

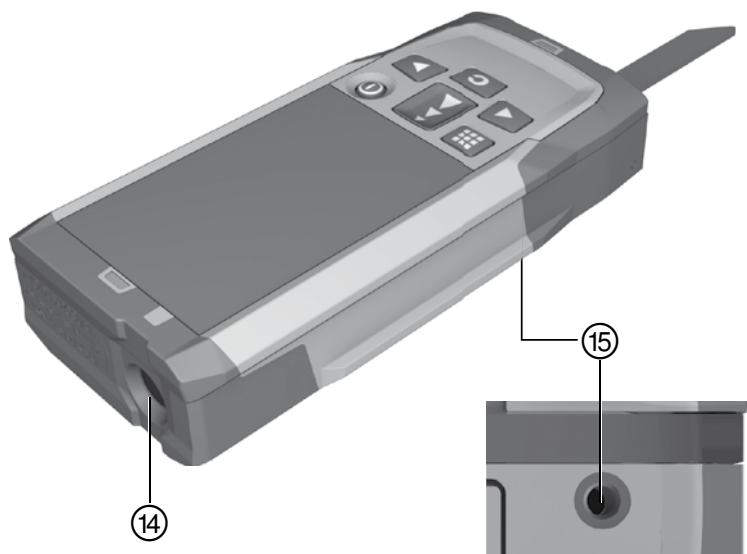
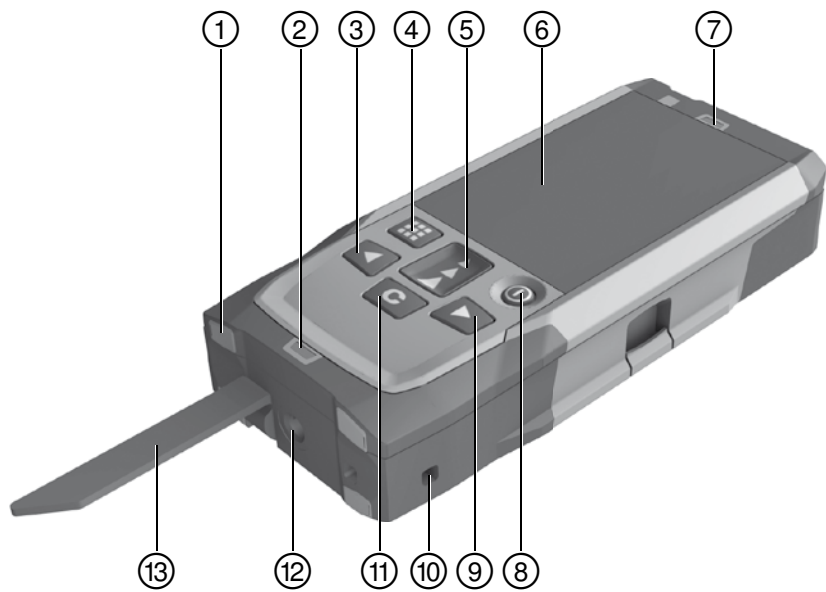
# HILTI

## PD-I

<b>Bedienungsanleitung</b>	<b>de</b>
<b>Operating instructions</b>	<b>en</b>
<b>Mode d'emploi</b>	<b>fr</b>
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<b>Manual de instrucciones</b>	<b>es</b>
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<b>Gebruiksaanwijzing</b>	<b>nl</b>
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<b>Instrucțiuni de utilizare</b>	<b>ro</b>

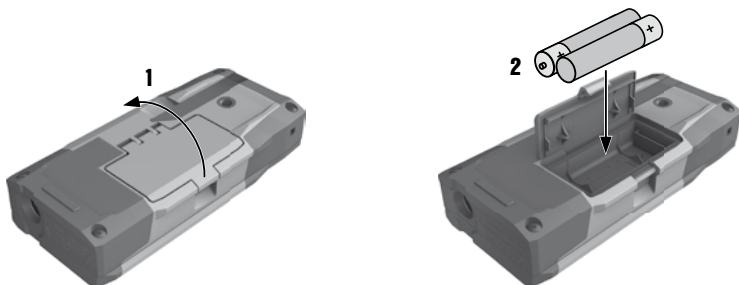


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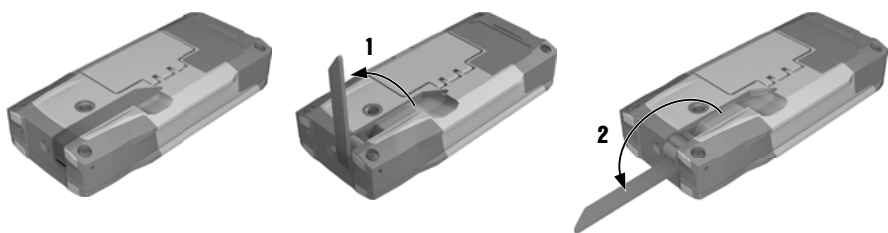




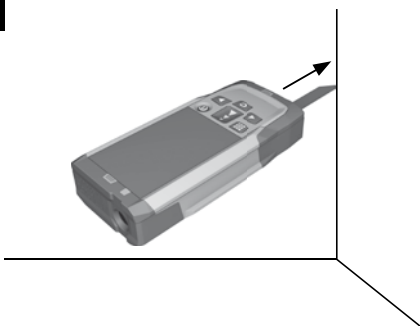
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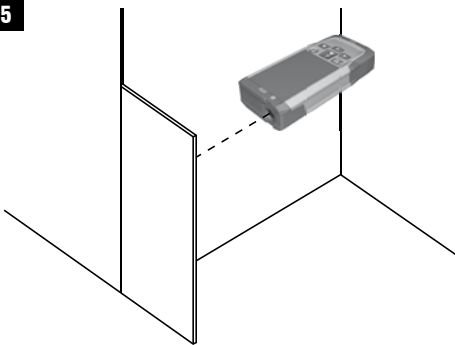
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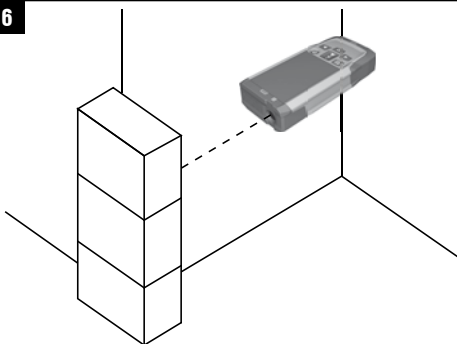
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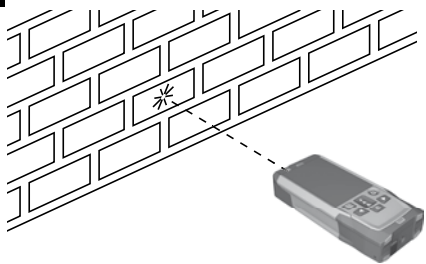
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## ORIGINAL OPERATING INSTRUCTIONS

### PD-I laser range meter

**It is essential that the operating instructions are read before the tool is operated for the first time.**

**Always keep these operating instructions together with the tool.**

**Ensure that the operating instructions are with the tool when it is given to other persons.**

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1 These numbers refer to the corresponding illustrations. The illustrations can be found on the fold-out cover pages. Keep these pages open while studying the operating instructions.

In these operating instructions, the designation "the tool" always refers to the PD-I laser range meter.

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#### Parts, operating controls and indicators 1

- 1 Rear contact surface
- 2 Reference indicator LED for rear contact
- 3 Left arrow button
- 4 "Menu" button
- 5 "Measure" button
- 6 Graphic display
- 7 Reference indicator LED for front contact
- 8 On/off button
- 9 Right arrow button
- 10 Wrist strap attachment point
- 11 Delete (clear) button
- 12 1/4" thread for PDA 72 measuring extension
- 13 Folding spike
- 14 Laser emitting and receiving lens
- 15 1/4" thread on the underside

## 1 General information

### 1.1 Safety notices and their meaning

#### DANGER

Draws attention to imminent danger that will lead to serious bodily injury or fatality.

#### WARNING

Draws attention to a potentially dangerous situation that could lead to serious personal injury or fatality.

#### CAUTION

Draws attention to a potentially dangerous situation that could lead to slight personal injury or damage to the equipment or other property.

#### NOTE

Draws attention to an instruction or other useful information.

### 1.2 Explanation of the pictograms and other information

#### Symbols



Read the operating instructions before use.



Return waste material for recycling.



Laser class II according to CFR 21, § 1040 (FDA)



Laser Class  
2



#### Location of identification data on the tool

The type designation and serial number can be found on the type identification plate on the tool. Make a note of this data in your operating instructions and always refer to it when making an enquiry to your Hilti representative or service department.

Type: \_\_\_\_\_

Generation: 01 \_\_\_\_\_

Serial no.: \_\_\_\_\_

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## 2 Description

### 2.1 Use of the product as directed

The tool is designed for measuring distances, adding and subtracting distances and offers many practical functions such as a timer, area and volume measurement, min/max calculation, setting out, trapezoidal area or painter's area measurement, Pythagoras function and data memory.

The tool is not designed for leveling.

When using the tool, the safety instructions (section 5) must be observed.

### 2.2 Display

The display is divided into various areas. The dark, upper area shows information about the status of the range meter (e.g. measuring reference point, battery status, laser on, laser on permanently). Directly below this area are the measuring functions (e.g. plus, minus), which can be selected by using the arrow buttons.

When the tool is in measuring mode, the measurements taken are shown at the bottom of the display area (the result line). When using functions such as "Area", measured distances are shown on the intermediate result line and calculated results are shown on the result line.

### 2.3 Display illumination

In low light conditions, the display is illuminated automatically as soon as a button is pressed. The display illumination intensity is reduced to 50% after 10 seconds. If no button is pressed over a period of 20 seconds, the display illumination switches off automatically.

#### NOTE

Illumination of the display consumes additional battery power. Shorter battery life is therefore to be expected when this feature is used frequently.

### 2.4 Basic principle

The distance is measured along a laser beam emitted by the tool to the point at which the beam strikes a reflective surface. The target from which the measurement is taken is clearly identified by the red laser measuring spot. The range of the tool depends on the reflectance and structure of the target surface from which measurements are taken.

### 2.5 Taking measurements to rough surfaces

When measuring to a rough surface, e.g. rough plaster etc., an average distance value is measured with the center of the laser spot weighted higher than the edges of the laser spot.

### 2.6 Taking measurements to curved or inclined surfaces

If the laser beam strikes the target surface at a very narrow angle, the light reflected may be inadequate. Conversely, too much light may be reflected toward the tool in situations where the laser beam strikes the target perpendicularly. We recommend use of the PDA 50, PDA 51 or PDA 52 target plate in both of these situations.

### 2.7 Taking measurements to wet or shiny surfaces

As long as the range meter can be aimed directly at the surface, the distance to the target will be reliably measured. With highly reflective surfaces, a reduction in range must be expected and the distance to the actual point of reflection may be measured.

### 2.8 Taking measurements to transparent surfaces

It is generally possible to measure distances to transparent or semi-transparent materials, e.g. liquids, polystyrene foam, etc. Light penetrates these materials, however, and measuring errors may therefore occur. Measuring errors may also occur when measurements are taken through glass or if objects are present within the line of the laser beam.





## 2.9 Control panel

"Measure" button	Quick start (when the tool is switched off, press the button briefly to switch it on).
	Begins distance measurement.
	Activates the laser beam.
	Activates continuous measuring mode (long press, approx. 2 sec.).
	Stops continuous measuring mode.
	Confirms the selected function or setting.
Left arrow button / right arrow button	Used to navigate between functions and to make settings.
The "Clear" button has various functions depending on the operating status:	Stops continuous measuring (tracking).
	Deletes the last measurement.
	Goes one step back (short press).
	Deletes all displayed measurements (long press).
	Ends the function if no measurements have been taken.
"Menu" button	Opens the main menu.
On/off button	Switches the tool on or off.

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## 2.10 The items supplied

- 1 PD-I laser range meter
- 2 Batteries
- 1 Soft pouch
- 1 Operating instructions
- 1 Manufacturer's certificate
- 1 Hand strap
- 1 Brochure for users



## 3 Accessories

Designation	Short designation
Target plate <sup>1</sup>	PDA 50
Target plate <sup>2</sup>	PDA 51
Target plate <sup>3</sup>	PDA 52
Measuring extension	PDA 72
Laser visibility glasses <sup>4</sup>	PUA 60
<sup>1</sup> With reflective coating (120x130 mm) <sup>2</sup> White (120x130 mm) <sup>3</sup> With reflective coating (210x297 mm) <sup>4</sup> For improved laser beam visibility under difficult lighting conditions.	





## 4 Technical data

Right of technical changes reserved.

Power supply	2 x 1.5 V, type AAA batteries
Battery condition check	Battery condition indicator with 4 segments showing 100%, 75%, 50%, 25% charge. No segments shown = battery is completely discharged.
Measuring range with target plate	0 ... 100 m
Accuracy (distance measurement) <sup>1</sup>	± 1.0 mm (2σ, standard deviation)
Accuracy (inclination measurement) <sup>2</sup>	± 0.2° (2σ, standard deviation)
Basic operating modes	Individual measurement / continuous measurement
Display	Illuminated liquid crystal display with permanent indication of distances, operating status and battery condition
Laser class	Visible 635 nm, output power < 1 mW: Laser Class 2 EN 60825-1:2007; IEC 60825-1:2007; Class II CFR 21 § 1040 (FDA)
Laser automatic switch-off	1 min
Tool automatic switch-off	10 min
Battery life	Room temperature: Up to 5000 measurements
Operating temperature range	-10 ... +50°C
Storage temperature range	-30 ... +70°C
Protection class <sup>3</sup>	IP 55 (protection against dust and water spray) IEC 60529
Weight (including batteries)	165 g
Dimensions	129 mm x 60 mm x 28 mm

<sup>1</sup> Influences such as particularly high temperature fluctuations, dampness, shock, dropping, etc. can affect accuracy. Unless stated otherwise, the tool was adjusted or calibrated under standard ambient conditions (MIL-STD-810G). When taking distance measurements, as a basic principle, an additional distance-dependent error of 0.02 mm per meter is to be taken into account.

<sup>2</sup> The reference for the inclination sensor is the underside of the tool (battery compartment). Influences such as particularly high temperature fluctuations, dampness, shock, dropping, etc. can affect accuracy. Unless stated otherwise, the tool was adjusted or calibrated under standard ambient conditions (MIL-STD-810G).

<sup>3</sup> Except the battery compartment

Menu / units	Distance	Area	Volume
m	Meters	m <sup>2</sup>	m <sup>3</sup>
cm	Centimeters	m <sup>2</sup>	m <sup>3</sup>
mm	Millimeters	m <sup>2</sup>	m <sup>3</sup>

## 5 Safety instructions

In addition to the information relevant to safety given in each of the sections of these operating instructions, the following points must be strictly observed at all times.

Keep all safety instructions and information for future reference.

### 5.1 Basic information concerning safety

- Do not render safety devices ineffective and do not remove information and warning notices.
- Keep laser tools out of reach of children.

- Failure to follow the correct procedures when opening the tool may cause emission of laser radiation in excess of class 2. **Have the tool repaired only at a Hilti service center.**
- Modification of the tool is not permissible.**
- Check that the tool functions correctly each time before use.**
- Measurements taken from surfaces with low reflectivity in highly reflective surroundings may be inaccurate.

- g) Measurements taken through panes of glass or other objects may be inaccurate.
- h) Rapid changes in the conditions under which the measurement is taken, e.g. persons walking through the laser beam, may lead to inaccurate results.
- i) **Do not point the tool toward the sun or other powerful light sources.**
- j) **Take the influences of the surrounding area into account. Do not use the tool where there is a risk of fire or explosion.**
- k) **The tool and its ancillary equipment may present hazards when used incorrectly by untrained personnel or when used not as directed.**
- l) **To avoid the risk of injury, use only genuine Hilti accessories and additional equipment.**
- m) **Observe the information printed in the operating instructions concerning operation, care and maintenance.**

#### 5.2 Proper organization of the workplace

- a) **Avoid unfavorable body positions when working from ladders. Make sure you work from a safe stance and stay in balance at all times.**
- b) **When the tool is brought into a warm environment from very cold conditions, or vice-versa, allow it to become acclimatized before use.**
- c) **As a precaution, check the previous settings and adjustments you have made.**
- d) **Secure the area in which you are working and take care to avoid directing the beam towards other persons or towards yourself when setting up the tool.**
- e) **Use the tool only within its specified limits.**
- f) **Observe the accident prevention regulations applicable in your country.**

#### 5.3 Electromagnetic compatibility

Although the tool complies with the strict requirements of the applicable directives, Hilti cannot entirely rule out the possibility of the tool being subject to interference caused by powerful electromagnetic radiation, leading to incorrect operation. Check the accuracy of the tool by taking measurements by other means when working under such conditions or if you are unsure. Likewise, Hilti cannot rule out the possibility of interference with other devices (e.g. aircraft navigation equipment). The tool complies with the

requirements of class A; The possibility of interference occurring in a domestic environment cannot be excluded.

#### 5.4 General safety rules

- a) **Check the condition of the tool before use. If the tool is found to be damaged, have it repaired at a Hilti service center.**
- b) **The user must check the accuracy of the tool after it has been dropped or subjected to other mechanical stresses.**
- c) **Although the tool is designed for the tough conditions of jobsite use, as with other measuring instruments it should be treated with care.**
- d) **Although the tool is protected to prevent entry of dampness, it should be wiped dry each time before being put away in its transport container.**

#### 5.5 Electrical

- a) **Keep the batteries out of reach of children.**
- b) **Do not allow the batteries to overheat and do not expose them to fire.** The batteries may explode or release toxic substances.
- c) **Do not charge the batteries.**
- d) **Do not solder the batteries into the tool.**
- e) **Do not discharge the batteries by short-circuiting.** This may cause them to overheat and present a risk of personal injury (burns).
- f) **Do not attempt to open the batteries and do not subject them to excessive mechanical stress.**
- g) Do not use carbon-zinc batteries in the tool.

#### 5.6 Laser classification

Depending on the version purchased, the tool complies with Laser Class 2 in accordance with IEC825-1:2007 / EN60825-1:2007 and Class II in accordance with CFR 21 § 1040 (FDA). This tool may be used without need for further protective measures. The eyelid closure reflex protects the eyes when a person looks into the beam unintentionally for a brief moment. This eyelid closure reflex, however, may be negatively affected by medicines, alcohol or drugs. Nevertheless, as with the sun, one should not look directly into sources of bright light. Do not direct the laser beam toward persons.

#### 5.7 Transport

**Always remove the battery from the tool before shipping.**

## 6 Before use



### 6.1 Inserting the batteries 2

#### CAUTION

**Do not use damaged batteries.**

#### CAUTION

**Always replace the complete set of batteries.**

#### DANGER

**Do not mix old and new batteries. Do not mix batteries of different makes or types.**

1. Open the battery compartment on the underside.

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- Remove the batteries from the packaging and insert them in the tool.  
**NOTE** Take care to observe correct polarity (see symbols in battery compartment).
- Close the battery compartment cover.
- Check to ensure that the battery compartment cover is closed securely.

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### 6.2 Switching the tool on / off

- The tool can be switched on by pressing either the "On / off" button or the "Measure" button.
- When the tool is switched off, press the "On / off" button: The tool switches on.  
The laser beam is switched off.
- When the tool is switched on, press the "On / off" button: The tool switches off.
- When the tool is switched off, press the "Measure" button: The tool and the laser beam switch on.

### 6.3 Menu

#### NOTE

From the main menu you can access special functions and the settings. Press the "Menu" button to go to the main menu. Use the left or right arrow buttons to move through the menu. The selected function will be shown highlighted. To select a function, confirm your choice by pressing the "Measure" button.

#### NOTE

The top line of the main menu is the individually configurable favorites bar. You can place your most frequently used functions here (see section 6.4.5 "Changing the favorites bar").

In the area below the separating bar you will find various application groups. Confirming an application group causes the group to open, showing all the functions it contains.

### 6.4 Settings



- When the tool is switched on, press the "Menu" button.
- Use the left or right arrow buttons to go to "Settings".
- Confirm by pressing the "Measure" button.

### 6.4.1 Measuring units



The measuring units m, cm or mm may be selected. The currently selected measuring unit is shown in a black square.

### 6.4.2 Measuring references



#### NOTE

The tool can take measurements from 5 different reference (contact) points. Switching between the front edge, rear edge and the threaded bushing on the underside (battery compartment) is done in the measuring reference menu. The reference is set automatically to the tip of the spike when the spike is folded out through 180°. When the PDA 72 measuring extension (optional accessory) is screwed onto the underside of the tool it is detected automatically by the tool and indicated in the display. The PDA 72 measuring extension can also be fitted to the underside of the tool (battery compartment) but is not detected automatically when in this position. When the spike is folded back in or the tool is switched off, the measuring reference is always reset to the rear edge of the tool. The currently selected measuring reference is indicated by the green LEDs and the measuring reference symbol in the display.



Front edge



Underside of the tool (battery compartment)



Rear edge



Spike



The PDA 72 measuring extension is screwed into the underside of the tool.

### 6.4.3 Angle units



The angle units used to show the inclination can be set to degrees, percent or mm/m. The currently selected angle unit is shown in a black square.

#### 6.4.4 Expert mode on / off



When the expert mode is active, the timer, min/max and measuring reference can be combined for use with all functions. In addition, supplementary information is shown for the following functions: Area, Volume, Pythagoras, Trapezoidal Area, Indirect Horizontal Distance and Indirect Vertical Distance. If a scale has been set in the "Settings" menu, this can be shown in export mode. The choices available are shown at the top edge of the display.

#### 6.4.5 Changing the favorites bar



Changes can be made to the favorites bar in these settings. The favorites bar provides quick access to the most frequently used functions.

1. Use the right or left arrow buttons to select the function you wish to change.
2. Confirm by pressing the "Measure" button.
3. Use the right or left arrow button to select the desired function.
4. Confirm by pressing the "Measure" button.

#### 6.4.6 Activating the Scale function



This function allows you to set the desired scale.

1. Use the left or right arrow buttons to set the desired scale.
2. Confirm the applicable number by pressing the "Measure" button.
3. Select the "tick" symbol to confirm the value.  
**NOTE** Expert mode must be active in order to be able to make use of the Scale function.

#### 6.4.7 Switching the signal tone on / off



The signal tone can be switched on or off in the signal tone settings.

1. Use the right or left arrow button to select the desired setting.
2. Confirm by pressing the "Measure" button.

#### 6.4.8 Permanent laser mode



When in permanent laser mode, a measurement is taken each time the "Measure" button is pressed. The laser is not deactivated after the measurement is taken. In this mode, several measurements can be taken very quickly, one after the other, with only a few presses of the button. The corresponding symbol is shown in the status bar of the main screen.

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#### 6.4.9 Show inclination in the display, on / off



In this menu you can select whether the angle of inclination is to be shown in the main screen (activate / deactivate).

#### 6.4.10 Calibrating the inclination sensor



In order to achieve greatest possible accuracy when making inclination measurements, the inclination sensor must be calibrated at regular intervals. If the tool has suffered an impact or has been subjected to temperature fluctuations, the inclination sensor must be recalibrated. Calibration is carried out in 3 steps.

1. To begin calibration, select the inclination sensor calibration symbol.
2. Lay the tool on a horizontal surface and then press the "Measure" button.
3. Rotate the tool horizontally through 180° and press the "Measure" button again.

**NOTE** The inclination sensor is now calibrated.

#### 6.4.11 Information about the tool



Here you will find information about the tool, such as the software version, hardware version and serial number.

#### 6.4.12 Resetting to the default settings



This function can be used to reset the tool to the default settings.

## 6.5 Measuring aids

### 6.5.1 Measuring using the spike 3 4

The spike can be used when measuring diagonally across rooms or from inaccessible corners.

1. Fold out the spike through 90°. The spike can then be used as the contact point.
2. Fold out the spike through 180°.

The measuring reference point is then set automatically. The tool detects the extended measuring reference.

### 6.5.2 Measuring using the PDA 50/51/52 target plate 5

#### NOTE

For reliable distance measurements, care should be taken to ensure that the laser beam strikes the target plate at right angles as far as possible.

#### NOTE

When the target plate is used and very high accuracy is required, 1.2 mm should be added to the measurement obtained.

When taking measurements to outside corners (e.g. on outside walls of buildings, perimeter fences, etc.), boards, bricks or other suitable objects can be held against the corner and used as the target. Use of the PDA 50, PDA 51 or PDA 52 target plate is recommended for long distances and in unfavorable light conditions, e.g. in strong sunlight. The PDA 50 target plate is made of durable plastic with a special reflective coating. Use of the target plate is recommended at distances greater than 10 m in unfavorable light conditions.

The PDA 51 target plate has no reflective coating and its use is recommended in unfavorable light conditions and at short distances.

The PDA 52 target plate is equipped with the same reflective coating as the PDA 50 but is considerably larger in size (210 x 297 mm). This makes it much easier to aim the tool at the target plate over long distances.

### 6.5.3 Taking measurements using the PUA 60 laser visibility glasses

#### NOTE

The laser visibility glasses have no protective function and thus do not protect the eyes from laser beams. As these glasses limit color vision they must not be worn by persons driving on a public road and must not be used to look directly into the sun.

The PUA 60 laser visibility glasses improve laser beam visibility considerably.

### 6.5.4 Measuring using the PDA 72 measuring extension

#### NOTE

The measuring extension is made from aluminium and is equipped with a non-conductive synthetic rubber grip.

When the PDA 72 measuring extension (optional accessory) is screwed onto the underside of the tool it is detected automatically by the tool and indicated in the display. The tool detects the extended measuring reference. The PDA 72 measuring extension can also be fitted to the underside of the tool (battery compartment) but is not detected automatically when in this position. Depending on how the tool is to be used, the reference can also be adjusted manually (see section "Measuring reference").

## 7 Operation

### 7.1 Distance measurement

#### NOTE

Generally speaking, the individual steps in all functions are always assisted by the graphic symbols displayed.

#### NOTE

If measuring errors occur during continuous measuring, and continuous measuring mode is canceled by pressing the "Measure" button again, the last valid measurement will be displayed.

#### NOTE

After starting a function, the laser beam is already switched on.

#### NOTE

You will obtain the most accurate results when all measurements within one function are taken from the same point of contact and axis of rotation.

### 7.1.1 Measuring modes

Distances can be measured using two different measuring modes, i.e. single measurement and continuous measurement. Continuous measurement is used for setting out given distances or lengths and can also be used where access is difficult, e.g. at corners, edges and in niches, etc.

#### 7.1.1.1 Single measurements



If the tool is switched off it can be switched on by pressing the "On/off" button or the "Measure" button. If the tool is switched on by pressing the "Measure" button the laser is also activated, so step one described below can be omitted.

1. Switch on the laser by pressing the "Measure" button.
2. Aim the tool at the target and press the "Measure" button.  
The measured distance will be shown in the result line in less than a second.

#### 7.1.1.2 Continuous measuring (tracking)

##### NOTE

During continuous measuring, distances are updated in the result line at the rate of approx. 6 - 10 measurements every second. The measuring rate depends on reflectivity of the target surface. If the signal tone is active, continuous measuring is indicated by a signal tone approx. 2 - 3 times per second.

1. Press the "Measure" button for about 2 seconds to activate continuous measuring mode.
2. Measuring is stopped by pressing the "Measure" button once again.  
The last valid measurement is then shown in the result line in the display.

#### 7.1.2 Measuring in bright conditions

We recommend use of the PDA 50, PDA 51 or PDA 52 target plate for long distances and in very bright light conditions.

#### 7.1.3 Measuring range

##### 7.1.3.1 Increased range

The range of the tool is generally increased when measurements are taken in the dark, at dawn or dusk and when the target and/or the tool is shaded from bright light.

Use of the PDA 50, PDA 51 or PDA 52 target plate also increases the range of the tool.

##### 7.1.3.2 Reduced measuring range

Measuring range may be reduced in bright conditions, e.g. in bright sunlight or when working under very powerful floodlights.

The range of the tool may be reduced when measurements are taken through glass or when objects lie within the path of the laser beam.

The range of the tool may be reduced when measurements are taken to mat green, blue or black surfaces or to wet or shiny surfaces.

#### 7.2 Adding / subtracting distances



Individual distances can be added or subtracted conveniently.

Addition can be used, for example, to determine the total length of window and door reveals or to add several part distances together in order to determine the total distance.

Subtraction can be used, for example, to determine the distance between the underside of a pipe or duct and the ceiling. This can be done by subtracting the distance between the floor and the underside of the pipe from the distance between the floor and the ceiling. If the pipe diameter is subtracted, the result is the distance between the top of the pipe and the ceiling.

1. Press the "Measure" button (the laser beam will switch on).
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance will be measured and displayed (the laser then switches off).
4. Use the right or left arrow buttons to select the desired arithmetic function.
5. Press the "Measure" button.  
The laser beam switches on.
6. Aim the range meter at the target.
7. Press the "Measure" button. The second distance is then measured and displayed in the intermediate result line. The result of the addition or subtraction is shown in the result line. You can add or subtract any desired number of distances.

**NOTE** Whenever you see the + and - option in the measuring function area of the display you may add or subtract a second measurement using the same function. If, for example, you are using the area measurement function, you can use the right or left arrow buttons to add or subtract several other areas.

#### 7.3 Measuring areas and volumes



To measure areas and volumes, select the Areas and Volumes application group. Select the appropriate function for your measuring task.

##### 7.3.1 Measuring rectangular areas



Each step of the area measurement operation is indicated graphically in the display. To measure a rectangular area you are required to measure two distances. For example, to determine the floor area of a room, proceed as follows:

1. Select the Rectangular Area function from the Areas and Volumes application group.
2. Aim the range meter at the target.

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3. Press the "Measure" button.  
The room width is measured and displayed in the intermediate result line.  
The graphic display automatically prompts you to measure the length of the room.
4. Aim the tool at the next target to obtain the length of the room.
5. Press the "Measure" button.  
The second distance is then measured, the area calculated immediately and the result is displayed in the result line.

### 7.3.2 Measuring triangular areas



Each step of the area measurement operation is indicated graphically in the display. To measure a triangular area you are required to measure three distances. For example, to determine the floor area of a room, proceed as follows:

1. Select the Triangular Area function from the Areas and Volumes application group.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.
5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line. The graphic display then automatically prompts you to measure the third distance.
6. Aim the range meter at the target.
7. Press the "Measure" button.  
The third distance is measured, the area is then calculated immediately and the result displayed in the result line.

### 7.3.3 Measuring volumes



Each step of the volume measurement operation is indicated graphically in the display. For example, to determine the volume of a room, proceed as follows:

1. Select the Cube Volume function from the Areas and Volumes application group.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.

5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the third distance.
6. Aim the range meter at the target.
7. Press the "Measure" button.  
The third distance is measured, the volume then calculated immediately and the result displayed in the result line.

### 7.3.4 Measuring cylinder volume



Each step of the volume measurement operation is indicated graphically in the display. To measure the volume of a cylinder you are required to measure two distances. For example, to determine the volume of a silo, proceed as follows:

1. Select the Cylinder Volume function from the Areas and Volumes application group.
2. Aim the range meter at the corresponding target to measure the height of the cylinder.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the next target to measure the diameter of the cylinder.
5. Press the "Measure" button.  
The second distance is measured, the volume then calculated immediately and the result displayed in the result line.

### 7.4 Trapezoid functions



#### NOTE

A reduced level of accuracy, much lower than the level of accuracy of the tool itself, must generally be expected when the indirect measuring method is used. In order to obtain the best results, care must be taken regarding the geometry of the situation (i.e. right angles and triangle relationships). Best results are obtained when the tool is aimed carefully at the corners of the object, when all points are within the same plane and when the measurements are taken from a location not too far away from the object.

#### NOTE

When taking indirect measurements, make sure that all measurements are taken in a horizontal or vertical plane.

Trapezoid functions can be used, for example, to determine the length of a roof. The Trapezoid function calculates the target distance with the aid of three measured distances. The Trapezoid with Inclination function calculates the target distance with the aid of two measured distances and an angle of inclination.

#### 7.4.1 Trapezoid function (3 distances)



Each step of the Trapezoid function is indicated graphically in the display. To make use of the Trapezoid function you require three distances. For example, to determine the length of a roof, proceed as follows:

1. Select Trapezoid from the group of special functions.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.
5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line.
6. Aim the range meter at the target.
7. Press the "Measure" button.  
The third distance is measured, the target length then calculated immediately and the result displayed in the result line.

#### 7.4.2 Trapezoid with Inclination (2 distances, 1 angle)



##### NOTE

For accurate results, calibrate the inclination sensor before using this function.

##### NOTE

When measuring an inclination, do not tilt the tool to the side. To avoid measuring errors when tilted, the corresponding warning is shown in the display and the measurement cannot be taken.

Each step when using the Trapezoid with Inclination function is indicated graphically in the display. In order to make use of the Trapezoid with Inclination function you need two distances and an angle. For example, to determine the length of a roof, proceed as follows:

1. Select Trapezoid with Inclination from the group of special functions.
2. Aim the range meter at the target.

3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.
5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line. The angle of inclination is measured at the same time.  
The target distance is calculated immediately and shown in the result line.

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#### 7.5 Pythagoras functions



##### NOTE

A reduced level of accuracy, much lower than the level of accuracy of the tool itself, must generally be expected when the indirect measuring method is used. In order to obtain the best results, care must be taken regarding the geometry of the situation (i.e. right angles and triangle relationships). Best results are obtained when the tool is aimed carefully at the corners of the object, when all points are within the same plane and when the measurements are taken from a location not too far away from the object.

##### NOTE

The system checks whether the geometric relationship allows a result to be calculated. An invalid result, caused by inadequate geometric conditions, is indicated by a warning triangle in the result line. In this case, one or more of the distances must be remeasured.

##### NOTE

When taking indirect measurements, make sure that all measurements are taken in a horizontal or vertical plane.

A distance can be measured indirectly by taking several measurements and the result then calculated using the Pythagoras rule. The Single Pythagoras method uses a triangle with two measured distances. The Double Pythagoras method uses two adjoining triangles. The Combined Pythagoras method uses the differential between two triangles.

#### 7.5.1 Single Pythagoras



Follow the symbols in the display. The blinking side of the triangle indicates the measurement to be taken. When the required distances have been measured, the result is then calculated and shown in the result line.



1. Select the Single Pythagoras function from the group of Pythagoras functions.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.  
**NOTE** In order to achieve accurate results, take care to ensure that the second distance is measured at right angles to the target distance.
5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line. The target distance is immediately calculated and displayed in the result line.

#### 7.5.2 Double Pythagoras



Follow the symbols in the display. The blinking side of the triangle indicates the measurement to be taken. When the required distances have been measured, the result is then calculated and shown in the result line.

1. Select the Double Pythagoras function from the group of Pythagoras functions.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.  
**NOTE** In order to achieve accurate results, take care to ensure that the second distance is measured at right angles to the target distance.
5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the third distance.
6. Aim the range meter at the target.
7. Press the "Measure" button.  
The third distance is measured and displayed in the intermediate result line.  
The target distance is immediately calculated and displayed in the result line.

#### 7.5.3 Combined Pythagoras



Follow the symbols in the display. The blinking side of the triangle indicates the measurement to be taken. When the required distances have been measured, the result is then calculated and shown in the result line.

1. Select the Combined Pythagoras function from the group of Pythagoras functions.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.
5. Press the "Measure" button.  
The second distance is measured and displayed in the intermediate result line.
6. Aim the range meter at the target.  
**NOTE** In order to achieve accurate results, take care to ensure that the third distance is measured at right angles to the target distance.
7. Press the "Measure" button.  
The third distance is measured and displayed in the intermediate result line. The target distance is calculated immediately and shown in the result line.

#### 7.6 Indirect measurements



##### NOTE

A reduced level of accuracy, much lower than the level of accuracy of the tool itself, must generally be expected when the indirect measuring method is used. In order to obtain the best results, care must be taken regarding the geometry of the situation (i.e. right angles and triangle relationships). Best results are obtained when the tool is aimed carefully at the corners of the object, when all points are within the same plane and when the measurements are taken from a location not too far away from the object.

##### NOTE

For accurate results, calibrate the inclination sensor before using these functions.

##### NOTE

When measuring an inclination, do not tilt the tool to the side. To avoid measuring errors when tilted, the corresponding warning is shown in the display and the measurement cannot be taken.

##### NOTE

When taking indirect measurements, make sure that all measurements are taken in a horizontal or vertical plane.

Indirect measurements can be used to determine distances that cannot be measured directly. There are several ways in which distances can be measured indirectly.

### 7.6.1 Indirect Horizontal Distance (1 angle, 1 distance)



This function is particularly useful in situations where a horizontal distance requires to be measured but the target is obstructed by an obstacle. Follow the graphical display, which indicates the distance to be measured. After measuring the necessary distance and angle, the result is calculated and shown in the result line.

1. Select the Indirect Horizontal Distance function from the Indirect Measurement group.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The distance and angle of inclination are measured and shown in the intermediate result line.  
The target distance is calculated immediately and shown in the result line.

### 7.6.2 Indirect Vertical Distance (2 angles, 2 distances)



This function is particularly useful in situations where a vertical distance on a wall requires to be measured but no direct access to the wall is possible (e.g. floor to floor height on the facade of a building). Follow the graphical display, which indicates the distances to be measured. After measuring the two distances necessary and the angles of inclination, the result is calculated and shown in the result line.

1. Select the Indirect Vertical Distance function from the Indirect Measurement group.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance and angle are measured and shown in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.
5. Press the "Measure" button.  
The distance and angle of inclination are measured and shown in the intermediate result line.  
The target distance is calculated immediately and shown in the result line.

### 7.6.3 Indirect Measurement on Ceilings (2 angles, 2 distances)



#### NOTE

Take care to ensure that the measured points and the point at which the tool is positioned all lie on the same vertical plane.

This function is particularly suitable for use in situations where a distance on a ceiling requires to be measured. Follow the graphical display, which indicates the distances to be measured. After measuring the two distances necessary and the angles of inclination, the result is calculated and shown in the result line.

1. Select the Indirect Measurement on Ceilings function from the Indirect Measurement group.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The first distance and angle are measured and shown in the intermediate result line.  
The graphic display then automatically prompts you to measure the second distance.
4. Aim the range meter at the target.
5. Press the "Measure" button.  
The distance and angle of inclination are measured and shown in the intermediate result line.  
The target distance is calculated immediately and shown in the result line.

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## 7.7 Special functions



### 7.7.1 Inclination function



#### NOTE

The reference surface for the inclination sensor is the underside of the tool (battery compartment).

The current inclination is shown graphically and numerically when using the Inclination function. Depending on how the angle units are configured in the settings, the current inclination is shown in degrees, percent or mm/m. If you press the "Measure" button when using this function, the current angle of inclination is saved.

### 7.7.2 Painter's Area



The Painter's Area function is used, for example, to determine the surface area of the walls in a room. This

is done by determining the total length of all walls and multiplying this figure by the height of the room.

1. Select Painter's Area from the group of special functions.
2. Aim the tool at the target to measure the first room length.
3. Press the "Measure" button.  
The first distance is measured and displayed in the intermediate result line.
4. Aim the tool at the target for the next room length and press the "Measure" button to take the measurement.  
The second distance is measured and displayed in the intermediate result line. The intermediate result shown in bold is the total of the room lengths.
5. Repeat this procedure until all room lengths have been measured.
6. When all room lengths have been measured, press the right arrow button to switch to room height.
7. Confirm by pressing the "Measure" button.
8. Aim the tool at the target for room height and press the "Measure" button to take the measurement. The room height is measured and displayed in the intermediate result line. The painter's area is calculated immediately and shown in the result line.

**NOTE** Other areas may be added to or subtracted from the painter's area. Use the right or left arrow buttons to select plus or minus. Confirm by pressing the "Measure" button. Then measure the length and width of the area. The area is calculated immediately and added to or subtracted from the painter's area. In the display you will see the result of the original painter's area calculation, the last length and width measurements and resulting area, as well as the newly calculated area to be added to or subtracted from the painter's area.

### 7.7.3 The Setting Out function



The tool can be used to indicate given distances, e.g. when setting out and marking the position of drywall framing.

1. Select the Setting Out function from the group of special functions.
2. Enter the distance manually.
3. In order to enter the distance manually, use the left or right arrow buttons to select the keyboard symbol.
4. Confirm by pressing the "Measure" button.
5. Use the right or left arrow buttons to select the corresponding digits.
6. Confirm the digits by pressing the "Measure" button.
7. To confirm the value, select the "tick" symbol in the lower right corner.
8. Then use the left or right arrow buttons to select the flag symbol.

**NOTE** The distance you have entered will then be shown between the two flags.

9. Press the "Measure" button to begin measuring. The arrows in the display indicate the direction in which the tool must be moved.

When the target distance is reached, black arrows appear above and below the distance shown in the display.

10. To set out the next distance increment, simply move the tool further in the same direction.  
The number of distance increments you have already set out is shown on the right.
11. Press the "Measure" button to stop measuring.

**NOTE** When the distance to be set out is reached, the currently used measuring reference is shown in the display to aid marking.

**NOTE** As an alternative to entering the distance manually, the distance to be set out may also be measured with the tool. To do this, select the symbol for single measurement and confirm your choice by pressing the "Measure" button. You can then measure the distance you wish to set out.

### 7.7.4 Min/Max Delta function



The "Maximum" function is used mainly to determine the length of diagonals, while the "Minimum" function is used to check parallels and set up objects parallel to each other, or to take measurements in situations where access is difficult.

The "Maximum" function makes use of continuous measuring mode. The value shown in the display is updated whenever the measured distance increases.

The "Minimum" function also makes use of continuous measuring mode. The value shown in the display is updated whenever the measured distance decreases.

By combining the "Maximum" and "Minimum" functions, differences in distance can be determined very quickly, easily and reliably. The distance between a pipe and a ceiling, or the distance between two objects even in inaccessible locations, can thus be easily and reliably determined.

1. Select the Min/Max Delta function from the group of special functions.
2. Aim the range meter at the target.
3. Press the "Measure" button.  
The tool begins measuring in continuous measuring mode.  
The values shown in the MIN and MAX display areas are then updated whenever the measured distance increases or decreases.  
The difference between Min and Max is calculated in the Delta field.
4. Press the "Measure" button to stop measuring.  
The last distances measured are shown in the results line.

### 7.7.5 Timer



The timer function works like the self-timer on a camera. When you activate the timer function and then press the "Measure" button, the measurement will be taken after a delay of 2 seconds. To adjust the timer to a delay of 5 or 10 seconds, use the right arrow button to move to the symbol that shows the seconds. The "Measure" button can then be used to set the timer delay time. Use the right or left arrow buttons to return to the "Measure" symbol in order to take the delayed measurement. The timer can be stopped by pressing the "C" button.

### 7.7.6 Offset function



The Offset function automatically adds or subtracts a predefined value to or from all measurements. This value can be entered manually or measured.

1. Select Offset from the group of special functions.
2. In order to enter the distance manually, use the left or right arrow buttons to select the keyboard symbol.
3. Confirm by pressing the "Measure" button.
4. Use the right or left arrow buttons to select the corresponding digits.

5. Confirm the digits by pressing the "Measure" button.
6. To confirm the value, select the "tick" symbol in the lower right corner.
7. Then use the left or right arrow buttons to select the Offset symbol. The offset you have chosen will then be shown in the upper area of the display. The chosen offset will then be added to or subtracted from every measurement you take (depending whether the value entered is preceded by a plus or minus sign).

**NOTE** As an alternative to entering the offset distance manually, the offset may also be measured with the tool. To do this, select the symbol for single measurement and confirm your choice by pressing the "Measure" button. You can then measure the desired offset distance.

### 7.7.7 Data memory



The tool saves measurements and the results of calculations continuously while in operation. Depending on the scope of the function used, a total of up to 30 values, including graphic symbols, are saved in this way.

When data memory is already filled with the 30 previous sets of displayed data, the "oldest" set of data is deleted when a new set of displayed data is saved.

Data memory can be completely cleared by pressing the "C" button for approx. 2 seconds while data memory is displayed.

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## 8 Care and maintenance

### 8.1 Cleaning and drying

1. Blow dust off the lenses.
2. Do not touch the lens with the fingers.
3. Use only a clean, soft cloth for cleaning. If necessary, moisten the cloth slightly with pure alcohol or a little water.  
**NOTE** Do not use any other liquids as these may damage the plastic components.
4. The temperature limits for storage of your equipment must be observed, especially in winter / summer.

### 8.2 Storage

Remove the tool from its case if it has become wet. The tool, its carrying case and accessories should be cleaned and dried (at maximum 40°C / 104°F). Repack the equipment only once it is completely dry. Check the accuracy of the equipment before it is used after a long period of storage or transportation. Remove the batteries from the tool before storing it for a long period. Leaking batteries may damage the tool.

### 8.3 Transport

Use the Hilti packaging or packaging of equivalent quality for transporting or shipping your equipment.

### 8.4 Calibration and adjustment of the laser

#### 8.4.1 Calibration of the laser

Monitoring of measuring equipment for users certified in accordance with ISO 900X: As specified in ISO 900X, you may carry out the inspection and testing of the PD-E laser range meter yourself (see ISO 17123-4: Field procedures for testing geodetic and surveying instruments: Part 4, electro-optical distance meters).

1. Select a readily accessible measuring distance of a known length (approx. 1 to 5 meters / 3 to 15 feet) which does not change over time and measure the same distance 10 times.
2. Determine the mean deviation from the known distance. This value should be within the specified accuracy tolerance for the tool.

3. Keep a record of this value and note the date when the next test is due.

**NOTE** Repeat this test at regular intervals as well as before and after important measuring tasks.

**NOTE** Apply a test and inspection confirmation sticker to the PD-E and keep a record of the entire monitoring, test and inspection procedure and the results.

**NOTE** Please refer to the technical data contained in the operating instructions and the information concerning measuring accuracy.

#### 8.4.2 Adjustment of the laser

To ensure correct adjustment of the laser range meter we recommend that it is returned to a Hilti Service Center for calibration. Accurate adjustment of the tool will be confirmed by a calibration certificate.

#### 8.4.3 Hilti calibration service

We recommend that the tool is checked by the Hilti calibration service at regular intervals in order to verify its reliability in accordance with standards and legal requirements.

Use can be made of the Hilti calibration service at any time, but checking at least once a year is recommended. The calibration service provides confirmation that the tool is in conformance, on the day it is tested, with the specifications given in the operating instructions.

The tool will be readjusted if deviations from the manufacturer's specification are found. After checking and adjustment, a calibration sticker applied to the tool and a calibration certificate provide written verification that the tool operates in accordance with the manufacturer's specification.

Calibration certificates are always required by companies certified according to ISO 900x.

Your local Hilti Center or representative will be pleased to provide further information.

## 9 Troubleshooting

Fault	Possible cause	Remedy
The tool can't be switched on.	The batteries are exhausted.	Replace the batteries.
	Incorrect battery polarity.	Insert the batteries correctly and close the battery compartment cover.
	The button is faulty.	Return the tool to Hilti for repair.
No distances displayed by the tool.	"Measure" button was not pressed.	Press the "Measure" button.
	Faulty display.	Return the tool to Hilti for repair.
Frequent error messages or the tool doesn't measure.	The target surface is too brightly lit by the sun.	Use the PDA 50/ PDA 51/ PDA 52 target plate.
	The target surface is too shiny.	Take measurements from less shiny surfaces.
	The target surface is too dark.	Use the PDA 50/ PDA 51/ PDA 52 target plate.
	Bright sunlight towards the tool.	Measure from the other direction - sun from behind.
Temperature symbol in the display	The temperature is too high or too low.	Allow the tool to cool down or warm up.
General hardware fault - symbol in the display	Hardware fault	Switch the tool off and on again. If the fault persists, contact Hilti Service.

## 10 Disposal

### WARNING

Improper disposal of the equipment may have serious consequences:

The burning of plastic components generates toxic fumes which may present a health hazard.

Batteries may explode if damaged or exposed to very high temperatures, causing poisoning, burns, acid burns or environmental pollution.

Careless disposal may permit unauthorized and improper use of the equipment. This may result in serious personal injury, injury to third parties and pollution of the environment.



Most of the materials from which Hilti tools or appliances are manufactured can be recycled. The materials must be correctly separated before they can be recycled. In many countries, Hilti has already made arrangements for taking back old tools and appliances for recycling. Ask Hilti customer service or your Hilti representative for further information.

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For EC countries only

Do not dispose of electrical appliances together with household waste.

In observance of the European Directive on waste electrical and electronic equipment and its implementation in accordance with national law, electrical appliances and batteries that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility.



Dispose of the batteries in accordance with national regulations.

## 11 Manufacturer's warranty - tools

Hilti warrants that the tool supplied is free of defects in material and workmanship. This warranty is valid so long as the tool is operated and handled correctly, cleaned and serviced properly and in accordance with the Hilti Operating Instructions, and the technical system is maintained. This means that only original Hilti consumables, components and spare parts may be used in the tool.

This warranty provides the free-of-charge repair or replacement of defective parts only over the entire lifespan of the tool. Parts requiring repair or replacement as a result of normal wear and tear are not covered by this warranty.

**Additional claims are excluded, unless stringent national rules prohibit such exclusion. In particular, Hilti is not obligated for direct, indirect, incidental or consequential damages, losses or expenses in connection with, or by reason of, the use of, or inability to use the tool for any purpose. Implied warranties of merchantability or fitness for a particular purpose are specifically excluded.**

For repair or replacement, send the tool or related parts immediately upon discovery of the defect to the address of the local Hilti marketing organization provided.

This constitutes Hilti's entire obligation with regard to warranty and supersedes all prior or contemporaneous comments and oral or written agreements concerning warranties.

**12 EC declaration of conformity (original)**

Designation:	Laser range meter
Type:	PD-I
Generation:	01
Year of design:	2012

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We declare, on our sole responsibility, that this product complies with the following directives and standards: 2006/95/EC, 2006/66/EC, 2004/108/EC, 2011/65/EU, EN ISO 12100.

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