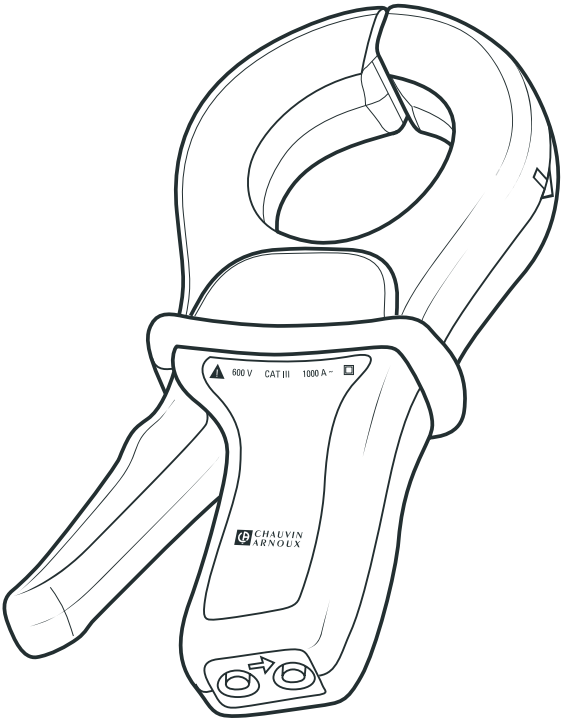
- PINCES AMPEREMETRIQUES AC
- AC CURRENT CLAMPS
- AC ZANGENSTROMWANDLER
- PINZE AMPEROMETRICHE CA
- PINZA AMPERIMETRICAS AC

# "C1XX"




| | |
|---|---|
| FRANÇAIS | Mode d'emploi |
| ENGLISH | User's manual |
| DEUTSCH | Bedienungsanleitung |
| ITALIANO | Libretto d'istruzioni |
| ESPANOL | Manual de instrucciones |

CHAUVIN ARNOUX

# *ENGLISH*

**Meaning of symbol** ⚠
**Caution! Please consult the User's manual before using the device.**
In this User's manual, failure to follow or carry out instructions preceded by this symbol may result in personal injury or damage to the device and the installations.

**Meaning of symbol** ⧈
This appliance is protected by dual insulation or reinforced insulation. It does not have to be connected to an earth protection terminal for electrical safety.

**Meaning of symbol**
Clamp fitted with an electronic output limiter, providing protection against voltage surges caused by the accidental opening of the clamp's secondary circuit: 30 V max. peak.

**Meaning of CAT III symbol**
This voltage surge category III clamp, with pollution level 2, complies with stringent reliability and availability requirements, corresponding to fixed industrial and domestic installations (see IEC 664-1).

Thank you for purchasing a **"C1XX" series ammeter clamp**.
To get the best service from this instrument :

- **read** this user's manual carefully,
- **respect** the safety precautions detailed.

## ⚠ PRECAUTIONS FOR USE ⚠

- Do not measure currents greater than 1200 A and limit measuring times above 1000 A (see 4.4.1 Overloads and 4.4.2 Frequencies).
- Do not use the device on non-insulated conductors with a potential of more than 600 V in relation to the earth and a voltage surge category greater than III.
- Comply with environmental conditions (see 4.4.3)
- Keep the gap perfectly clean (see 5.1 Cleaning).

## GUARANTEE

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).

# CONTENTS



# 1. PRESENTATION

The "C100" series clamps are designed to measure alternating currents, on low and medium-powered installations, from 0.1 A to 1200 A ~ for certain models. See 4. Characteristics).

They can be used on all multimeters, wattmeters, recorders or oscilloscopes for the C160. According to model (see 4.2) : single or multi-calibre output, alternating current or alternating voltage.

They have dual insulation or reinforced insulation and comply with international norms, particularly IEC 1010-2-032 “ammeter clamps”. (See 4.6.)

# 2. DESCRIPTION

*(See drawing in 6. Appendix)*

❶ Output: Ø 4 mm sockets or lead (according to model) : lead length : 1.5 m and 2 m for the C160.

❷ Ratio switch for multi-calibre models.

❸ The raised arrow on top of the clamp jaw indicates the direction of the current flow. The current is considered to flow in the positive direction when it flows from the current producer to the current consumer. This clamp orientation is necessary when measuring power (measuring current in parallel with voltage).

# 3. USE

⚠ Limit the measuring time between 1000 and 1200 A : 15 minutes on, followed by 30 minutes off.

⚠ With the C100 model, which is not protected by an output limiter, do not clamp a conductor before connecting the clamp to the corresponding measuring device. Likewise, do not disconnect the clamp from the measuring appliance when the clamp is still attached to the cable.

- Before connecting the clamp to the multimeter, check that the multimeter has an appropriate calibre.
- Open the jaws and clamp the cable through which the current you wish to measure is running. Roughly centre the cable in the jaws. Follow the direction of the arrow, if so required by the application in question.
- To read the measurement, apply the appropriate reading coefficient (See 4.2 “Input/output ratio”).

**NB :** for multi-calibre models, select the ratio which provides the best resolution and precision.

# 4. CHARACTERISTICS

## 4.1 Reference conditions

- Temperature : +20... +26°C
- Humidity : 20... 75% RH
- Conductor centred in jaws
- Sinusoidal current : 48... 65 Hz
- Distortion factor : < 1%
- Direct current : no
- Continuous magnetic field : earth field (< 40 A/m).
- Alternating magnetic field : no
- Proximity of external conductors : no current
- Measuring device impedance
  - C100 / C102 / C103 : £ 5 W
  - C112 / 113 : £ 1 W
  - C122 / C148 : £ 0.2 W
  - C106 / C107 / C116 / C117 : ³ 1 MW and £ 100 pF
  - C160 : ³ 1 MW and £ 47 pF
  - C173 : ³ 10 MW and £ 100 pF

## 4.2 Specifications and references for ordering

| Model | Reference for ordering | Nominal measuring scope | Input/Ouput ratio | Connec-tion | Ouput protected against voltage surges |
|---|---|---|---|---|---|
| **Alternating current output** | | | | | |
| **C100** | P01.1203.01 | 100 mA... 1000 A | 1 mA~ / 1 A~ | Sockets | No |
| **C102** | P01.1203.02 | | | Sockets | 30 V max. peak |
| **C112** | P01.1203.14 | 10 mA... 1000 A | | | |
| **C103** | P01.1203.03 | 100 mA... 1000 A | 1 mA~ / 1 A~ | Leads | |
| **C113** | P01.1203.15 | 10 mA... 1000 A | | | |
| **C122** | P01.1203.06 | 1 A... 1000 A | 5 mA~ / 1 A~ | Sockets | |
| **C148** | P01.1203.07 | 1 A... 1000 A | 5 mA~ / 1 A~<br>10 mA~ / 1 A~<br>20 mA~ / 1 A~ | Sockets | |

| Model | Reference for ordering | Nominal measuring scope | Input/Ouput ratio | Connection |
|---|---|---|---|---|
| **Alternating voltage output** | | | | |
| **C106** | P01.1203.04 | 100 mA... 1000 A | 1 mV~ / 1 A~ | Sockets |
| **C116** | P01.1203.16 | 10 mA... 1000 A | | |
| **C107** | P01.1203.05 | 100 mA... 1000 A | 1 mV~ / 1 A~ | Lead |
| **C117** | P01.1203.17 | 10 mA... 1000 A | | |
| **C160** | P01.1203.08 | 1 A... 1000 A<br>100 mA... 100 A<br>100 mA... 10 A | 1 mV~ / 1 A~<br>10 mV~ / 1 A~<br>100 mV~ / 1 A~ | Lead<br>BNC |
| **C173** | P01.1203.09 | 1 A... 1000 A<br>100 mA... 100 A<br>10 mA... 10 A<br>1 mA... 1 A | 1 mV~ / 1 A~<br>10 mV~ / 1 A~<br>100 mV~ / 1 A~<br>1000 mV~ / 1 A~ | Lead |

## 4.3 Precision and dephasing (in reference conditions)

- **C100 / C102 / C103 / C106 / C107 : 1000 A calibre**

| **Intensity in A~** | 0,1...10 A | 10 A | 50 A | 200 A | 1000...1200 A |
|---|---|---|---|---|---|
| **Intrinsic error** (1) | £ 3% (3) | £ 3% | £ 1,5% | £ 0.75% | £ 0.5% |
| **Dephasing** | (2) | £ 3° | £ 1.5° | £ 0.75° | £ 0.5° |

- **C112 / C113 / C116 / C117 : calibre 1000 A**

| **Intensity in A~** | 10...100 mA | 0,1...1 A | 1...10 A | 10...100 A | 100...1200 A |
|---|---|---|---|---|---|
| **Intrinsic error** (1) | £ 3% (4) | £ 2% (5) | £ 1% | £ 0.5% | £ 0.3% |
| **Dephasing** | (2) | (2) | £ 2° | £ 1° | £ 0.7° |

- **C122 / C148 : 1000 A calibre**

| **Intensity in A~** | 1...20 A | 20 A | 50 A | 200 A | 1000...1200 A |
|---|---|---|---|---|---|
| **Intrinsic error** (1) | 6% (6) | £ 5% | £ 3% | £ 1.5% | £ 1% |
| **Dephasing** | (2) | £ 5° | £ 3° | £ 1.5° | £ 1° |

- **C148 : 500 A calibre**

| **Intensity in A~** | 1...10 A | 10 A | 25 A | 100 A | 500...600 A |
|---|---|---|---|---|---|
| **Intrinsic error** (1) | 6% (7) | £ 6% | £ 3% | £ 2% | £ 1% |
| **Dephasing** | (2) | £ 6° | £ 4° | £ 3° | £ 2.5° |

**C148 : 250 A calibre**

| **Intensity in A~** | 1...5 A | 5 A | 12,5 A | 50 A | 250...300 A |
|---|---|---|---|---|---|
| **Intrinsic error** (1) | 10% (8) | £ 10% | £ 5% | £ 2% | £ 2% |
| **Dephasing** | (2) | (2) | £ 10° | £ 10° | £ 10° |

(1) As % of output signal
(2) Unspecified
(3) + 0.1 mA for C100 / C102 / C103 or + 0.1 mV for C106 / C107
(4) + 5 mA for C112 / C113 or + 5 mV for C116 / C117
(5) + 3 mA for C112 / C113 or + 3 mV for C116 / C117
(6) + 0.5 mA
(7) + 1 mA
(8) + 2 mA

■ **C160 : 1000 A calibre (2000 A max. peak)**

| **Intensity in A~** | 1...50 A | 50...200 A | 200...1000 A | 1000...1200 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 1% + 1 mV | | | |
| **Dephasing** | (2) | £ 3° | £ 2° | £ 1° |

**C160 : 100 A calibre (300 A max. peak)**

| **Intensity in A~** | 0.1...5 A | 5...20 A | 20...100 A | 100...120 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 2% + 5 mV | | | |
| **Dephasing** | (2) | £ 15° | £ 10° | £ 5° |

**C160 : 10 A calibre (30 A max. peak)**

| **Intensity in A~** | 0.1...0.5 A | 0.5...2 A | 2...10 A | 10...12 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 3% + 10 mV | | | |
| **Dephasing** | (2) | (2) | £ 15° | £ 15° |

(1) As % of output signal (2) Unspecified

■ **C173 : 1000 A calibre**

| **Intensity in A~** | 1...10 A | 10...100 A | 100...1000 A | 1000...1200 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 1% + 0.2 mV | £ 0,5% + 0.2 mV | £ 0.2% | £ 0.2% |
| **Dephasing** | (2) | £ 2° | £ 1° | £ 1° |

**C173 : 100 A calibre**

| **Intensity in A~** | 0.1...1 A | 1...10 A | 10...100 A | 100...120 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 1% + 0.2 mV | £ 0.5% + 0.2 mV | £ 0.3% | £ 0.2% |
| **Dephasing** | (2) | £ 2° | £ 1° | £ 1° |

**C173 : 10 A calibre**

| **Intensity in A~** | 0.01...0.1 A | 0.1...1 A | 1...10 A | 10...12 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 1% + 0.2 mV | £ 0.5% + 0.2 mV | £ 0.5% | £ 0.5% |
| **Dephasing** | (2) | £ 5° | £ 2° | £ 2° |

**C173 : 1 A calibre**

| **Intensity in A~** | 0.001...0.01 A | 0.01...0.1 A | 0.1...1 A | 1...1.2 A |
|---|---|---|---|---|
| **Intrinsic error** (1) | £ 3% + 1 mV | £ 3% + 1 mV | £ 0.7% + 1 mV | £ 0.7% + 1 mV |
| **Dephasing** | (2) | (2) | £ 10° | £ 10° |

(1) As % of output signal (2) Unspecified

## 4.4 Conditions of use

The "C100" clamps must be used in the following conditions, in order to comply with user safety and metrological performance requirements.

### 4.4.1 Overloads

- Limit measuring time above 1000 A.

| Intensity | I ≤ 1000 A~ | 1000 A~ < I ≤ 1200 A~ |
|---|---|---|
| Operation | Permanent (1) | 15 minutes on, followed by 30 minutes off. |

1) With a frequency F ≤ 1 kHz except C173

**C173 with frequency £ 500 Hz :**
- Permanent up to 800 A
- Permanent up to 1000 A if temperature £ 40°C
- 15 min. on, followed by 30 min. off for 1000 A < I < 1200 A

### 4.4.2 Frequency

- **C100 / C102 / C103 / C106 / C107 / C112 / C113 / C116 / C117 / C122 :**
  - Use : 30 Hz to 5 kHz
  - Current limitation beyond 1 kHz as per following formula :

$$I\ permanent = \frac{1000\ A}{f\ (in\ kHz)}$$

- **C148 :**
  - Use : 48 Hz to 1 kHz
- **C160 :**
  - Use : 10 Hz to 100 kHz (-3 dB from 50 kHz to 100 kHz)
  - Current limitation beyond 1 kHz as per following formula :

$$I\ permanent = \frac{1000\ A}{f\ (in\ kHz)}$$

- **C173 :**
  - Use : 10 Hz to 1 kHz for 1000 A calibre
    10 Hz to 3 kHz for other calibres
  - Current limitation beyond 500 Hz as per following formula :

$$I\ permanent = \frac{1000\ A}{2 \times f\ (in\ kHz)}$$

### 4.4.3 Environmental conditions

- Indoor use
- Altitude : ≤ 2000 m
- Climatic conditions : -10 to +55° C and RH < 85%
- Avoid splashing with water

## 4.5 Dimensions and weight

- Overall dimensions : 216 x 111 x 45 mm
- Weight : approx. 550 g
- Jaw opening : 53 mm
- Open jaw height : 139 mm
- Max. clamping capacity : Ø 52 mm cable or 1 5x5 mm bar or 4 30x5 mm bars

## 4.6 Compliance with international norms

### 4.6.1 Electrical safety (as per IEC 1010-1 and 1010-2-032)

- Dual insulation ⧈
- Pollution level 2
- Installation category III
- Operating voltage 600 V

#### 4.6.2 EC-compliant electromagnetic compatibility

- Emissivity (as per EN 50081-1)
- Susceptibility (as per EN 50082-2)

#### 4.6.3 Mechanical protection

- IP40 protection rating (as per IEC 529) with jaws closed and IP30 with jaws open

#### 4.6.4 Auto-extinction

- Jaws and housing: V0 (as per UL 94)

# 5. MAINTENANCE

⚠ **For maintenance, use only specified spare parts. The manufacturer will not be held responsible for any accident occuring following a repair done other than by its After Sales Service or approved repairers.**

## 5.1 Cleaning

The clamp must not be clamped to a cable and must be disconnected from the measuring device. Do not splash water onto the clamp.

- Keep the jaw gap perfectly clean. Remove dust with a dry, soft cloth. Wipe the iron jaws from time to time with an oil soaked cloth, in order to prevent rust from forming.
- Clean the unit with a cloth and a little soapy water. Rinse with a damp cloth. Then dry quickly with a cloth or pulsed air at 70°C max.

## 5.2 Metrological verification

- **It is essential that all measuring instruments are regularly calibrated.**
  For checking and calibration of your instrument, please contact our accredited laboratories (list on request) or the Chauvin Arnoux subsidiary or Agent in your country.
- **Repairs under or out of guarantee** : Please return the product to your distributor.