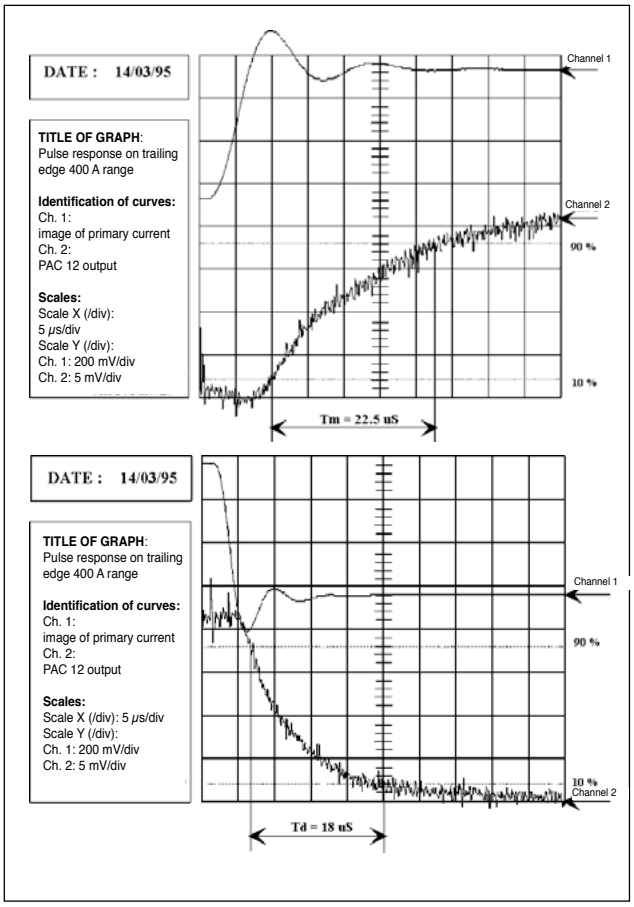


60 A calibre

600 A calibre

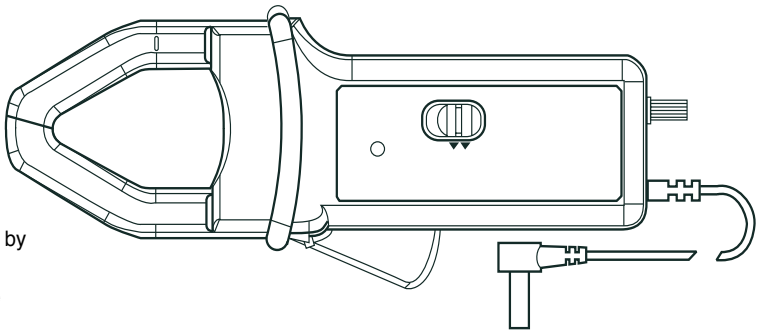
Pulse response





Current clamp for AC/DC current
Model PAC20

Current	1000 A AC 1400 A DC
Output	1 mV/A



Description

The PAC20 model accurately measures AC or DC currents by using the Hall-effect principle.

This clamp has a mV output so that direct readings may be made with a multimeter or logging equipment, etc.

Electrical specifications

Current calibres:
0.5 A...1000 A AC (1400 A peak)
0.5 A...1400 A DC

Output signal:
1 mV/A

Accuracy (1):

Current range	1 A ...100 A	100 A ...800 A	800 A...1000 A
Accuracy in % of output signal	1.5 % ± 1 mV	2.5 %	4 % 1000 A ...1400 A DC: 4 %

Phase shift (1):

Current range	10 A ... 200 A	200 A ... 1000 A
Phase shift 45 Hz…65 Hz	< 2.5°	< 2°

Overload:
3000 A DC and 2000 A AC up to 1 kHz

Bandwidth:
DC…5 kHz

Noise:
DC...1 kHz: < 1 mV
DC…5 kHz: < 1.5 mV
0.1 Hz…5 kHz: < 500 µV

Load impedance:
> 100 kΩ at 100 pF

Insertion impedance:
0.39 mΩ at 50 Hz, 58 mΩ at 1000 Hz

Rise/fall time:
Rise:
< 100 μs from 10 % to 90 % of the voltage value

Fall:
< 100 μs from 10 % to 90 % of the voltage value

Operating voltage:
600 V rms

Common mode voltage:
600 V rms

Influence of adjacent conductor:
< 10 mA/A at 50 Hz

Influence of conductor position in jaws:
0.5 % of the reading

Battery:
9 V alkaline (NEDA 1604 A, IEC 6LR61)

Low battery signal:
Green LED when the battery voltage > 6.5 V

Battery life:
120 hours with Alkaline battery

Mechanical specifications

Operating temperature:
-10 °C to +55 °C

Storage temperature:
-40 °C to +80 °C

Relative humidity for operation:
+10 °C to +35 °C: 90 ± 5 % RH (without condensation)
+40 °C to +55 °C: 70 ± 5 % RH (without condensation)

Influence of temperature:
< 300 ppm/°K or 0.3 %/10 °K
< 0.3 A/°K

Influence of humidity:
10 %...90 % RH at reference temperature: < 0.1 %

Operating altitude:
0 to 2,000 m

Zero adjustment:
±12 A (10-turn potentiometer)

Max. jaw insertion capacity:
1 cable Ø 42 mm, 2 cables Ø 25.4 mm or 2 busbars 50 x 5 mm

Casing protection rating:
IP30 in accordance with IEC 529

Drop test:
1 m on a 38 mm container of oak on concrete, test in accordance with IEC 1010

Shock resistance:
100 g, in accordance with IEC 68-2-27

Vibration resistance:
Test in accordance with IEC 68-2-6

Frequency range:
5 to 15 Hz: amplitude: 1.5 mm
15 to 25 Hz: amplitude: 1 mm
25 to 55 Hz: amplitude: 0.25 mm

Self-extinguishing capability:
Casing and jaws: UL 94 V0

Dimensions:
236.5 x 97 x 44 mm

Weight:
520 g

Colours:
Dark grey and red jaws

Output:
via 1.5 m double insulated cable with 4 mm male safety plug

Safety specifications

Electrical safety:
double or reinforced insulation between the primary the secondary and outer casing in accordance with IEC 1010-1-2 (indoor use).
600 V category III, pollution 2
300 V category IV, pollution 2

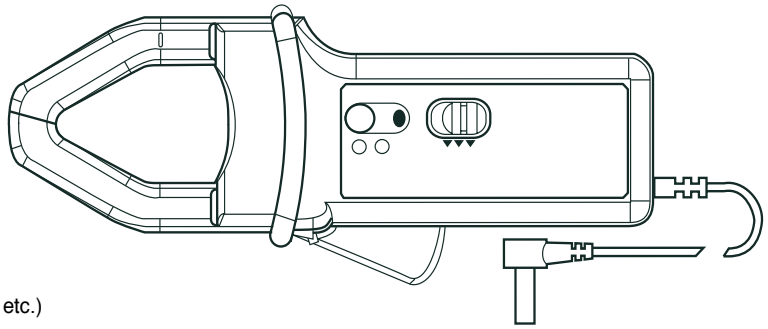
Electromagnetic compatibility (EMC):
EN 50081-1: class B
EN 50082-2:
- Electrical discharge IEC 1000-4-2
- Radial field IEC 1000-4-3
- Fast transients IEC 1000-4-4
- Magnetic field at 50/60 Hz IEC 1000-4-8

(1) Conditions of reference: 18 °C at 28 °C, 20 % to 75 % RH, 48 Hz to 65 Hz, external magnetic field < 40 A/m, no DC component, no current-carrying conductor nearby, centred test sample, charge ≥ 1 MΩ and ≤ 100 pF, reset to zero before measurement (only DC) DC to 65 Hz, battery 9 V ±0.1 V

To order	Reference
AC/DC current clamp model **PAC20** with battery and user's manual	P01120071
AC/DC current clamp model **PAC20** in carrying case with battery and user's manual	P01120071D

Current clamp for AC/DC current
Model PAC21

Current	100 A AC 150 A DC	1000 A AC 1400 A DC
Output	10 mV/A	1 mV/A



Description

The PAC21 model accurately measures AC or DC currents using the Hall-effect principle.

This clamp with mV output (direct reading on multimeters, etc.) is equipped with an automatic DC zero system.

Electrical specifications

Calibre	150 A	1400 A
Current range	0.2 A ... 100 A (150 A peak) 0.4 A ... 150 A DC	0.5 A ... 1000 A (1400 A peak) 0.5 A ... 1400 A DC
Output signal	10 mV/A	1 mV/A
% Accuracy of output signal (1)	0.5 A...20 A: 1.5 % ±5 mV 20 A...100 A DC: 1.5 % 100 A...150 A DC: 2.5 %	0.5 A...100 A: 1.5 % ±1 mV 100 A...800 A DC: 2.5 % 800 A...1000 A DC: 4 % 1000 A...1400 A DC: 4 %
Phase shift (45...65 Hz) (1)	10 A...20 A: < 3° 20 A...100 A: < 2°	10 A...200 A: < 2° 200 A...1000 A: < 1.5°
Noise	DC...1 kHz: < 8 mV DC…5 kHz: < 12 mV 0.1 Hz…5 kHz: < 2 mV	DC...1 kHz: < 1 mV DC…5 kHz: < 1.5 mV 0.1 Hz…5 kHz: < 500 µV
Rise/fall time	≤ 100 µs from 10 % to 90 % of the voltage value	≤ 70 µs from 10 % to 90 % of the voltage value

Overload:
3000 A DC and 2000 A AC up to 1 kHz

Bandwidth:
DC...10 kHz at -3 dB

Load impedance:
≥ 1 MΩ and ≤ 100 pF

Insertion impedance:
0.39 mΩ at 50 Hz, 58 mΩ at 1000 Hz

Operating voltage:
600 V rms

Common mode voltage:
600 V rms

Influence of adjacent conductor:
< 10 mA/A at 50 Hz

Influence of conductor position in jaws:
0.5 % of the reading

Battery:
9 V alkaline (NEDA 1604 A, IEC 6LR61)

Low battery signal:
Green LED when the battery voltage > 6.5 V

Battery life:
50 hours Alkaline battery

Overload indicator:
red LED

Auto switch-off:
10 minutes

Mechanical specifications

Operating temperature:
-10 °C to +55 °C

Storage temperature:
-40 °C to +80 °C

Relative humidity for operation:
+10 °C to +35°C: 90 ± 5 % RH (without condensation)
+40 °C to +55 °C: 70 ± 5 % RH (without condensation)

Influence of temperature:
< 300 ppm/°K or 0.3 %/10 °K
< 0.3 A/°K

Influence of humidity:
10 % to 90 % RH at reference temperature: < 0.1 %

Operating altitude:
0 to 2,000 m

Zero adjustment:
± 10 A by pushbutton

Max. jaw insertion capacity:
1 cable Ø 42 mm, 2 cables Ø 25.4 mm or 2 busbars 50 x 5 mm

Casing protection rating:
IP30 in accordance with IEC 529

Drop test:
1 m on a 38 mm container of oak on concrete, test in accordance with IEC 1010

Shock resistance:
100 g, in accordance with IEC 68-2-27

Vibration resistance:
test in accordance with IEC 68-2-6

Frequency range:
5 to 15 Hz: amplitude: 1.5 mm
15 to 25 Hz: amplitude: 1 mm
25 to 55 Hz: amplitude: 0.25 mm

Self-extinguishing capability:
Casing and jaws: UL94 V0

Dimensions:
236.5 x 97 x 44 mm

Weight:
520 g

Colours:
Dark grey and red jaws

Output:
Via 1.5 m double insulated cable with 4 mm male safety plug

Safety specifications

Electrical safety:
double or reinforced insulation between the primary, the secondary and outer casing in accordance with IEC 1010-1-2 (indoor use).
600 V category III, pollution 2
300 V category IV, pollution 2

Electromagnetic compatibility (EMC):
EN 50081-1: class B
EN 50082-2:
- Electrical discharge IEC 1000-4-2
- Radial field IEC 1000-4-3
- Fast transients IEC 1000-4-4
- Magnetic field at 50/60 Hz IEC 1000-4-8

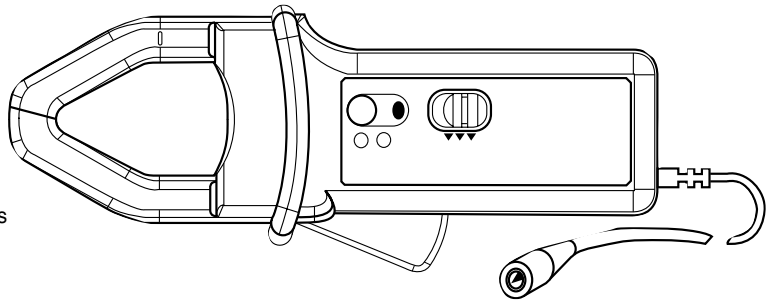
(1) Conditions of reference: 18 °C at 28 °C, 20 % to 75 % RH, 48 Hz to 65 Hz, external magnetic field < 40 A/m, no DC component, no current-carrying conductor nearby, centred test sample, charge ≥ 1 MΩ and ≤ 100 pF, reset to zero before measurement (only DC) DC to 65 Hz, battery 9 V ±0.1 V

To order	Reference
AC/DC current clamp model **PAC21** with battery and user's manual	P01120069
AC/DC current clamp model **PAC21** in carrying case with battery and user's manual	P01120069D

Oscilloscope clamp for AC/DC current

Model PAC22 (insulated current probe)

Current	100 A AC 150 A DC	1000 A AC 1400 A DC
Output	10 mV/A	1 mV/A



■ Description

The PAC22 model accurately measures AC or DC currents using the Hall-effect principle. This clamp with mV output on BNC (direct reading on oscilloscopes, etc.) is equipped with an automatic DC zero system.

■ Electrical specifications

Current calibres:
0.2 A AC...100 A AC (150 A peak) / 0.4 A DC...150 A DC
0.5 A AC...1000 A AC (1400 A peak) / 0.5 A DC...1400 A DC

Output signal:
10 mV AC+DC / A AC+DC (1.5 V for 150 A)
1 mV AC+DC / A AC+DC (1.4 V for 1400 A)

Accuracy and phase shift [1]:

■ 150 A calibre

Primary current	0.5 A…10 A	10 A…20 A	20 A…100 A	100 A…150 A (only DC)
Accuracy in % of output signal	≤ 1.5 % + 5 mV	≤ 1.5 % + 5 mV	≤ 1.5 %	≤ 1.5 %
Phase shift	Not specified	≤ 3°	≤ 2.2°	–

■ 1400 A calibre

Primary current	0.5 A…10 A	10 A…100 A	100 A…200 A	200 A…800 A	800 A…1000 A	1000 A…1400 A (only DC)
Accuracy in % of output signal	≤ 1.5 % + 1 mV	≤ 1.5 % + 1 mV	≤ 2.5 %	≤ 2.5 %	≤ 4 %	≤ 4 %
Phase shift	Not specified	≤ 2°	≤ 2°	≤ 1.5°	≤ 1.5°	-

Bandwidth:
DC...10 kHz (-3 dB) (depending on current value)

Rise/fall time from 10 % to 90 %:
24 μs

10 % delay time:
15 μs

Insertion impedance (at 400 Hz / 10 kHz)
< 2.7 mΩ / < 67 mΩ

Maximum currents:
3000 A DC or 1000 A AC continuous for a frequency ≤ 1 kHz (limitation proportional to the inverse of one third of the frequency above that)

DC zero adjustment:
Automatic
■ 60 A calibre:
± 10 A in 25 mA to 40 mA increments

■ 600 A calibre:
± 10 A in 25 mA to 40 mA increments

Typical output noise level (peak-peak) from DC to 100 kHz:
■ 150 A calibre:
DC to 1 kHz: ≤ 8 mV or 0.8 A DC
DC to 5 kHz: ≤12 mV or 1.2 A DC
0.1 Hz to 5 kHz: ≤ 2.0 mV rms or 0.2 Arms

■ 1400 A calibre:
DC to 1 kHz: ≤ 1 mV or 1 A DC
DC to 5 kHz: ≤ 1.5 mV or 1.5 A DC
1 Hz to 5 kHz: ≤ 500 μV rms or 0.5 A rms

Output impedance:
100 Ω

Battery:
9 V alkaline (NEDA 1604A, IEC 6LR61)

Battery life: 50 hours typical

Typical consumption:
10 mA typical / 14 mA max.

Battery level indicator:
Green LED

Overload indicator:
Red LED indicates the measured current is too high for the selected range
Influence of power supply voltage:
≤ 0.1 % of the reading

Influence of temperature:
Measurement: ≤ 300 ppm/K or 0.3 % of output signal per 10 °K
DC zero: 40 mA/10 °K

Influence of relative humidity:
< 0.5 % of output signal

Influence of adjacent conductor at 23 mm: ≤ 10 mA/A at 50 Hz

Influence of external field:
≤ 1.3 A for 400 A/m

Influence of Ø 20 mm conductor position in jaws:
DC to 440 Hz: ≤ 0.5 % of the reading
DC to 1 kHz: ≤ 1 % of the reading
DC to 2 kHz: ≤ 3 % of the reading
DC to 5 kHz: ≤ 10 % of the reading

Influence of frequency [2]:
< 1 % of output signal from 65 Hz to 440 Hz
< 3.5 % of output signal from 440 Hz to 2 kHz
3 dB % of output signal from 2 kHz to 10 kHz

Common mode rejection:
> 65 dB A/V at 50 Hz

Remanence:
0 to 100 A DC: 1 A typical
0 to 250 A DC: 1,7 A typical
0 to 500 A DC: 2.5 A typical
0 to 1000 A DC: 3.6 A typical
0 to 1400 A DC: 4.4 A typical

Oscilloscope clamp for AC/DC current
Model PAC22 (insulated current probe)

Mechanical specifications

Max. jaw opening:
31 mm

Clamping capacity:
Cables: Ø 39 mm
Ø 25.4 mm x 2
Bars: 1 busbar 50 x 12.5 mm
2 busbars 50 x 5 or 31.5 x 10 mm
3 busbars 25 x 8 mm
4 busbars 25 x 5 mm

Output:
Coaxial cable 2 m long, terminated by an insulated BNC connector

Dimensions:
236.5 x 97 x 44 mm

Weight:
520 g with battery

Operating temperature:
-10 °C to +55 °C

Storage temperature:
-40 °C to +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:
IP40 (IEC 529)

Drop test:
1 m (IEC 68-2-32)

Shock resistance:
100 g / 6 ms / half-period (IEC 68-2-27)

Protection against impacts:
IK04 0.5 J (EN 50102)

Vibration resistance:
5-15 Hz: 1.5 mm peak
15-25 Hz: 1 mm peak
25-55 Hz: 0.25 mm peak
(IEC 68-2-6)

Self-extinguishing capability:
UL94 V2

Colours:
Dark grey casing with red jaws

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

Electromagnetic compatibility (EMC):
EN 50081-1: class B
EN 50082-2:
- Electrostatic discharge IEC 1000-4-2:
  4 kV in contact, performance criterion B
  8 kV in the air, performance criterion B
- Radiated field IEC 1000-4-3:
  3 V/m level 2: influence < 5 % of measurement range
- Fast transients IEC 1000-4-4:
  1 kV performance criterion B
- Magnetic field at the network frequency (IEC 1000-4-8):
  field of 30 A/m at 50 Hz level 4
  performance criterion A
- Conducted disturbances (IEC 1000-4-6):
  3 V performance criterion A

(1) Conditions of reference: 23 °C ± 5 °K, 20 % at 75 % RH, power supply voltage 9 V ± 0.1 V DC sinusoidal signal with frequency of DC to 65 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) Out of reference domain.

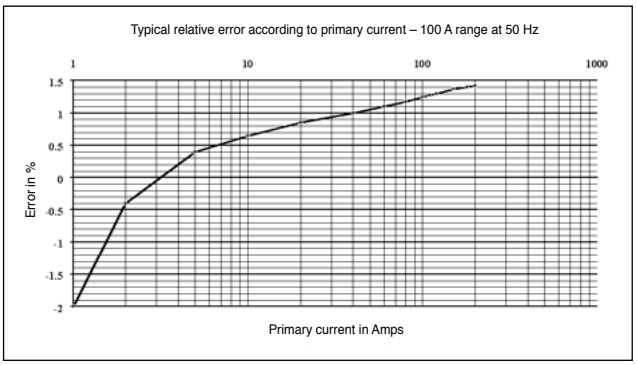
To order	Reference
Current clamp for AC/DC current model **PAC22** for oscilloscope with battery and user's manual	P01120073

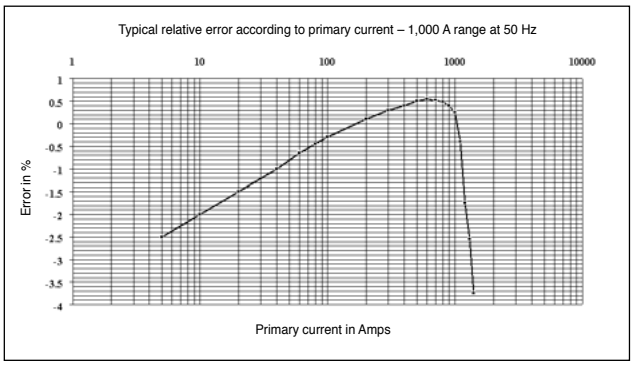
Current clamp for AC/DC current
Model PAC22 (insulated current probe)

Curves

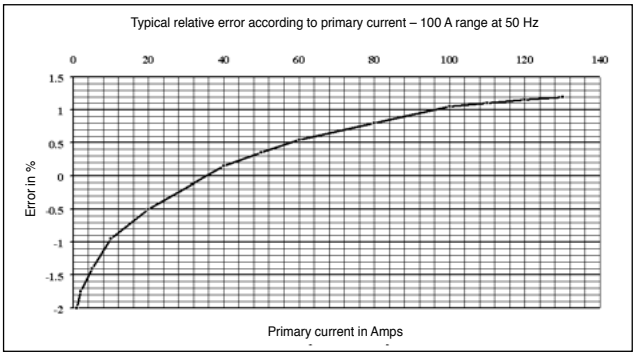
150 A calibre | *1400 A calibre*

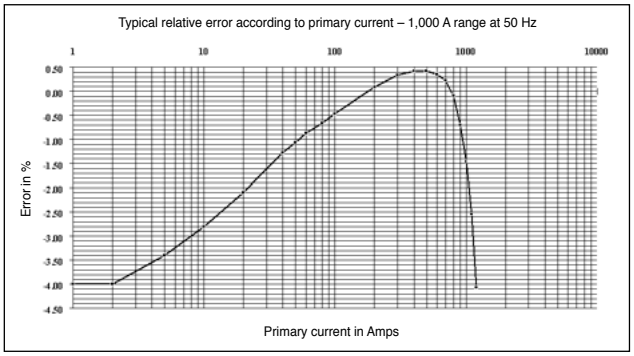
Linearity in DC



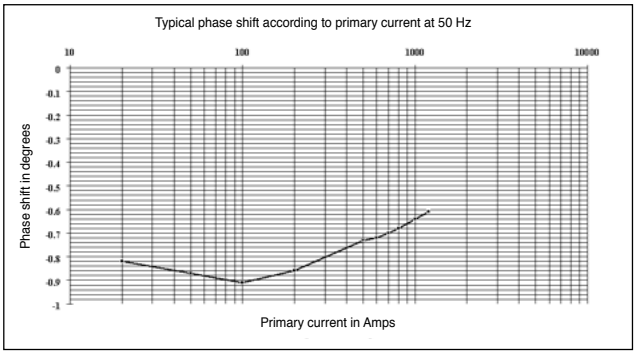


Linearity in AC

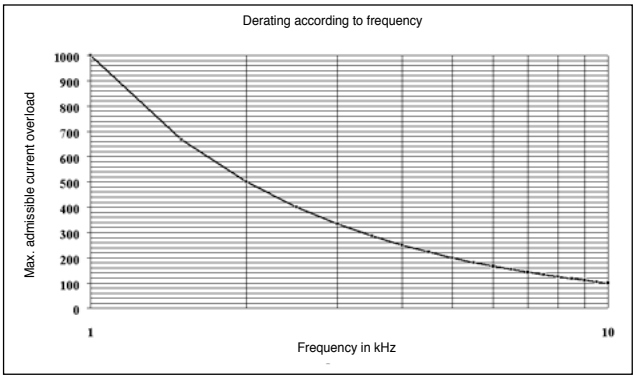




Phase shift



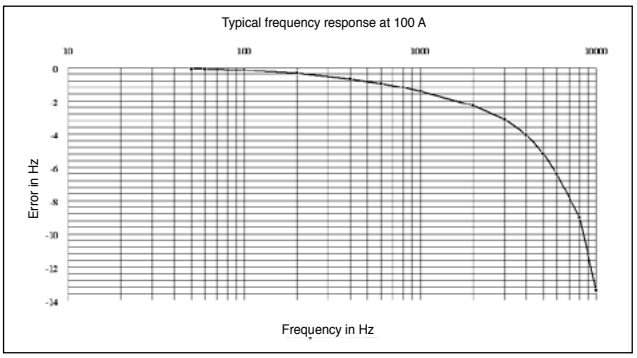
Limitation of measurable current according to the frequency



Oscilloscope clamp for AC/DC current
Model PAC22 (insulated current probe)

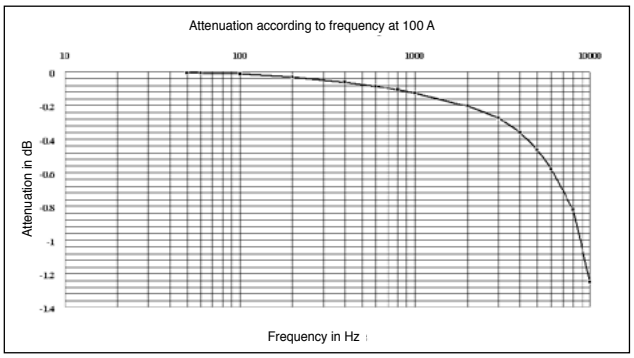
Curves

Frequency response



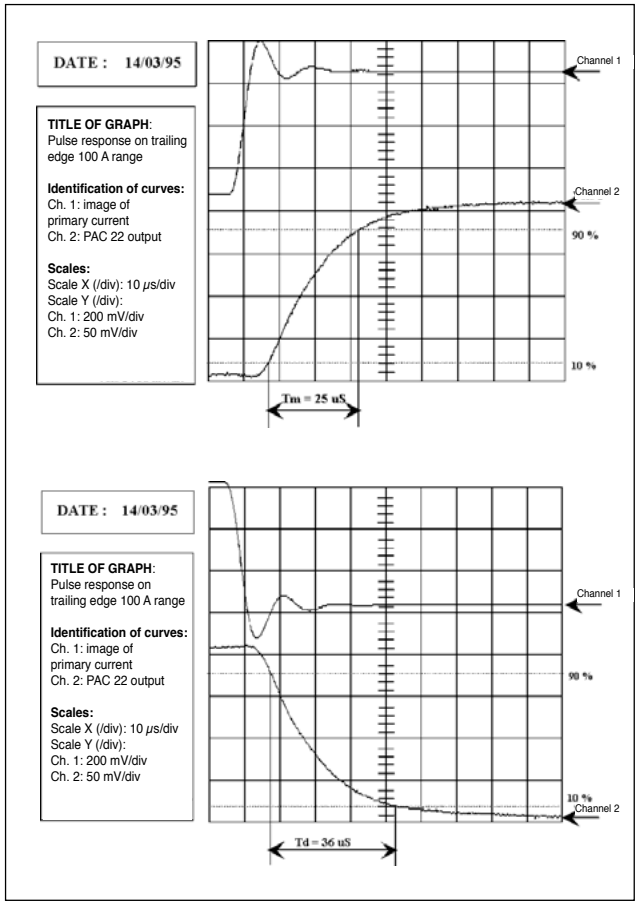
150 A calibre

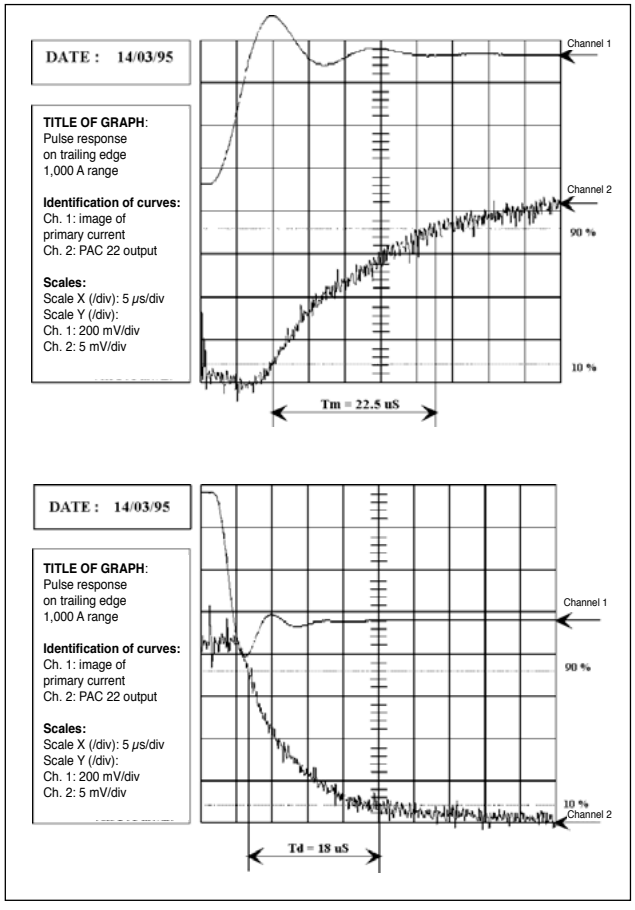
Attenuation according to frequency



1400 A calibre

Pulse response





SYSTEM TECHNOLOGY SWEDEN AB
www.systemtech.se
Tel: 013-35 70 30
sales@systemtech.se
Linnégatan 14 • 582 25 LINKÖPING