FR - Notice de fonctionnement
EN - User's manual
DE - Bedienungsanleitung
IT - Manuale d'uso
ES - Manual de instrucciones

CHAUVIN ARNOUX

B102

Pince ampèremétrique
Current clamp
Zangenstromwandler
Pinze amperometriche
Pinza amperometrica

Measure up

Vous venez d'acquérir une **pince ampèremétrique B102** et nous vous remercions de votre confiance.

Pour obtenir le meilleur service de votre appareil :
- **lisez** attentivement cette notice de fonctionnement,
- **respectez** les précautions d'emploi.

ATTENTION, risque de DANGER ! L'opérateur doit consulter la présente notice à chaque fois que ce symbole de danger est rencontré.

Appareil protégé par une isolation double.

Information ou astuce utile.

Le produit est déclaré recyclable suite à une analyse du cycle de vie conformément à la norme ISO14040.

Le marquage CE indique la conformité à la Directive européenne Basse Tension 2014/35/UE, à la Directive Compatibilité Électromagnétique 2014/30/UE et à la Directive sur la Limitation des Substances Dangereuses RoHS 2011/65/UE et 2015/863/UE.

La poubelle barrée signifie que, dans l'Union Européenne, le produit fait l'objet d'une collecte sélective conformément à la directive DEEE 2012/19/UE.

Définition des catégories de mesure

- La catégorie de mesure IV correspond aux mesurages réalisés à la source de l'installation basse tension.
  Exemple : arrivée d'énergie, compteurs et dispositifs de protection.
- La catégorie de mesure III correspond aux mesurages réalisés dans l'installation du bâtiment.
  Exemple : tableau de distribution, disjoncteurs, machines ou appareils industriels fixes.
- La catégorie de mesure II correspond aux mesurages réalisés sur les circuits directement branchés à l'installation basse tension.
  Exemple : alimentation d'appareils électrodomestiques et d'outillage portable.

ENGLISH

Thank for purchasing a **B102 ammeter clamp**.

To obtain optimum service from this appliance:
- **read** this user manual carefully,
- **comply with** the precautions for use.

	WARNING, DANGER! The operator should refer to this user's manual whenever this danger symbol appears.
	Equipment protected by double insulation.
	Useful information or tip.
	The product has been declared recyclable after analysis of its life cycle in accordance with the ISO 14040 standard.
	The CE marking indicates compliance with the European Low Voltage Directive (2014/35/EU), Electromagnetic Compatibility Directive (2014/30/EU), and Restriction of Hazardous Substances Directive (RoHS, 2011/65/EU and 2015/863/EU).
	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 2012/19/EU. This equipment must not be treated as household waste.

Definitions of the measurement categories

- Measurement category IV corresponds to measurements taken at the source of low-voltage installations.
  Example: power feeders, meters and protection devices.
- Measurement category III corresponds to measurements on building installations.
  Example: distribution panel, circuit-breakers, machines or fixed industrial devices.
- Measurement category II corresponds to measurements taken on circuits directly connected to low-voltage installations.
  Example: power supply to domestic electrical appliances and portable tools.

PRECAUTIONS FOR USE

- Keep the gap perfectly clean.
- Do not “click” the jaws together so as to avoid damaging the magnetic circuit’s contact surfaces.
- Do not use the clamp on uninsulated conductors whose potential with regard to the Earth is over 600 V.
- Do not use the clamp out of doors.
- Do not use the clamp on uninsulated conductors at altitudes over 2000 m.
- Do not use the clamp on conductors whose current is higher than the maximum authorized current.

1. CONTENTS

1. DESCRIPTION

1.1. PRESENTATION

B102 ammeter clamps are designed to measure current cables and bars without having to open the circuit to insert them. They also isolate the circuit on which the output measurement from the clamp is being taken, thus making them safe to use. Inserting a B102 clamp on cables or bars is easy and reassuringly safe.

B102 clamps are mainly designed for:

- Leakage current differential measurements (from 500 µA) when searching for faults.
- Measuring AC currents up to 400 A.

B102 clamps are used as accessories for multimeters, recording devices or any equipment with a voltage input.

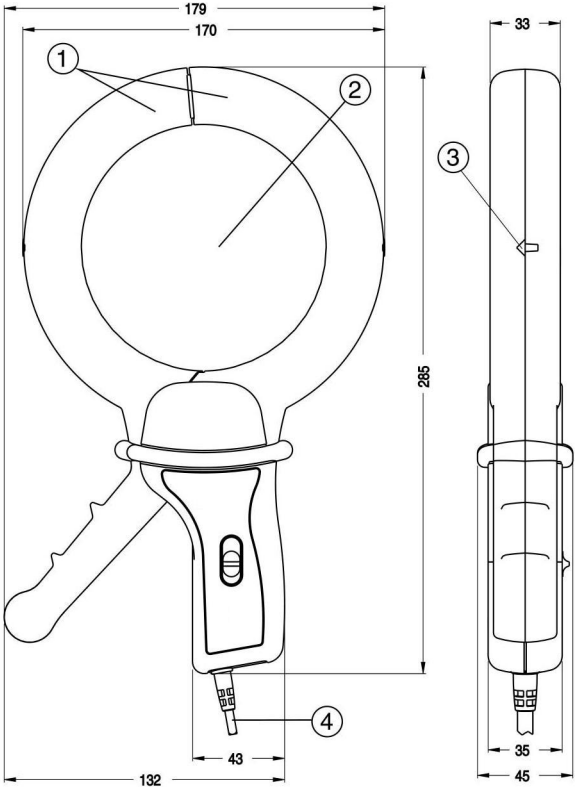


Figure 1: *Dimensions and indication numbers for the B102 clamp's main components.*

The main components are as follows (figure 1):

- **Jaws:** gap: 112 mm (1). Capacity with jaws open: 250 mm.
- **Clamping capacity:** cable with a maximum diameter of 115 mm (2).
- **Current direction:** arrow (3), visible on the side of the clamp, indicating the current's direction. The current is deemed to be circulating in the positive direction when it flows from the current's generator to the current's consumer.
- **Sizes:** 2
  - Measurement current: 4 A: output 1 mV/mA.
  - Measurement current: 400 A: output 1 mV/A.
- **Output:** voltage output, via a 1.5 m-long cable moulded into the clamp and terminating in two 90° elbow male safety plugs.

2. USE

2.1. IMPORTANT RECOMMENDATION

- Failure to observe the procedure described risk causing a dangerously high voltage for the operator on the clamp's output and causing damage to the clamp.
- Do not clamp onto a conductor before connecting the clamp to the relevant measuring instrument. Also, do not disconnect the measuring instrument while the clamp is still gripping the cable.
- Ensure that you keep the gap perfectly clean.
- Do not «click» the jaws together so as to avoid damaging the jaw faces.

2.2. METHOD OF OPERATION

Proceed as follows:

1. **Connect the cable from B102 clamp's outlet to the multimeter paying careful attention to the polarity.**
2. **Select the more appropriate rating on the clamp (P1, P2) and the appropriate size of receiver for the output signal, which must be adequately insulated.**

Position on image	Selector switch position	Readout
P1	400 A or 1 mV/A	400 mV for 400 A or 1 mV per A
P2	4 A or 1000 mV/A	1 mV for 1 mA or 1000 mV per A

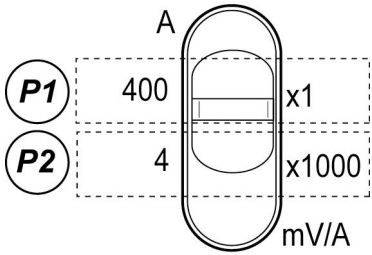


Figure 2: *Reminder of the selector switch's positions.*

3. **Open the jaws and clamp either the conductor whose current is to be measured or the various conductors for the differential current measurements.**
   Ensure that the clamp is correctly closed (no foreign body in the gap).
   Carefully observe the direction of the arrow, if the application requires this (source at the base of the arrow, receiver at the tip) mainly for mains system or power analysers
4. **Determine the current in the conductor by applying the appropriate readout coefficient to measured value according to the rating selected on the multimeter and the clamp's sensitivity.**

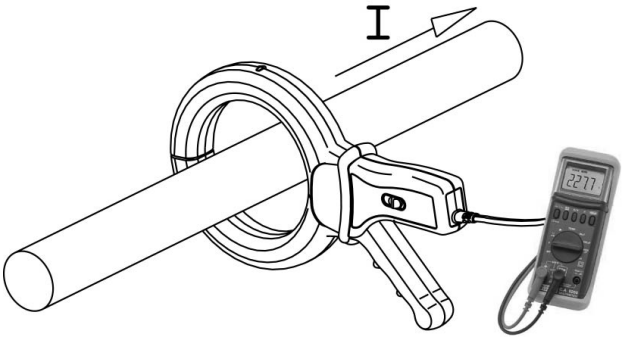


Figure 3: *Principle for using the B102 ammeter clamp.*

Example: Measurement of an intensity of 22.77 A with a B102 clamp and a CA 5220 multimeter.

- The clamp's selector switch is set to (P2) «4 x 1000»,
- The multimeter's commutator is set to «V».
- The multimeter displays **22.77**.

2.3. INSTALLATION LAYOUTS

2.3.1. «TT» SYSTEM

To measure the currents deriving from faults, simply clamp the active conductors to take the measurement. Please note:

- The faults loop generally consists of an earth on one section of its circuit, which does not exclude the possibility of voluntary or faulty electrical connections between the main earth terminals for the installation and the supply.
- One supply point, generally the Neutral supply, is connected directly to Earth and the masses are connected to Earth terminals, which are generally separate from for the supply.

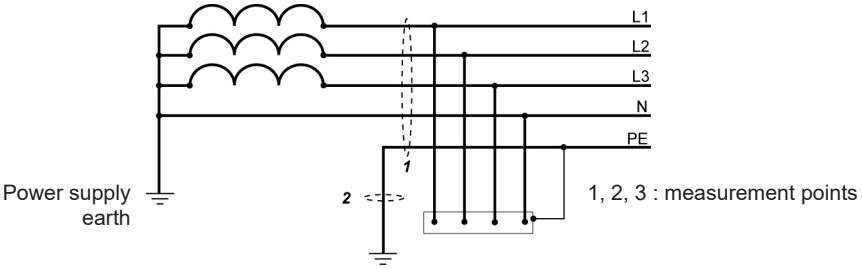


Figure 4: *Configuration in TT system.*

2.3.2. «TN» SYSTEM

The fault loop consists only of galvanic components. One supply point, generally the Neutral supply, is connected directly to Earth and the installation's masses are connected to this point by protective conductors. A distinction must be made between three separate cases.

«TNC» system

To measure the currents deriving from faults, place the clamp over the PEN Earth connection.

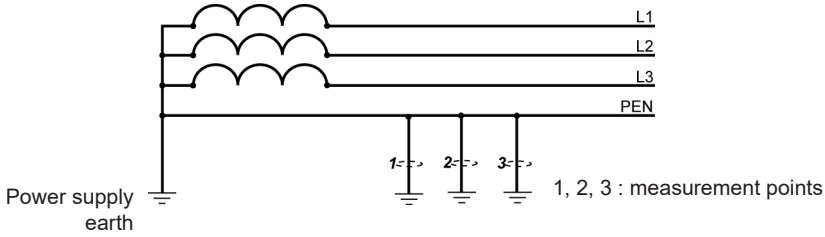


Figure 5: *Configuration in TNC system.*

«TNS» system

To measure the currents deriving from faults, separate the PE wire from the active wires.

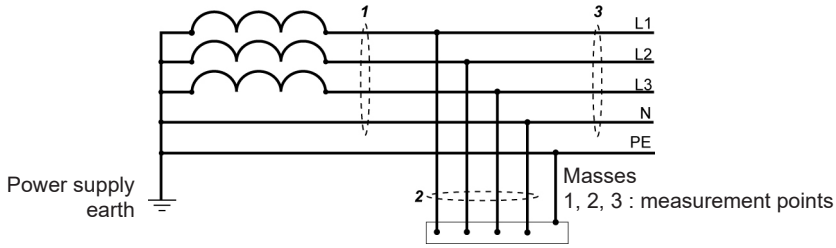


Figure 6: *Configuration in TNS system.*

2.3.3. «IT» SYSTEM

To measure the fault currents, clamp the active conductors (Neutral included when distributed). Please note that the intensity limit for the current resulting from the faults is obtained either by inserting an impedance between a supply point (generally the Neutral supply) and Earth.

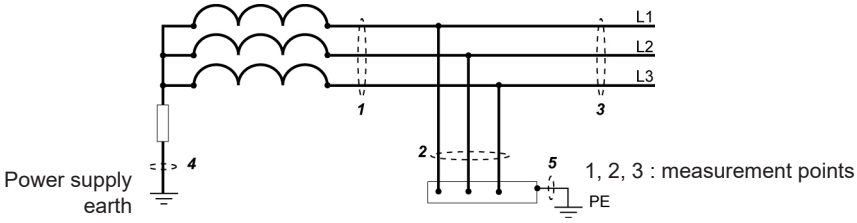


Figure 7: *Configuration in IT system.*

3. MAINTENANCE

Only the specified replacement parts should be used for maintenance purposes. The manufacturer will not be held responsible for any accident occurring following any repairs made other than by its After Sales service or approved repairers.

3.1. MAINTENANCE

The clamp must necessarily be away from any conductor and disconnected from the measuring instrument.

3.1.1. MAGNETIC CIRCUIT

- Keep the jaw gap perfectly clean.
- Clean the gap with a soft cloth if required.

3.1.2. CASING AND CABLE

- Clean the clamp's casing, arms and output cable with a sponge dampened with soapy water.
- Rinse these parts with a sponge dampened with clean water.
- Never run water over the clamp. Dry with a cloth or pulsed air (at a maximum temperature of 80°C).

4. CHARACTERISTICS

4.1. REFERENCE CONDITIONS

Ambient temperature:	23°C ± 3K.
Relative humidity:	20 to 75 %HR.
Position of the conductor:	Centred in the jaws.
Current frequency and form:	Sinusoidal 50 and 60 Hz ± 0.2 Hz, distortion ± 1 %.
Superimposed DC current:	No DC current.
Continuous magnetic field:	Earth field < 40 A/m.
Alternating magnetic field:	No external alternating magnetic field
Proximity of external conductors:	None.
Measuring device's impedance:	≥ 10 MΩ / 100 pF.

4.2. PRECISION AND DEPHASING

Under the reference conditions.

4.2.1. 4 A RATING

Nominal current:	4 A AC.
Measurement range:	0.5 mA to 4 A AC.
Output/input ratio:	1 mV AC / A AC.

Errors, in ± % of VS in the reference range.

Ip	0.5 mA to 10 mA	10 mA to 100 mA	100 mA to 4 A
Intrinsic error	3 % + 1 mV	0.5 % + 0.5 mV	0.5 % + 0.5 mV
Dephasing	Not specified	< 15°	< 10°

4.2.2. 400 A RATING

Nominal current: 400 A AC.
Measurement range: 0.5 A to 400 A AC.
Output/input ratio: 1 mV AC / A AC.

Errors, in ± % of VS in the reference range.

Ip	0.5 A to 10 A	10 A to 100 A	100 A to 400 A
Intrinsic error	0.5 % + 0.5 mV	0.35 % + 0.5 mV	0.35 % + 1 mV
Dephasing	Not specified	< 60’	< 40’°

4.3. CONDITIONS OF USE

The B102 clamp must be used under the conditions defined above in order to meet the requirements for operator safety and the metrological performance levels.

4.3.1. OVERLOADS

- Ip limit current: permanent 400 AC RMS.
- Peak current: < 1000 A.
- Permissible transient di/dt: ≤ 30 A/µs.
- Conductor temperature: ≤ 70°C with a maximum peak of 90°C.

4.3.2. FREQUENCY

- For use from 48 Hz to 1 kHz.

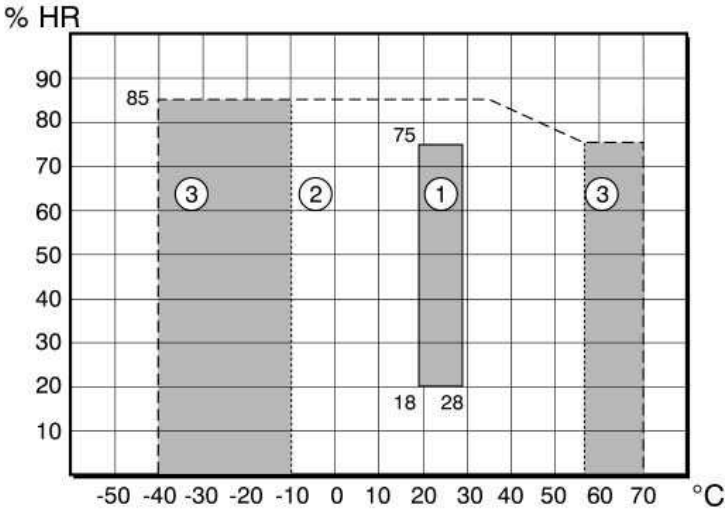
4.3.3. ENVIRONMENTAL CONDITIONS

The graph shows the air temperature and humidity conditions for the casing.

① : Reference range.

② : Operating range.

③ : Storage range.



- For use indoors.
- Pollution level 2 to IEC 61010.
- Operating altitude: ≤ 2000 m on uninsulated conductors.
- Transport altitude: ≤ 12000 m.

4.3.4. ERRORS CAUSED BY EXTERNAL INFLUENCES

- Ambient temperature: < 0.1 % per 10 K.
- Position of the gripped conductor: (max with not centred conductor) 0.1 % typic of Vs (non differential current); 0.2 % max.
- Residual differential: (max with not centred conductor) 0.1 % typic of IP (differential current); 0.2 % max.
- External fields, 1 V/A (1): < 60 mV of Vs.
- External fields, 1 mV/mA (1): < 100 µV of Vs.
- Coupled DC current, 1 V/A (2): < 1 mV for continuous 1 A.
- Coupled DC current, 1 mV/mA (2): < 0.1 mV for continuous 1 A.
- Frequency, 1 V/A (3): < 1.5 % from 30 Hz to 1 kHz.
- Frequency 1 mV/mA (3): < 0.5 % from 30 Hz to 1 kHz.

(1) : 400 A/:m 50 Hz field perpendicular to the clamp opening.
(2) : DC current coupled onto an AC current.
(3) : Limited to 1 kHz for 100 A.

Influence of the input impedance (Z_e) of the measuring instrument

Quantity of influence	Range	Max. influence on the measurement
Influence of instrument Z_e (impedance Z_e in kΩ)	1 V/A 1 mV/A	E% = [Ze/(Ze + 4.8)-1] x 100 E% = [Ze/(Ze + 0.0048) -1] x 100

4.3.5. DIMENSIONS AND WEIGHT

- Overall dimensions: 285 x 175 x 45.
- Weight: 1300 g approx.
- Clamp opening: 112 mm.
- Maximum jaw gap: 250 mm.
- Maximum clamping capacity: Max 115 mm Ø cable.

4.4. COMPLIANCE WITH INTERNATIONAL NORMS

4.4.1. ELECTRICAL SAFETY

(To NF EN 61010-2-032, ver. 03)

- Double-insulated appliance.
- Pollution level 2.
- Installation category III.
- Operating voltage 600 V.

4.5. ELECTROMAGNETIC COMPATIBILITY

- Industrial environment: criterion B.
- Emissivity (to EN 61326-1)
- Susceptibility (to EN 61326-1)

Self-extinguishing capacity

- Jaws ans casing: VO (to UL 94).

5. WARRANTY

Except as otherwise stated, our warranty is valid for **12 months** starting from the date on which the equipment was sold. Extract from our General Conditions of Sale provided on request.

The warranty does not apply in the following cases:

- Inappropriate use of the equipment or use with incompatible equipment;
- Modifications made to the equipment without the explicit permission of the manufacturer's technical staff;
- Work done on the device by a person not approved by the manufacturer;
- Adaption to a particular application not anticipated in the definition of the equipment or not indicated in the user's manual;
- Damage caused by shocks, falls or floods.

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