



User Manual

PCE-186 CB Cable Detector



User manuals in various languages (français, italiano, español, português, nederlands, türk, polski, русский, 中文) can be found by using our product search on: www.pce-instruments.com

Last change: 2 December 2019
v1.0








Contents

1	Safety notes	1
2	Specifications	2
3	Amplifier Probe	3
3.1	Features.....	3
3.2	Instructions.....	3
3.3	Maintenance	4
4	Tone Generator / DMM.....	4
4.1	Tone Generator Features	4
4.2	Tone Generator Instructions.....	5
4.3	DMM Features	7
5	Instrument Layout.....	8
6	Button Functions	8
7	Measurement	9
7.1	Voltage measurement	9
7.2	Resistance Measurement.....	10
7.3	Continuity Check	11
7.4	Diode Measurement	12
8	Maintenance	12
8.1	Battery Replacement.....	12
8.2	Cleaning and Storage.....	12
9	Contact.....	14
10	Disposal	14

1 Safety notes

Please read this manual carefully and completely before you use the device for the first time. The device may only be used by qualified personnel and repaired by PCE Instruments personnel. Damage or injuries caused by non-observance of the manual are excluded from our liability and not covered by our warranty.

- The device must only be used as described in this instruction manual. If used otherwise, this can cause dangerous situations for the user and damage to the meter.
- The instrument may only be used if the environmental conditions (temperature, relative humidity, ...) are within the ranges stated in the technical specifications. Do not expose the device to extreme temperatures, direct sunlight, extreme humidity or moisture.
- Do not expose the device to shocks or strong vibrations.
- The case should only be opened by qualified PCE Instruments personnel.
- Never use the instrument when your hands are wet.
- You must not make any technical changes to the device.
- The appliance should only be cleaned with a damp cloth. Use only pH-neutral cleaner, no abrasives or solvents.
- The device must only be used with accessories from PCE Instruments or equivalent.
- Before each use, inspect the case for visible damage. If any damage is visible, do not use the device.
- Do not use the instrument in explosive atmospheres.
- The measurement range as stated in the specifications must not be exceeded under any circumstances.
- Non-observance of the safety notes can cause damage to the device and injuries to the user.
- Please observe the International Electrical Symbols listed below:

	Meter is protected throughout by double insulation or reinforced insulation
	Warning! Risk of electric shock
	Caution! Refer to this manual before using the meter
	AC - Alternating current
	DC - Direct current

We do not assume liability for printing errors or any other mistakes in this manual.

We expressly point to our general guarantee terms which can be found in our general terms of business.

If you have any questions please contact PCE Instruments. The contact details can be found at the end of this manual.

2 Specifications

Specifications		
AC voltage measurement		
Measuring range	Resolution	Accuracies
400 mV	0.1 mV	± 1% + 5 Dgt
4V	1 mV	± 1% + 5 Dgt
40V	10 mV	± 1% + 5 Dgt
400V	100 mV	± 1% + 5 Dgt
750V	1V	± 1% + 5 Dgt
DC		
Measuring range	Resolution	Accuracies
400 mV	0.1 mV	± 0.5% + 3 Dgt
4V	1 mV	± 0.5% + 3 Dgt
40V	10 mV	± 0.5% + 3 Dgt
400V	100 mV	± 0.5% + 3 Dgt
750V	1V	± 0.5% + 3 Dgt
Resistance		
Measuring range	Resolution	Accuracies
400 Ω	0.1 Ω	± 1.2% + 3 Dgt
4 kΩ	1 Ω	± 1.2% + 3 Dgt
40 kΩ	10 Ω	± 1.2% + 3 Dgt
400 kΩ	100 Ω	± 1.2% + 3 Dgt
4 MΩ	1 kΩ	± 1.2% + 3 Dgt
40 MΩ	10 kΩ	± 2.0% + 4 Dgt
Input impedance	10 MΩ	
Overvoltage protection	500V DC	
Continuity test		
Measuring range	Beep	
400 Ω	> 25 Ω	
Line detection	By beep	
Beep switchable	Slowly pulsating tone	
	Fast pulsating tone	
Locating depth	Max. 50 cm	
Connections	RJ-11 plug, coconut clamps	
Power supply receiver	9V block battery	
Power supply transmitter	9V block battery (transmitter function)	
	2 x 1.5V AAA (voltmeter)	
Environmental conditions	0 ... 50°C / 32 ... 122°F, 5 ... 95% rh	
Weight transmitter	About 265 g / < 1 lb	
Weight receiver	About 89 g / < 1 lb	

3 Amplifier Probe

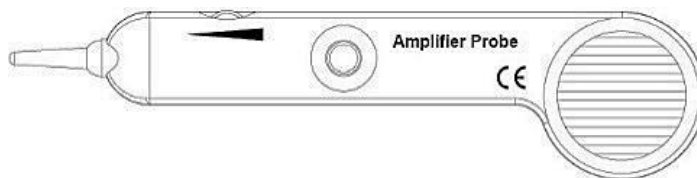


Figure 1

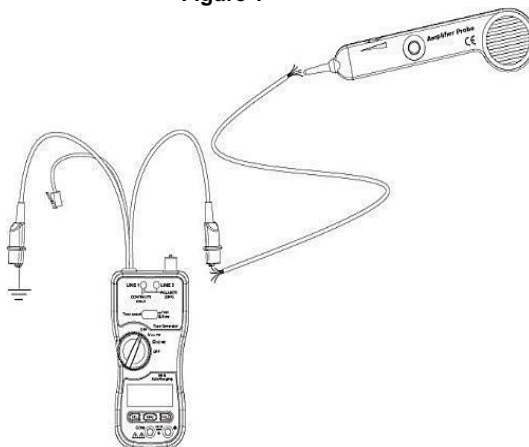


Figure 2

3.1 Features

- The Amplifier Probe is designed to identify and trace wires or cables within a group without damaging the insulation.
- Works with any Tone Generator to identify wires.
- Volume control for increased sensitivity and adjustable to suit work environment.
- Recessed ON/OFF button prevents battery drain.
- Power supply is from any 9V battery with a life of approximately 100 hours.
- An audio jack is provided for a headset.

3.2 Instructions

- Connecting the tone generator.
In terminated working cables:
 Connect one test lead to a terminated wire and the other test lead to earth or equipment ground (See figure 2).
In unterminated or non-working cables:
 Connect one test lead to an unterminated wire and the other test lead to another unterminated wire.



- Depress the round on/off spring-loaded button on the amplifier probe. The volume control switch can be adjusted to suit the environment. Volume can be increased to overcome noise, or decreased to reduce interference.
- Touch the tip of the amplifier probe to the insulation of each suspect conductor.
- Reception of tone will be loudest on the subject wire.
- An audio jack is provided for headset.

3.3 Maintenance

The amplifier probe is maintenance free, except for battery replacement. Remove the screw from the battery compartment, replace the 9 V battery and reassemble.

Warranty limited solely to repair or replacement; no warranty of merchantability, fitness for a particular purpose or consequential damages.

4 Tone Generator / DMM

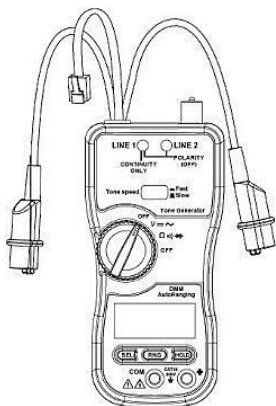


Figure 3

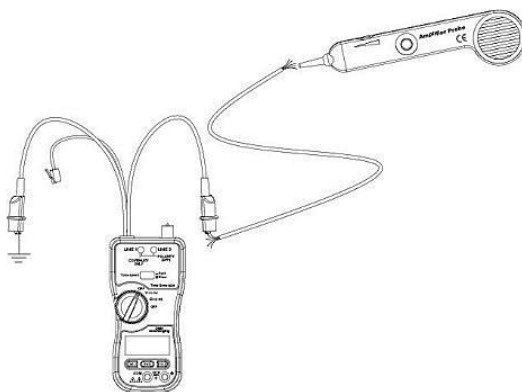
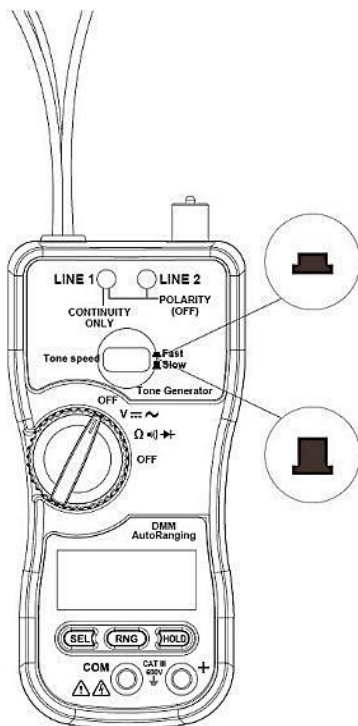


Figure 4

4.1 Tone Generator Features

- Red and black test leads with a standard 4 conductor modular cord and plug.
- A 3-position toggle switch controls the modes of operation and two bi-coloured LEDs display the line polarity for Lines 1 and 2.
- The tone and continuity (cont.) test functions only apply to Line 1.
- A tone selection push button is located on the front panel for choosing either a fast dual alternating tone or a slow dual alternating tone directly.

CAUTION: DO NOT CONNECT TO AN ACTIVE AC CIRCUIT EXCEEDING 24 V IN THIS MODE.



4.2 Tone Generator Instructions

All of the following tests can be performed by using the red and black test leads or the modular plug.

NOTE: When using the modular test plug, the polarity test function applies to Lines 1 and 2. The continuity and tone functions ONLY apply to Line 1.

- **POLARITY TEST: IDENTIFYING TIP & RING (SWITCH TO "OFF")**
 1. Connect the RED test lead to the side of one line and the BLACK lead to the side of another line.
 2. The LED will glow "GREEN" when you connect the RED test lead to the RING SIDE of the line.
 3. The LED will glow "RED" when you connect the RED test lead to the TIP SIDE of the line.
- **IDENTIFYING LINE CONDITION (SWITCH TO "OFF")**
 1. Connect the RED test lead to the RING SIDE of the line and the BLACK to the TIP.
 2. Watch the LED:
 - A BRIGHT "GREEN" LED indicates a CLEAR line.
 - A DIM "GREEN" LED indicates a BUSY line.
 - A BRIGHTLY FLICKERING "GREEN and RED" LED indicates a RINGING line.



- **VERIFYING LINES (SWITCH TO "OFF" THEN "CONT")**

1. Dial the line to be verified.
2. While the line is ringing, connect the RED lead to the RING SIDE of the line and the BLACK to the TIP.
3. In the "OFF" position, the indicator lamp will flicker "RED and GREEN" when the test leads are connected to the subject pair.
4. If you switch the test set to "CONT", it will terminate the call on the subject line.

- **SENDING TONE (SWITCH TO "TONE")**

CAUTION: DO NOT CONNECT TO ANY ACTIVE AC CIRCUIT EXCEEDING 24V IN THIS MODE.

1. Connect the test leads to the pair, or attach one lead to ground and one lead to either side of the line. (See figure 4)
2. A fast dual alternating tone or a slow dual alternating tone can be selected from the tone selection push button.
3. Probe the suspected wires with the amplifier probe. Reception of tone will be strongest on the subject wire. In case of ready access to bare conductors, a handset or headphone may be used to receive the tone.

- **TESTING CONTINUITY (SWITCH TO "CONT")**

CAUTION: DO NOT CONNECT TO ANY ACTIVE AC OR DC CIRCUIT IN THIS MODE.

1. Connect the test leads to the subject pair.
2. Use "cont." position.
3. A bright "GREEN" light indicates continuity. The LED will not glow if the line resistance exceeds 12k Ω .

- **TESTING CONTINUITY USING TONE (SWITCH TO "TONE")**

CAUTION: DO NOT CONNECT TO ANY ACTIVE AC OR DC CIRCUIT IN THIS MODE.

1. Connect the test leads to the subject pair.
2. Use a handset or headset at the remote end and touch the wire end(s) with the clip lead(s).
3. Reception of tone is an indication of continuity.

- **MODULAR TESTING**

1. All above tests are available through the modular plug for line 1 only - red and green wires.

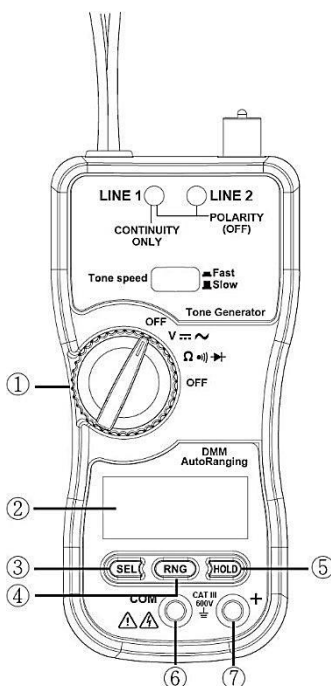
- **COAX TESTING**

1. To test unterminated coax, connect red to outer shield and black to centre conductor or red to outer shield and black to ground.
2. To test terminated coax, connect red to connector housing and black to centre pin or red to connector housing and black to ground.

4.3 DMM Features

- 4000 counts LCD.
- Full automatic measurement.
 - Voltage measurement.
 - Resistor measurement.
- Range change function.
- Select function.
- Data Hold function.
- Continuity check.
- Diode measurement.
- Low battery indication.
- Input impedance: 10M Ω .
- Safety Standard:
 - EN 61010-1 CAT III 600V
 - EN 61010-2-30
 - EN 61326-1

5 Instrument Layout



- | | |
|--------------------------|----------------|
| ① Function rotary switch | ⑤ Hold Button |
| ② LCD | ⑥ COM Terminal |
| ③ Select Button | ⑦ "+" Terminal |
| ④ Range Button | |

6 Button Functions

- ① **Function rotary switch**
The rotary switch selects the function.
- ② **LCD**
3999-count LCD with LOW BATTERY indication.
- ③ **Select Button**
For AC/DC function selection.
In the resistance + continuity + diode function, press the Select button to select resistance, continuity or diode function.
- ④ **Range Button**
Press the Range button to select the manual range mode. In manual range mode, each time press Range button (less than one second), the range increments and new value is displayed. To exit the manual range mode and return to auto mode, press the RANGE button (More than one second).

⑤ **HOLD Button**

Press the HOLD button (HOLD annunciator turns on) makes the meter stop updating the LCD display. This mode can be nested in most of the special modes. Enabling HOLD function in automatic mode makes the meter switch to manual mode, but the full scale range remains the same. Hold function can be cancelled by changing the measurement mode, pressing range, or push HOLD again.

⑥ **COM Terminal**

This is the ground input terminal. Use the BLACK test lead to connect.

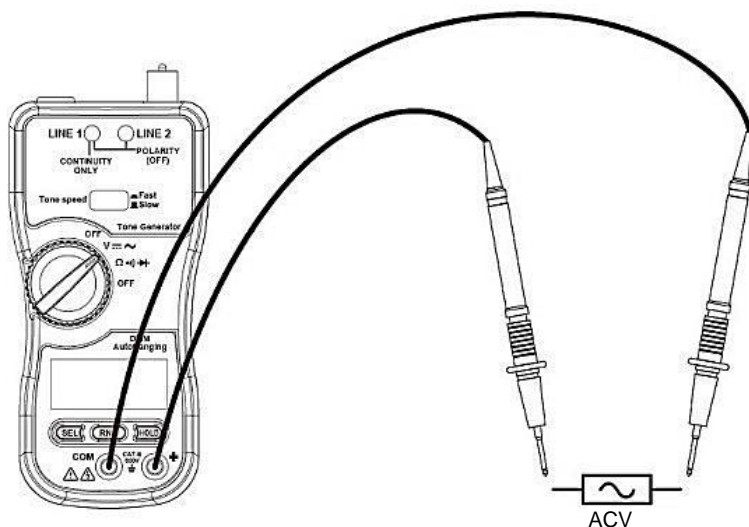
⑦ **"+" Terminal**

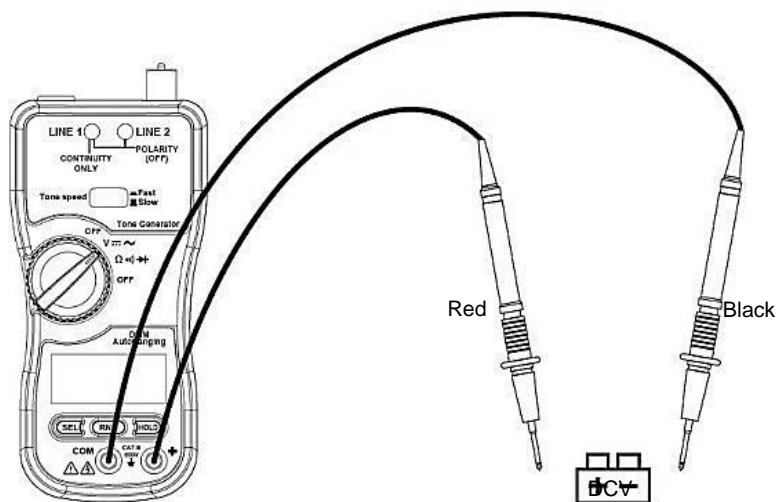
This is positive input terminal for voltage / ohm measurement. Use the RED test lead to connect.

7 **Measurement**

7.1 **Voltage measurement**

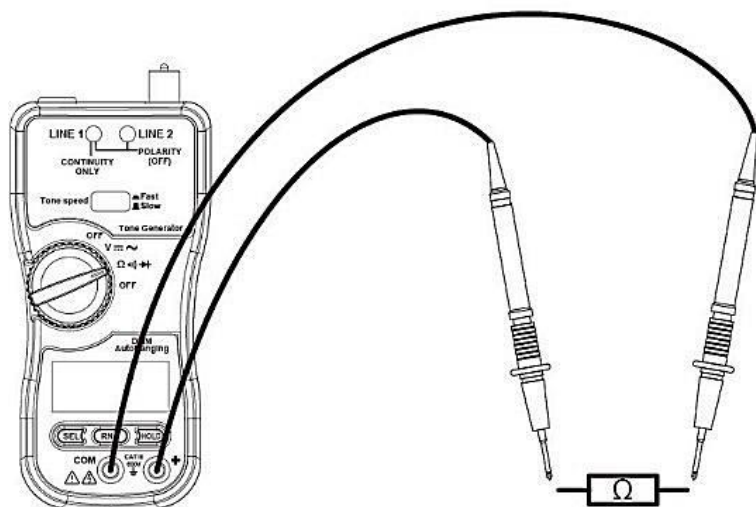
- Insert the BLACK test lead to COM and the RED test lead to the "+" terminal.
- Switch to $V \sim$ function for ACV or DCV selection.
- Get the reading directly from the LCD.





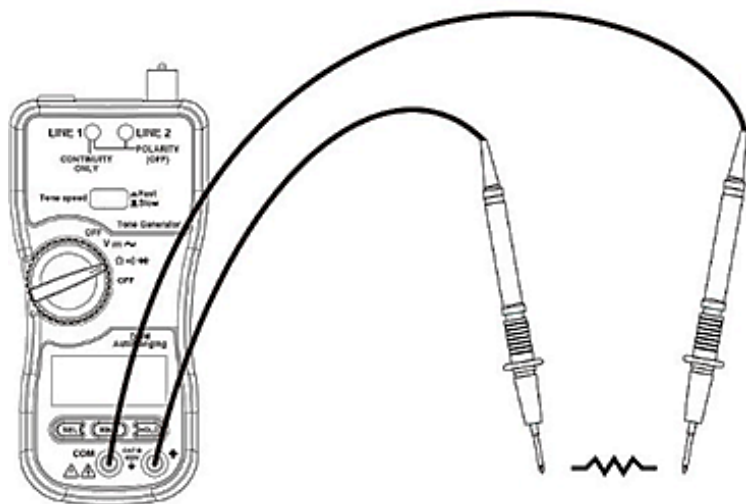
7.2 Resistance Measurement

- Switch to OHM range and make sure there is no power in the circuit being measured. Insert the BLACK test lead to the COM and the RED test lead to the "+" terminal.
- Connect the test leads to the circuit or device under test and get the reading directly from the LCD.



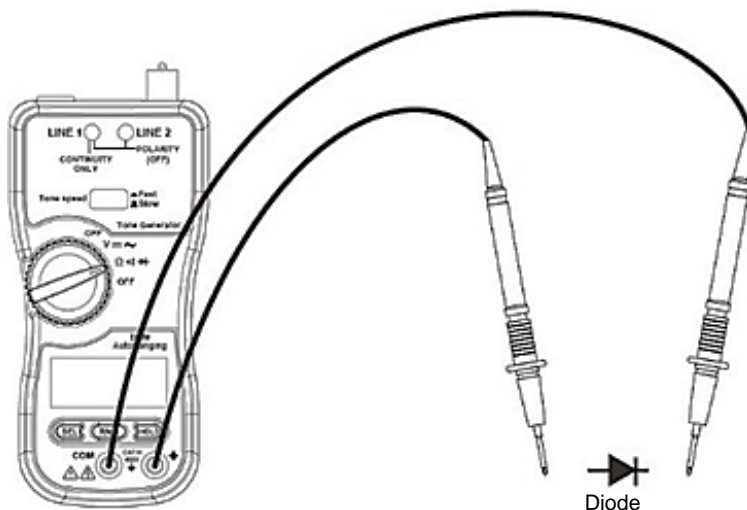
7.3 Continuity Check

- Continuity check shares the same configuration with 400.0 Ω manual resistance measurement mode, but with buzzer output to indicate continuity. The buzzer generates a 2 kHz sound whenever the digit number less than 25 Ω .
- Because the cycle time of measurement is only 50 ms, the least significant digit will not display.



7.4 Diode Measurement

- Diode measurement mode shares the same configuration with 4000 V manual voltage measurement mode.
- If the test circuit is open or the voltage drop between the two ports of the device (diode) under test are larger than 2 V, the LCD will show "OL".
- The buzzer generates a 2 kHz sound whenever the digit number is less than 0.25 V. As the cycle time of measurement is only 50 ms, the least significant digit will not display.



8 Maintenance

8.1 Battery Replacement

- **Amplifier Probe:** Adjust the volume control to at least 4 or 5 on the Amplifier Probe, hold down the push button, and place the tip of the probe near a live conductor (i. e., a 110 V power cord). If no sound is generated, replace a 9 V battery inside the Amplifier Probe.
- **Tone Generator:** Select the "Tone" switch on the Tone Generator. Adjust the volume control to at least 4 or 5, hold down the push button, and place the tip of the probe to the cables attached to the Tone Generator. If no tone is generated, replace a 9V battery for the Tone Generator.
- **Multimeter:** Replace two AAA batteries with the " " symbol appears at the upper left hand corner of the LCD.

8.2 Cleaning and Storage

WARNING: To avoid electrical shock or damage to the meter, do not get water inside the case.

Periodically wipe the case with a damp cloth and detergent.

Do not use abrasives or solvents.

If the meter is not used for over 60 days, remove the battery for storage.

9 Contact

If you have any questions, suggestions or technical problems, please do not hesitate to contact us. You will find the relevant contact information at the end of this user manual.

10 Disposal

For the disposal of batteries in the EU, the 2006/66/EC directive of the European Parliament applies. Due to the contained pollutants, batteries must not be disposed of as household waste. They must be given to collection points designed for that purpose.

In order to comply with the EU directive 2012/19/EU we take our devices back. We either re-use them or give them to a recycling company which disposes of the devices in line with law.

For countries outside the EU, batteries and devices should be disposed of in accordance with your local waste regulations.

If you have any questions, please contact PCE Instruments.



PCE Instruments contact information

Germany

PCE Deutschland GmbH
Im Langel 4
D-59872 Meschede
Deutschland
Tel.: +49 (0) 2903 976 99 0
Fax: +49 (0) 2903 976 99 29
info@pce-instruments.com
www.pce-instruments.com/deutsch

Germany

PCE Produktions- und
Entwicklungsgesellschaft mbH
Im Langel 26
D-59872 Meschede
Deutschland
Tel.: +49 (0) 2903 976 99 471
Fax: +49 (0) 2903 976 99 9971
info@pce-instruments.com
www.pce-instruments.com/deutsch

The Netherlands

PCE Brookhuis B.V.
Institutenweg 15
7521 PH Enschede
Nederland
Telefoon: +31 (0)53 737 01 92
info@pcebenelux.nl
www.pce-instruments.com/dutch

United States of America

PCE Americas Inc.
711 Commerce Way suite 8
Jupiter / Palm Beach
33458 FL
USA
Tel: +1 (561) 320-9162
Fax: +1 (561) 320-9176
info@pce-americas.com
www.pce-instruments.com/us

France

PCE Instruments France EURL
23, rue de Strasbourg
67250 Soultz-Sous-Forêts
France
Téléphone: +33 (0) 972 3537 17
Numéro de fax: +33 (0) 972 3537 18
info@pce-france.fr
www.pce-instruments.com/french

United Kingdom

PCE Instruments UK Ltd
Unit 11 Southpoint Business Park
Ensign Way, Southampton
Hampshire
United Kingdom, SO31 4RF
Tel: +44 (0) 2380 98703 0
Fax: +44 (0) 2380 98703 9
info@pce-instruments.co.uk
www.pce-instruments.com/english

China

PCE (Beijing) Technology Co., Limited
1519 Room, 6 Building
Zhong Ang Times Plaza
No. 9 Mentougou Road, Tou Gou District
102300 Beijing, China
Tel: +86 (10) 8893 9660
info@pce-instruments.cn
www.pce-instruments.cn

Turkey

PCE Teknik Cihazları Ltd.Şti.
Halkalı Merkez Mah.
Pehlivan Sok. No.6/C
34303 Küçükçekmece - İstanbul
Türkiye
Tel: 0212 471 11 47
Faks: 0212 705 53 93
info@pce-cihazlari.com.tr
www.pce-instruments.com/turkish

Spain

PCE Ibérica S.L.
Calle Mayor, 53
02500 Tobarra (Albacete)
España
Tel. : +34 967 543 548
Fax: +34 967 543 542
info@pce-iberica.es
www.pce-instruments.com/espanol

Italy

PCE Italia s.r.l.
Via Pesciatina 878 / B-Interno 6
55010 Loc. Gragnano
Capannori (Lucca)
Italia
Telefono: +39 0583 975 114
Fax: +39 0583 974 824
info@pce-italia.it
www.pce-instruments.com/italiano

Hong Kong

PCE Instruments HK Ltd.
Unit J, 21/F., COS Centre
56 Tsun Yip Street
Kwun Tong
Kowloon, Hong Kong
Tel: +852-301-84912
jyi@pce-instruments.com
www.pce-instruments.cn