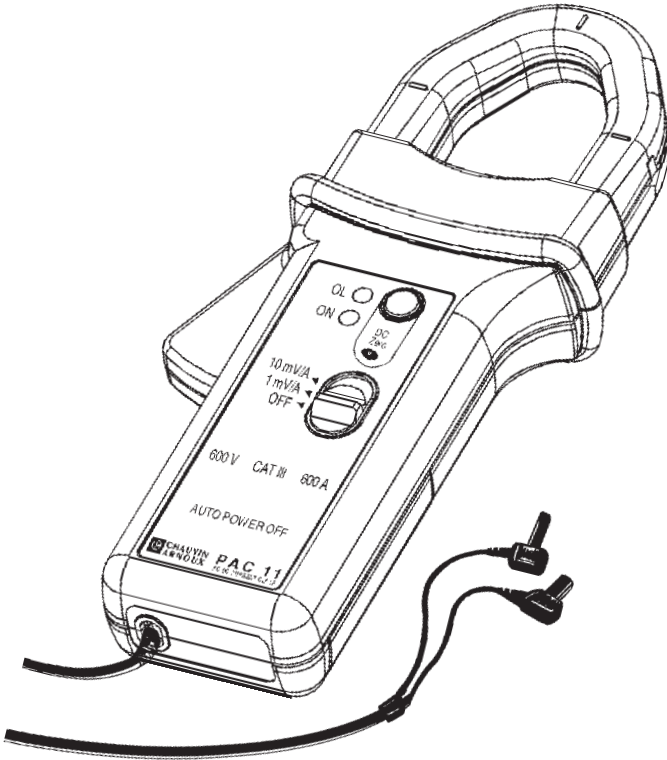




致力于电子测试、维护领域!

PAC 11



Measure up



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Thank you for purchasing a **AC/Dc current clamp**.

For best results from your instrument:

- **read** these operating instructions carefully,
- **comply** with the precautions for use.



WARNING, risk of DANGER! The operator must refer to these instructions whenever this danger symbol appears.



Application or withdrawal authorized on conductors containing dangerous voltages. Type A current sensor as per IEC 61010-2-032.



Equipment protected by double insulation.



The CE marking indicates conformity with European directives, in particular LVD and EMC.



The rubbish bin with a line through it indicates that, in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2002/96/EC.

SAFETY PRECAUTIONS

- Only use the PAC 11 clamp indoors.
- Do not expose the clamp to running water.
- Do not use the PAC 11 clamp on uninsulated conductors at a voltage of more than 600 V in relation to the earth.
- For measurements on DC current, check zero output. Adjust if necessary (see “Operating procedure”).
- During measurement, ensure that the conductor is in line with the markings on the jaws and that the clamp closes correctly.
- Your clamp is supplied with a set of adhesive labels. Choose the label for your language and stick it to the back of the case.

WARRANTY

Our guarantee is applicable for twelve months after the date on which the equipment is made available (extract from our General Conditions of Sale, available on request).

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1. PRESENTATION

The PAC 11 current clamp measures DC or AC currents, without opening the circuit they are flowing in. The current clamp is used as an accessory for multimeters, recorders, etc.

This clamp measures DC currents up to 600 A and AC currents up to 400 A rms (600 A peak). It outputs the form and amplitude of the current measured as a voltage image of the primary current.

The clamp has two ranges, 40 A (sensitivity 10 mV/A) and 400 A (sensitivity 1 mV/A), a zero adjust push button, auto off feature to economise the battery power supply and two light indicators, one for faults (over-range / incorrect zero reset), the other for power supply.

2. DESCRIPTION

See descriptive diagram at the end of the User Manual.

- ① Passage of the conductor
- ② Jaws
- ③ Protective non-slip guard
- ④ Automatic zero DC button
- ⑤ Red fault light (over range / incorrect zero adjustment)
- ⑥ Green light indicating correct power supply
- ⑦ 3-position sliding switch (off / selection of 1 mV/A or 10 mV/A ranges)
- ⑧ Hand-held parts
- ⑨ Fitted lead 1.5 m
- ⑩ Safety plug \varnothing 4 mm

3. OPERATING PROCEDURE

3.1. SWITCHING ON

Set the sliding switch ⑦ to the appropriate position, 40 A range (sensitivity 10 mV/A) or 400 A range (sensitivity 1 mV/A). Correct operation is indicated by a green light ⑥ indicating that the battery is in good condition.

After approximately 10 minutes of operation of the clamp without manipulation of the control buttons, the power supply cuts off automatically (see "Auto off" below).

If this green indicator does not come on when the clamp is switched on, or goes out before it has operated for 10 minutes, it is necessary to replace the battery.

3.2. DC ZERO ADJUSTMENT

Ensure that the jaws of the clamp are correctly closed and that they do not enclose any conductor. Connect the clamp to your measurement instrument. Press the auto zero button ④. The red light ⑤ comes on for approximately three seconds to indicate that the instrument is on zero calibration. If zero can not be obtained, this indicator light remains lit to indicate the fault.

3.3. MEASUREMENT

After having switched on the clamp, connected it to the measurement instrument on the appropriate range, and followed the auto zero procedure (see the two paragraphs above), clamp the conductor to be measured ① between the jaws of the clamp.

The value is displayed on the measurement instrument.

Depending on the sensitivity selected on the clamp and the range of your measurement instrument, apply the conversion ratio to get the value of the current.



On DC current measurement, ensure that the arrow located on the external edge of the jaws ② corresponds to the direction of the current flowing in the conductor (source ⇒ receiver).

3.4. OVERLOAD INDICATION

Detection of overload of the range of the clamp is indicated by the red light ⑤. This indicator flashes for a peak current greater than 60 A on the 40 A range (10 mV/A) or 600 A on the 400 A range (1 mV/A).

3.5. AUTO OFF

The PAC 11 has an Auto Off feature which switches off 10 minutes after the clamp has been switched on, without the controls being used.

When the clamp is switched off by this automatic function, the switch ⑦ must first be set to the OFF position before being switched on again.

This function can be overridden by the user when switching on. Simply press the auto zero button ④ at the same time as setting the switch ⑦ from the OFF position to the 1 mV/A or 10 mV/A position. If the green indicator ⑥ flashes whilst the zero reset button is being pressed, this indicates that the auto off function has been inhibited.

4. SPECIFICATIONS

Ranges	Input/output ratio	Measurement extent		
		AC rms	peak max	DC
40 A	10 mV/A	0.2 ... 40 A	0.2 ... 60 A	0.4 ... 60 A
400 A	1 mV/A	0.5 ... 400 A	0.5 ... 600 A	0.5 ... 600 A

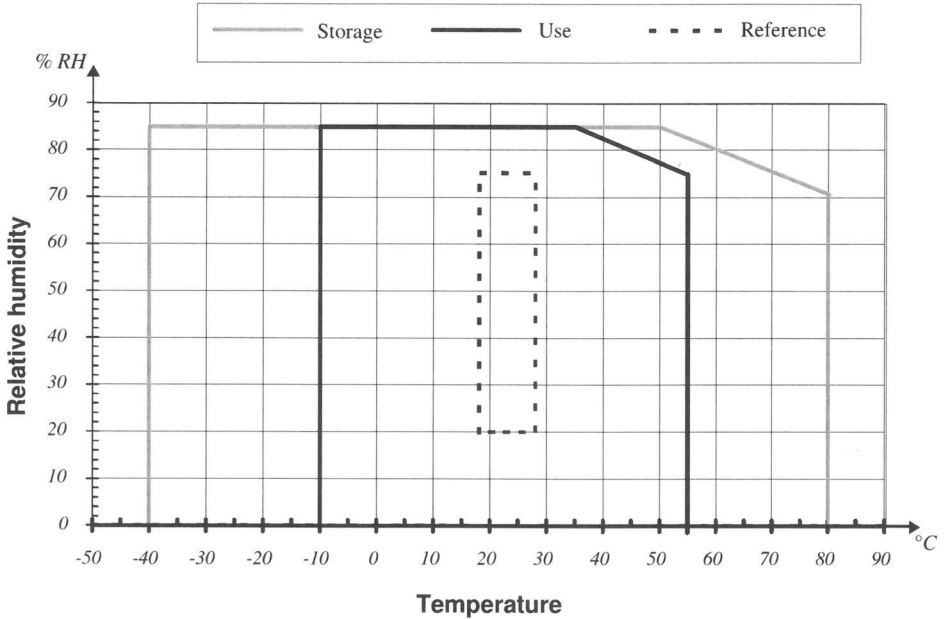
4.1. REFERENCE CONDITIONS

- Temperature : 18 ... 28°C
- Humidity rate : 20 ... 75% RH
- Battery voltage : 9 V ± 0.1 V
- Position of conductor : centred on the markings of the clamp
- Magnetic field : Earth's DC field
- Absence of external AC magnetic field
- Absence of electric field
- Measurement for a DC current or an AC sinusoidal current ≤ 65 Hz
- Impedance of the measurement instrument : ≥ 1 MΩ and ≤ 100 pF

4.2. OPERATING CONDITIONS

The instrument must be used in the following conditions to satisfy the safety of the user and the metrological performance :

- Use indoors
- Working altitude : ≤ 2000 m
- Transportation altitude : $\leq 12\,000$ m
- Environmental conditions : see graph below



4.3. METROLOGICAL SPECIFICATIONS

All the errors are indicated as a % of V_s (value of the output voltage).

- Output impedance : $100\ \Omega$
- Zero adjustment : ± 10 A by automatic step from 25 to 40 mA approx.

40 A range (10 mV/A)

- Intrinsic error in the field of reference

Primary current	0.5 ... 40 A	40 ... 60 A (on DC only)
Accuracy	$\leq 1.5\ \% + 5\ \text{mV}$	$\leq 1.5\ \%$

■ Phase error (45 ... 65 Hz)

Primary current	10 ... 20 A	20 ... 40 A
Phase shift	≤ 3°	≤ 2.2°

- Rise time from 10 to 90 % Vs : ≤ 100 μs
- Fall time from 90 to 10 % Vs : ≤ 100 μs
- Output noise :
 - from DC ... 1 kHz ≤ 8 mV or 0.8 Acc
 - from DC ... 5 kHz ≤ 12 mV or 1.2 Acc
 - from 0.1 Hz ... 5 kHz ≤ 2.0 mV rms or 0.2 A rms

400 A range (1 mV/A)

■ Intrinsic error in the reference range

Primary current	0.5 ... 100 A	100 ... 400 A	400 ... 500 A	500 ... 600 A
			(on DC only)	
Accuracy	≤ 1.5 % + 1 mV	≤ 2 %	≤ 2.5 %	≤ 3 %

■ Phase error (45 ... 65 Hz)

Primary current	10 ... 300 A	300 ... 400 A
Phase shift	≤ 2.2°	≤ 1.5°

- Rise time from 10 to 90 % Vs : ≤ 70 μs
- Fall time from 90 to 10 % Vs : ≤ 70 μs
- Output noise :
 - from DC ... 1 kHz ≤ 1 mV or 1 A peak - peak
 - from DC ... 5 kHz ≤ 1.5 mV or 1.5 A peak - peak
 - from 1 Hz ... 5 kHz ≤ 500 μV rms or 0.5 A rms

Distortion parameters

- Maximum distortion of the frequency on the measurement (to be added to the error in the reference range) :
 - from 65 to 440 Hz - 1%
 - from 440 to 2000 Hz - 3.5%
 - from 2 to 30 kHz - 3 dB
- Battery voltage : ≤ 0.1% / V
- Temperature : ≤ 300 ppm /°C or 0.3% /10°C
- Humidity 10...85% RH at ambient temperature : ≤ 0.5%
- Position of a conductor f ∅ 20 mm :
 - from DC to 440 Hz < 0.5%
 - from 440 Hz to 1 kHz < 1%
 - from 1 kHz to 2 kHz < 3%
 - from 2 kHz to 5 kHz < 10%
- Adjacent conductor carrying an AC current 50 Hz, at 23 mm from the clamp : < 10 mA/A
- Distortion of an external field 400 A/m (50 Hz) on centred cable : < 1.3 A
- Common mode rejection : > 65 dB A/V
- Residual magnetism : < 10 mA/A

4.4. MECHANICAL SPECIFICATIONS

- Watertightness : IP 30 in accordance with IEC 529
- Clamping diameter : 1 cable \varnothing 30 mm (or 2 cables \varnothing 24 mm)
a busbar of cross section 50 x 10 mm
- Outside dimensions of clamp : 224 x 97 x 44 mm
- Fitted lead : 1.5 m
- Weight : 440 g approx

- Drop height : to IEC 68-2-32
- Protection from shocks : 100 g in accordance with IEC 68-2-27
- Vibrations : to IEC 68-2-6

4.5. ELECTRICAL SPECIFICATIONS

- Power supply : 9 V battery (type 6LR61, 6LF22 or NEDA 1604)
- Battery life : approx 50h with an alkaline battery

Operating limits

- On DC current : 3000 A permanent
- On AC : 1000 A permanent up to 1 kHz

The maximum permitted current (AC) on overload from 1 kHz is defined in accordance with the following formula :

$$I_p \text{ max} = \frac{1000}{F(\text{kHz})}$$

Electric shocks

Instrument with dual insulation or strengthened insulation in accordance with IEC 61010-2-032.

Between the primary, the secondary and the hand-held part located below the guard, dielectric test voltage: 7850 V DC

Maximum common mode voltage between the conductor on which the measurement is made and the earth, or the output and the earth:

- 600 V for installations of category III and degree of pollution 2

Installation category and degree of pollution in accordance with IEC 664 and 664A

4.6. ELECTROMAGNETIC COMPATIBILITY

Emissions and immunity in an industrial setting compliant with IEC 61326-1.

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Wir bedanke uns bei Ihnen für den Kaus des **zangenstromwandler für oszilloskop** und das damit entgegengebrachte Vertrauen.

Für die Erlangung eines optimalen Betriebsverhaltens Ihres Gerätes bitten wir Sie:

- diese Bedienungsanleitung **sorgfältig zu lesen**,
- die Benutzungshinweise **genau zu beachten**.



ACHTUNG, GEFAHR! Sobald dieses Gefahrenzeichen irgendwo erscheint, ist der Benutzer verpflichtet, die Anleitung zu Rate zu ziehen.



Anbringung oder Abnahme zulässig an Leitungen unter Gefährdungsspannung. Stromsonde Typ A gemäß IEC 61010 2 032.



Das Gerät ist durch eine doppelte Isolation geschützt.



Die CE-Kennzeichnung bestätigt die Übereinstimmung mit den europäischen Richtlinien, insbesondere der Niederspannungs-Richtlinie und der EMV-Richtlinie.



Der durchgestrichene Mülleimer bedeutet, dass das Produkt in der europäischen Union gemäß der WEEE-Richtlinie 2002/96/EG einer getrennten Elektroschrott-Verwertung zugeführt werden muss.

SICHERHEITSHINWEISE

- Verwenden Sie den Zangenstromwandler PAC 11 nur in Innenräumen !
- Den Stromwandler nicht mit Wasser bespritzen oder in Wasser eintauchen.
- Verwenden Sie den Zangenstromwandler PAC 11 niemals an nicht isolierten Leitern, die ein Potential von mehr als 600 V gegenüber Erde aufweisen.
- Vergewissern Sie sich vor Gleichstrommessungen, daß der Zangenausgang auf Null liegt. Nehmen Sie gegebenenfalls einen Nullabgleich der Zange vor (siehe "Bedienungshinweise").
- Achten Sie bei Messungen darauf, daß die Lage des Leiters mit den Markierungen auf den Zangenbacken übereinstimmt und daß die Backen richtig geschlossen sind.
- Der Zangenstromwandler wird mit einem Satz Aufklebe - Etiketten geliefert. Etikett in entsprechender Sprache auf das Gerät aufkleben.

GARANTIE

Unsere Garantie erstreckt sich auf eine Dauer von zwölf Monaten ab dem Zeitpunkt der Bereitstellung des Geräts (Auszug aus unseren allg. Verkaufsbedingungen. Erhältlich auf Anfrage).

5. ANNEXE / APPENDIX / ANHANG / ALLEGATO / ANEXO

Description, voir page 4

Description, see page 11

Beschreibung, siehe Seite 18

Descrizione, vedere pag. 25

Para la descripción, véase página 32

