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Manual
PCE-TLM300

Start-up

Inserting / replacing Batteries

See figure {**B**} - Open the positioning bracket. Remove the locking clip and slide the endpiece down. Slide the red locking mechanism to the side and open the battery compartement. Insert new or replace used batteries. Close battery cover, reinsert the endpiece and fix locking clip.

The battery symbol {**C, 20**} appears permanently blinking in the display when the battery voltage is too low. The batteries should be replaced as soon as possible.

- Pay attention to correct polarity.
- Use alkaline batteries.
- Batteries should be removed if the device will not be used for a long time (danger of corrosion).

When changing the batteries the settings and stack content remain unchanged.

Multifunctional Endpiece

See figure {**D**}

The device can be used for different measurement situations:

- For measurements from an edge open the positioning bracket until it locks in place. See figure {**F**}.
- For measurements from a corner, open the positioning bracket until it locks in place, with a slight push to the right the bracket can be turned further. See figures {**D** and **F**}.

A built-in sensor automatically detects the orientation of the positioning bracket and calculates the corresponding distances accordingly.

Integrated telescopic viewfinder

The device is equipped with a telescopic viewfinder on the right hand side. The viewfinder is especially helpful when aiming at distant targets. When looking through the viewfinder, the target is clearly visible thanks to the 2x magnification. At distances beyond 30 m the laser spot is centered on the crosshair, below 30 m the laser spot appears on the edge of the crosshair, which is normal.

Level

The integrated bubble level allows simple horizontal levelling of the instrument.

Keypad

See figure {A}:

1 ON/MEASURING
2 MEASUREMENT REFERENCE
3 AREA
4 VOLUME
5 ROOM ANGLE
6 TRAPEZOID MEASUREMENT
7 PLUS [+]
8 EQUAL [=]
9 MENU
10 UNITS
11 CLEAR/OFF
12 MINUS [-]
13 INDIRECT MEASUREMENT PYTHAGORAS
14 RECALL/MEMORY
15 HISTORY/TIMER

Display

See figure {C}

1 Information about faulty measurement
2 Laser "Active"
3 Roof length
4 Measurement reference
5 Maximum value of continuous measurement
6 Roof pitch (angle)
7 Minimum value of continuous measurement
8 Trapezoid area
9 Recall of historical storage

10 Storage of constant

11 Main line

12 Units with exponents ($^2/^3$), Degree

13 Room angle

14 Hardware error

15 Indirect measurement - Pythagoras

16 Indirect measurement - Pythagoras - Trapezoid, partial height

17 Three auxiliary lines (e.g. previous results)

18 Area / Volume

19 Offset setting

20 Battery indication

Menu functions

Presettings

The menu allows selection of the settings that will remain in memory after the instrument is switched off.

Navigation in the menu

Press the **MENU** -key {**A, 9**} repeatedly to scroll through the possible menu functions (LIGHT, BEEP, OFFSET, LASER, RESET).

When the desired menu option appears, select it with the **EQUAL** - key {**A, 8**}, scroll through the possible settings with the **PLUS** - key {**A, 7**} or the **MINUS** - key {**A, 12**} and store the selected setting with the **EQUAL** - key {**A, 8**}. Press **CLEAR** - key {**A, 11**} to leave the menu without saving any changes in the settings.

Selecting Light - display illumination

Press **MENU** - key {**A, 9**} briefly to select desired **LIGHT** setting.

Possible settings:

- OFF
- ON
- AUTO: ON for 15 seconds
  The display illumination remains on for 15 seconds after the last key press.

☞ In permanent ON mode, the display illumination consumes more battery power.

☞ Default setting: Display illumination AUTO.

Selecting Beep

Press **MENU** - key {**A, 9**} briefly to select desired **BEEP** setting.

Possible settings:

- ON
- OFF

☞ Default setting: **BEEP** ON.

Measure with offset

An offset automatically adds or subtracts a value to/ from ALL measurements. With this feature tolerances can be taken into consideration e.g. between unfinished and finished dimensions.

Select the menu function **OFFSET** {C, 19} , confirm with the **EQUAL** - key {A, 8}. Adjust the OFFSET with the **PLUS** - key {A, 7} or the **MINUS** - key {A, 12}.

By holding the keys down, the setting values will increase/decrease faster. Once you have entered the proper offset confirm your selection with the **EQUAL** - key {A, 8}.

As long as an **OFFSET** {C, 19} is added/subtracted the symbol is visible on the display.

Laser in continuous operation

The laser continuous operation activates the laser permanently.

Press **MENU** - key {A, 9} briefly to select desired **LASER** setting.

☞   Default setting: LASER continuous operation OFF.

Reset

When you select the menu function **RESET** (RESET will blink in the display) and press the **EQUAL**-key {A, 8} the device will default to factory settings.

CAUTION: Any customized presettings as well as stored values will be deleted.

Operation

Switching On/Off

ON: Press **ON** - key {**A, 1**} briefly. The laser is active. Battery indication is displayed until the next keystroke.

OFF: Press and hold **OFF** - key {**A, 11**}. To maximize battery life the laser beam will switch off after 90 seconds of inactivity, the device will automatically switch off after 3 minutes of inactivity.

CLEAR key

Pushing the **CLEAR** - key {**A, 11**} clears the last entry or measurement. Within a function (area, volume, etc.) single measurements can be deleted step by step and remeasured.

Reference setting

If the positioning bracket is folded out, the device recognizes the position, adapts the reference and calculates distances accordingly.

The default reference setting is from the rear of the instrument. By pressing the **REFERENCE** - key {**A, 2**}, the setting can be changed, so that the next measurement taken will be from the "front" of the instrument.

Afterwards the reference setting automatically defaults back to rear. See picture {**G**}.

You can choose the "front" reference permanently by pressing the **REFERENCE** - key {**A,2**} longer. Press the **REFERENCE** - key {**A, 2**} longer another time to change to "Measuring with tripod". Using a tripod eliminates shaking when measuring over long distances. On the back of the instrument is an industry standard ¼"-threaded hole for use with a camera tripod mounting screw. For correct measure-ments the reference needs to be adapted.

Press the **REFERENCE** - key {**A, 2**} short to change back to the "rear" reference.

☞   The selected reference setting is displayed {**C, 4**}.

Selecting Units

Press **UNITS** - key {**A, 10**} briefly to select desired unit.

Possible units:

Distance	Area	Volume
0.000 m	0.000 m²	0.000 m³
0.00 m	0.00 m²	0.00 m³
0 mm	0.000 m²	0.000 m³
0.00 ft	0.00 ft²	0.00 ft³
0.00 $^1/_{32}$ ft in	0.00 ft²	0.00 ft³
0' 0" $^1/_{32}$	0.00 ft²	0.00 ft³
0.0 in	0.00 ft²	0.00 ft³
0 $^1/_{32}$ in	0.00 ft²	0.00 ft³

Measuring

Single distance measuring

Pressing **ON/MEASURING** - key {**A, 1**} turns the laser on. Aim at the desired target and press **ON/MEASU-RING** - key {**A, 1**} again. The measured distance is displayed immediately in the chosen unit.

Minimum/maximum measuring

This function allows the user to measure the minimum or maximum distance from a fixed measuring point as well as to determine spacing - see figure {**H**}. It is commonly used to measure a diagonal distance (maximum value) or a horizontal distance (minimum value).

Press and hold **ON/MEASURING** - key {**A, 1**} until you hear a beep, indicating the device is in a continuous measuring mode. Then slowly sweep the laser back and forth respectively up and down over the desired target point - see figure {**H**} - (e.g. a corner in the room).

Press **ON/MEASURING** - key {**A, 1**} again and the continuous measurement will be stopped. The values for maximum and minimum distances are shown in the display as well as the last measured value in the main line.

Functions

Addition/Subtraction

To add or subtract two or more measurements simply works as follows:

Measurement +/- Measurement +/- Measurement +/- .... = RESULT

Pressing the **EQUAL** - key {**A, 8**} ends the sequence and displays the result in the main line; the actual measurements are scrolled upwards in the display. Pushing the **CLEAR** - key {**A, 11**} undoes the most recent operation.

Areas and volumes can be added/subtracted in exactly the same manner.

Area

Press the **AREA** - key {**A, 3**} for the area function. The corresponding symbol appears in the display. When both measurements have been taken the result will be automatically calculated and displayed in the main line.

If you want to measure another area, press **AREA** - key {**A, 3**} once more.

Volume

Press the **VOLUME** - key {**A, 4**} for the volume function. The corresponding symbol appears in the display. When 3 measurements have been taken the result will be automatically calculated and displayed in the main line.

If you want to measure another volume press **VOLUME** - key {**A, 4**} once more.

Indirect Measuring (Pythagoras)

The device can calculate distances using Pythagoras' theorem. This method is useful when the distance to be measured is difficult or dangerous to access.

- Make sure you strictly follow the sequence of the measurements
- All target points need to be vertically or horizontally in the same plane
- Best results can be expected if the device is turned around a fixed point (e.g. positioning bracket folded out completely and the device is held towards a wall)
- It is possible to use the "**Minimum/maximum measuring**" by pressing the **ON/MEASURING** - key {**A, 1**} longer. The minimum value is used for the measurements perpendicular towards the target respectively the maximum value for the other measurements.

Indirect Measuring - Determination with two points

See figure {**I**}

Press the **PYTHAGORAS** - key {**A, 13**} until the correct symbol appears on the display. The distance to be measured will flash in the display. Take the necessary measurements.

The result and the single measurements appear on the display.

CAUTION: Right angle is necessary for the second measurement - use **"Minimum/maximum measuring"** as explained.

Indirect Measuring - Determination with three points

See figure {**J**}

Press the **PYTHAGORAS** - key {**A, 13**} until the correct symbol appears on the display. The length to be measured appears flashing on the display. Take the necessary measurements. The result and the single measurements appear on the display.

CAUTION: Right angle is necessary for the second measurement - use **"Minimum/maximum measuring"** as explained.

Indirect Measuring - Determination of a partial height with three points

See figure {**K**}

Press the **PYTHAGORAS** - key {**A, 13**} until the correct symbol appears on the display. The length to be measured appears flashing on the display. Take the necessary measurements.

The result and the single measurements appear on the display.

CAUTION: Right angle is necessary for the third measurement - use **"Minimum/maximum measuring"** as explained.

Room angle Measuring

See figure {L}

The device can calculate a room angle using Triangle' theorem. This method is useful when e. g. the right angle of a room needs to be checked.

- Make sure you strictly follow the sequence of the measurements

- All target points need to be vertically or horizontally in the same plane

- It is possible to use the "**Minimum/maximum measuring**" by pressing the **ON/MEASURING** - key {**A, 1**} longer. The minimum measuring is used for the first two measurements, the maximum measuring for the third measurement.

Press the **ROOM ANGLE** - key {**A, 5**} the room angle symbol appears on the display. The length to be measured appears flashing on the display. Take the necessary measurements. The result and the single measurements appear on the display.

Trapezoid Measuring

See figure {M}

The device can calculate trapezoid values using Pythagoras' theorem. This method is useful when e. g. the length of a roof or the angle of the roof needs to be measured.

- Make sure you strictly follow the sequence of the measurements

- All target points need to be vertically or horizontally in the same plane

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- It is possible to use the "**Minimum/maximum measuring**" by pressing the **ON/MEASURING** - key {**A, 1**} longer. The minimum measuring is used for the first two measurements, the maximum measuring for the third measurement.

Press the **TRAPEZOID** - key {**A, 6**} for the trapezoid function. The trapezoid symbol appears on the display. The length to be measured appears flashing on the display. Take the necessary measurements. The result and the single measurements appear on the display.

Press the **TRAPEZOID** - key {**A, 6**} after the measurement long to display additional trapezoid information such as e.g. roof length, roof angle and area.

Storage of Constants/Historical storage

Storage of a Constant
It is possible to store and recall a frequently used value e.g. height of a room. Measure the desired distance, press **MEM** - key {**A, 14**} long until the device beeps to confirm the storage.

Recalling the constant
Press **RCL** - key {**A, 14**} short to recall the constant. Press **EQUAL** - key {**A, 8**} to take result from the memory for further calculations.

Historical storage
Press **HISTORY** - key {**A, 15**} short and the previous 20 results (measurements or calculated results) are

shown in reverse order. Using the **PLUS** - key {**A, 7**} and the **MINUS** - key {**A, 12**} allows to navigate in the historical storage. Press **EQUAL** - key {**A, 8**} to take a result from the stack to use for further calculations.

Timer

Press and hold **TIMER** - key {**A,15**} to start the timer function. With the **PLUS** - key {**A,7**} and the **MINUS** - key {**A,12**} the delay time (5 - 60 seconds) can be adjusted. The remaining seconds until measurement are displayed. Press the **ON/MEASURING** - key {**A,1**} to start the countdown. The last 5 seconds are counted down with a beep. After the last beep the measurement is taken.

Appendix

Message Codes

All message codes will be displayed with either "InFo" or "Error".
The following mistakes can be corrected:

InFo	Cause	Remedy
204	Calculation error	Repeat procedure
206	No endpiece detection	Attach endpiece properly. If error still occurs, replace endpiece with a new one (replacement part).
252	Temperature too high	Cool down instrument
253	Temperature too low	Warm up instrument

InFo	Cause	Remedy
255	Receiver signal too weak, measurement time too long, distance › 100 m	Use target plate
256	Received signal too powerful	Use target plate (grey side)
257	Wrong measure-ment, ambient brightness too high	Use target plate (brown side)
260	Laser beam inter-rupted	Repeat measurement

Error	Cause	Remedy
🔧	Hardware error	Switch on/off the device several times and check if the symbol still appears. If so please call your dealer for assistance.

Technical Data

Range (use target plate for longer distances)	0.05 m to 200 m 0.2 ft to 650 ft
Measuring accuracy up to 30 m (2 σ, standard deviation, room temperature)	typ.: ± 1.5 mm*
Smallest unit displayed	1 mm
Laser class	II
Laser type	635 nm, < 1 mW
Ø laser spot (at distance)	6 / 30 / 60 mm (10 / 50 / 100 m)
Autom. switch off laser	1.5 min
Autom. switch off instrument	3 min
Integrated telescopic viewer	2x magnification
Illumination	✓
Multifunctional endpiece	✓
Timer	✓
Single Measurement	✓
Maximum, Minimum, Continuous Measurement	✓
Historical storage of	20 values
Indirect Measuring functions with Pythagoras	✓
Area/Volume calculation	✓

Calculator functions	✓
Trapezoid function	✓
Angle function	✓
Battery life, Type AA, 2 x 1.5V	up to 10 000 measurements
IP rating	IP 54 splash proof, dust proof
Dimension	148 x 64 x 36 mm
Weight (with batteries)	~ 250 g
Temperature range: Storage Operating	-25°C to +70°C (-13°F to +158°F) -10°C to +50°C (-14°F to +122°F)

* maximum deviation occurs under unfavourable conditions such as bright sunlight or when measuring to poorly reflecting or very rough surfaces. For distances over 30 m the maximum deviation may increase by ± 0.1 mm/m to a maximum of ± 10 mm.

Measuring Conditions

Measuring Range

At night, at dusk and when the target is shadowed the measuring range without target plate is increased.

Use a target plate to increase the measurement range during daylight or if the target has a bad reflection.

Measuring Surfaces

Measuring errors can occur when measuring toward colourless liquids (e.g. water) or dust free glass, styrofoam or similar semi-permeable surfaces.

Aiming at high gloss surfaces deflects the laser beam and measurement errors can occur.

Against non-reflective and dark surfaces the measuring time can be increased.

Care

Do not immerse the unit in water. Wipe off dirt with a damp, soft cloth. Do not use aggressive cleaning agents or solutions. Treat the optical surfaces with the same care that you would apply to eyeglasses and cameras.

In this direction will find a vision of the measurement technique:
http://www.industrial-needs.com/measuring-instruments.htm

NOTE: "This instrument doesn't have ATEX protection, so it should not be used in potentially explosive atmospheres (powder, flammable gases)."