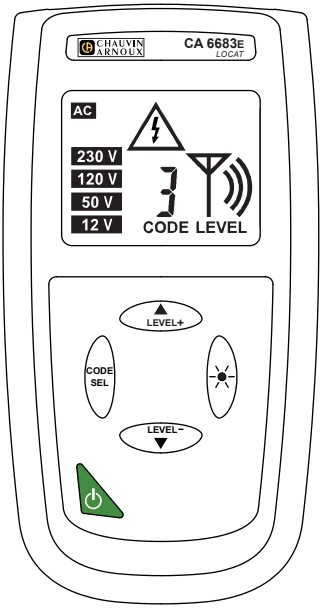
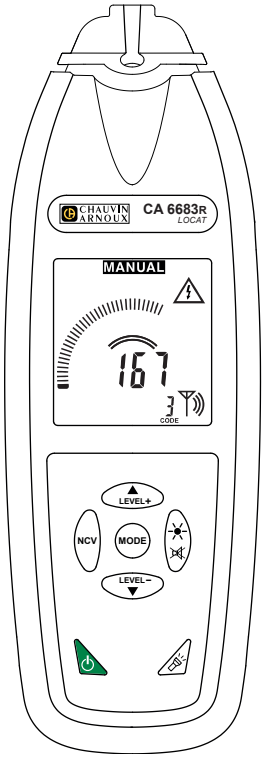
FR - Notice de fonctionnement
EN - User's manual
DE - Bedienungsanleitung
IT - Manuale d'uso
ES - Manual de instrucciones

CHAUVIN ARNOUX

CA 6683





Localisateur de câble
Cable locator
Kabeltester
Localizzatore di cavi
Localizador de cable

Measure up

ENGLISH

Thank you for your confidence in our **CA 6683 cable locator** that you have just acquired.

For best results from your instrument:
- **read** this user manual carefully,
- **comply with** the precautions for use.


WARNING, risk of DANGER! The operator must refer to this user's manual whenever this danger symbol appears.


CAUTION, risk of electric shock. The voltage applied to parts marked with this symbol may be hazardous.


Instrument protected by double insulation.


Useful information or tip.

Battery.


The product is declared recyclable following an analysis of the life cycle in accordance with standard ISO 14040.


The CE marking indicates compliance with the European Low Voltage Directive (2014/35/EU), the Electromagnetic Compatibility Directive (2014/30/EU), the Directive on Radioelectric Equipment (2014/53/EU) and the Directive on the Restriction of Hazardous Substances (RoHS, 2011/65/EU and 2015/863/EU).


The rubbish bin with a line through it means that in the European Union, the product must undergo selective disposal in compliance with Directive WEEE 2012/19/EU.

Definition of measurement categories

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

CONTENTS

PRECAUTIONS FOR USE

This instrument complies with safety standard IEC/EN 61010-2-030 for voltages up to 300 V in category III.

Failure to observe the precautions for use may create a risk of electric shock, fire, explosion, and/or destruction of the instrument and of the installations.

- The operator and/or the responsible authority must carefully read and clearly understand the various precautions to be taken in use. Sound knowledge and a keen awareness of electrical hazards are essential when using this instrument.
- If you use this instrument other than as specified, the protection it provides may be compromised, thereby endangering you.
- Do not use the instrument on networks whose voltage or category exceeds those listed.
- Do not use the instrument if it seems to be damaged, incomplete, or poorly closed.
- Before each use, check the condition of the insulation on the leads, housing, and accessories. Any item whose insulation is deteriorated (even partially) must be set aside for repair or scrapping.
- Use only the leads and accessories supplied. The use of leads (or accessories) of a lower voltage or category limits the voltage or category of the combined instrument and leads (or accessories) to that of the leads (or accessories).
- When handling leads and crocodile clips, do not place fingers beyond the physical guard.
- Always use personal protection equipment systematically.
- All troubleshooting and metrological checks must be performed by competent and accredited personnel.

1. COMMISSIONING

1.1. DELIVERY CONDITION

The instrument is supplied in a case containing:

- 1 CA 6683E transmitter with protective sheath,
- 1 CA 6683R receiver with protective sheath,
- 2 right-angled safety leads (red and black), length 1.5 metres,
- 2 crocodile clips (red and black),
- 1 earthing rod,
- 1 E14 socket adaptor (screw) - 2 red and black safety leads,
- 1 B22 socket adaptor (bayonet) - 2 red and black safety leads,
- 1 type C7 mains adapter - 2 red and black safety leads,
- 2 sets of 6 x 1.5 V LR03 or AAA alkaline batteries,
- 1 user manual in 5 languages.

1.2. ACCESSORIES

A cable reel with a 30 m cable terminated with safety plugs

1.3. SPARES

- 2 right-angled safety leads (red and black), length 1.5 metres,
- 2 crocodile clips (red and black)
- 1 earthing rod
- 1 set including: E27 socket adapter, B22 socket adapter and C7 mains adapter
- 2 sets of 6 x 1.5 V LR03 or AAA alkaline batteries,

For accessories and spares, check out our website:
www.chauvin-arnoux.com

1.4. INSERTING THE BATTERIES

6 batteries need to be inserted in the transmitter and 6 batteries in the receiver.

- Turn the instrument over.
- Using a screwdriver, unscrew the 2 captive screws.
- Remove the battery hatch.
- Position the ribbon at the bottom of the battery hatch.
- Place the 6 batteries in their housing on the ribbon, matching the polarity indicated.
- Close the battery hatch, making sure that it is fully and correctly closed.
- Tighten the 2 captive screws.

If you need to remove the batteries, pull the ribbon.

2. INSTRUMENT PRESENTATION

2.1. INSTRUMENT FEATURES

The CA 6683 cable detector is a portable instrument consisting of a transmitter and a receiver. The transmitter and receiver are powered by batteries. They are equipped with large backlit LCD displays.

The CA 6683 makes it possible to:

- searching for and detect ungrounded electrical or metal conductors,
- find a short-circuit or break in an electrical cable or conductor.

The CA 6683 indicates the value of the AC or DC voltage present and enables non-contact detection (NCV: Non Contact Voltage) of the phase conductors.

The receiver is equipped with a torch to illuminate dark locations.

2.2. CA 6683

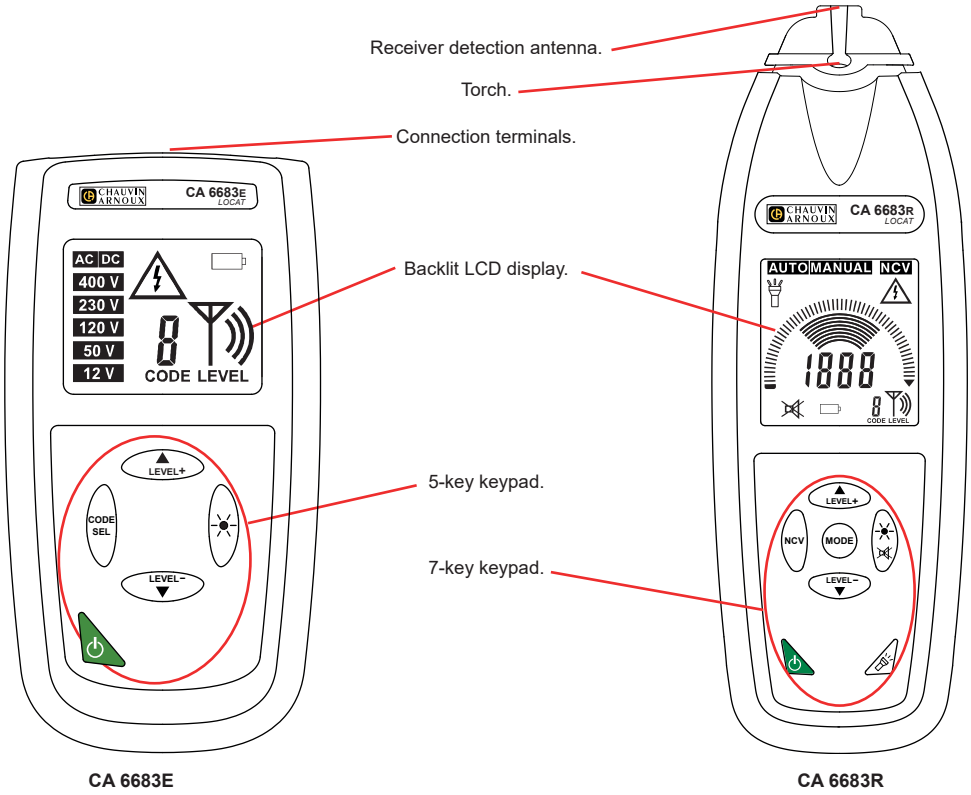


Figure 1

2.3. DISPLAYS

2.3.1. CA 6683E TRANSMITTER DISPLAY

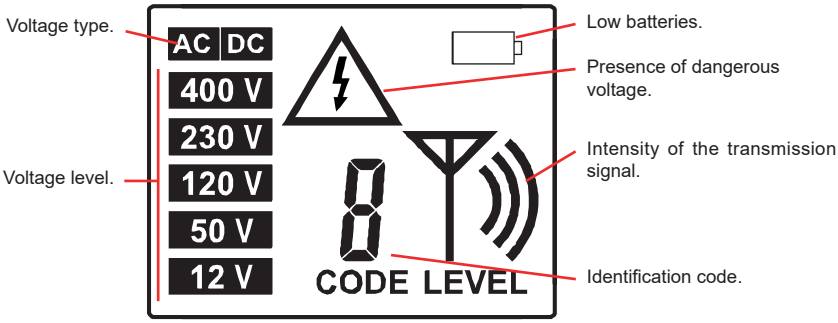


Figure 2

2.3.2. CA 6683R RECEIVER DISPLAY

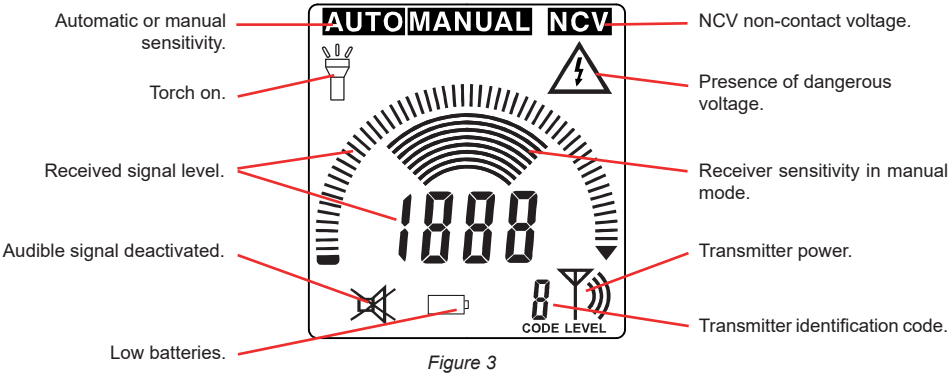


Figure 3

2.4. KEYS

2.4.1. CA 6683E TRANSMITTER KEYPAD

⏻	to turn instrument on and off.
▲▼	to increase or decrease the signal transmission strength.
CODE SEL	to select the transmitter identification code.
☀	to switch the display backlighting on or off.

2.4.2. CA 6683R RECEIVER KEYPAD

	to turn instrument on and off.
	to turn torch on or off.
▲▼	to increase or decrease signal reception sensitivity in manual mode.
NCV	to activate or deactivate the NCV function.
 	short press: to switch the display backlighting on or off. long press: to activate or deactivate the sound signal.
MODE	■ to switch detection sensitivity level from automatic to manual mode. In this case, the setting is made using the ▲▼ keys. ■ if the NCV function is active, it can be deactivated to switch in the transmitter signal detection function

2.5. AUTO OFF

To save battery life, the receiver switches off automatically after 15 minutes with no buttons being pressed or no voltage detected in NCV. Backlighting and the flashlight are not affected by auto power off

The transmitter does not have an automatic switch-off function, but to save battery life, the backlight switches off after one minute.

3. USE

3.1. WARNING

Connecting the transmitter to a live installation may cause a current in the circuit in the order of a mA. Normally, the transmitter should only be connected between phase and neutral.

If the transmitter is accidentally connected between the phase and the protection conductor, this can, under certain conditions, lead to tripping differential protection devices. In the event of a fault in the installation, all parts connected to earth may become live.
This is why, when using the instrument on a live installation, it is necessary to check beforehand that the installation complies with the standards (NFC15-100, VDE-100, etc., depending on the country), particularly the aspects concerning earth resistance and the connection of the protection conductor to earth.

3.2. MEASUREMENT PRINCIPLE

The transmitter injects an alternating voltage, modulated by digital signals, into the conductor to be identified, generating a proportional alternating electric field.

The receiver is equipped with a sensitive sensor, which displays the level of the electric field detected.

3.3. GETTING STARTED

3.3.1. CONNECTION EXAMPLE

To understand how the instrument works, make the following example connection:

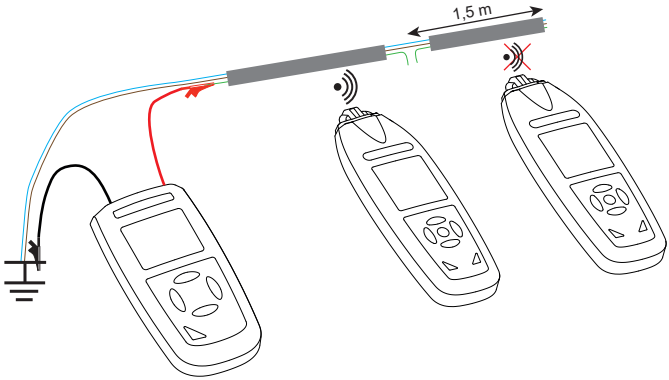


Figure 4

- Take a piece of 3-conductor cable with a section area of 1.5 mm², a few metres long.
- Create an artificial break by cutting one of the conductors about 1.5 m from the end of the cable.
- Using the leads supplied, connect the end of this conductor to one terminal on the transmitter and the other terminal to earth.
- Connect the other conductors of the cable to the same earth.
  At the other end of the cable, the conductors must be in the air (not connected).

3.3.2. USE

- Turn on the transmitter by pressing the ⏻ button.
- Press the **CODE SEL** key to select the transmitter identification code from 1 to 7.
- Press the ▲▼ buttons to set the transmission level to maximum intensity (3 waves).

- Turn on the receiver by pressing the ⏻ button. It automatically detects the transmitter's ID code and switches to the same channel.
- By default, the instrument is in automatic (**AUTO**) mode. Press the **MODE** key to switch to manual mode (**MANUAL**) in order to adjust the sensitivity. Press the ▲▼ keys to adjust the signal reception sensitivity. The sound signal changes pitch with the change in signal intensity.
- Move the sensitive part of the receiver slowly along the cable to the location of the break. The display shows the reception level and the received signal level. When the receiver passes over the break, the intensity of the signal displayed drops and eventually disappears completely.
- To refine detection, use the ▼ key to reduce sensitivity as much as possible.

3.3.3. THE 2 TRANSMITTER CONNECTION MODES

These two connection modes are the unipolar mode and the bipolar mode.

In unipolar mode, the connection is made only with the power is off.
In bipolar mode, the connection can be made with voltage live or off.

3.4. UNIPOLAR MODE

Unipolar mode is used to:
- detect a break in a conductor in the walls or floors;
- locate and follow a conductor, socket, junction box, switch, etc., in domestic installations;
- locate bottlenecks, kinks, deformations and obstructions in the sheaths and conduits of installations.

In the unipolar mode, connect the **+** terminal of the transmitter to one conductor and the **-** to earth. This earth can be an auxiliary earth, the earth terminal of a power outlet or a water pipe connected to earth.

3.4.1. LOCATING AND TRACING CONDUCTORS AND IDENTIFYING OUTLETS

Preconditions:
- The circuit must be de-energised.
- The neutral conductor and the protective conductor must be connected.

Measurement:
- Connect the transmitter between the phase and the protective conductor.
- Follow the line starting from the socket to find the switch (mechanical or differential) to disconnect this socket.

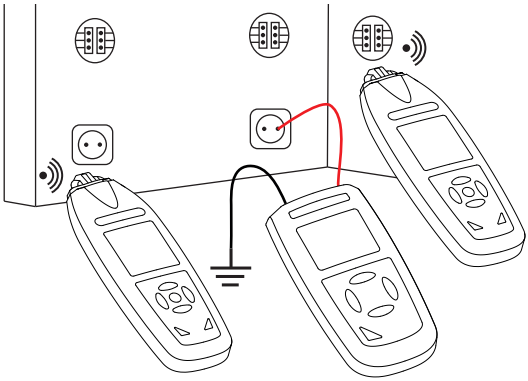


Figure 5

Note:
If the cable fed by the transmitter signals is close to other conductors, the signal can spread over these cables, creating parasitic circuits and causing erroneous detections.

3.4.2. LOCATING LINE BREAKS

Preconditions:
- The circuit must be de-energised.

Measurement:
- Connect the transmitter to the wire being checked and earth.
- Connect all unused lines to earth.
- Move the sensitive part of the receiver slowly along the cable. When the receiver passes over the break, the intensity of the signal displayed drops and eventually disappears completely.
- Fine-tune the detection by minimizing the power level emitted by the transmitter and adjusting the receiver sensitivity to manual mode.

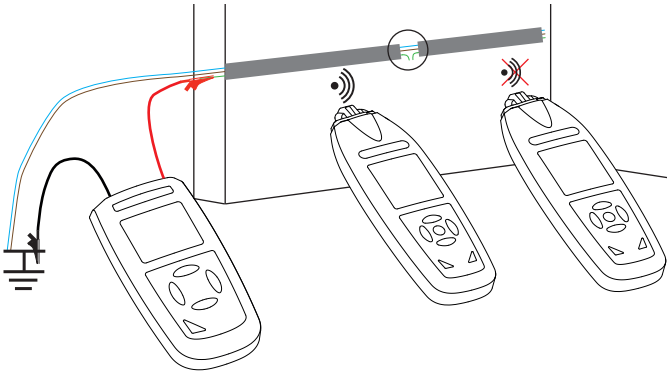


Figure 6

Note:
- The resistance of the interrupted line must be greater than 100 kΩ.

3.4.3. LOCATING LINE INTERRUPTIONS BREAKS USING TWO TRANSMITTERS

The location of a line break may not be accurate in the event of unsatisfactory conditions due to field disturbance. By using two transmitters (the second being optional), one at each end of the broken line, a more precise location can be obtained. Each transmitter is set to a different identification code. For example, one on code 7 and the other on code 3.

Preconditions:
- The circuit being measured must not be live.

Measurement:
- Connect the two transmitters to each end of the line.
- Connect all unused lines to earth.
- Move the sensitive part of the receiver slowly along the cable. The receiver will indicate 7 on the left side of the line break and 3 on the right side. When the receiver is placed directly above the break, no line code will be displayed because the signals from the two transmitters are superimposed.
- Fine-tune the detection by reducing the power level emitted by the transmitter and adjusting the receiver sensitivity to manual mode.

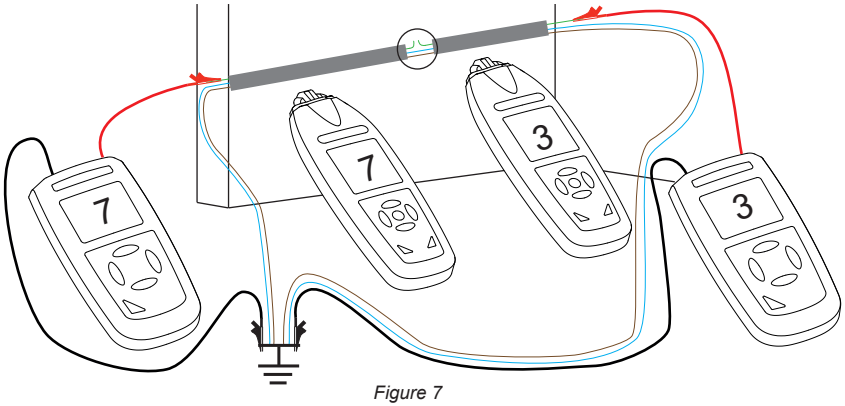


Figure 7

Note:

- The resistance of the interrupted line must be greater than 100 kΩ.

3.4.4. DETECTING FAULTS IN AN UNDERFLOOR HEATING SYSTEM

Preconditions:

- The circuit must be de-energised.
- The resistance circuit must not be shielded with an earthed shield, otherwise the identifier will not work.

Measurement:

- This measurement can be made with one or two transmitters. Connect the transmitter(s) as described in §3.4.2 or §3.4.3.
- The measurement method is identical.

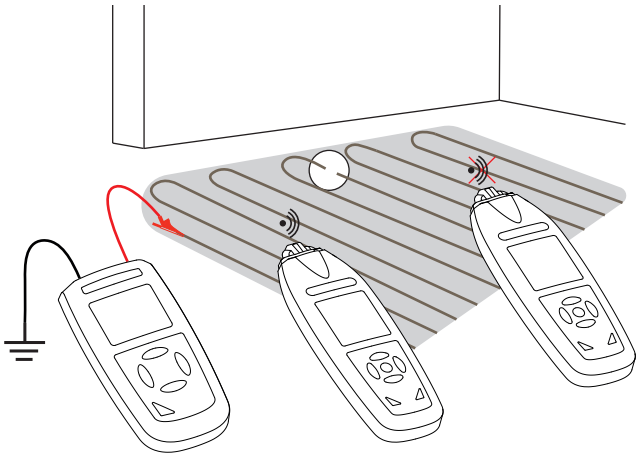


Figure 8

Note:

- If there is a shielding layer above the heating wires, there may be no earth connection. If necessary, disconnect the shield from the earth connection.
- Make sure there is a considerable distance between the transmitter earth and the line you are looking for. If this distance is too short, the line may not be located accurately.

3.4.5. DETECTING THE NARROWED (OR BLOCKED) PART OF A NON-METALLIC SHEATH

Preconditions:

- The sheath must be made of a non-conductive material (such as plastic).
- The conductor in the sheath must not be live.

Measurement:

- Connect the transmitter to the metal conductors in the sheath and to an auxiliary earth.
- Move the sensitive part of the receiver slowly along the sheath. When the receiver passes over the narrowed area, the signal intensity displayed drops sharply.
- Fine-tune the detection by minimizing the power level emitted by the transmitter and adjusting the receiver sensitivity to manual mode.

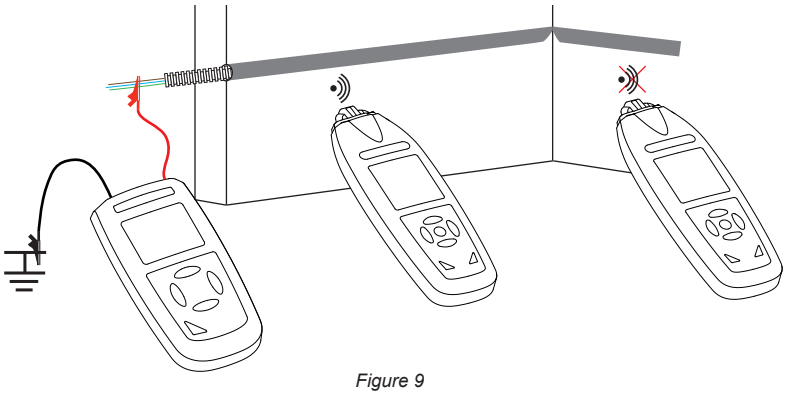


Figure 9

Note:

- Make sure there is a considerable distance between the transmitter earth and the sheath being located. If the distance is too short, the sheath may not be located accurately. It is preferable to use an earth connection outside the installation, for example using the earthing rod supplied.
- If you only have a non-conductive sheath (fibreglass, PVC, etc.), insert a metal wire with a sectional area of around 1.5 mm² into it.

3.4.6. DETECTION OF A METAL WATER SUPPLY OR HEATING PIPE

Preconditions:

- The pipe must be conductive (such as galvanised steel).
- The pipe must not be earthed.
- The pipe must not be too close to the ground, otherwise the detection distance will be very short.

Measurement:

- Connect the transmitter to the pipe to be detected and to earth.
- Move the sensitive part of the receiver slowly along the pipe. Follow it along the walls or floor.
- Fine-tune detection by adjusting the power level emitted by the transmitter and the sensitivity of the receiver in manual mode.

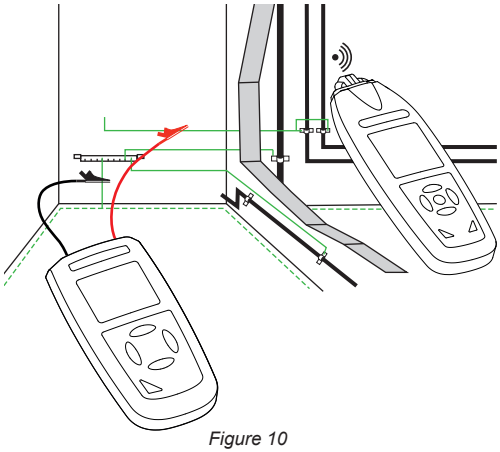


Figure 10

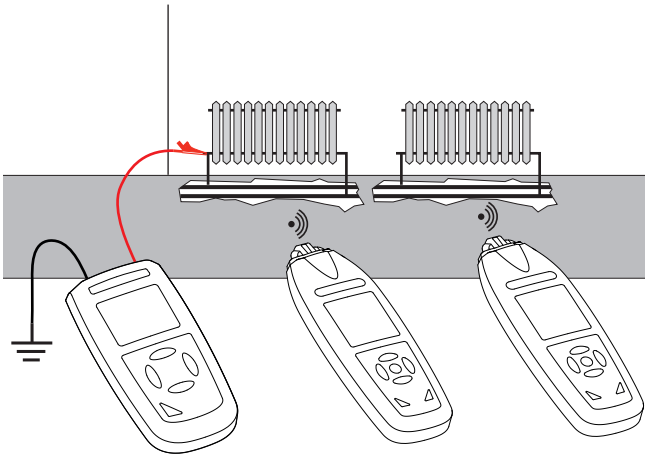


Figure 11

3.4.7. IDENTIFICATION OF A POWER SUPPLY ON THE SAME FLOOR

Preconditions:

- The circuit being measured must not be live.

Measurement:

- To cut power, trip the main circuit breaker for this floor.
- In the electrical distribution box, disconnect the neutral wire of the circuit to be identified.
- Connect the transmitter between this neutral wire and an auxiliary earth.
- Fine-tune detection by adjusting the power level emitted by the transmitter and the sensitivity of the receiver in manual mode.

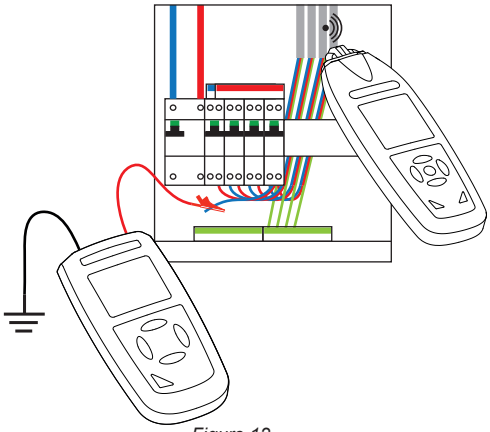


Figure 12

3.4.8. TRACING A BURIED CIRCUIT

Preconditions:

- The circuit must not be live.
- The distance between the earth wire and the circuit to be searched for should be as long as possible. If this distance is too short, the circuit may not be located accurately.

Measurement:

- Connect the transmitter between the wire to be searched for and an auxiliary earth.
- Slowly move the receiver along the circuit to be searched for. The strongest signals represent the precise position of the circuit.
- The depth of detection is strongly influenced by the earthing conditions. Select the appropriate receiver sensitivities to locate the circuit accurately.
- The greater the distance between the transmitter and receiver, the lower the power of the signals received, and the shallower the depth of detection.

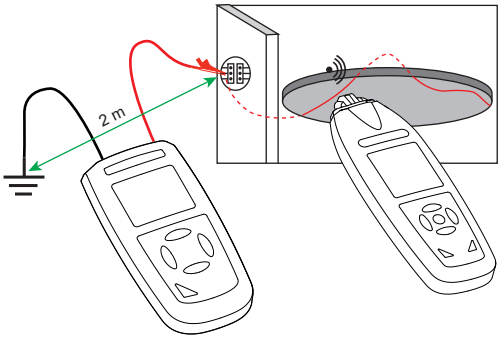


Figure 13

3.5. BIPOLAR MODE

This connection can be used on a live or a de-energised mains line. The transmitter is connected to the two conductors by the two test leads.

Connection to a live line:

- Connect the **+** terminal of the transmitter to the phase.
- Connect the **-** terminal of the transmitter to neutral.

If the terminal **-** is connected to the protective conductor instead of the neutral, the current from the transmitter is added to the leakage current already present in the installation. The total current can then trip the differential circuit breaker.

Connection to a de-energised line:

- Connect the **+** terminal of the transmitter to a conductor,
- Connect the **-** terminal of the transmitter to the other conductor,
- At the end of the line, connect the two wires together.

Alternatively, the two transmitter test leads can be connected to the two ends of a single conductor. In addition, since the installation is de-energised, the protective conductor can also be used without risk.

3.5.1. CLOSED CIRCUIT APPLICATIONS

- In de-energised circuits, the transmitter sends signals to the circuits to be detected.
- In live circuits, the transmitter sends signals to the circuits to be detected and also measures the voltage present.

Measurement:

- Connect the transmitter between phase and neutral.
- Follow the line starting from the socket to find the switch (mechanical or differential) to disconnect this socket.
- If necessary, adapt the transmitter's transmitting power.

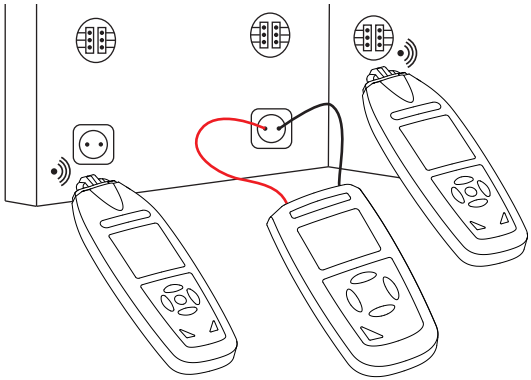


Figure 14

Note:

- This method is used to search for outlets, switches, fuses, etc., in electrical installations equipped with sub-distribution cabinets.
- The depth of detection varies depending on the material where the cable is located. It is generally less than 50 cm.

3.5.2. SEARCHING FOR FUSES

Measurement:

- To cut off the voltage, trip all the distribution box differential breakers.
- Connect the transmitter between the phase and neutral of the circuit for which the protection fuse is being sought. Use the optional connection accessories for mains sockets or outlets.
- The fuse sought for is the one with the strongest and most stable signals. The detector can find signals on other fuses, but they are relatively weak.
- For best detection results, place the receiver on the edge of the fuse holder.
- Adjust the transmitter power.
- Select manual mode on the receiver and the appropriate reception sensitivity to locate the circuit accurately.

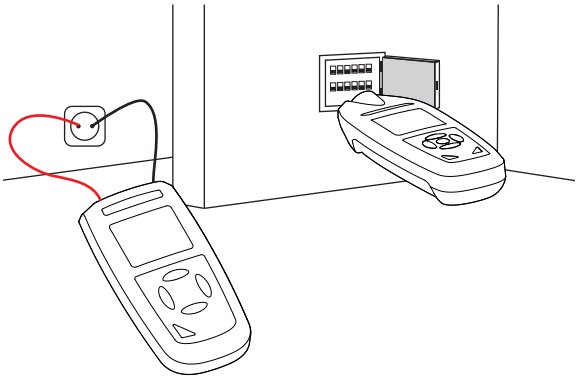


Figure 15

Note:

- The identification and location of fuses is strongly influenced by the state of the wiring in the electrical distribution box. In order to search for fuses as accurately as possible, it may be necessary to open or remove the box cover.

3.5.3. CHECKING FOR A SHORT CIRCUIT

Preconditions:

- The circuit must be de-energised.

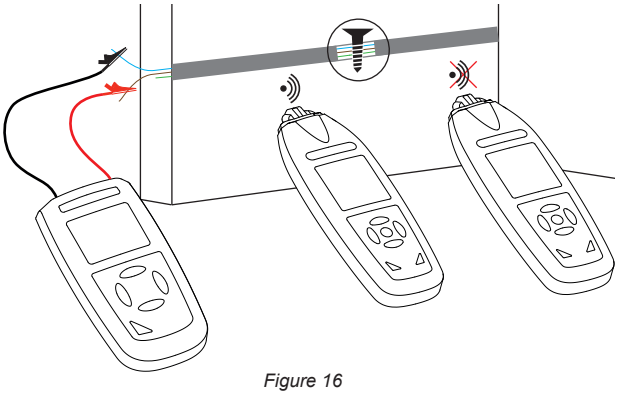


Figure 16

Measurement:
- Connect the transmitter to two of the circuit conductors.
- Move the sensitive part of the receiver slowly along the cable. When the receiver passes over the short-circuit, the intensity of the signal displayed drops and eventually disappears completely.
- Fine-tune the detection by minimizing the power level emitted by the transmitter and adjusting the receiver sensitivity to manual mode.

Note:
- When searching for short circuits in sheathed electrical wires and cables, detection depths vary because the wires in the sheath are twisted. Only short circuits with an impedance of less than 20 Ω can be detected correctly. The impedance of the short circuit can be measured with a multimeter.
- If the short-circuit impedance is greater than 20 Ω, use the method in section 3.4.2. Locating line breaks.

3.5.4. DETECTION OF RELATIVELY DEEPLY BURIED CIRCUITS

When measuring in bipolar mode on a multiconductor cable, the depth of detection is severely limited. Use an auxiliary conductor, outside the cable.

Preconditions:
- The circuit must be de-energised.

Measurement:
- Connect the transmitter between one of the circuit conductors and the auxiliary conductor. The distance between the circuit and the auxiliary conductor must be at least 2 metres and greater than the burial depth.
- Follow the buried circuit by slowly moving the sensitive part of the receiver.

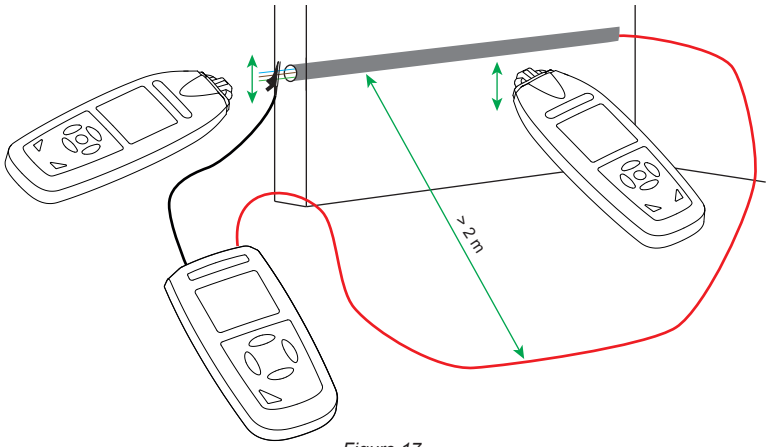


Figure 17

Note:
- In this application, the influence of soil or wall moisture on the depth of detection is negligible.

3.5.5. SORTING OR DETERMINING CONDUCTORS BY PAIR

Preconditions:
- The circuit must be de-energised.

Measurement
- Short-circuit the wire ends of each pair. Each pair remains isolated from the others.
- Connect the transmitter to a pair and assign it an identification code, for example 7.

- Connect the transmitter to another pair and assign it a different identification code, for example 5.
- Connect the transmitter to a final pair and assign it another identification code, for example 3.

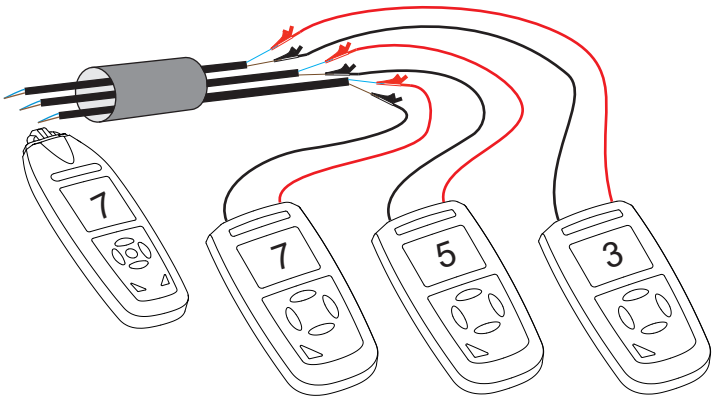


Figure 18

Note:
- You can use several transmitters with different identification codes.

3.6. METHOD FOR INCREASING THE EFFECTIVE DETECTION RADIUS OF LIVE CIRCUITS

The magnetic field produced by the transmitter signal is conditioned by the shape and size (surface area) of the loop created via the “outgoing” conductor (connected to the **+** terminal of the transmitter) and the “return” conductor (connected to the **-** terminal of the transmitter).

In a configuration where the transmitter is connected to the phase and neutral conductors, made up of two parallel wires, the effective detection radius (distance) does not exceed 50 cm.

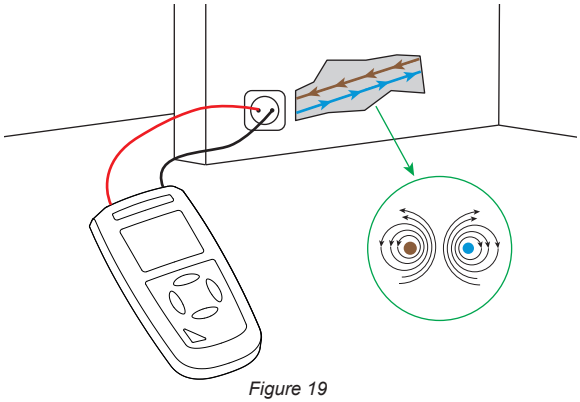


Figure 19

By using a cable extension, a detection distance of up to 2.5 metres may be achieved.

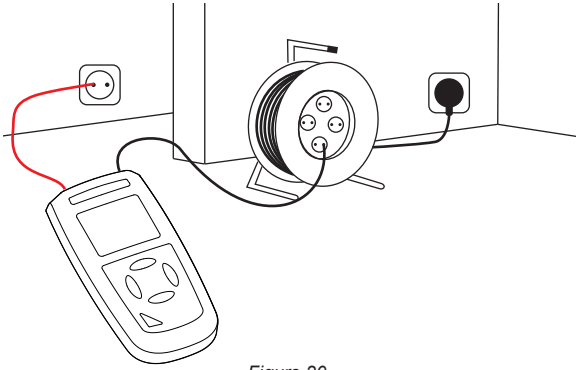


Figure 20

3.7. IDENTIFYING THE MAINS VOLTAGE AND LOOKING FOR BREAKS IN THE CIRCUIT

This application does not require the transmitter, unless you wish to use the transmitter's voltmeter function to measure the value of the voltage in the circuit.

Preconditions:

- The circuit must be connected to the mains supply and energised.

Measurement:

- Press the **NCV** button to activate the non-contact voltage measurement.
- Trace the live line by moving the sensitive part of the receiver.
- The number of bars in the received signal intensity and the audible signal frequency emitted are a function of the voltage in the circuit to be detected and the distance from this circuit. The higher the voltage and the shorter the circuit distance, the more bars are displayed and the higher the frequency of the audible signal.

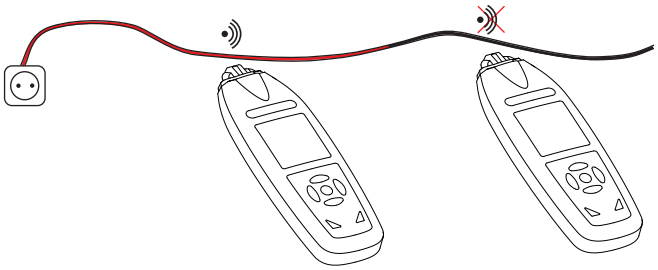


Figure 21

Note:

- When searching for the ends of several supply lines, each line must be connected successively and separately.

3.8. TRANSMITTER VOLTMETER FUNCTION

If the transmitter is connected to a live circuit with a voltage higher than 12 V, the transmitter display will show the value (unsigned in the case of DC) (12 V, 50 V, 120 V, 230 V, 400 V) and the type of voltage (AC or DC).

It will also indicate whether the voltage is dangerous ( ) or not.

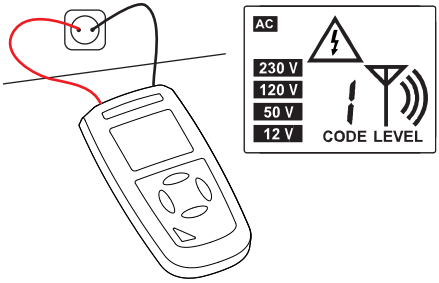


Figure 22

4. TECHNICAL CHARACTERISTICS

4.1. ELECTRICAL CHARACTERISTICS

4.1.1. TRANSMITTER

Output signal frequency: 125 kHz
External voltage identification range: 12 to 400 VDC ± 2.5%; 12~400VAC (50 or 60 Hz) ± 2.5%
NCV function: 12 to 1000 VAC at 50/60 Hz.

4.1.2. RECEIVER

Detection depth:

- Unipolar application: 0 to 2 m approximately
- Bipolar application: 0 to 0.5 m approximately
- Single loopback line: up to 2.5 m

The detection depth also depends on the material and specific applications.

Mains voltage identification: 0 to 0.4 m approximately

4.2. POWER SUPPLY

The transmitter and receiver are powered by 6 type LR03 or AAA batteries each.

Transmitter power consumption: between 5 and 36 mA depending on use.
Receiver power consumption: between 16 and 36 mA depending on use.

Battery weight: 12 x 12 gr = 144 gr approximately

4.3. ENVIRONMENTAL CONDITIONS

For indoor use and outdoor use in dry weather.
Degree of pollution: 2.
Altitude < 2,000 m

Operating temperature: 0 to 40°C, with a maximum relative humidity of 80% (non-condensing).
Storage temperature: -20 to +60°C, with a maximum relative humidity of 80% (non-condensing).

4.4. MECHANICAL CHARACTERISTICS

Transmitter dimensions (L × W x H): 160 mm × 84 mm × 40 mm
Receiver dimensions (L × W × H): 198 mm × 67 mm × 36 mm

Transmitter weight: Approximately 350 g
Receiver weight: Approximately 310 g

4.5. COMPLIANCE WITH INTERNATIONAL STANDARDS

The transmitter complies with safety standard IEC/EN 61010-2-030 for voltages up to 300 V in category III.
The receiver complies with safety standard IEC/EN 61010-031 as a type F sensor for voltages up to 300 V in category III.

4.6. ELECTROMAGNETIC COMPATIBILITY (EMC)

The instrument complies with IEC/EN 61326-1.

5. MAINTENANCE

Except for the batteries, the instrument contains no parts that can be replaced by untrained or unauthorised personnel. Any unauthorised work or any part replacement with equivalents may seriously compromise safety.

5.1. CLEANING

Disconnect anything connected to the instrument and switch it off.

Use a soft cloth, moistened with soapy water. Rinse with a damp cloth and dry quickly with a dry cloth or forced air. Do not use alcohol, solvents, or hydrocarbons.

5.2. BATTERY REPLACEMENT

When the symbol appears, all the batteries need to be replaced.
If the symbol blinks, the batteries are too low to power the instrument and it switches off.

Turn the instrument off and then refer to section 1.4 to replace the battery.

Old batteries must not be treated as household wastes. Take them to the appropriate collection point for recycling.

6. WARRANTY

Except as otherwise stated, our warranty is valid for **24 months** starting from the date on which the equipment was sold. The extract from our General Terms of Sale is available on our website.
www.group.chauvin-arnoux.com/en/general-terms-of-sale

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 instrument by a person not approved by the manufacturer;
- adaptation to a particular application not anticipated in the definition of the equipment or by the user manual;
- Damage caused by shocks, falls, or floods.

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